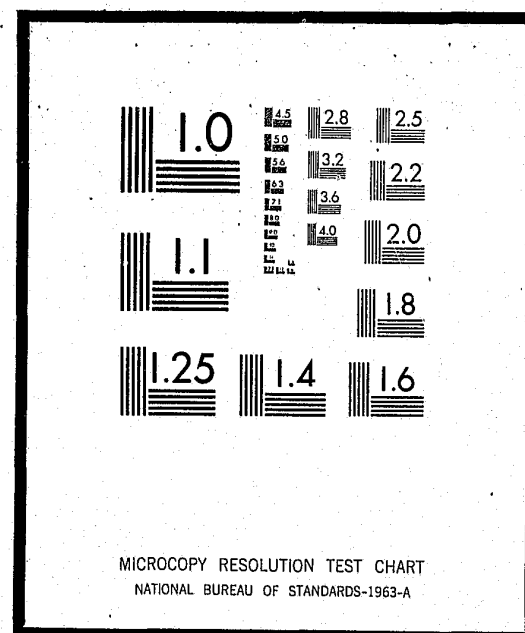


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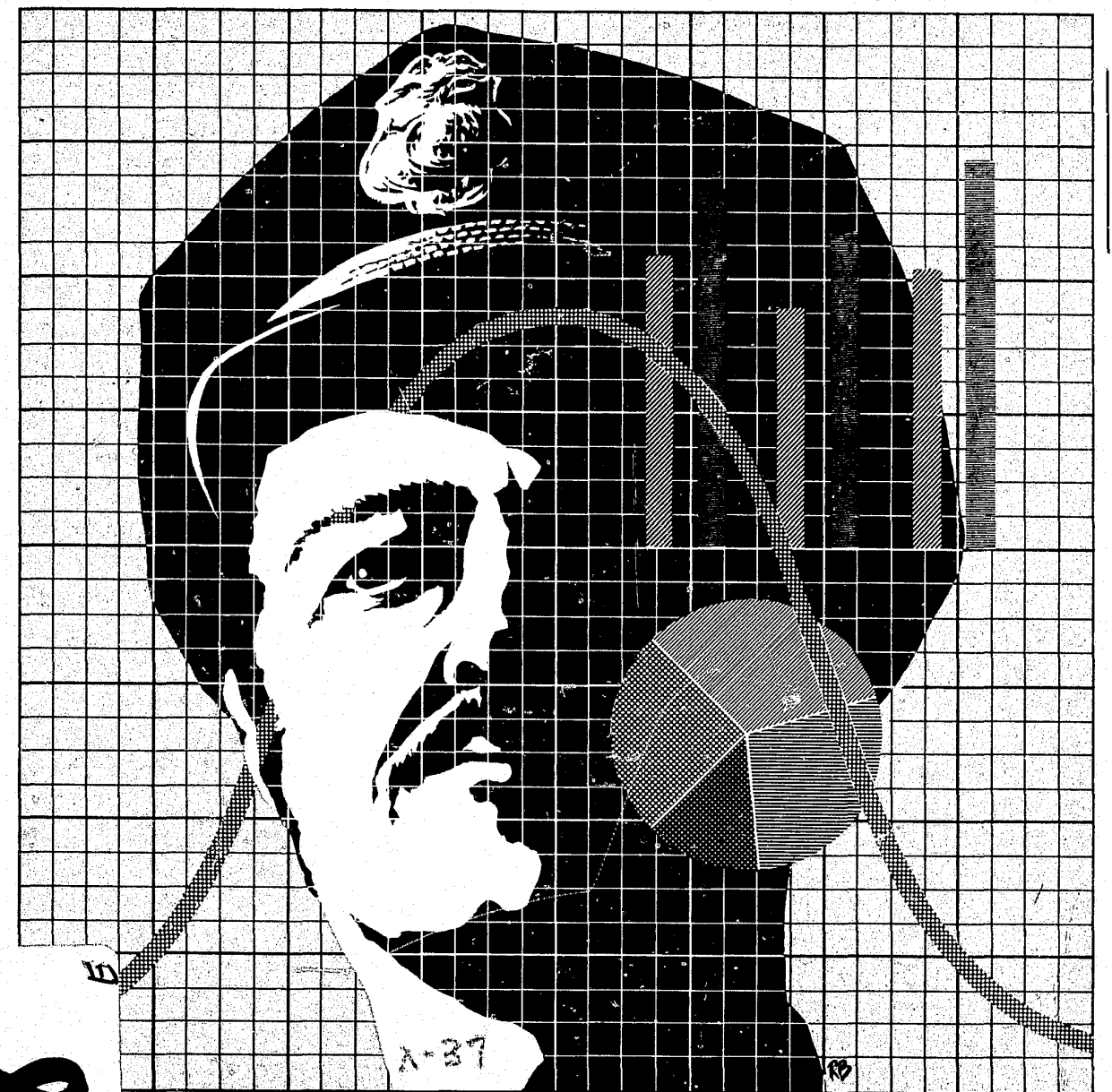


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AN EVALUATION OF POLICY RELATED RESEARCH:  
REVIEWS AND CRITICAL DISCUSSIONS  
OF POLICY-RELATED RESEARCH  
IN THE FIELD OF POLICE PROTECTION

by

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## FOREWORD

This evaluation of policy-related research on police protection is one of 19 in a series of projects on the Evaluation of Policy-Related Research in the Field of Municipal Systems, Operation, and Services, funded by the Division of Social Systems and Human Resources in the Research Applied to National Needs (RANN) Program of the National Science Foundation.

A large body of research on municipal systems, operations, and services has been created over the last quarter century. However, its usefulness to decision makers has been limited because it has not been evaluated comprehensively with respect to technical quality, usefulness to policy makers, and potential for codification and wider diffusion. In addition, this research has been hard to locate and not easily accessible. Therefore, systematic and rigorous evaluations of this research are required to provide syntheses of evaluated information for use by public agencies at all levels of government and to aid in the planning and definition of research programs.

Recognizing these needs, the Division of Social Systems and Human Resources issued a Program Solicitation in January 1973 for proposals to evaluate policy-related research in 17 categories in the field of municipal systems, operations, and services. This competition resulted in 19 awards in June 1973.

Each of the projects was to: 1) Evaluate the internal validity of each study by determining whether the research used appropriate methods and data to deal with the questions asked; 2) Evaluate the external validity of the research by determining whether the results were credible in the light of other valid policy-related research; 3) Evaluate the policy utility of specific studies or sets of studies bearing on given policy instruments; 4) Provide decision makers, including research funders, with an assessed research base for alternative policy actions in a format readily interpretable and useable by decision makers.

Each report was to include an analysis of the validity and utility of research in the field selected, a synthesis of the evidence, and a discussion of what, if any, additional research is required.

The following is a list of the awards showing the research area evaluated, the organization to which the award was made, and the principal investigator.

- (1) Fire Protection - Georgia Institute of Technology, Department of Industrial and Systems Engineering, Atlanta, Georgia, 30332; D. E. Fyffe.
- (2) Fire Protection - New York Rand Institute, 545 Madison Avenue, New York, New York, 10022; Arthur J. Swersey.
- (3) Emergency Medical Services - University of Tennessee, Bureau of Public Administration, Knoxville, Tennessee, 37916; Hyrum Plaas.
- (4) Municipal Housing Services - Cogen Holt and Associates, 956 Chapel Street, New Haven, Connecticut, 06510; Harry Wexler.
- (5) Formalized Pre-Trial Diversion Programs in Municipal and Metropolitan Courts - American Bar Association, 1705 DeSales Street, Northwest, Washington, D. C., 20036; Roberta-Rovner-Pieczenik.
- (6) Parks and Recreation - National Recreation and Park Association, 1601 North Kent Street, Arlington, Virginia, 22209; The Urban Institute, 2100 M Street, N.W., Washington, D. C., 20037; Peter J. Verhoven.
- (7) Police Protection - MATHEMATICA, Inc., 4905 Del Ray Avenue, Bethesda, Maryland, 20014; Saul I. Gass.
- (8) Solid Waste Management - Massachusetts Institute of Technology, Department of Engineering, Cambridge, Massachusetts, 02139; David Marks.
- (9) Citizen Participation Strategies - The Rand Corporation, 2100 M Street, N.W., Washington, D. C., 20037; Robert Yin.
- (10) Citizen Participation: Municipal Sub-systems - The University of Michigan, Program in Health Planning, Ann Arbor, Michigan, 48104; Joseph L. Falkson.
- (11) Economic Development - Ernst & Ernst - 1225 Connecticut Avenue, Northwest, Washington, D. C., 20036; Lawrence H. Revzan.
- (12) Goal of Economic Development - University of Texas-Austin, Center for Economic Development, Department of Economics, Austin, Texas, 78712; Niles M. Hansen.

- (13) Franchising and Regulation - University of South Dakota, Department of Economics, Vermillion, South Dakota, 57069; C. A. Kent.
- (14) Municipal Information Systems - University of California, Public Policy Research Organization, Irvine, California, 92664; Kenneth L. Kraemer.
- (15) Municipal Growth Guidance Systems - University of Minnesota, School of Public Affairs, Minneapolis, Minnesota, 55455; Michael E. Gleeson.
- (16) Land Use Controls - University of North Carolina, Chapel Hill, Center for Urban and Regional Studies, Chapel Hill, North Carolina, 27514; Edward M. Bergman.
- (17) Land Use Controls - The Potomac Institute, Inc. 1501 18th Street, N.W., Washington, D. C., 20036; Herbert M. Franklin.
- (18) Municipal Management Methods and Budgetary Processes - The Urban Institute, 2100 M Street, N.W., Washington, D. C., 20037; Wayne A. Kimmel.
- (19) Personnel Systems - Georgetown University, Public Services Laboratory, Washington, D. C., 20037; Selma Mushkin.

A complementary series of awards were made by the Division of Social Systems and Human Resources to evaluate the policy-related research in the field of Human Resources. For the convenience of the reader, a listing of these awards appears below:

- (1) An Evaluation of Policy Related Research on New Expanded Roles of Health Workers - Yale University, School of Medicine, New Haven, Connecticut, 06520; Eva Cohen.
- (2) An Evaluation of Policy Related Research on the Effectiveness of Alternative Allocation of Health Care Manpower - Interstudy, 123 East Grant Street, Minneapolis, Minnesota, 55403; Aaron Lowin.
- (3) An Evaluation of Policy Related Research on Effects of Health Care Regulation - Policy Center, Inc., Suite 500, 789 Sherman, Denver, Colorado, 80203; Patrick O'Donoghue.
- (4) An Evaluation of Policy Related Research on Trade-Offs Between Preventive and Primary Health Care - Boston University Medical Center, Boston University, School of Medicine, Boston, Massachusetts, 02215; Paul Gertman.

- (5) An Evaluation of Policy Related Research on Effectiveness of Alternative Programs for the Handicapped - Rutgers University, 165 College Avenue, New Brunswick, New Jersey, 08901; Monroe Berkowitz.
- (6) An Evaluation of Policy Related Research on Effects of Alternative Health Care Reimbursement Systems - University of Southern California, Department of Economics, Los Angeles, California, 90007; Donald E. Yett.
- (7) An Evaluation of Policy Related Research on Alternative Public and Private Programs for Mid-Life Redirection of Careers - Rand Corporation, 1700 Main Street, Santa Monica, California, 90406; Anthony H. Pascal.
- (8) An Evaluation of Policy Related Research on Relations Between Industrial Organization, Job Satisfaction, and Productivity: Brandeis University, Florence G. Heller Graduate School for Advanced Studies in Social Welfare, Waltham, Massachusetts, 02154; Michael J. Brower.
- (9) An Evaluation of Policy Related Research on Relations Between Industrial Organization, Job Satisfaction and Productivity - New York University, Department of Psychology, New York, New York, 10003; Raymond A. Katzell.
- (10) An Evaluation of Policy Related Research on Productivity, Industrial Organization and Job Satisfaction - Case Western Reserve University, School of Management, Cleveland, Ohio 44106; Suresh Srivastva.
- (11) An Evaluation of Policy Related Research on Effectiveness of Alternative Methods to Reduce Occupational Illness and Accidents - Westinghouse Behavioral Safety Center, Box 948, American City Building, Columbia, Maryland, 21044; C. Michael Pfeifer.
- (12) An Evaluation of Policy Related Research on the Impact of Unionization on Public Institutions - Contract Research Corporation, 25 Flanders Road, Belmont, Massachusetts; Ralph Jones.
- (13) An Evaluation of Policy Related Research on Projection of Manpower Requirements - Ohio State University, Center for Human Resource Research, Columbus, Ohio, 43210; S. C. Kelley.
- (14) An Evaluation of Policy Related Research on Effectiveness of Alternative Pre-trial Intervention Programs - ABT Associates, Inc., 55 Wheeler Street, Cambridge, Massachusetts, 02138; Joan Mullen.

- (15) An Evaluation of Policy Related Research on Standards of Effectiveness for Pre-Trial Release Programs - National Center for State Courts, 725 Madison Place, N.W., Washington, D. C., 20005; Barry Mahoney.
- (16) An Evaluation of Policy Related Research on Effectiveness of Volunteer Programs in the Area of Courts and Corrections - University of Illinois, Department of Political Science, Chicago Circle, Box 4348, Chicago, Illinois, 60680; Thomas J. Cook.
- (17) An Evaluation of Policy Related Research on Effectiveness of Juvenile Delinquency Prevention Program - George Peabody College for Teachers, Department of Psychology, Nashville, Tennessee, 37203; Michael C. Dixon.
- (18) An Evaluation of Policy Related Research on Exercise of Discretion by Law Enforcement Officials - College of William and Mary, Metropolitan Building, 147 Granby Street, Norfolk, Virginia, 23510; W. Anthony Fitch.
- (19) An Evaluation of Policy Related Research on Exercise of Police Discretion - National Council on Crime and Delinquency Research Center, 609 2nd Street, Davis, California, 95616; M. G. Neithercutt.
- (20) An Evaluation of Policy Related Research on Post Secondary Education for the Disadvantaged - Mercy College of Detroit, Department of Sociology, Detroit, Michigan, 48219; Mary Janet Mulka.

Copies of the above cited research evaluation reports for both Municipal Systems and Human Resources may be obtained directly from the principal investigator or from the National Technical Information Service (NTIS), U. S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia, 22151 (telephone: 703/321-8517).

This research evaluation by Saul I. Gass, Principal Investigator, of MATHEMATICA, Inc. on Police Protection was prepared with the support of the National Science Foundation. The opinions, findings, conclusions, or recommendations are solely those of the authors.

It is a policy of the Division of Social Systems and Human Resources to assess the relevance, utility, and quality of the projects it supports. Should any readers of this report have comments in these or other regards, we would be particularly grateful to receive them as they become essential tools in the planning of future programs.

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and Human Resources

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## I. SUMMARY

This study is the result of a National Science Foundation contract to MATHEMATICA, Inc. to perform an evaluation of policy-related research in the field of police protection. The objectives of this work were to make a significant body of policy-related research on police protection more accessible to and usable by policy makers, and to provide a more rigorous basis for future research projects dealing with policy-related research on police protection.

The study approach taken was first, to collect and abstract approximately 200 research items; second, to arrange these items by broad policy categories; third, with the aid of a review committee, to have a subset of these items selected for their importance to police research; fourth, to review the selected items in terms of their internal validity; and fifth, to subject the selected items in each policy area to an external validity review. A more detailed description of the study approach is given in Appendix A. The internal and external validity evaluations, along with abstracts of the items reviewed are presented in Section III. Additional relevant references are listed in Appendix B.

As this review of law enforcement research was constrained by its objectives, funds and time, it was not designed to be a state-of-the-art discussion. We do feel, however, that we were able to discuss and evaluate some of the more current and important research in eleven policy areas. These areas are:

- administration and management
- effectiveness and evaluation
- crime prevention - architecture
- crime prevention - crime statistics
- police technology
- resource allocation
- patrol operations - patrol beat design
- patrol operations - emergency response
- patrol operations - traffic
- personnel selection, evaluation and training
- police/community relations

From our evaluations, we distilled statements of research problems and new research directions for each policy area, and the police protection field in general. These statements are given in Section II - Impressions, Conclusions and Recommendations. The justifications of these statements are developed in the individual

evaluations of the related policy areas of Section III. We summarize these research statements below, but we first wish to note and emphasize the following points.

The main criticisms that tend to apply to most law enforcement research endeavors are:

1. lack of commitment to research by policymakers,
2. failure to articulate goals and objectives of police protection, and
3. improper study design and analytic methods.

These represent major concerns that must be addressed by both police administrators and researchers.

In terms of commitment, we found many studies that so deviated from the study design as to make the results and conclusions invalid, i. e., administrators did not allow, or were unable to maintain the control aspects of the study; the low level of funds and other resources allocated to the research precluded any meaningful results; and, the apparent resistance to change at all levels of a police department--especially at the top echelon--makes the implementation of any valid research results most difficult. For example, due to a lack of commitment, the neighborhood team policing projects and their evaluations were confounded and, in our view, yielded inconclusive results.

In terms of goals and objectives, researchers working on studies involving changes to the current operations have the task of determining measures that demonstrate whether a change increases or decreases a department's efficiency or effectiveness. Here, the studies of the fleet car plan and the use of helicopters for patrol led to ambiguous results due to the lack of precision in defining goals, objectives and related measures.

For researchers, in particular, we note that one of significant research design problems is in the selection of controls for evaluation of experimental treatment subjects. For those police research projects whose research results are based on a control group, the requirement for and selection of controls appears to be an afterthought (see the helicopter studies, for example). This concern, plus the improper application of statistical techniques, caused us to include, in Section II, material describing recommended research methodologies. There we stress the need for research in formulating goals, objectives and measures of law enforcement activities; under what conditions research methodologies can employ random experimental concepts; and principles to be applied when conducting non-random experiments.

In general, valid applicable research has been an accomplishment in the law enforcement field. We do find, however, that much

analytical effort has been expended in studying the same set of problems in the policy areas of resource allocation and police patrol. Two related points evolve from this apparent overkill: (1) there is a need for a law enforcement research center to test, evaluate and standardize the successful methodological approaches, and (2) there is a need for a clearinghouse activity that will acquaint police administrators, their staffs and researchers as to what research has been accomplished. The center would aid police departments in translating applicable research to their environments, while the clearinghouse would be able to supply relevant documentation. The clearinghouse should not be a passive activity, i. e., one that just accepts reports and disseminates them; it should review such material for their adequacy and be critical in terms of having such reports meet certain documentation and research standards.

Each reviewer attempted to evaluate the individual papers in his or her policy area in order to make a statement as to whether the research was internally valid. This was done for a number of papers; but we found that many research items did not lend themselves to a firm statement that this paper was or was not internally valid. For example, in the policy topic area of Police Effectiveness and Evaluation, the papers "An Analysis of the Apprehension Activities of the New York City Police Department"

and "Equality of Distribution of Police Services--A Case Study of Washington, D. C." were cited as two examples of items that were internally valid, while the paper "The Indianapolis Police Fleet Plan" was not rated in that the study design that had to be assumed by the author precluded the giving of a proper rating. As examples of internally invalid research we cite the two studies dealing with the use of helicopters for police patrol. These items reached conclusions by stretching the use of statistical and experimental procedures beyond what we felt to be proper.

We wish to emphasize that our giving a rating of internally valid or internally invalid is based on the documents distributed and normally available to police administrators, and our ratings are thus based only on the information contained in these documents. We trust that we were able to remain objective in our discussions and criticisms and to minimize subjective impressions or individual biases. We recognize and want to stress that many of the studies were initiated under circumstances that by definition would cause the results of the study to be invalid, or at best indeterminate, e.g., an evaluation project that began after a project was completed or well on its way. And we must also stress that such constraints were usually beyond the control of the researchers in question. However, we do feel that researchers in the police area (as well as

in other municipal service areas) must become more involved in the initial design of such studies and hopefully, refuse to participate and thus not give their apparent scientific blessings to ill-conceived projects, especially evaluation activities.

Our review of the eleven police policy areas identified important research topics that we feel have not been successfully pursued and require new research programs, or that we found missing from the study's research literature. These topics are presented below in summary fashion; the rationale for their inclusion is developed in the corresponding external and internal validity discussions of Section III.

---Subjects Recommended for Future Police Research---

● Police Administration and Management

.. Team Policing

- A test of the neighborhood team policing concept in which the study plan is followed faithfully (need to enlist support of mid-level police management who feel threatened by decentralization of operational authority);

.. Crime Statistics

- Relationships between various kinds of crime statistics and law enforcement goals;
- Policy implications of the various possible measures of crime incidence;
- How to inter-relate offender and victimization statistics;



- .. Productivity
  - Definitive concept of productivity in law enforcement context;
  - Concepts and techniques for measuring quality of police protection;
- .. Finance
  - Whether current police pension plans deter professionalization and job mobility, and whether modifications would promote any law enforcement goal;
- .. Non-Patrol Functions
  - Determination of what law enforcement agencies or types of departments should have an intelligence unit;
- .. Computers
  - Use of computers to better enable policy makers to utilize completed law enforcement research;
  - Use of computers to get operational and crime data that is timely.
- Police Effectiveness and Evaluation
  - Definition of police service indicators and unambiguous procedures for their measurement and audit, and translation of such research into operational use.
- Crime Prevention - Architectural
  - Concepts for extending defensible space theory to non-apartment house settings;
  - Experimental comparison of defensible space and fortress model as means of reducing crime.

- Crime Prevention - Crime Statistics
  - Detailed concepts and procedures to enable policy-makers to make use of crime statistics;
  - Use of Bayesian statistics for combining police wisdom and empirical data to estimate relationship between population factors and crime patterns.
- Police Technology
  - Definitive study of the use of helicopters as patrol and patrol-augmentation vehicles, in a range of geographic environments (i. e., urban, suburban, rural, desert, water), to find out where they are useful and for what tasks;
  - Methods of testing new technology and devices in terms of how such equipment can improve the overall operations of a police department.
- Resource Allocation
  - How to apply theoretical resource allocation procedures to the needs of individual police departments;
  - Procedures for validating theoretical resource allocation models;
  - Effects of resource allocation methods on overall police department operations (i. e., impact on organization as a whole).

- Patrol Operations - Patrol Beat Design

- A man/machine procedure for combining mathematical models and human experience in determining beat designs;
- Research relevant to changing long established beats:
  - Trade-offs between patrol unit familiarity with a beat and the need to balance the patrol workload among beats;
  - Proper measure of beat workload and compactness;
  - When and how often beats should be changed;
  - Relationship between beat size and response time and equity;

These subjects require a testing and service center to address such research questions and to develop a computerized experimental city for evaluating new methods of police patrol through simulation experiments; and to supply technical assistance for implementing worthwhile research results.

- Patrol Operations - Emergency Response

- Clearinghouse for reports of results of applying simulation models to emergency response systems in police departments;
- Relationship between response time and arrest and clearance rates, and crime levels;
- Whether and how response time should vary according to crime type and location.

- Patrol Operations - Traffic

- Use of highway-implemented electronic sensors and remote receiving terminals for evaluating methods of improving rate of capture of traffic violators.

- Personnel Evaluation, Selection & Training

- Further validation of predictor variables' correlation with behavior, including use of broader population base and different community environments; definition of desirable performance and development of objective measures useful in research and officer evaluation appropriate in various settings.

- Police/Community Relations

- Surveys to differentiate between problems of lack of communication and problems of conflict in police and citizen priorities for police work;
- Relationship between citizen attitudes and level of police performance in carrying out objective duties;
- Formulate ways of further incorporating citizens into police work and test in controlled experiments.

As part of our study we conducted an informal survey of police chiefs and commissioners to ascertain what research topics are viewed as important at the basic policy-making level in the field of police protection. Our questionnaire listed the main topics we had found in the research literature and requested the respondent to rate

its importance. We also invited the respondent to indicate any topics not covered that should be considered for future research. There were six topics that obtained almost unanimous ratings of "important" and these are listed below;

- Reduction of police response time,
- Police computerized information systems,
- Measuring effectiveness of crime prevention programs,
- Evaluation of changes in crime rates and other police measures of effectiveness,
- Standards for promotion of police officers, and
- Surveys of public attitudes toward police, including victimization surveys.

The detailed results are presented in Section II. The reader will note that these six items and their implied research needs have a direct relationship to items recommended for future research in the preceding listing, i. e., the felt needs of the sample of police chiefs does appear to match the research needs that evolved from our study of past police research.

One aspect of this project was to investigate a research approach (described in Appendix A) to the evaluation of research, i. e., did the study methodology meet the objectives of making a significant body of police policy-related research more accessible

and usable to policy makers, and has it yielded a basis for the guidance of future police research? We trust that this will prove to be the case, and hope other researchers can benefit by both the product of our activities and our experiences in the use of the methodology.

## II. IMPRESSIONS, CONCLUSIONS AND RECOMMENDATIONS

In this section we summarize what we have learned about the subject of research into police protection. Subsection A indicates what we believe to be the major methodological problems in the work that we have reviewed; although it is by no means a complete or exhaustive list of the errors in research planning, execution or analysis that we have encountered. Subsection B contains a summation of the research, within each of our policy headings, which we feel should be undertaken in the future. In Subsection C we present the results of an informal survey of police departments that we conducted to discover the relative importance that policy-makers attach to various areas of police-protection research. In Subsection D we state certain principles which we believe could lead to better research. Finally, Subsection E contains a recommended checklist of questions for use by law enforcement policy-makers that we feel will help to assure that the research done for them will be valid.

In order to understand better how we arrived at the basis of this summation and to obtain a view of the totality of methodological and research problems that beset the area of police protection, the reader is encouraged to read the detailed internal and external reviews presented in Section III.

### A. Major Recurring Barriers to Valid Research

The major problems we have found are perhaps not unique to law enforcement, but may well be found in any governmental process which



engages in a program of self-evaluation and improvement. Generally they fall under one or more of these headings: 1. lack of commitment to research by policy-makers, 2. failure to articulate goals and objectives of police protection, and 3. improper study design and analytic methods.

1. Lack of Commitment to Research by Policy-Makers

Law enforcement research involving police participation often manifests a lack of support at the executive levels. The existence and unmistakable demonstration of such support is essential, particularly in the case of research that investigates possible changes in the way police work is conducted. We have found numerous instances in which studies conducted by or with police departments were essentially abandoned even though carried out to their ostensible conclusions. To cite two illustrations: neighborhood team policing studies, which called for the total police function to be performed by the team assigned to the neighborhood was confounded by non-protocol interventions of specialized units into study locations, as well as ad hoc assignments that drew team personnel out of their neighborhoods; studies of helicopters as patrol-supplement vehicles, in which helicopters were dispatched to attend to incidents outside the study district.

Such departures from study plans may be expected if policy-makers do not convey down through the ranks that the research efforts are of genuine importance and have their strong support. This lack of commitment may often be attributable to a belief that the subject matter being

researched has already been established or is intuitively obvious, pro or con, so that any research in that area is merely to be tolerated. It may also be due to simple indifference, in which case research activities may be considered permissible only during the times when it conflicts with no other obligations and does not inconvenience the participants. Policy-makers should make known their biases regarding the research--at least to allow the research planners to plan realistically.

Lack of commitment is also suggested when one finds research grossly underfunded relative to its apparent aspirations, or research which is designed by unqualified personnel. Dollars may be given out to grudgingly, or the dollars accepted from external sources may be too few for promises of definitive results on monumental issues. Of course, this may also be explained by a simple lack of sophistication in research matters. Non-sophistication may similarly explain the reliance on staff analysts for the planning of research that requires specialized training or experience only to be found outside of the agency. We have found complicated questions of validation of pre-employment psychological examinations undertaken apparently according to the views of general analysts who are untrained in any psychological specialty.

An undercurrent found in much of the work on new methods of police protection is the resistance to change. Understandably, those who have risen to the policy-making level have been rewarded by the police system as presently constituted, and they may tend to be protective of the status

quo. Some amount of this influence is desirable to deter change which is ill-considered and lacking in theoretical or empirical support. Adverse effects of this conservative impulse may be found where experimentation has been restricted to atypical departmental subjects - for instance, where experimentation in the use of non-sworn personnel is used as an excuse to eliminate marginal or undesirable individuals.

## 2. Failure to Articulate Goals and Objectives

A common failing of research in this area is the absence of any clear statement of law enforcement goals and objectives. This is especially detrimental in studies of the effectiveness of police work. It is less acute when the subject is efficiency or equity, since these imply only that whatever it is that police actually do should be done economically and uniformly (or relative to actual need).

It is usual for published research to contain discussion of goals of police work, but there is generally not a clear translation of espoused goals into tangible objectives. Without this delineation, hypotheses cannot be framed with the degree of specificity that is required for scientific testing. Perhaps the most conspicuous consequence of this vagueness is the lack of definition to be found among outcome or output measures. One is far too often left with the feeling that the measure chosen by the researcher is imperfectly related to what it is that law enforcement people are supposed to do, and do proficiently. For example, the goal most often stated in law enforcement research is crime prevention, and

the measures most often relied upon are crime rates or apprehension rates--yet the exact relationship between the occurrence of some crime (or some arrest) and the non-occurrence of some other would-be crime has never been established. What is missing in this "typical" situation is some statement of an objective of police work that links such measures with the goal of crime prevention. (We deal further with the subject of goals and objectives in Section III of this report.)

## 3. Improper Study Design and Analytic Methods

This topic is included in our list of major barriers to validity, because, we believe, it is often the result of a lack of commitment to scientific inquiry at the executive levels or of the designation of unqualified persons as research designers. We would like to indicate briefly the design and analytic defects which are major and recurrent in the work we have reviewed.

Probably the most significant single design problem found in our review is in the area of selection of controls for evaluation of experimental treatment subjects. By the term "controls" we mean a source of data that will enable the researcher to isolate and measure the effect of the treatment that is the subject of the research. There are two major categories of controls: (1) concurrent, or peer group, which means applying the treatment to one group and comparing the results with another group that is identical in all respects except that it did not receive the treatment; if the treatment group improves relative to the control group,

it has to be due to the treatment; and (2) historical, meaning that we have only the treatment group and we compare its performance after treatment with its performance before, given that there has been no major change with the passage of time other than the introduction of the treatment. Controlled experiments are spoiled if the treatment and control groups differ in some important way other than receiving or not receiving the treatment; such extraneous factors are known as "confounding variables." When historical controls are used, a confounding variable would be something causing change independently of the treatment.

Too often controls seem to be treated as an afterthought, perhaps not fully taken into account in staging the level of effort to go into the research. Peer group controls in such situations seem to be the group which can be accessed most conveniently, even if it is very different than the group that is the subject of experimentation. Confounding variables are then dismissed under the assumption that they do not actually exist or that their impact is negligible. Alternatively, we may find a welter of possible extraneous influences being discussed in detail, with the chore left to the reader of deciding whether any of them seriously detracts from the conclusions arising out of the comparison of treatment and control. It is especially disturbing to find the researcher arriving at his conclusions, with the cautions that were in full display in the front end of the report totally absent in the conclusion end.

Cases using controls in the form of historical facts about the treatment subjects (pre/post experimental designs) are just as vulnerable to confounding factors as designs using contemporaneous controls. It is commonly found that possible maturation effects or time changes in recording procedures were glossed over or left unexplored. The amount of pre-treatment data to be used--that is the starting point in a time series generally seems to be arbitrary, though the choice of a starting point can greatly influence the calculation of the expected value to be used for comparison of post-treatment results.

From the point of view of analysis, the main theme appears to be the misuse of statistical procedures. Often neither methods nor basic data are given in the documents we have read, or not in sufficient detail to permit critical substantive evaluation, which leaves the reader in the position of either drawing a negative inference or giving the benefit of the doubt owing to the researcher's reputation. Where the techniques are discernible, what is discerned is often faulty, such as the use of Analysis of Variance models when treatments have not been allocated randomly, or the use of Chi Square on percentages (non-frequency data), or regression lines computed using only the elementary formulas despite time-correlation or other forms of non-independence among the putative independent variables. Inference, which is the step logically following from analysis, is thereby rendered invalid.

# B. New Directions and Needs in Police Protection Research

The overall discussion and external validity analyses sections of the report identify research topics which are missing in the literature and which we feel are worthy of consideration, or which have been attempted without fruitful outcome. This subsection pulls together, in summary fashion, those recommendations.

Policy Topic	Subjects Recommended for Future Research
<u>Police Administration and Management:</u>	
<u>Team Policing</u>	-- A test of the neighborhood team policing concept in which the study plan is followed faithfully (need to enlist support of mid-level police management who feel threatened by decentralization of operational authority);
<u>Crime Statistics</u>	-- Relationships between various kinds of crime statistics and law enforcement goals; -- Policy implications of the various possible measures of crime incidence; -- How to inter-relate offender and victimization statistics;
<u>Productivity</u>	-- Definitive concept of productivity in law enforcement context; -- Concepts and techniques for measuring quality of police protection;

Policy Topic	Subjects Recommended for Future Research
<u>Police Administration and Management (cont'd):</u>	
<u>Finance</u>	-- Whether current police pension plans deter professionalization and job mobility, and whether modifications would promote any law enforcement goal;
<u>Non-Patrol Functions</u>	-- Determination of what law enforcement agencies or types of departments should have an intelligence unit;
<u>Computers</u>	-- Use of computers to better enable policy makers to utilize completed law enforcement research; -- Use of computers to get operational and crime data that is timely.
<u>Police Effectiveness and Evaluation</u>	-- Definition of police service indicators and unambiguous procedures for their measurement and audit, and translation of such research into operational use.
<u>Crime Prevention-- Architectural</u>	-- Concepts for extending defensible space theory to non-apartment house settings; -- Experimental comparison of defensible space and fortress model as means of reducing crime.
<u>Crime Prevention-- Crime Statistics</u>	-- Detailed concepts and procedures to enable policy-makers to make use of crime statistics; -- Use of Bayesian statistics for combining police wisdom and empirical data to estimate relationship between population factors and crime patterns.



Policy Topic	Subjects Recommended for Future Research
<u>Police Technology</u>	<ul style="list-style-type: none"> <li>-- Definitive study of the use of helicopters as patrol and patrol-augmentation vehicles, in a range of geographic environments (i. e. urban, suburban, rural, desert, water), to find out where they are useful and for what tasks;</li> <li>-- Methods of testing new technology and devices in terms of how such equipment can improve the overall operations of a police department.</li> </ul>
<u>Resource Allocation</u>	<ul style="list-style-type: none"> <li>-- How to apply theoretical resource allocation procedures to the needs of individual police departments;</li> <li>-- Procedures for validating theoretical resource allocation models;</li> <li>-- Effects of resource allocation methods on overall police department operations (i. e. impact on organization as a whole).</li> </ul>
<u>Patrol Operations-- Patrol Beat Design</u>	<ul style="list-style-type: none"> <li>-- A man/machine procedure for combining mathematical models and human experience in determining beat designs;</li> <li>-- Research relevant to changing long established beats: <ul style="list-style-type: none"> <li>... Trade-offs between patrol unit familiarity with a beat and the need to balance the patrol workload among beats;</li> <li>... Proper measure of beat workload and compactness;</li> <li>... When and how often beats should be changed;</li> <li>... Relationship between beat size and response time and equity.</li> </ul> </li> </ul>

Policy Topic	Subjects Recommended for Future Research
<u>Patrol Operations-- Patrol Beat Design (cont'd)</u>	These subjects require a testing and service center, to address such research questions and to develop a computerized experimental city for evaluating new methods of police patrol through simulation experiments; and to supply technical assistance for implementing worthwhile research results.
<u>Patrol Operations-- Emergency Response</u>	<ul style="list-style-type: none"> <li>-- Clearinghouse for reports of results of applying simulation models to emergency response systems in police departments;</li> <li>-- Relationship between response time and arrest and clearance rates, and crime levels;</li> <li>-- Whether and how response time should vary according to crime type and location.</li> </ul>
<u>Patrol Operations-- Traffic</u>	<ul style="list-style-type: none"> <li>-- Use of highway-implanted electronic sensors and remote receiving terminals for evaluating methods of improving rate of capture of traffic violators.</li> </ul>
<u>Personnel Evaluation, Selection &amp; Training</u>	<ul style="list-style-type: none"> <li>-- Further validation of predictor variables' correlation with behavior, including use of broader population base and different community environments; definition of desirable performance and development of objective measures useful in research and officer evaluation appropriate in various settings.</li> </ul>
<u>Police-Community Relations</u>	<ul style="list-style-type: none"> <li>-- Surveys to differentiate between problems of lack of communication and problems of conflict in police and citizen priorities for police work;</li> <li>-- Relationship between citizen attitudes and level of police performance in carrying out objective duties;</li> <li>-- Formulate ways of further incorporating citizens into police work and test in controlled experiments.</li> </ul>

A review of police protection research reveals the use of a wide range of techniques that include all the tools of modern management science/operations research: queuing theory, simulation, linear programming, computers, etc. Most of the work involving management science remains at a theoretical level. Not enough research in this area is brought to fruition in field tests, and less is actually implemented. Where research does lead to implementation, it is too often the case that outside consultants provide the necessary impetus. Except in a few innovative cities, the police staff itself is rarely in the forefront of the search for and use of management science techniques relevant to police operations. The fact that there are but very few papers reporting the experiences of police working with sophisticated models in an ongoing manner provides clear evidence that management science has not achieved real operational impact. Yet it is precisely such ongoing, operational, police directed usage which is required if modern technical management techniques are to realize the potential indicated in theoretical studies.

The cause of this lack of police staff involvement in developing and implementing management science techniques is clear: very few police departments have staff members who have been trained in or at least are thoroughly familiar with management science, its methods and techniques. In general the police do not have the capability to take new techniques and apply them to their local environment. Yet the real

payoff of these methods comes from working with them in an operational manner; continually improving effectiveness and efficiency through the interplay between analyst, technique and reality. To summarize, if the methods of management science are to achieve a positive but as yet latent impact on the police environment, police staffs must learn enough of these methods to participate in the development, implementation, and operation of techniques which show theoretical promise.

Such learning could be achieved by (Federally funded?) short courses, seminars, and lecture series given on a continuing basis. After introducing basic concepts, the curricula ought to provide realistic experience by means of terminal oriented models and prepared problem situations. Many branches of government routinely provide this type of training for their staff, e. g. the armed forces. Police departments provide similar educational opportunity in other areas such as computer science and fiscal management. One or more national centers staffed by researchers/teachers could substantially improve the technical management capabilities of local police staffs.

### C. Policy-Makers' Indicated Felt Needs

In the process of selecting policy-relevant research for intensive evaluation, we had limited interaction with a number of law enforcement experts (see Appendix A). From among the topics covered in the research documents thus selected, we extracted 25 topics which, taken together, represented a cross section of the work that had been done in the police protection field. To broaden our view, we then undertook to poll a number of police chiefs and commissioners in metropolitan areas to determine which topics they considered important or unimportant. Our purpose in doing this was not only to extend our scope, but to attempt to discover which areas are in fact deemed worthy of research by individuals who must determine policy for actual police departments. This subsection presents the results of that poll.

The survey was done in two stages, employing the questionnaire shown in Figure 1. The numbers entered in the questionnaire show, for each topic, the number of respondents who rated it as "Important," "No Opinion," or "Unimportant." In the first stage the questionnaire went to nine cities, seven of whom responded. The responses showed that Topic Number 4a (Management of Highway Traffic) was one of relative indifference; this was deleted from the questionnaire, replaced by Topic Number 4b (Consolidation of Services With Adjoining Areas and/or Cooperative Activities). The revised questionnaire went to another set of nine cities,

SURVEY OF POLICY RELEVANCE OF SELECTED POLICE PROTECTION RESEARCH TOPICS

	TOPIC	RELEVANCE TO POLICE POLICY MAKERS (check one)			Comments
		Important	No Opinion	Unimportant	
1	Mathematical models for resource allocation and beat design	10	3		
2	Computer simulation models for patrol and dispatch policy evaluation	9	3	1	
3	Reduction of police response time	13			
4a	Management of Highway Traffic <u>1/</u>	3	1	3	
4b	Consolidation of services with adjoining areas and/or cooperative activities <u>2/</u>	4	1	1	
5	Team policing <u>3/</u>	9	2	1	
6	Police computerized information systems	12	1		
7	Computer assisted dispatching	10	3		
8	Measuring effectiveness of crime prevention programs	12	1		
9	Cost models for comparing policy or program alternatives	9	4		
10	Evaluation of changes in crime rates and other police measures of effectiveness	12	1		
11	Off duty use of marked police cars	6	2	5	
12	Use of nonlethal weapons for law enforcement	6	4	3	
13	Mobile telecommunications	12		1	
14	Helicopters of other aircraft in routine patrol	7	3	3	

1/ First survey only.

2/ Second survey only.

3/ No response on one of the questionnaires.

15	Design for building home and public transportation safety	4	6	3	
16	Devices and methods for improving police safety	11	2		
17	Crime detection and alarm systems	10	2	1	
18	Physical and psychological traits relevant to police performance	11	2		
19	Standards for promotion of police officers	12	1		
20	Prediction of future performance of police recruits	9	2	2	
21	Job attitudes of policemen	10	1	3	
22	Race/ethnic bias in police employment, including racial attitudes of police	8	4	1	
23	Height and other physical standards for job performance	9	2	2	
24	Civilian participation in police work	9	2	2	
25	Surveys of public attitudes toward police, including victimization surveys	12	1		

On what issues (other than the 25 listed above) would you like to see research done?

six of whom responded. In sum, out of eighteen metropolitan police officials contacted, completed questionnaires were received from thirteen.

Figure 1 shows that of the 25 policy topics there were six that were unanimously considered to be important from a policy viewpoint, or where importance was the virtually unanimous response (i. e. twelve votes for "Important" and one for "No Opinion"). These are as follows in Table 1:

Table 1  
Research Topics Deemed Important by Police Policy-Makers

Topic Number on Questionnaire	Policy Topic
3	Reduction of police response time
6	Police computerized information systems
8	Measuring effectiveness of crime prevention programs
10	Evaluation of changes in crime rates and other police measures of effectiveness
19	Standards for promotion of police officers
25	Surveys of public attitudes toward police, including victimization surveys

The final item on the questionnaire was the invitation to the respondent to write in any other issues that he might feel should be researched. On seven out of the 13 responses, such entries were made. There were a total of fourteen distinct statements of issues on those seven questionnaires; these

are listed in Table 2 below. As can be observed in Table 2, most of those issues could be placed under the heading of some topic on the questionnaire, so that, in effect, they were variations of what had already been covered. For example, the issue statement "public attitude's relationship to criminal behavior" bears close resemblance to the subject of victimization surveys, which is part of Topic Number 25. Only four of the issue statements (the bottom four in Table 2) could not be related to something covered on the questionnaire.

Our reason for asking the respondents to note any other issues that should be researched was, first, to find specific topics that may indicate a lag between completed research and current needs of police policy-makers; and, second, to get some estimate of the extent to which current research (as represented by the 25 topics on our questionnaire) falls short of actual demand. As to the second goal, it should be obvious that our modest survey may be useful in detecting the existence of a problem if it is of a large magnitude.

We found that on the questionnaires on which other issues were written, and where those statements actually corresponded to some topic printed on the questionnaire, that the printed topic tended to be marked "Important." The only exception was the statement "Defensible space in crime prevention," corresponding very closely to Topic Number 15, but on that questionnaire Topic Number 15 was judged "Unimportant." This tends to corroborate the matchings we made between write-in statements

Table 2

Other Issues Deemed Worthy of Research:  
Responses Included on Questionnaires by Policy-Makers

Corresponding Topic Printed on Questionnaire (Topic No.)	Policy-Maker's (Write-In) Statement
6	"Application of data processing to criminal records, especially fingerprint files and the associated search, retrieval match process"
10	"Models for the evaluation of program effectiveness in the areas of patrol, traffic and investigations"
"	"Measurement of individual performance--patrol and investigations"
"	"Police performance related to resources"
"	"Police work as related to the energy crisis--performance, etc."
"	"Standards for police officer effectiveness"
15	"Defensible space in crime prevention"
19	"Career development--Civilian, police career ladders"
"	"Career path development--lateral entry at middle management and above"
25	"Public attitude's relationship to criminal behavior"
--	"Police input to municipal planning process"
--	"Intense political involvement in the affairs of the police agency and news media involvement"
--	"Effectiveness of compact cars in patrol and other areas of law enforcement"
--	"Transfer of non-police functions to other agencies"



and topics printed on the form, and further supports the conclusion that the bottom four statements in Table 2 are the only indications of felt needs wholly outside the state-of-the-art in police protection research.

#### D. Recommended Research Methodologies

We want to include in this report some positive statement about ways of doing research, which if implemented in the work we have reviewed, would have avoided the need for criticisms such as those in the preceding Subsection A.

##### 1. Formulating Goals and Objectives; Choosing Measures

Foremost is the need at the very outset of a law enforcement research project to define what goal or goals of police work the research is intended to promote. A goal is necessarily defined on a lofty plane, and may well be a concept which is incapable of any direct measurement. For example, the goal of crime prevention is immeasurable since we have virtually no knowledge of would-be crimes that do not happen or even reach the threshold.

In order to be able to know whether the subject which is to be investigated promotes any stated goal of police work, that goal must be translated into a more concrete objective which is capable of quantification. In the crime prevention example, an objective coming under that goal might be a reduction in the crime rate.

This two-step process is essential for proper evaluation of police-protection research, and we recommend that it be done very explicitly in the planning stage of any such research undertaking. Not infrequently, something like this appears to be done; what is not done--and what we feel is crucial--is a logical justification of the implied proposition that what

satisfies the objective also promotes the goal. In our above example, we would expect to have the benefit of some convincing argument that a reduction in crime rate means less crime is occurring than would otherwise be the case. This argument must tend to show that the reduction was not something which was going to occur anyway, independent of anything involved in the research. If this logical connection cannot be made in the planning stage between goal and alleged objective, the project ought to be held up until an adequate objective can be formulated.

We believe that this process will also guide the researcher to a clear-minded choice among the possible measures, whether for hypothesis testing or parameter estimation, that might be used to determine whether objectives and goals have been met. (By "parameter estimation" we mean the use of statistical procedures to determine, as well as we can, some quantity in a place or population, such as the number of burglaries occurring per year.) The failure to follow such a process is conspicuous in research where--pursuing our example further--a profusion of crime rates are employed simultaneously without any analysis of the differences in their implications for the stated law enforcement goals. It is also evident in papers which discuss goals and objectives, and the relevancy of various measures, but as an isolated part of the work, having little or nothing to do with the results and estimates or inferences to be extracted from them.

## 2. Conditions for Randomized Experiments

We naturally look for research to be done in the classical mold, which essentially means strict compliance with the requirements of randomization - the observation or testing of some factor in a sample drawn randomly from a population of interest. Analysis in the classical mold demands that the outcome be compared with appropriate controls, whether in the form of pre-treatment values (pre/post comparisons), or an untreated sample drawn randomly from the same population as the treated group (peer-group comparisons).

Randomized investigations are highly desirable because they are prima facie valid. That is, unless the design can be shown to be inappropriate or not faithfully adhered to, the researcher can compel the reader to draw inferences from the sample to the population. He can establish that his conclusions are not limited to the particular subjects used or participating in his study.

Truly randomized investigations are rare outside the laboratory setting. They are especially rare among studies carried out with human subjects rather than proxies (e. g. rats). As a rule, randomization with human subjects works only when those subjects are moved into a special environment, or if their regular activities are sharply altered, such as in clinical trials of experimental drugs.

We can identify certain conditions under which randomized experiments might be worth attempting in the police protection field:

a. Where the treatment (i. e. new concept related to police work) does not in any material way conflict with current, standard police practice.

This condition is not met by concepts such as neighborhood team policing where treatment (e. g. generalization of functions, decentralization of authority) must supplant standard practice (specialization and centralization) in the treatment area.

Where this condition is not met, a randomization design may still be worthwhile if the following condition is satisfied:

b. Perfect uncertainty as to whether the standard or experimental police method is better.

In neighborhood team policing trials, one gets the impression that police executives (at least at the middle management level) believed that the experimental treatment was inferior and hence, would suspend it when emergencies occurred, preferring to fall back on the standard methods when the chips were down. On the other hand, the helicopter studies we have reviewed suggest that it was believed that the treatment (helicopters) was superior to the standard (land vehicles, foot patrol, etc.) means of aiding in certain arrests, and hence, would call these aircraft out of the experimental districts to help with arrests in the control districts.

Analogous to clinical trials, randomized experiments in policing could be done if, say, people who had been victims of crime would move into special districts (crime hospitals) where they would consent to have the police try out new policing treatments. Neighborhoods could then be randomly allocated to the experimental or treatment categories when some new patrol, vehicle, or other crime-fighting device were to be tested. Similarly, the police who worked in this clinical district would be those who had a genuine interest in trying out new policing modalities.

The idea of clinical districts is fanciful, of course, but in essence that is what is done in computer simulation (Monte Carlo) experiments, notably those used to evaluate variations in beat design. Simulation lacks the realism of field experiments and in effect is a kind of laboratory experimentation. However, this gives us yet another condition under which randomized studies would be appropriate:

c. Where the standard and treatment modes of police work, the police department, the criminal population, and the general population can be represented in a quantitative model which can be programmed for computer operation.

### 3. Proper Approach to Non-Random Experiments

In the vast majority of situations, the conditions for randomized experiments are not met. In this connection, we offer the following principles for the reader's consideration:

A little research done well is better than no research at all.

The policy-maker with a research budget, or with outside funds available for that purpose, should realize that not all projects are capable of yielding definitive results on questions of major importance. Another way of expressing this is that definitive results on major questions generally would require a far greater commitment of resources than the policy-maker can possibly make.

It should also be recognized that probably no amount of resources committed to police protection research could solve the nationwide epidemic of crime in a limited time. Compare the experience of cancer researchers, who, in the late '60's, were hearing the complaints of numerous politicians that huge outlays of money (far more than was requested) in the early and mid-60's, had failed to produce a cure for the disease. Crime and cancer have it in common that very little is known about etiology, which from any logical point of view, threatens overly-ambitious eradication programs with doom. It is worth some reflection that the sociological criminologists (e.g. Marvin Wolfgang, et.al., in The Sociology of Crime and Delinquency, 2nd ed. 1970, pages 1-48) argue that crime is normative, and there will always be some forms of conduct which society will proscribe; this implies that "crime prevention" is an illusion, except insofar as it relates to the elimination of particular kinds of behavior. (The argument that there will always be disease in human populations is made by René Dubos in The Mirage of Health, although he regards disease as an absolute, rather than normative, condition).

These considerations suggest that the proper focus should not so much be the complete and final testing out of theories, but rather the generation of useful empirical data that may contribute to such eventual resolution, but which may also serve other purposes such as the examination of other theories. This focus would require police protection researchers to become more familiar with the work that has already been done, and which is currently underway, than seems to be the rule. If the prime focus is definitive testing, assuming the commitment of resources is realistic, it should still be considered whether the outcome will also advance other secondary purposes.

This principle of modest aims, and the visualization of research projects as fitting into progressions of projects which may in the long run issue definitive theories, suggests the following as well:

Research done badly (whether much or little) is worse than no research at all.

As we pointed out in the preceding section, randomized experiments done properly enable the researcher to compel others to adapt the application of his results to the population from which his sample was drawn. When randomization is not involved (or where the randomized trial breaks down), the researcher cannot enforce the inferences that he would like to have drawn. Yet it is conceded by social scientists that experiments with human subjects very rarely can be randomized, and if attempted can be expected to fail (e.g., J. A. Caporaso and L. L. Roos, Jr., editors of

Quasi-Experimental Approaches: Testing Theory and Evaluating Policy,  
1973, Northwestern University Press).

Caporaso and Roos, and the contributors to their book (op. cit.), take the position that high quality research can be done even if randomization is not feasible. The essence of their position is that non-randomized experimentation (what they call "quasi-experiments") can achieve the same ends - if it is done very, very well. Randomized and quasi-experiments exist in a Hertz/Avis relationship in which No. 2 must try harder. While unable to compel inferences to populations, the quasi-experimenter invites such inferences by demonstrating that the work was done with scrupulous care and that the factors which could militate against the proposed inferences are unreasonable.

More often than not, the expensive and elaborate research in police protection that we have reviewed has been deprived of validity because of significant confounding factors that the researchers either were unaware of or merely sought to dismiss with bare assumptions. The quasi-experimenter strives to identify these possible threats to validity and gathers data to determine whether in fact they matter. Thus, in addition to formulating the major hypothesis that, say, a certain treatment (policing method) is effective in reducing crime, each of the main sources of bias becomes a rival hypothesis which is subjected to objective evaluation as part of the experiment. In this way, the quasi-experimenter anticipates and de-fuses his critics.

Obviously, there are two important drawbacks to quasi-experimentation: it can add heavily to the cost of experimentation, and the experimenter runs the risk that the rival hypotheses may prevail. As to the first, we would like to observe that at present, research is usually under-funded in relation to its apparent aims; as to the second, we repeat that the policy-maker is ill-advised to conduct research which is directed solely at definitively testing out some highly specific theory.

The quasi-experimenter thus hopes to show that his sample, while not randomly drawn, is representative of the population of interest, so that the conclusions pertaining to his sample may reasonably be extended to the entire population. To the extent that the researcher cannot show that his sample is typical, it becomes less likely that others will agree to any such enlargement of the scope of his conclusions. If representativeness does not exist, the researcher may at least hope to identify the part of the population of which his sample is typical.

The following example will describe and contrast the classical randomization approach and quasi-experimentation. Suppose that a law enforcement policy-maker on the national level wishes to find out whether introducing a certain kind of non-lethal weapon as standard equipment for routine patrol could reduce street crime in urban environments (cities of 50,000 or more population), and wishes in a sample of one police district in one U. S. city to test the hypothesis that it can do so.



(a) Randomized Experiment

Employing a multi-stage sampling design, the experimenter might randomly choose one city, then randomly assemble a district size force from the police department in that city, and then assign that force to a randomly chosen district within the city. Thereafter it would be observed whether, in comparison with some appropriate control, the street crime rate drops significantly during the time of the experiment.

Based on our study of police protection research, we can foresee a number of serious pitfalls in such a design:

--The political or police leadership in the randomly-chosen city may refuse to participate because of the organizational headaches that would be involved, or perhaps due to preconceived opinions about the effectiveness of routine patrol with non-lethal weapons in reducing street crime, or reaction of the public or business interests in the randomly-chosen district.

--There may be no opposition at the planning stage, but protest may develop during the experiment which would force termination of the study.

--There may be no effective protest at any stage, but a lack of cooperation on the part of police officials who, believing such patrol to be unworthy of testing, would send armed patrol elements into the treatment area when threatening conditions develop; or perhaps some officers would employ lethal firearms in restricted situations in defiance of the experimental directives, at least occasionally.

(b) Quasi-Experimentation

The quasi-experimenter would acknowledge at the outset that the conscription of subjects through randomization would be unlikely to succeed because the experimental treatment patrol with non-lethal weapons would require people to abandon their accustomed ways of doing their jobs. Instead, he would set as his objective the selection of volunteers willing to subject themselves to a test of non-lethal weapons, and who would be reasonably typical of the American urban environment. To do this, he might identify various population attributes for characterizing cities that would be relevant to law enforcement, and pertinent attributes for describing urban police departments. Based on these characteristics, he would compute the various appropriate measures for cities of 50,000 or more population in the U. S., and their police forces, and identify those which are reasonably close to the average for this population (i. e. those that could be called representative). From among these he would endeavor to select one where the willingness to participate (at all levels) may be found. If more than one are found, the most typical would be his choice; if none are found, there is no study to be made, unless the experimenter could instead plan a computer simulation study of patrol with non-lethal weapons in the hope that the results may serve to induce the willingness that is needed to carry out a valid field study. Alternatively, if no volunteers are found among the typical sites, he must proceed with a volunteer location which is representative of some particular subset of

American cities, though strikingly different from the average of the entire population.

Assuming that a volunteer is found, the experimenter, before proceeding with the test, would set up rival hypotheses competing with the hypothesis that the treatment works based on the possible sources of bias that he can identify. The fact that the study subjects are volunteers implies various types of possible bias, such as:

- The political leadership may be extremely liberal, and may be the only group that would countenance non-lethal weapons as firearm substitutes no matter what the study might show;

- The police leadership may be motivated by avant garde social theories that other police leaders would not agree with;

- The officers willing to serve as experimental patrolmen may be very inexperienced, ultra-liberal minded, or of the type that wishes to avoid confrontations.

- The population of the experimental district may simply be politically powerless and unable to prevent any experiments in novel police methods;

- The amount of street crime in the volunteer experimental district may be negligible.

The researcher must determine whether there is any link that may logically exist between any such bias factor and the street crime rate. If

a connection is at all likely, it is not to be written off by means of a simplifying assumption: instead, data must be gathered on that factor to shed some empirical light on the relationship, or the lack thereof.

For example, the researcher may reason that if the volunteer patrol force is predominantly experienced and of commanding physical appearance, this fact could tend to decrease the incidence of street crime. If it turned out that the patrolmen were thus atypical, it would be incumbent on the researcher to obtain some data on whether such factors influence criminal behavior in the population. If the information cannot be gotten as part of the study, the results are correspondingly deprived of validity--at least until such time in the future when research is done that establishes the degree of correlation between experience and physical appearance and the incidence of street crime.

These questions of bias should be raised and resolved in the planning stage (although quasi-experimenters apparently often do these analyses in retrospect), and if at that point it is determined that data relating to rival hypotheses (e.g. that a drop in crime rate is due to the composition of the patrol force, rather than the restriction of lethal firearms) would be too costly, this should be taken to mean that the research effort is underfunded, or that the question of unarmed patrol is beyond the present scope of research methodology. Ideally, then, bias should be explored before the project is fully committed to run, to gain assurances that the outcome will be valid, to get data which might be treated as covariables in the ultimate

analysis, or if need be, to rule out research that would be doomed to failure through non-acceptance of the results.

E. The Policy-Maker as Research Evaluator

The police policy-maker can do much to assure the quality of research done by his staff or contractors, even though he may not have the particular subject-matter training that the research requires, simply by asking the right kind of non-technical questions while the work is still in the planning stage. The following checklist of questions to be directed at the researcher should be considered for such evaluation purposes.

1. What do you perceive to be the law enforcement goals that will be promoted by such research?
2. What steps have you gone through in deducing research hypotheses from these goals--and what are these hypotheses?
3. If you will be estimating any population parameters, what are they and what is their connection to law enforcement goals?
4. What measures have you chosen for hypothesis testing and parameter estimation and why have you chosen those in particular?
5. Have you considered any potential sources of bias that might invalidate the results of your hypothesis testing and parameter estimation?
  - If so, what are they?
  - Which of them do you consider to be sufficiently serious threats to validity to warrant gathering information on them as part of your study?

- Have you established procedures to gather such information?
- How will you use such information in analyzing the results of the research?

6. In your research design, have you included controls, and if so, can you justify your choice of controls?
7. What analytical tools (such as Analysis of Variance, Chi-Square or regression models) are you planning to use, and on what do you base your selection of them?

The policy-maker should expect his researcher to make a bona fide effort to answer these questions in terms that can be understood by the layman. This is not to say that the policy-maker can hope to understand the research methods as well as the researcher, but he can be assisted in learning more than he already knows. The main purpose in asking, however, is not so much to learn about research as it is to make sure that these critical matters have been given careful thought by the researcher. The policy-maker should realize that the researcher is not often challenged to show exactly how his work will be useful to program managers, or to offer proof that he has made genuine efforts to assure that his conclusions will be valid, owing to the fact that the researcher rarely has any responsibility for what follows after his study is done. The policy-maker, in observing the demeanor of the researcher in answering the above questions, is in a good position to judge whether these important matters have been thought through, and thus whether the research is likely to be good research.

### III. INTERNAL AND EXTERNAL VALIDITY ANALYSES

In this section we present the internal and external validity analyses of selected research reports in the following police policy areas:

- administration and management,
- effectiveness and evaluation,
- crime prevention - architectural,
- crime prevention - crime statistics,
- police technology,
- resource allocation,
- patrol operations - patrol beat design,
- patrol operations - emergency response,
- patrol operations - traffic,
- personnel selection, evaluation and training, and
- police/community relations.

Each policy area is discussed in a separate subsection below. A subsection begins with the policy area's external validity discussion, followed by the internal validity reviews. Again, we stress that we have not meant to be all inclusive. We have been selective in our choices--if by no other reason than by attempting to select items that have appeared in the past ten years.<sup>1/</sup>

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<sup>1/</sup> See Appendix A which describes the selection and study methodology.

Each internal evaluation review is prefaced by an abstract or abstracts relating to the particular research area under evaluation. The reader is advised to first read the external evaluation review to obtain reference points for the material covered in the policy area, then read the internal evaluation reviews of interest, followed by a second reading of the external review; as the policy area's research requirements are based on the internal evaluation reviews, a second reading of the external review will yield a better understanding of the reasons behind the research recommendations.

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A. Police Administration and Management

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## EXTERNAL VALIDITY EVALUATION

### Police Administration and Management

In our review of policy-related research in the field of police protection, we have found a number of studies on diverse topics under the heading of administration and management. They are: neighborhood team policing, crime statistics and evaluation of police work, measurement of police productivity, financial aspects of police administration and management, police discipline and investigation of police misconduct, nonpatrol functions such as detective and intelligence activities, and the use of computers in police work. Research work in most of these areas do not lend themselves to an external validity discussion and are not treated here. Thus, in this section we review only the material relating to the concept of neighborhood team policing, and the important area of crime statistics and evaluation; and, because of its general importance, we include a discussion on the use of computers in police work.

#### A. Evolving Concepts of Police Work - Team Policing

In the past few years, the world outside of law enforcement has become interested in what police actually do, and with that has come considerable interest in re-defining police responsibilities.

While the general public undoubtedly views crime-fighting as the predominant role of the law enforcement officer, John A. Webster, in

The Realities of Police Work (1973), found approximately 50% of patrol time in Baywood, California, consumed in administrative tasks, while only 3% was attributable to crimes against the person. It is possible, of course, that members of every profession spend a good deal more time on housekeeping matters than the public knows. But the point remains that the glamorous role of crime-fighting occupies very little of the average officer's average day on patrol, even though the exact percentage may vary from one location to another, and from one type of agency to another.

In fact, as law enforcement officials know, the major part of the patrol officer's time is spent on matters unrelated to - or beyond the periphery of - crime, but which constitute services provided to the public. The concept of team policing is an attempt to bring this service function out from the shadows of popular awareness. Team policing means putting a group of officers and a commander into a geographic area and assigning to them all of the police responsibility for that location. Advocates of this concept also argue for specialized training to better equip police officers for their service roles. Essentially, their view is that an officer on patrol is a social worker, clinical psychologist, marriage counsellor, etc., in addition to a crime-fighter, and he should receive specialized training to perform these duties.

The major works reviewed on the subject of team policing cover the application of this technique in eight locations: Team Policing: Seven

Case Studies (1973), L. W. Sherman, et al., and Evaluation of Operation Neighborhood (1973), P. B. Bloch and D. I. Specht. The last two authors also have produced a manual on the subject: Neighborhood Team Policing (1973).

Looking across the eight cities reported in these studies, there is very little, if anything, which they have in common that is positive. Perhaps the main commonality has been the tendency of police middle-level management to undercut attempts at experimenting with this new concept. Since mid-management experiences some loss of authority (probably only in the short run, however) owing to the decentralizing of decision-making power in team policing, it is not surprising that there would be some foot-dragging among the senior personnel, taking the form of interference with assignments in and around the test locations, and with dispatch and support functions generally. This may be the principal factor in the lack of any definitive showing of the potential merits of team policing. In sum, based on the neighborhood team policing evaluation studies, we can only conclude that the concept as described above has not been fully evaluated due to the lack of commitment by the testing police department and the serious lack of any experimental design procedures.

#### B. Evaluation of Police Work - Crime Statistics

The term "crime statistics" comprehends a great many kinds of measurement. It may refer to any point in the sequence of events ranging from the occurrence of a criminal act to the completion of sentence by one convicted of the crime. It is popular wisdom--reasonably well documented--that when we begin with the stage represented by the criminal act itself and move forward in time, the frequencies of the successive events (arrests, indictments, etc.) fall off precipitously. Consequently, there may appear to be a considerable amount of crime, or not so much, or very little, indeed, depending on the stage in this sequence where the count is made of the number of events that have happened. At whatever stage the measurements are taken, it appears that the observed frequencies are usually converted into rates--e.g. number of events per unit of time, or unit of geographical area, or per person or thing at risk, etc.--so as to be interpretable as probabilities of occurrences, given certain conditions.

When it comes to choosing the kind of measurement to be made as crime statistics, the reactions of crime analysts are varied. Sometimes, it seems, there is little awareness that more than one kind of measurement exists. Often it seems that the measure is chosen that will help to minimize the costs of time requirements of doing a particular study. However, the choice is made in actuality, the guiding principle ought to be that the appropriate measure depends on the use to be made of it. This point should be obvious, though it appears that it is frequently overlooked.

Among law enforcement officials, the uses of crime statistics are normally for program planning and/or evaluation. In the context of planning, there are two main objectives: program selection or design, and the establishment of a baseline for subsequent evaluation. (See CAPER: Crime Analysis - Project Evaluation - Research, American Justice Institute (1972).)

Whether we speak of planning or evaluation, the program itself is commonly identified as one pertaining to crime prevention. Crime statistics are used to identify places, times, and conditions in which crime is unusually common and hence inferred to be relatively likely to occur in the future; one crime may be found to be more frequent than another, and thus more likely to occur at any given time in the future. Through this kind of inquiry, a program is chosen. The thrust of such a program, whatever its specifics, is that the crime rate should go down after its implementation. It seems anomalous, however, that law enforcement officials should choose, or tolerate, this emphasis on crime prevention. As regards crime, law enforcement jurisdiction over any person is conditioned on probable cause to believe that a crime has already occurred, yet crime prevention operates before such occurrence, and hence a responsibility is assumed for which the necessary authority is lacking. It would be analogous to the military establishment undertaking to guarantee that there will be no more wars, even though foreign policy is in civilian hands.

But in light of the fact that law enforcement programs are so often directed at crime prevention, what sort of crime statistics are appropriate for evaluating such programs? The simple answer to that question is crime statistics which will show change in the incidence of crime before and after the program is implemented. Beyond this simple answer lies the impossibility of knowing precisely how much crime occurs in a population over a stated period. The practical question is, instead, among all possible estimators of crime incidence--all being imperfect--which will be the least imperfect under the circumstances?

Biderman and Reiss discuss the varieties of crime-incidence estimators in On Exploring the "Dark Figure" of Crime (1967). They describe two opposing points of view: (1) the institutionalist view, which is that it is appropriate to estimate incidence according to number of events to which law enforcement institutions respond, holding that these are the only truly reliable numbers, and further, that the actions of such agencies operationally define society's true concerns; and (2) the realist view, which rejects institution-produced numbers as being unduly filtered, preferring instead to know how many acts of criminality were experienced in the population, according to the claims of those who identify themselves as the victims. Each school has logically valid objections to the other, so that any sensible position on estimation must lie somewhere in between.

In taking a stand between the institutional and realist extremes, law enforcement officials ought to propose the use of police data, which in

fact they do (hence, the dependence of the accepted authority--Uniform Crime Reports--on the information produced by police departments). Some filtering of victim claims is certainly a necessity to eliminate baseless allegations; the screening of claims by police is the only form of institutional filtering that can be governed by law enforcement officials, and thus it is the only sort for whose validity they can vouch.

The filtering of claims of criminality by the courts introduces enormous inaccuracies, and law enforcement officials should advocate against it. It is often proposed that police reports should be purified by removing all complaints (whether initiated by citizens or officers) that do not withstand probable-cause review at the presentment or indictment level. This is a screen with a mesh that is too fine, however. No one knows even to a rough approximation just how many meritorious cases are dismissed because they are found on hearsay, legally incompetent witnesses, witnesses who leave the jurisdiction, evidence that is improperly seized, or arrests that are procedurally defective. The Criminal Justice System, whose values only partially overlap those of the police, is not an appropriate source of institutional filtering of police data for evaluating law enforcement programs directed at crime prevention.

The foregoing is not intended to argue that law enforcement officials should be the exclusive evaluators of their own efforts. The conflict of interest is that would be both obvious and substantial, and would deprive

evaluation efforts of credibility. What is needed for the proper evaluation of crime prevention programs should involve the police jointly with agencies that are independent of the police.

Evaluation based on police data appropriately begins with the "unfounding" procedures applied to reports by the police themselves at the precinct level. Presumably these procedures vary from one place to another, though there may be a great deal in common among them. More should be published on the subject of unfounding. The LEAA rightly recommends that crime reporting by patrolmen and investigators be subject to periodic audit. See Data Needs for Crime Specific Planning (1972), Attachment 2, describing an audit system used since 1960 in the St. Louis Metropolitan Police Department. LEAA is particularly concerned with the possibility of the "downgrading" of offenses having the effect of a paper reduction in crime. There must be a considerable temptation on the part of law enforcement officials to engage in downgrading of reports, especially when it is fully realized that crime prevention programs saddle them with responsibility without commensurate authority.

In addition to imposing quality control procedures to cleanse the existing channels of reported crime, evaluation requires that steps be taken to discover reportable but unknown offenses--termed the "dark figure" of crime. Victimization surveys are recommended as a device for estimating the "dark figure." In Surveys of Population Samples for Estimating Crime Incidence (1967), Biderman analyzes some of the early



surveys. He found that the difference between crime rates based on cross-sectional sample surveys and those based on UCR figures reported by police is often substantial; apparently the former is some multiple of the latter, though the surveys considered in his paper showed a range of 4 to 1 to 10 to 1 for Part I Index Crimes. His analysis leads him to conclude that a considerable portion of the "dark figure" is due to the failure of police to make permanent record of complaints, since he observed that a high percentage of victimizations were said to have been reported, although police files did not contain any record of them. To the extent that this is true, it must be more of a problem with one kind of crime than another, as one national survey showed very little difference between victimization and offense rates for homicide, robbery, and auto theft, while victimization rates were substantially higher for assault, rape, larceny and burglary.

Certainly police data are a doubtful vehicle for evaluation statistics unless police strive to record all of the crime that they have notice of, and to do so accurately. This will not happen unless the leadership communicates to the rank and file the conviction that complete and accurate reporting is an important part of the law enforcement mission.

The desirability of victimization data for evaluating crime prevention programs is worthy of some discussion. The fundamental question is: why should both victimization and offense figures be used? The reason is, simply, that offense rates alone will not suffice. The objective in compiling

crime statistics, as here considered, is to permit an accurate before-and-after analysis of the effects of some crime prevention measure. The "after" rate may well be influenced by the success of that measure; for example, if the measure enhances the popular view of police effectiveness, more of the crime that occurs is likely to be reported, which paradoxically may cause the program to appear to have failed.

If victimization survey results are studied, response by response, it should be possible to ascertain with reasonable precision the number of offenses, given that some offenses may entail a number of victims. Consequently, survey data properly analyzed will yield both victimization and offense rates. Assuming that the survey responses are narratives which are screened to delete those that do not factually make out a crime, or which are internally inconsistent (i. e. institutional filtering), the offense rate than computed should equal the police rate plus the "dark figure" amount of reportable offenses. This is the incidence of criminal offenses in the population.

Offense rates in the context of evaluation are relevant in at least two respects: (1) the law enforcement mission in combatting crime is to apprehend offenders, while the number and plight of victims is properly the concern of other institutions; and (2) success of police crime prevention efforts should be viewed in light of the before-and-after

change in the percentage of all offenses that are being handled by the police. For example, if the total volume (or rate) of crime does not change, or increases, but the crime prevention program has resulted in the police handling a greater percentage of the cases, there is a meaningful sense in which the police may be said to have succeeded.

### C. Computers in Police Work

In this section we give an overview of the use of computers for law enforcement activities. The papers in this area are represented by descriptive and survey material and are not appropriate for internal validity review. However, as the implementation of much of the law enforcement research reviewed here is dependent on computer technology, we feel that the following overview is important. The basic references are the papers by K. W. Colton and the others (see Appendix B: Additional References).

The major categories of police computer applications are administration, operations, management, and planning and research. In these terms, the largest area of application is operations (patrol and inquiry, traffic, investigation and dispatching), followed by administration (payroll, personnel, budget, inventory, fleet maintenance). Over the past ten years, emphasis has shifted from traffic and crime reports to

real-time applications for patrol and inquiry. This has been due to the availability of Federal funds, especially to support computer tie-in to the FBI National Crime Information Center. A survey which asked police officials to rank the importance of computer applications yielded the following ordering: police deployment and resource allocation, crime-related files, and police patrol and inquiry, with administrative applications least significant. Just about all users and nonusers of computers felt that computers can be of positive value to their departments. (All departments in cities with over 50,000 population and 25% of the departments between 25,000 and 50,000 population were surveyed, for a total of 498 departments, with 376 responding to the survey.) Nearly half of the respondents use computers or punch card equipment, with 39% using computers. By 1974, it was estimated that about 63% of the respondents would be using computers, with Federal LEAA money looked at as a definite influence on a department's ability to finance a computer installation.

In order to determine whether computers have been of any real worth on the "war on crime," 14 departments were visited and an unstructured set of interviews were conducted. Although most interviewees felt that the computers did not lead up to expectations (in what sense is not clear), most felt that the expenditures were worth the benefits.

Although in some instances direct benefits can be measured, e.g. the increase in revenue due to the automation of the traffic citation process, and while other benefits are indirect, e.g. the ability to check out a car in real-time before it is stopped, the survey results indicated that "some of the greatest impacts of the computer on the police, if they are to come, will not be through the technical improvements but through the more subtle impacts on police administration, management and politics." We submit that such subtle (unknown) impacts should not be given too much weight as they are the type associated with the charisma of the computer, and have failed to materialize in industrial and other governmental settings. One could hardly justify any computer based on the hope that management practices will be upgraded in some fashion. We feel that there are many basic administrative, management and operational areas for which computer processing is necessary and that such employment of computers does not have to be measured or justified in terms of the impact on the war on crime. A profit-making business tends to justify its computer operations in terms of contribution to profit; a police department should not attempt the impossible task of justifying its computer operations in terms of some surrogate profit function. However, a basis for acquiring and/or expanding computer operations should and can be formulated by police officials in terms of current vs. future personnel costs, more timely presentation and evaluation of operational statistics, development and use of automated manpower allocation and scheduling, etc. These items

are visible and important measures of automation; we should not have to rely on "softer" impacts for the justification of computers. To this end, it is encouraging to note that the major reasons given for using a computer are to improve service to the public, to improve a patrolman's ability to identify and apprehend, and to make internal operations more efficient.

The routine computer applications are being accomplished, but there is a decided gap between a police department's ability to use a computer and the utility of mathematical procedures for some key operational areas such as resource allocation, beat design, or dispatching. These types of advanced applications--discussions of which form the basis of many of the reviews given in this study--are available for evaluation now, but need more than just a computer for their successful implementation. They require trained analysts, who understand and are a part of the police milieu, and a department's commitment of time and money to test and evaluate the right approach for implementation within its organizational structure.

As noted in the reviews of resource allocation research, a key element for the effective operation of a police department is the department's ability to collect and analyze crime and operational data in a timely fashion. Few departments have the ability for turning out daily statistics overnight and thus, a division or precinct commander does not have timely information as to the level and type of crimes appearing in

each beat, or how many calls for service each patrol unit handled and how much time was spent by each unit on its calls. This type of daily operational and productivity data is standard for most manufacturing activities and represents the first step in an organization's ability to go beyond the routine in computer processing. In this area Colton notes the following experience:

"As particular situations are encountered, compromises must often be made. For example, a primary reason for computer-aided dispatch is to speed the process of dispatching patrol cars to given calls. In Tulsa, Oklahoma, the police department is installing a modified command and control system. It will provide extensive information for analysis, reporting, investigation, etc. However, the department has also discovered that it will actually take slightly longer to dispatch a car because of the time required to input all the pertinent data before a response can be obtained. Tremendous gains will be made in terms of new information available, but compromises must also be accepted."

In sum, the role of computers is a most important one in terms of the effective utilization of the products of law enforcement research. Our concern should be how to combine these products with computers, and not be solely concerned with the role and impact of computers. In these terms, we agree with Colton in the following assessment:

"Surely the computer is here to stay, but it would be a mistake to think that it will play a major role (at least in the short run) in revolutionizing

the police forces or many of the major issues that they face. The conditions of police departments are, to a large extent, determined by the conditions of our society. As a consequence, the computer will have only a marginal impact on their ultimate problems. Improved efficiency, shorter response time, better investigation of crimes, and improved management may be some of the benefits that will result. However, the bigger law enforcement issues, such as the prevention of crime, the handling of offenders, police-community relations, etc., must still be resolved in the larger context of the society as a whole. Further, from the visits to police departments conducted as a part of this study it was learned that the general nature of each department and the variations from city to city have a major impact on the use and acceptance of the computer. Thus, in many departments the traditional nature of the police force may have a larger effect upon computer operations than the computer will have on the police."

POLICY TOPIC: Police Administration and Management--Team Policing

TITLE: The Realities of Police Work

AUTHOR: John A. Webster

PUBLISHER: Kendall/Hunt Publishing Company, Dubuque, Iowa

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ABSTRACT:

A study of the actual tasks and activities engaged in by the Patrol officers of a medium sized California City (Baywood) over a period of 54 weeks during 1967 (mainly). The study examines the Communications Section's records of dispatches to all patrol units over that period and analyzes the content by type of activity and time elapsed in performance. Activities are classified into six major categories: Crimes against Persons; Crimes against Property; Traffic; On-view (patrol initiated activity); Social Service; and Administration.

Results show that patrol units spend over half (50.19%) of their active time engaged in administration tasks--including meal and rest breaks among these. Another 13% was spent on Social Service tasks, which nearly matches the 14.82% of time spent in dealing with Crimes against Property. Only 2.96% of patrol time is spent on Crimes against Persons, the category about which one hears most and patrolmen consider their major task.

The discussion indicates that there should be some reconsideration of the policeman's role and some analysis of the need for restructuring the training approaches for patrolmen. Training should perhaps be modified to include training for social and administrative tasks--with special emphasis on human relations and services aspects.



## INTERNAL VALIDITY EVALUATION

### The Realities of Police Work

by

John A. Webster  
1973

#### 1. Research Goals, Objectives, Policy Issues

This book describes an investigation of the current activity requirements of patrolmen with consideration of possible restructuring of patrolman's job, so as to correspond more closely to the crime-fighter image, or of the patrolman's training and self-concepts, so as to correspond more closely to the realities of policework, including the large requirement for social services.

#### 2. Face Validity Check

The study covers the data accumulated by Communications Section reports of dispatches of patrolmen over 54 weeks of 1967+, without specification of the exact period by start and finish. Data recorded were the basic identifying codes for each of 109 possible events/reasons for dispatch, for both primary assignment to the event and backup assignment and the time required to complete each assignment. These basic data were analyzed as to category and types of activity and for percentage of time consumed within each category.

The study appears basically valid in that the source of data was primary and the analysis performed is straightforward and to the point of determining what patrolmen report that they really do on patrol. The analyses reported appear satisfactory to the complexity (categorization level) of the data and in general, but not always, the interpretation and conclusions drawn from the data are reasonable and supported by the data. Some interpretations are made in relation to other data, from referenced sources, and in terms of personal biases. These do not invalidate the actual data and the direct implications thereof, nor negate the value of much of the discussion.

#### 3. Methodology

All dispatches for the 54 week period were recorded on IBM cards and the data were reduced at three week intervals. The resulting 18 reports, containing the events by code number, with the frequency and elapsed time of both the primary patrol assignment and any cover assignment, were then compiled into one data base. The data base was then analyzed by the 109 specific event codes, grouped into six categories of activity: (1) Crimes against the Person; (2) Crimes against Property; (3) Traffic Assignments; (4) Patrolman-initiated Events, Social Service Events; and (6) Administration. Frequency and consumed times for the primary assignment and the cover assignment were analyzed by code and category.

Analysis consisted of determining the frequency and percentages of occurrence of each event code and for each category and of the times elapsed for each code.

Although data were analyzed by all of the 109 codes, results are reported mainly by the six categories and by some groups of codes within these. For some categories, especially the two crime categories, results are reported by specific crime categories, for others, the groups are rather broad, as in the administrative category.

#### 4. Data Requirements and Data Utilized

For the purposes of a time study/task analysis, the frequency of performance and the times required for performance are appropriate data types. Were it intended to estimate anything about the effectiveness of task performance, criteria for task performance would have to have been established and examined. This was not desired in the present study.

The purpose was to establish, on an overall basis, what kinds of activities were engaged in and to what degree by the total patrol force of the Department. Obtaining the data directly from the dispatcher, who initiated and recorded the start and finish of each activity appears to be the most direct way of accomplishing this without interfering with the patrolmen's activity.

The only inadequacy in the data used appears to be the lack of information on whether patrol vehicles were manned by one or two men. Apparently this varied and was not readily known by the dispatcher. At least it was not analyzed. Such information would yield even more definitive data on the total amount of patrolman time spent in each activity category. As is, the study only indicates the proportion of total patrol vehicle time spent in each activity without directly equating to or relating to patrolman time. No attempt was made to estimate the frequency of teamed vs. single patrol operations, which may have been impossible. Such clarification would be desirable in future study of this problem.

It should be pointed out that while these findings for "Baywood" are interesting in and of themselves but should not be taken as necessarily typical of any other city of similar size. No norms of arrests within the categories broken out in this report are given for cities in general, so that the percentage of patrolmen's time spent on any of these categories undoubtedly reflect local laws, moves, and current citizen's concerns. Thus another city may well vary considerably. The author's claim that this book is the answer to the question "What is police work" therefore, needs qualifying by saying that this gives the answer to what is reportedly police work in Baywood.

A further concern is that the 54 week reporting period used might result in a slightly distorted distribution of calls. This if, for example,

the last 2 weeks in December are repeated for a second year, undue emphasis on shoplifting and any other seasonal crimes might have been reported.

#### 5. Experimental Design and Controls

The basic observational (record keeping) design was followed throughout. Data were recorded directly by the best available observer, who was also the person who defined the code applicable to each event (except for patrolman initiated events). This was probably the most direct and objective way to obtain the basic frequency and time data without affecting the basic distributions. Any form of record keeping by patrolmen themselves or by riding observers might have affected the data.

Such observation or self reporting could have been used either simultaneously or subsequent to the period of data collection to determine such effects. Obviously, this question would be meaningful for conduct of future studies. Also, riding observers would have been able to collect some data about effectiveness of performance in addition to time elapsed. Such data as ratings of success, by observers or by citizens, would perhaps make the study data more meaningful for other Departments.

In general, for initial determination of patrolman activities and time usage, this design was appropriate. Further, the analysis of the

overall proportions of time and patrol effort is justified for this purpose. However, for future studies, additional data about the number of persons in each vehicle would be desirable, to yield an analysis of total effort expended by the individual patrolman. Similarly, individual events might have been analyzed, instead of what appear to have been sums of events within codes. That is, individual events' elapsed times could have been studied and the distributions and variances examined. And, likewise, individual patrol vehicle (or team, or man) performance could have been studied to examine the variations by code type and by patrol unit. These additional analyses would have yielded more detailed information on ranges of variation of performance by both category code and unit. Such additional information might be even more valuable for review by researchers and other Police Departments, in addition to the summary data available in this study.

#### 6. Results and Recommendations

Overall results showed that patrolmen spent nearly two thirds of their patrol time in social services and administration, with over half of the consumed time spent in administrative duties (actually over 30% of the time was spent in meal breaks and rest breaks, recorded under the administrative category).

The basic distribution of percentages of event frequencies and time consumed across the six categories was:

	Frequency*	%Frequency*	%Consumed Time
Crimes against Persons	11,060	2.82	2.96
Crimes against Property	66,160	13.76	14.82
Traffic	40,997	7.16	9.20
Patrolman-initiated Events	117,853	19.68	9.10
Social Service	unreported	17.27	13.70
Administration	unreported	39.28	50.19
	540,481		

Thus, even adding the 9.10% time spent in patrolman initiated events to that associated with crimes against persons and property (17.78%), the patrol units spend only an average of 26.88% of their time in dealing with crime on the streets, etc. Less than a third of active time on patrol is so expended.

Overall, 540,481 events were recorded during the 54 week period. Added to this number of primary assignments were 58,730 cover assignments, which were for one or more backup vehicles to assist the primary patrol unit at the scene of the event. The primary assignments consumed 277,475 patrol hours (not patrolman hours) while the cover assignments consumed 23,652 patrol hours.

Results are discussed by many of the individual event types and a general discussion of the relationships and of patrolman and officer reports is presented. A major report by officers and patrolman is the complaint that the patrolmen are "order takers" and reporters rather than

\* Frequencies are for actual event occurrence, while the reported % frequencies are for the combination of primary and cover assignments to all events. Dividing the category frequency by the total frequency may not yield the figure shown as % frequency.

law enforcers. This is based on the (observed) frequencies of services and the high reported frequency of simple report preparation even in dealing with actual criminal events. Most frequently, the offenders in crimes have left the scene of the crime before the patrolman arrives. He then collects information and prepares reports to be turned over to the detective division for investigation. These perceived roles are apparently frustrating to patrolmen, apparently wishing more involvement in glamorous and herioc aspects of law enforcement.

A major conclusion of the study is that patrolmen provide much more social service contacts to citizens (even though frequently only to answer questions about problems, etc.), than they are trained or inclined to handle. Further, they are heavily engaged in administrative work, reporting and paper pushing, to the necessary exclusion of crime prevention or patrol.

This leads to the overall conclusion that while "the object of patrol is to ... eliminate or reduce the opportunity for misconduct and to increase the likelihood that a criminal will be apprehended (in the act on immediately after)," patrol operations in Baywood and most other American cities do not accomplish this object. Webster concludes that the data indicate that incorrect emphasis is being placed on the policemen in the role of crime fighters, involved in daily dangerous activities requiring the use of force and violence. The data show that crimes of violence occupy only about 17% of the patrol time (or approximately 81 minutes per eight hour day.



The discussion then leads to personnel utilization and the potential use of non-sworn personnel to accomplish some of traffic and administrative responsibilities (such as locating and removing abandoned autos). Webster also discusses the need for increased experience and training in social service areas for patrolmen, based on the data.

As conclusion and recommendation, Webster states "serious reevaluation of police recruitment, training, and duties is needed so that the attitudes about and responses to police work held by the public and police themselves reflect actual police activity rather than an image which bears little resemblance to the reality of a policeman's role."

#### 7. Discussion

Although some of the interpretations and conclusions of this report are obviously drawn from or extended by material other than the actual data, the overall impact of this study appears to be valid and of value. The examination of what patrolmen do, and how often, and how much they do it, is a preliminary step toward defining detailed job and training requirements. The findings that patrolmen spend large portions of their patrol time doing things far removed from dealing with violent crime suggest need for some revisions to current concepts of both patrol operations and training for such.

These data and the discussion thereof seem to strongly suggest that the patrolman's job, while including real danger and risks, may

consist largely of tasks requiring social skills, patience and understanding. This suggests as the author concludes, that there should be a reevaluation of the current concepts and programs for training patrolmen and policemen in general. Thus, it appears that the requirement for large portions of social contact with non-criminal population and/or with persons suffering from mental illness or social deprivation should be provided for thorough specialized training and experiential sessions to develop understanding and coping skills.

In particular, social service training is not part of most training programs and yet the patrolman in Baywood spends nearly as much time involved solely in such activity (13.70%) as dealing such as rape, assault, robbery, etc., the patrolman must also deal with comforting or calming victims, much more often than with apprehension of criminals, the total proportion of time requiring social skills is higher than that. Webster concludes at one point: "It is unfortunate for the policeman as well as for the public that he spends more training time learning to fire a pistol than learning to handle a drunk, a person who is mentally ill, or a family fight."

The obverse of this is that the patrolman's job be so defined that he will be primarily a crime prevention and law enforcement agent and that the municipal governments establish another mode of accomplishing the multitude of social service tasks now falling on the police.



Either solution would lead to more realistic relationships between personnel task requirements and training programs. Either train to meet the task or change the job to meet the training and goal statements of police departments. However, the latter change, in what policemen must be called upon to accomplish may not be possible.

**CONTINUED**

**1 OF 10**

POLICY TOPIC: Police Administration and Management--Team Policing

TITLE: Neighborhood Team Policing

AUTHOR: P. B. Bloch and D. I. Specht

PUBLISHER: The Urban Institute, Washington, D. C.

VOL. /NO.:

DATE: May 1, 1973

NO. PAGES: 300

ABSTRACT:

This report is a practical manual and theoretical guide to neighborhood team policing, a method of decentralizing police departments in order to hold a team commander and a team responsible and accountable for the quality of police service and control of crime in a neighborhood. Chapter I is a summary of current knowledge about neighborhood team policing and a description of what the authors believe would be an ideal neighborhood team policing system. Chapter II describes the neighborhood team policing programs of several police departments. Subsequent chapters suggest methods and procedures for: planning and implementing neighborhood team policing; administering an ongoing program; training and education; lines of authority and methods of supervision of neighborhood teams; running a neighborhood team; constructing a project budget.

Appendices describe suggested operational guidelines, a format for team commander reports, a model proposal to LEAA action funds, a case study of a N. Y. City team, a way of organizing a referral guide for use by police officers, and a description of a training program implemented in St. Petersburg, Florida.

## INTERNAL VALIDITY EVALUATION

### Neighborhood Team Policing

P. B. Bloch and D. Specht  
May 1, 1973

#### 1. Research Goals, Objectives, Policy Issues

This study was not meant to represent research in the sense that hypotheses were put forth to be tested, and as such, cannot be reviewed in our framework for internal validity. However, due to importance of the concepts covered, it was felt that the paper should be discussed.

This report addresses the issue of how basic law enforcement services should be provided by detailing an alternative known as neighborhood team policing, i. e. a way of decentralizing police departments by breaking up relatively large divisions or precincts into teams with 20 to 40 officers and officials, with a team commander who is held responsible and accountable for the effectiveness of his team. The team responsibilities are to control crime, improve community relations and to provide essential police services. Here, neighborhood team policing is viewed as a way to go and alternative modes of delivery of service, other than the classical urban mode, is not discussed nor evaluated in any sense. It is our opinion that the issue here should be the selection among a range of alternatives that can vary by city and department.

#### 2. Face Validity Check

The authors note that current information available on team policing is mostly anecdotal, few evaluations have been reported, and that in general, the results are not scientifically satisfactory. Overviews of team policing experiences in 11 cities are given, plus some of the risks of the team method are cited, e. g. resistance by elements of the department, increase risk of corruption. However, the tone of the presentation is definitely pro team policing, i. e. it is a good thing for just about all departments. The authors' do warn the reader that the validity of their recommendations are not based on hard evidence, and a national research effort is required to determine the conditions under which neighborhood team policing represents an improvement over other methods of police organization. Such caveats are weak in that the report attempts to detail how a police department can and should implement neighborhood team policing.

In their survey of team policing, the authors' introduce the misleading concept of an "Ideal City" which is considered to have adopted the recommendations in this book. It appears as if the authors feel that neighborhood team policing can be applied anywhere, i. e. the Ideal City has from 50,000 to 9,000,000 people and a police force from 100 to 35,000 officers, and the team area description is "any area."

### 3. Methodology

The report is not a systematic attempt to investigate and evaluate the neighborhood team policing concept, but represents the authors' views on how a police department can go about instituting such teams. A narrative description of the on-going teams in 11 cities is given, including short statements of what, if anything, each city was doing in terms of evaluation.

The report is put forth as a method of decentralizing police departments in order to improve police-community relations, increase effectiveness in controlling crime and improve the police officer's satisfaction with his job. No evidence is presented to support these statements.

### 4. Data Requirements and Data Utilized

For the 11 cities, summary tables are given that describe and compare the characteristics of each city's program. One important characteristic is a city's evaluative approach. As there are wide differences in each program, it is unclear how the planned evaluations will enable us to generalize any conclusions. As the Cincinnati experiment appears to be the best planned and funded (due to a Police Foundation \$1.9 million grant), its evaluation alone will be looked at as being the definitive one on neighborhood team policing.

### 5. Experimental Design and Control

As noted, this study was not to evaluate any specific neighborhood team policing approach, but represents the authors' views on how to go about setting up a team program. Of interest here are the views taken with respect to measuring a program's effectiveness.

The authors note that if a department is committed to the concept, it may have little desire to evaluate its effectiveness and relatively little is to be gained from gathering information which is unlikely to affect future decisions. However, if there are competing programs, then they should be constructed in an experimental and controlled sense so that "treatments" can be compared. They also offer an extensive list of performance measures which should enable evaluators to determine the effect on crime, the number of criminals apprehended and prosecuted, attitudes, police attitudes and job satisfaction, and the quality of police service. These data are to be gathered from police and court records, surveys and by the use of external observers.

What needs to be faced in this area, as well as other programs which change field operations, is both the value of conducting experiments and our ability to really conduct controlled experimentation in this complex social environment. We offer the thought that directed and purposive change, i. e. the continuing attempt to try new things, is in itself a proper thing for a department to do always. But some basic mode of evaluation,



agreed to beforehand, reasonably easy and inexpensive, must be a requirement of the program. We do not, as yet, know what such a basic mode of evaluation should be.

#### 6. Results and Recommendations

The report describes in detail a proposed approach to planning and implementation of a neighborhood team, much of the description dealing with organizational, community and individual officer concerns. Many possible problem areas are highlighted, e.g. potential union opposition, with general advice forthcoming, e.g. "...a department should face reality that it can accomplish only what its officers support."

As part of the neighborhood team policing concept, the authors call for a new system of education to be provided by a department and to involve all officials and officers in a training program which will spread the concept of neighborhood team policing through the ranks. The authors feel that an on-going continuing educational program on all aspects of the program, emphasizing team meetings and discussions, must be an integral part of the program and essential for its success and continuation.

Discussions are also given on guidelines and objectives, evaluation, team organization, how to organize a task force for initiating the team concept, and how to prepare a budget. Much of this appears to be based on the Cincinnati approach to team policing which is now underway.

#### 7. Discussion

This report represents a compendium of information concerning the neighborhood team policing concept. Most of it is not factual, and represents the authors interpretations and implications that team policing, as they define its objectives and goals, is the preferred way to organize almost any urban police department.

We are struck by a table which contrasts the old method of policing with neighborhood team policing. The impression one gets is that all good things are found in the team policing column, and that the "old method" is rather militaristic and infeasible in its approach. We argue that old method cannot be characterized by reactive policing (responding to calls) or aggressive policing (stop and frisk and street interrogations), while team policing is decentralized planning (crime analysis, use of plain clothes or special tactics, investigations, preventive programs, referral programs, service activities). Also, that the old method is centralized planning (innovation through orders from the Chief or other important official). The old method (we define it as current practice) allows for all types of variations and experimentation (granted not in all cities and not for all parts of a city) and can even allow for neighborhood team policing being a part of its mode of operation.

Although some mention is made of evaluating a proposed program to initiate team policing versus other possible programs, plus the recognition that any new program needs care and nurturing to be successful, there appears to be little concern as to how a team will impact the total effectiveness of the department. Police, as well as other municipal services, are measured as to their efficiency, effectiveness, equity and responsiveness to the needs of the community. A team localizes these measures and could degrade the department measures. For example, a team is admonished not to take any calls outside of its area except emergencies, and the dispatcher should indicate to the caller of a nonemergency situation that the call is being delayed in order to have a neighborhood police unit to handle the call. We submit that the neighborhood citizenry would soon be making all calls an emergency. The ability of the department to respond to all calls within a certain amount of time and the delivery of equitable service must be considered in establishing operational groundrules and measures.

Proper concern must be given to officer progression through the ranks. An assumption of the neighborhood team approach is that a team is responsible for all law enforcement activities in its neighborhood and can provide all services. Thus, a detective, investigator, etc. are all part of a team, and an officer can progress and be promoted to these areas.

The authors call for the integration of detectives into the patrol division as it should improve the morale of the department and create a greater commitment to common goals; and detective-patrol rivalries will be reduced and patrol officers will become better trained in investigation. We do not know if these assertions are true; also we might find patrol officers being afflicted by the Dick Tracy syndrome in that their time is spent on solving crimes, not in activities which can prevent and deter crimes.

It is clear that under proper supervision a team can be effective in certain areas. Much of this depends on supervision, commitment and rewards, items which the authors recognize and comment on in detail. What is unclear is whether a team approach should be initiated and what resources are required. There is an implied assumption that a police department operating under the old method with a certain level of manpower, can convert to the team approach with the same manpower (with some retraining). A team would ordinarily be assigned a number of men based on standard, proportional allocation methods. But will that number be sufficient to do the job? Or do we tacitly redefine the team objectives based on such allocations? Are we trying to be more efficient (do better with the same resources) or be more effective (alter the agreed upon measures with possibly changing resources)?

An appendix of the report contains a sample grant application, drawn up by the authors, for a department interested in testing the team

concept. The objectives are to test the concept and methodology under experimental conditions for a period of one year in order to determine its effects on the solution of criminal offenses, community attitudes to the police and patrolmens' attitudes toward their work. The purpose of these objectives is to enable the department to determine if this method results in more effective utilization of patrol resources than existing methods and should be implemented city-wide. Decrease in crime is not expected, in fact an increase might be reported due to citizen involvement.

We are concerned that a success would cause the city (here the authors) to go all the way. There is no evidence that a team project in selected neighborhoods means that it will work throughout a city. In fact, the complete teaming of a city under the experimental guidelines could prove quite detrimental and inoperative.

In sum, this report represents the authors' views of team policing and how to set up and evaluate a project. The reader should recognize that at this writing there is no basis for claiming a team approach is a better law enforcement practice over other organizational and operational arrangements. It is difficult to keep the authors' good methodological statements in focus when they are beclouded by such disputatious and interpretive statements like "...the officer should treat people as criminals only when their acts are serious enough to demand criminal

treatment. Crimes committed by adults against strangers usually deserve criminal treatment. Crimes against loved ones sometimes do not." Also, "Increased prosecution of less serious criminal cases may interfere with the investigation and prosecution of more serious criminal cases. Time spent on one type of case will not be spent on the other. Citizens irritated by petty prosecutions may be less likely to cooperate in serious cases. Furthermore, less serious cases will add to the court backlog. These will increase the delay in prosecuting serious cases. The team should assist the court by not unnecessarily cluttering its docket with less serious cases."

POLICY TOPIC: Police Administration and Management--Team Policing

TITLE: Team Policing: Seven Case Studies

AUTHOR: L. W. Sherman, C. H. Milton and T. V. Kelly

PUBLISHER: The Police Foundation, 1015 18th Street, N.W.  
Washington, D. C. 20036

VOL./NO.:

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NO. PAGES: 108

ABSTRACT:

This is a case report of seven cities' efforts to implement some form of team policing. The study describes each of the seven efforts and examines those elements which contribute to successful and relatively unsuccessful team policing. In addition, the report analyzes the operational elements common to most team policing efforts in relation to certain organizational elements deemed necessary to their implementation.

The case studies include: two small cities--Holyoke, Massachusetts and Richmond, California; two middle sized cities--Dayton, Ohio and Syracuse, New York; two large cities--Detroit, Michigan and Los Angeles, California; and--New York City. Data on what was done in each team policing effort and how it was implemented in each city form the input to the descriptions and the analysis. There are no hard data as to the effectiveness of the efforts, rather the emphasis is placed on what and how the cities tried in team policing and what the departmental and public reactions were.

The conclusions indicate a favorable relationship between success in creating organizational changes to support team policing and actual success in achieving the operational goals of the efforts. Where the departments managed to achieve their organizational supports to some degree, they were also usually able to achieve some of their operational aims.

Major obstacles to team policing stem from non-cooperation within the departments. And major aids to potential implementation derive from detailed involvement of department members in development of the program and from development of adequate training programs for team police forces.

The study presents some interesting thoughts for police forces considering team policing. The discussion should be helpful to such considerations and detailed team planning.

## INTERNAL VALIDITY EVALUATION

### Team Policing: Seven Case Studies

by

L. W. Sherman, C. H. Milton and T. V. Kelley  
August 1973

#### 1. Research Goals, Objectives and Policy Issues

This study is directed toward the overall goal of increased police effectiveness and reduced crime through improving police-community relations. It proposes that more responsive and more effective patrol and other police services may result through implementation of team policing, or neighborhood police teams concentrating in a restricted service area or community. It is also believed that this issue of team policing can lead to increased citizen cooperation and support for the police within the community.

#### 2. Face Validity Check

This study contains descriptions of team policing efforts in seven different cities. It also presents an analysis of the elements of team policing and of the supports necessary to make it most effective. Each case study discusses these elements and the overall discussion relates the efforts and their relative successes.

As a descriptive study of current and recent experiences this report appears well conceived and well presented. Studies reported support the discussion and the conclusions presented. The study is not truly evaluative, rather its aim is to report and suggest that these results might stimulate other departments to consider team policing. As such the study appears both valid and valuable. Further discussion of the related evaluation studies referred to in the report would make the overall impact of this study greater for the average reader.

#### 3. Methodology

The report is intended to examine and present the attempts to implement varieties of team policing in seven American cities. The basic methods used are the case study approach to each city combined with analysis of the similarities and differences in implementation and effectiveness of the approaches. The analysis includes a definition of the three basic operational elements believed to comprise team policing (geographic stability, maximum team member interaction, and maximum communication with community) and the four organizational supports believed essential to its success (unity of supervision, lower-level flexibility in policy-making, unified delivery of services, and combined investigative and patrol functions). Each of the seven cities are discussed in relation to their incorporation of these elements and their success in meeting their local objectives.



The study examines the team policing experience on a case basis to formulate some preliminary indications of why team policing has worked well in some places and less well in others. The seven cities studied were: two small cities--Holyoke, Massachusetts and Richmond, California; two middle sized cities--Dayton, Ohio and Syracuse, New York; two large cities--Detroit, Michigan and Los Angeles, California; and New York City. Each city was studied by staff members for from two to six days, with a minimum of 16 hours spent on patrol. Officials at all levels were interviewed, as were community leaders and residents, and relevant documents were reviewed. Initial data were collected during 1971 and follow-up data were collected in 1972 and early 1973.

Data collected were not statistics but rather descriptions and evaluation statements. Analysis does not compare city programs except in relation to the degree of implementation of the operational and organizational elements and the kinds and degrees of success obtained. The case studies concentrate on what was done and how, rather than on the results in terms of crime reduction, etc. This is consonant with the stated intention of the study.

#### 4. Data Requirements and Data Utilization

Were more time and effort available for this comparison of the seven team policing efforts, the study could have made much more extensive and perhaps more meaningful comparisons. No attempt has been

made to examine or compare crime statistics, detailed attitudes of police or community persons, victim reports of crime, nor any direct measures of police effectiveness. Such comparisons would have been useful in support of the discussion of the good and bad aspects of the implementation of team policing in the various cities; however, without a pre-team data base, figures gathered after teaming have no basis for comparison.

For the purposes as stated, the data used are probably adequate for reporting what was done, how it was done and some subjective evaluations of the effects. They are sufficient to communicate a flavor of the modes of police operation used in the different cities and some of the problems and strengths associated with each of the implementations. These data are insufficient to indicate that team policing should or should not be instituted in any community. They do, however, suggest that if one is considering such methods of policing, the experiences described here may assist the planning, development and evaluation of such new implementations.

Future studies should be planned with due care and concern for the evaluation component (as the authors advise, in Chapter VI: Evaluations). Such reports as the present one, bringing experiences from several points and projects together for the interested audience, should also include some of the detailed data drawn from the existing evaluations (as referenced, but not reported, in the present report).

## 5. Experimental Design and Control

The case study design was used with no collection of baseline data and with no form of control, except casual comparisons drawn between the areas where team policing was used and those where it was not. A more comprehensive and satisfactory report of the implementation and effects could have been developed through application of a pre-post design, given the time and opportunity for collection of baseline data. This is not fair criticism of the present study, since this study was conceived and generated after team policing implementation in most, if not all, of these cities. There was no opportunity for design of the study in the experimental sense. One further source of bias exists in that in three of the seven communities involved in this study, the team concept was introduced and guided largely on the policy recommendations of Patrick V. Murphy (Chief of Police in Syracuse and Commissioner in Detroit and New York).

## 6. Results and Recommendations

Team policing, as studied here, involves the attempted implementation of three basic operational elements that differ from conventional policing. The elements are:

- (1) Geographic stability of patrol, i. e., permanent assignment of teams of police to small neighborhoods,
- (2) Maximum interaction among team members, including close internal communication among all officers assigned to an area during a 24 hour period, seven days a week, and

- (3) Maximum communication among team members and the community.

According to the analysis, those departments which were most successful in their projects also had in common four organizational support elements:

- (1) Unity of supervision of the team,
- (2) Lower-level flexibility in policy making,
- (3) Unified delivery of all police services in the neighborhood, and
- (4) Combined investigative and patrol functions in the team.

Table 1 taken from the study summarizes the results for each city with respect to planning and attaining each of these elements.

TABLE 1

SUMMARY OF ELEMENTS  
(The following summarizes the elements of team policing in each city.)

Operational Elements	Dayton	Detroit	New York	Syracuse	Holyoke	Los Angeles (Venice)	Richmond
Stable geographic assignment	+	+	-	+	+	+	•
Intra-team interaction	-	+	-	-	+	+	+
Formal team conferences	-	+	-	-	+	+	+
Police-community communication	+	+	-	-	+	+	•
Formal community conferences	+	•	•	-	+	+	•
Community participation in police work	+	+	+	•	+	+	•
Systematic referrals to social agencies	+	-	-	•	•	•	+
<i>Organizational Supports</i>							
Unity of supervision	+	+	-	+	+	+	+
Lower-level flexibility	-	-	-	+	+	+	+
Unified delivery of services	+	-	-	+	+	+	•
Combined patrol and investigative functions	+	+	•	+	+	+	+

Key.

- + the element was planned and realized
- the element was planned but not realized
- the element was not planned

These data support the contention that those cities which successfully provided the organizational support elements were more likely to accomplish their plans with respect to the operational elements. This may be especially true for the element: unity of supervision. However, it is clear from the Table that realizing the organizational supports did not assure operational element achievement in Syracuse, even though this appeared true for Holyoke, Los Angeles and Richmond, and partially so for Dayton.

The following paragraphs summarize the major points of the report.

Of prime importance to success is the development of specific goals and objectives for the program and the planning of how the program will accomplish its goals. The main point is that as much of the department should be as involved in these developments as possible--preferably down to the patrol officers themselves. This involvement in program planning and development leads to support rather than resistance, and resistance was found to be the most deleterious factor in these studies.

Specific goals for the team policing effort are also necessary to determine the content of training, the next most important element in program development and success. Proper definition and administration of training programs appeared to be somewhat lacking in each of these cases. Although the specific lacks were various, there were limitations

in performance which appeared related to partially inadequate training.

As stated: "The experience of seven cities indicates that the basic elements of team policing cannot be achieved without training. (Whatever the form of training)...it is essential." And, "Experience also indicates that the process of training may be much more significant than the subjects taught." This suggests that involvement of the potential team members in training in relation to the requirements of the job is the necessary condition (although perhaps not entirely sufficient). The most successful training appeared to involve field visits to other cities to see their progress. The experience indicates that training had been mainly limited by the imagination of the trainers, rather than by limitations of trainees; and, where not well implemented, has led to decreased effectiveness of team policing.

Actual implementation of the plan also caused some problems for the cities. Among these were: difficulties in achieving stability of assignment in a neighborhood; development of a good team relationship with the community; interaction with citizen groups wanting to assist on patrols; the role of team members as investigators; difficulties with moving from traditional control-directed supervision to newer modes demanding supportive supervisor activities; problems associated with communications within the team caused largely by shift and watch problems; and, the special problems associated with the need for establishing and maintaining

team flexibility at the neighborhood level. Many of these problems were attributed to the failure of teamleaders to perform as directed and desired. However, many of these leader failures were themselves attributable to factors in the larger organizational context, rather than to individual incompetence or motivational aspects. The major organizational obstacles to successful team policing were middle management non-cooperation and resentment; resistance by peers not involved in the teams; and problems associated with the dispatcher system.

Team policing is a form of decentralization which gives less power to mid-management than did centralization. Mid-management personnel often impeded the achievement of the team policing goals because of this. Were mid-management personnel more directly involved in the planning and development of the programs, they might have been won over to cooperation. The power at each level could conceivably be expanded simultaneously, especially if management took upon themselves the major support function for team policing activities instead of being concerned about the loss of control functions. In this way, mid-management would gain power rather than lose it.

Peer resistance to team policing arose mainly from not being involved in the development or implementation of the concepts and feelings of being left out, discriminated against, as compared with the team police groups. The left out portion of the

force generally objected strongly to team policing, especially where team policing split a district or precinct. Opposition mainly took the form of political action and verbal criticism rather than overt acts against the team members or groups. The field cooperation of the non-team patrolmen generally was not affected; support to the teams being readily provided when required.

Dispatching activities were responsible for much of the cross area and out of the neighborhood calls that team patrols had to take, and this resulted in lessened effectiveness in most cities. The dispatching problem was not necessarily intended, but resulted from the pressure under which the dispatcher must work to assign and record calls. Dispatchers must be converted to the awareness that neighborhood cars must stay in neighborhoods. This was difficult to learn in most cities. Cars were frequently called out of the districts, partially because they were more available because of the flexible staffing of the team and their assignments. Assignment to shifts and watches based on workloads resulted in less pressure on the team personnel than on non-team personnel usually assigned on a uniform basis around the clock.

The conclusion is that team policing as a decentralized professional patrol style has not truly been achieved in any of these cities--a function of the depth of the change represented in the attempts. Failures are related to the above obstacles: mid-management resistance and (sometimes)

subversion; dispatching, and, the failure of patrols to be sufficiently clear as to how their role and behavior should differ from that of a regular patrol--combined with resentment of a group considered elite by their peers.

Also: "There is at present a great concern among police forces and in American cities at large to consider change, to make police officers more responsive to the community. Whether a specific community should adopt team policing, however, depends first on that community's goals and second on that community's judgment of team policing's effectiveness within its own situation. Most of all, it depends on both the commitment and the available resources to manage a complex process of institutional and community change."

## 7. Discussion

This is an interesting report of seven "experiments" (better called innovations) in team policing that partially failed. The report should be useful to persons interested in deciding whether they might try team policing. There should probably have been more discussion of what team policing really is or isn't--the current set of seven approaches seemed all to be relatively unique, at least in some aspects. Perhaps a more explicit description of the responsibilities and activities of each team policing group would have made the concept more understandable.

The analysis of the elements of team policing, while useful, is not necessarily a description of what team policing should be--or of the common elements of teaming in the several cities.

Several major implications of the study were not explicitly stated as recommended items but should have been. These include the basic point of explicit involvement of all levels of the department in planning and development for team policing. Also, the major requirement for analysis of behavioral requirements and specific training to fill these should have been reiterated as basic to the development of team policing.

Overall, the study report is internally consistent and should be a valid addition to guidance to departmental planners in relation to team policing efforts. The data are not, obviously, rigorously evaluative, but neither are the recommendations and conclusions dictating implementation of team policing nor decrying its possibilities. The report does what it purports to do: it examines the data available about seven team policing efforts and summarizes these for the reader's review, appraisal and evaluation.

A detailed review of the available hard evaluation data about these seven cities would be highly desirable. Such a study should be conducted and reported as a supplement to the anecdotal, analytic-descriptive presentation given here. It would be particularly interesting to obtain



data on both crime occurrences and citizen attitudes in the experimental areas and the rest of the cities for comparable periods.

For additional valuable information on these innovative attempts at team policing, the reader is referred to the specific reports on the individual cities that are referenced in this report. These are as follows:

- (1) Detroit: "The Beat Commander Concept," The Police Chief, September 1972, by Peter B. Bloch and Cyrus Ulberg, Urban Institute.
- (2) New York: Evaluation of Operation Neighborhood, Urban Institute, Paper No. 4000-3, December 1973, by Peter B. Bloch and David I. Specht.
- (3) Syracuse: Final Report: Crime Control Team II, OCCP Proposal No. 433, November 1970 to February 1973, prepared for the New York Office of Crime Control Planning by Syracuse Police Department, 1973.
- (4) Holyoke: Evaluation Report on the Holyoke Team Police Experiment, by Helen Campbell O'Malley, Holyoke, Massachusetts: Holyoke Police Department, June 1973.
- (5) Richmond, California: "Team Policing--Four Years Later," FBI Law Enforcement Bulletin, December 1972, by Lourn G. Phelps and Sgt. Lorne Harmon.
- (6) Dayton, Ohio: Community Centered Team Policing: A Second Year Evaluation, by Thomas A. Tortoriello and Stephen J. Blatt, Dayton, Ohio: Communications Research Associates, April 1973.

Although some of these specific reports have been examined, they are not being reviewed in detail because of the conciseness of this survey report and the lack of quality of evaluation shown in those reports examined, which corresponds to the reports of the authors of the present

research. The reports present some data which might well be of interest and support the conclusions reported here, but there are poor, if any, experimental comparisons which allow meaningful interpretation of the rather limited evaluative data.

POLICY TOPIC: Police Administration and Management--Team Policing

TITLE: Evaluation of Operation Neighborhood

AUTHOR: P. B. Bloch and D. I. Specht

PUBLISHER: The Urban Institute, Washington, D. C.

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ABSTRACT:

In January 1971, New York City launched a neighborhood team policing program called "Operation Neighborhood." At that time, a single precinct was divided so that a sergeant and a team of patrolmen would have twenty-four hour responsibility for police service in a neighborhood. The objectives of the program, which included over 62 teams and over ten percent of all patrol officers were:

- To control crime more effectively,
- To increase community cooperation in crime control,
- To improve police-community relations,
- To tailor police operations to the needs of local communities,
- To increase police officer job satisfaction,
- To improve the working relationship between patrol officers and their immediate supervisors.

The goals of neighborhood team policing require substantial change throughout an entire police department. Neighborhood police teams (NPT's), as implemented by New York City, changed the roles of patrolmen and supervisors and altered the entire organization of the patrol function. Training, vehicle dispatching, planning, and community relations all are part of the Operation Neighborhood concept.

This paper reviews the Operation Neighborhood Police Team Project of the N. Y. C. Police Department. As the evaluation group was confronted with an ongoing project, whose growth and design was not under their control, we find that this is not an evaluation in the controlled experiment sense, but an attempt to study changes in an ongoing activity in order to determine what benefits, if any, result.

This evaluation had to rely on: (1) observations, inquiries, and judgments of the evaluators, (2) available data which often were ambiguous both because of how they were collected and because of the lack of adequate comparison groups to use as baselines, and (3) some limited surveys of police and citizens. All of this information is "management information." Although comparison precincts were selected, they are only roughly similar to experimental precincts and to volunteer neighborhood police teams. Therefore, data interpretation is more artful than scientific.

Operation Neighborhood apparently has led to a modest improvement in crime reduction and to more arrests by patrolmen. In general, this result has been produced without creating any basic changes in police job satisfaction or patrol attitudes. Looking at the variety of measures used in this report, one can infer that team members may be motivated to do more, but that the way they perform is very much the same as before they joined Operation Neighborhood.

## INTERNAL VALIDITY EVALUATION

### Evaluation of Operation Neighborhood

P. B. Bloch and D. I. Specht  
December 1973

#### 1. Research Goals, Objectives, Policy Issues

Neighborhood team policing is a police organizational concept which is a way of decentralizing police departments by subdividing districts into smaller geographical units in which are placed teams of officers, with each team supervised by a team commander who is held responsible and accountable for the effectiveness of his team and the law enforcement activities in the team's area. The objectives of the neighborhood teams program is to control crime more effectively by increasing community cooperation, improving police-community relations by tailoring police operations to the needs of the local community, and by increasing police officer job satisfaction and improving the working relationship between patrol officers and their immediate supervisors. This approach is contrasted to the "old method" of organization in that responsibility does not rest in one supervisor and that such items as training, community relations, decentralization and local patrol assignments are stressed more heavily in the neighborhood approach.

The N. Y. C. program was an attempt to implement the team concept with the purpose to determine if greater efficiency can be produced by granting authority to the precinct commander to assign sergeants and patrolmen to a specific area of the precinct. In addition, authority was granted to the Neighborhood Team to devise tactics for coping with the sector's crime and other police related problems.

One assumption of the N. Y. C. team program is that by granting greater authority to assist the public, and by assigning specific personnel to an area with the authority to do a job, in time, there will be an increase in cooperation and a reduction in apathy on the part of many of the people of the area.

The team approach, with its explicit purpose to bring the patrol officers back to the neighborhood (as were the foot patrolmen) and the designation of responsibility, represents the major organizational variation being considered by many police departments. This study was an attempt to obtain the information necessary to determine if this approach, as carried out by the N. Y. C. Police Department, does represent an improvement in police operations.

Although we criticize many aspects of this report, we want to emphasize that the research organization made it clear to the N. Y. C. Police Department that the evaluation would lack precision in its finding. Evidently the Department was committed to the team concept and felt that an experimental evaluation was not necessary.

## 2. Face Validity Check

This study is a vain attempt to bring some semblance of an evaluation framework to the NYC Police Department Neighborhood Team Policing Program. The authors were fully aware of the difficulties in performing the proposed evaluation, i. e. the program was started without any evaluative process and was well on its way before the evaluative team became involved. The evaluative organization wrote to the NY City Police Department that it might be "extremely difficult to tell whether any observed improvement will be due to the special quality of personnel in the project or to the basic design of the neighborhood team policing program."

The reader is warned rightly that any implied conclusions are not valid and the conclusions and recommendations (see below) are couched in cautionary terms. It is disturbing, however, to see this report discuss the evaluation process undertaken and the results presented as if proper evaluation methodology were actually applied. In order to have an adequate basis for evaluating this type of program's success, the researchers would have liked to develop an experiment with a random choice of personnel, a random selection of matched areas, and the collection of extensive baseline data and continuing data. There are questions as to whether or not you can ever run such experiments in the real police world--how can you establish controls on actual operations,

especially when the operations and outcomes are a function of bureaucratic, organizational and individual goals, most of which are in conflict with each other. Also, the cost, the cooperation of a department, the time required, and many related experimental requirements cause us to believe that true controlled experimentation of such programs may be impractical and its attainment a myth.

This concern should be faced by researchers and possibly a new evaluative approach is required. It would have been helpful if the present study contrasted the ideal evaluative framework and its process, i. e. what they would have done if all things were correct, with what they had to do on this study. We submit that they are not the same.

### 3. Methodology

Three principal types of measurements were used in the evaluation; a patrol survey, citizen survey and departmental measures. The team policing experimental groups were compared to some related comparison group (not control groups). The comparisons are termed rough by the authors. The patrol survey was designed to measure attitudes of patrolmen toward the community, toward their supervisors and toward their jobs; and observations of patrolmen about community attitudes. The citizen survey was to measure the citizen awareness of the program and to determine the program's impact on the area's citizens. The department

measures were arrest productivity, effect on crime rates, citizen complaints, absenteeism and the use of the patrol units to answer the calls in its neighborhood.

The authors note that the initiation of the team concept had serious implementation difficulties (no orderly planning, failure to implement patrol unit dispatch guidelines) and that conflicting activities were started (a career paths program which rotated officers regularly among precincts). We also note that four outstanding sergeants were selected to become the first team commanders.

The patrol survey was a set of questions which were administered three times on a voluntary basis to the experimental and comparison patrolmen. The questions were to elicit information on supervision, extrinsic job satisfaction, citizen cooperation, citizen support, attitude toward community, corruption, citizen hostility, satisfaction with policing tasks, vehicle dispatch, index of change. Sets of questions were grouped and their scores compiled into an index for each of the above areas. The individual scores which formed a compilation were weighted heuristically and a simultaneous linear regression technique and t-test was used to determine the variables of significance.

A community survey was administered to individual residents, businessmen, community meeting attendees and students. The sample in each case was so small and the process so questionable (telephone



calls to individuals) that we wonder why the survey was conducted. (125 people in the experimental area out of 152,460 residents and 54 people in a comparison area out of 223,421 residents.) The authors note that "Interpretation of results from the community survey should be made with great care. These samples are not truly representative and the sample size are too small to give great confidence in the interpretation of results. In addition, the precincts being compared are not strictly comparable."

#### 4. Data Requirements and Data Utilized

The researchers were at a disadvantage in that the areas used for the experiment were not studied beforehand to obtain any baseline data, nor selected in any scientific process. Similarly for the personnel assigned or who volunteered to join a team. Thus, the only historical data available would be crime rates and arrest rates, while the new data had to be collected by the surveys described above. No field observers were used to study and collect data on the functional aspects of the teams and the comparable groups. The police survey questions and the resultant data were thought by the investigators to be the type which would enable them to make some type of determination as to the worth of the team approach. However, the reliability of the police questionnaire should be a subject of concern. For example, an index of a patrol officer's perceptions of citizen support is based on asking the patrolman to indicate how

many times have citizens complimented him during the past month, how many citizens they talk to, what percentage of people on the precinct belong to groups which support the police politically or as volunteers, etc. Just about all questions were highly subjective, intuitive, impossible to know, and not open to checks in any form. However, the results are tabulated and discussed, albeit with many caveats as to the correct interpretation, as if the survey and information were very accurate.

#### 5. Experimental Design and Control

As noted, no proper design was attempted and no proper experimental evaluation was desired by the NYC Police Department. The authors state that this was a reasonable decision, made in the best interest of the NYC Police Department and note that only when an administrator is unsure of the merits of a program or is considering two competing programs which he believes to have roughly equal merit is a comparative evaluation worth doing. If this is the case, we wonder why the NYC Police Department contracted for the reported study in the first place. If no evaluation is required, then the reasons why should be so stated and no wasted, quick fix attempted to give the program some semblance of validity.

#### 6. Results and Recommendations

The authors do make the following statements with respect to conclusions and recommendations: Operation Neighborhood has led to a

modest improvement in crime reduction and to more arrests by patrolmen, i. e. the data of the experimental areas vs. the comparisons areas show such an improvement; team members may be motivated to do more, but that the way they perform is very much the same as before they joined Operation Neighborhood; Operation Neighborhood has an excellent public relations image and has won a measure of popular acceptance. Recommendations include the following: on balance, Operation Neighborhood appears to have had some success despite the conflicting demands which resulted in less than total commitment from department leadership and results are sufficiently promising to merit controlled expansion.

#### 7. Discussion

Except for the fact that the "hard" crime and arrest data showed interesting trends in the experimental areas, we submit that there is no basis for making any of the above conclusions and recommendations. We strongly suggest that the NYC program was not the neighborhood team concept at all, but just a change in organizational structure, and a change which was not really implemented or believed by the police department.

For example, the three important concepts of neighborhood team policing is responsibility of a team commander, community relations, and that the team patrol units would work in the neighborhood. For the first concept, the report notes that orders and directions from a team

sergeant were often countermanded by the precinct authorities and that the supposed supervisory relationships were not established. For the second concept, the report notes that orders were issued banning patrolmen from talking with shopkeepers or shopping in local stores, thus creating resentment among police officers and disrupted the operation of some teams. For the third concept, based on an analysis of the radio run cards, the report states that approximately 50 percent of the radio runs within team areas were handled by non-team units, and furthermore, approximately 52 percent of the runs by team units were out of the areas.

We can only conclude that the study was not on the neighborhood team policing concept as visualized by the authors, but directed towards a variation of the NYC Police Department's approach to administration and management. The team concept as practiced by NYC is a bastardized approach in order to do something. The continuation of the program should have been seriously questioned in light of the fact that it evidently had a deleterious effect on the working patrolman, e. g. answers to questions on the patrolmen survey showed that 80 percent of the respondents in Operation Neighborhood teams believed their job was getting worse, two percent felt that an extended program would improve the force, and that Operation Neighborhood had little or no success in broadening the patrolmen's concept of his job or in changing his opinion of the relative importance of police activities.

POLICY TOPIC: Police Administration and Management--Evaluation Statistics

TITLE: CAPER: Crime Analysis - Project Evaluation - Research

AUTHOR: Anonymous

PUBLISHER: American Justice Institute, San Jose, California

VOL. /NO.: LEAA NI 70-023-G; PB 213 611

DATE: March 1972

NO. PAGES: 76

ABSTRACT:

CAPER is a methodology for collecting, processing, and analyzing offenses reported to the police. The methodology may be computerized or used manually. The CAPER methodology provides "baseline data" in a format usable for crime analysis and project evaluation purposes. It documents a system for describing the location and characteristics of crimes reported within any size or shape geographic area of the city. This report is written for the layman, but supporting technical information including the coding structure, costs and procedures is included. CAPER is in operation in San Jose.

## INTERNAL VALIDITY EVALUATION

### CAPER: Crime Analysis - Project Evaluation - Research

Anonymous  
March 1972

#### 1. Research Goals, Objectives, Policy Issues

The aim of this paper is to introduce the planner to the virtues of computerizing police data for crime prevention program planning and evaluation. The concept is that useful information can be gained by means of counts and tabulations, even though the data extracted from individual offense reports is quite limited. It is a fundamental premise of this paper that crime prevention planners should begin with objective data describing the crime problem in the area of interest, rather than relying entirely on expert opinion as to the character of the problem; secondly, that the same body of data will serve as a baseline for the chosen program; and thirdly, that by gathering similar data as time progresses, the success of the program can appropriately be assessed in before-and-after comparisons of the prevalence of crime.

#### 2. Face Validity Check

To data-oriented specialists there is nothing really novel in CAPER (Crime Analysis - Project Evaluation - Research). It is not a unique method, but a straight-forward application of operations or systems

analysis. The report states that "CAPER presents a methodology to collect, access and display data required for crime analysis, program evaluation and research." In effect what the developers of CAPER have done is to argue that it is desirable to "collect, access and display data" for such purposes. Just how the planner would go about doing this is conceded to be up to the planner, and what one will do with the data once it is gathered depends upon the conditions the planner confronts. The argument itself is well worth making, of course, and the authors do a fair job of it. The report shows how the developers went about putting together a CAPER system for Santa Clara County, and the City of San Jose, California; apparently, the system is (or was at the time the report was written) in use there. The reader should bear in mind that the systems and coding specifics in the report are not necessarily of general applicability.

#### 3. Methodology

The CAPER method, as illustrated, involves abstracting information from verified complaints (or direct observations of police officers) and the investigative report. This is apparently done by an officer with direct knowledge of the case, rather than by a clerk who must try to interpret the paperwork. The abstracted information is then put onto a coding record for transformation into a machine-readable record. The data thus processed builds up a bank of information as time passes and investigations

are completed. What this bank will contain depends upon what the planner chooses. In San Jose, this is the time and place where the crime occurred, what the crime was, what sort of person did it, what was lost, and who the victim was.

In addressing the subject of crime prevention, the planner may use this data bank to research the level of crime prevailing at the time (and its rate of change with time), and to characterize it in detail. This is presumably a matter of finding out how much crime there is, where it is occurring, and what kinds of people or property seem to be the major targets. Given this objective profile, crime prevention efforts can be tailored to the manifest needs.

At subsequent times the same analyses can be performed to determine how much change has occurred since implementing the program that was chosen. Hence, planning and evaluation would stem from the same data bank at different times.

The report states that a CAPER system could be manual, rather than computerized. The implication is clear that the former would be a nightmare for any sizeable volume of data, especially if analyses in any detail were to be desired. The point is made that there are a number of pre-packaged computer programs (along with the necessary services) available into which machine-readable data can be fed without much trouble to obtain simple counts, tabulations, cross tabulations and various

statistical measures. The names and addresses of the sources of such programs and computer services, as well as cost estimates, are given in an appendix.

#### 4. Data Requirements and Data Utilized

CAPER is restricted to operational data: more specifically, direct crime reports. This is the who/what/when/where/how of actual offenses. Nothing is included in the way of administrative data, such as person-hours required for certain law enforcement activities, and the amount of money that must be budgeted. In fact, the planner would do well to take such factors into account as an integral part of the decision as to where to put the crime-prevention resources. Certainly the costs of achieving certain gains should be figured into the subsequent evaluation as well, or what would have been required to achieve more than was actually realized. This seems obvious; yet the CAPER developers felt it was outside the scope of program analysis and evaluation.

The need for validation was recognized, and it is suggested by the authors that coding personnel periodically be given reports to code that they have done in the past, to judge consistency, and to give the same cases to different coders to evaluate variability. This is good advice, but it should be realized that there are potential statistical inference difficulties. For example, now-and-later consistency checking may be confounded with differences in powers of recollection among coders



handling the same case, it would be necessary to eliminate the coder who knows the case first hand; among the others, there would be the problem of judging coders based on coding from bare records absent personal knowledge, though personal knowledge is well recommended as a coder attribute. This is not to say that such reliability analysis should not be done, but to indicate that a superficial approach may have certain distinct shortcomings.

There are even more serious problems that this manual does not acknowledge, which were revealed in a publication of the American Justice Institute based on actual use of CAPER to study burglary in San Jose.<sup>1/</sup> Essentially, this problem relates to the fact that a "case" is an arbitrary unit, in the sense that it may relate to a single incident, involving one offender and perhaps one victim, or it may encompass a number of such elements. For example, the CAPER developers set up a Victim/Offender record, which, among other things, calls for the age and sex of the offender, but in another field in the same record asks how many offenders there were.

To fit the multiple incident cases into what in effect was a single-incident mold, coding instructions were supplied. In burglary cases, for example, where various items were reported stolen, the coder was to identify the most important item only, but if one of them had a serial

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<sup>1/</sup> Santa Clara Criminal Justice Pilot Program - Burglary in San Jose, American Justice Institute, Sacramento, California, February 1972.

number, it was to be counted regardless of its value. Similarly, if a case involved both a burglarization and a homicide, it would be counted only as a homicide case.<sup>2/</sup>

It would seem better to allow for coding of each incident within a case, with some categories of offenses to be excluded if thought to be below the level of crime prevention concern. In all likelihood this sort of open-ended coding scheme was considered and rejected on the grounds that it could greatly increase the volume of coding, keypunching, computer running time, and, of course, expense.

#### 5. Experimental Design and Controls

The work underlying this paper apparently involved no experimentation. The subject of controls, however, was addressed under the heading to procedures for validating the reliability of the coding of police reports as CAPER input data. Experimentation in this context might be appropriate, if done to evaluate what the outcome would be of applying CAPER to prescribed sets of reports. Various sets of reports might be structured to represent certain "typical" or "extreme" situations occurring in everyday police work. The kinds of data CAPER yields could then be analyzed to determine whether, from the viewpoint of the law enforcement policymakers, the system is as useful as claimed. Accuracy of coding and any procedural problems might then be investigated.

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<sup>2/</sup> Op. cit., footnote 1 above.

## 6. Results and Recommendations

The authors explain the sort of results one can get from CAPER by summarizing what was actually accomplished in the San Jose burglary study. In sum, what they discovered was that certain kinds of burglaries (e. g. residential) were occurring predominantly in certain parts of town, at certain times of the day, and days of the week. This is suggested as useful targeting information for a burglary prevention program. This is quite reasonable, but a note of caution should be added: the San Jose study only covered the cases for one four month period. It is risky to take a body of data, look for remarkable relationship, then conclude that those that are found reflect reality. The difficulty is that if one looks long enough, something is going to appear remarkable, by chance, even if there is nothing though it may only be attributable to chance. For instance, if one considers every minute in the day, some minute may appear to be the time of a disproportionate number of crimes; but out of  $24 \times 60 = 1,440$  minutes in a day, it is to be expected that an apparent focus will appear; yet, in another body of data, some other minute in the day may appear to be the focal point.

The report spells out a number of possible applications of CAPER-type data systems. Mapping (e. g. crime mapping) is emphasized, and the use of the system to obtain data about victims, rather than offenses and offenders only, is discussed.

## 7. Discussion

The kind of tool that CAPER constitutes should be used with great care. This is particularly true in light of the problem identified in the section above of providing the capability of conducting virtually unlimited "fishing expeditions" which might yield spurious conclusions. If CAPER is at the disposal of persons without scientific training, this risk would be a serious one; there may be some inclination on the part of a zealous official to locate what looks like a remarkable fact and thereupon launch into a study, or perhaps alter established departmental procedures forthwith.

This problem might be avoided by breaking CAPER-produced baseline data into two sets: (1) a calibrating set in which relationships between crime and various factors are sought; and (2) a validating set in which such apparent relationships are re-examined. The allocations of data into these sets should be done according to random sampling techniques, though before doing so reports might well be divided into relevant subsets (e. g. daytime incidents treated separately from nighttime incidents) and the sampling for the calibration and validation could be done within each subset. Sampling usually calls for relatively large bodies of data, which may imply that CAPER-like methods would be useful only when applied to reports covering substantial periods of time.

Similarly, evaluation of the outcome of a prospective study in which CAPER was used as the baseline source should be done, where possible,

at more than one time point. Repeated "quick-look" evaluations would be especially appropriate if the study were to be concluded in a rather short time.

POLICY TOPIC: Police Administration and Management--Evaluation Statistics

TITLE: On Exploring the "Dark Figure" of Crime

AUTHOR: Albert D. Biderman and Albert J. Reiss, Jr.

PUBLISHER: The Annals of the American Academy of Political and Social Science

VOL. /NO. :

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ABSTRACT:

The history of criminal statistics bears testimony to a search for a measure of "criminality" present among a population, a search that led increasingly to a concern about the "dark figure" of crime--that is, about occurrences that by some criteria are called crime yet that are not registered in the statistics of whatever agency was the source of the data being used. Contending arguments arose about the dark figure between the "realists" who emphasized the virtues of completeness with which data represent the "real crime" that takes place and the "institutionalists" who emphasize that crime can have valid meaning only in terms of organized, legitimate social responses to it. This paper examines these arguments in the context of police and survey statistics as measures of crime in a population. It concludes that in exploring the dark figure of crime, the primary question is not how much of it becomes revealed but rather what will be the selective properties of any particular innovation for its illumination.

## INTERNAL VALIDITY EVALUATION

### On Exploring the "Dark Figure" of Crime

Albert D. Biderman and Albert J. Reiss, Jr.  
November 1967

#### 1. Research Goals, Objectives, Policy Issues

The purpose of this paper is to describe the differences between the use of police statistics and judicial statistics as indicators of the amount of crime in a community. The author sets out to show that the important question is not which kind of statistics are better, but rather, to which kind one's assumptions will lead.

If a program or policy for combating crime is to be evaluated by means of objective data on change in crime prevalence through time, it is obvious that a choice must be made among counting mechanisms, such as number of arrests or number of convictions. It is not so obvious how such a choice is to be made. This paper is directed at this problem.

#### 2. Face Validity Check

This paper presents thought on philosophical planes. Virtually no attempt is made to explain how the concepts developed in the paper would apply to actual evaluation problems.

#### 3. Methodology

The author's method in this paper is that of analysis of the literature (past and present) on "statistical criminology," to expose the logical elements underlying the use of statistics in this context. The author does not advocate any particular statistical philosophy, nor does he undertake to harmonize the various conflicting schools of thought, though he does offer some amount of criticism of each.

#### 4. Data Requirements and Data Utilized

"Data" are used in this study only insofar as thought (and logic) come within the scope of that term. There is a good deal of reference to historical works, tending to show how thought in the area of statistical criminology has evolved over the years.

#### 5. Experimental Design and Controls

These concepts do not apply to this paper.

#### 6. Results and Recommendations

This paper does an excellent job of explaining the differences between using police data and court data, as regards the basic beliefs of the user. More precisely, the subject is the "realists" (e.g. police data) versus the "institutionalists" (e.g. court data).



To the institutionalist, what counts is what actually moves law enforcement agencies to take action, and the appropriate crime rate is the number of times such agencies act. There are two basic assumptions: first, the major source of concern to organized society (government) is the offender (that is, law enforcement agencies exist to deter and combat offenders); second, crime statistics should only count properly verified events, to enhance the reliability of such numbers. Therefore, to the pure institutionalist, only guilty verdicts should be tabulated as crime statistics.

In contrast to the institutionalist, the realist is concerned with every act of a criminalistic nature that is experienced in a population, whether verified or not. In this school of thought, the appropriate crime rate is the number of such experiences, following from these two assumptions: first, the major focus should be victims, not offenders; second, verification of alleged offenses is irrelevant, since the victim is the ultimate authority on what has happened to him. Consequently, the pure realist would count all complaints filed with the police into the crime rate.

Substantively, the two schools differ in certain categories of crime felt to be deserving of greater attention by law enforcement agencies. The realist would like to see a crackdown on "white collar crime" (e.g. cheating on expense vouchers by business executives). To the realist, we are all victimized by white collar criminals, and hence this is an area in which police should be active. Typically, the institutionalist would view such conduct as private wrongs, actionable in civil lawsuits, but not injurious to society in the aggregate.

The institutionalist emphasizes vices such as gambling, prostitution, and marketing smut, as these tend to corrupt society, and hence people involved in these activities are offenders. The realist is unenthusiastic about such things since, in his mind, there are no personal victims.

According to the authors of this paper, relatively few people would be found at either extreme. Usually those tending toward the realist position would concede some doubt about the reliability of uncorroborated complaints, and would advocate some measure of verification. And those who view crime in terms of institutional process would concede that counting as crime only that for which a verdict of guilty is returned would permit a great deal of "real" crime to escape measurement.

They point out that systems for estimating the rate of crime usually have qualities of both schools. They cite the Uniform Crime Reports (UCR) as an example. The UCR relies upon police reports to get at as much of the real crime as possible; also, it is limited to predatory crimes, where underreporting may be expected to be minimal. These, of course, are realist views. But it is institutionalist in the sense that it is intended that the reports going to the FBI shall be those that have gone through whatever institutional filters a police department uses to "unfound" crank, perjurious, or mistaken complaints. Furthermore, rates are published only for crimes whose (institutional) definitions vary relatively little from one state to another.

The authors observe that both the realist and institutionalist schools, and all mixtures of the two, worry about the "dark figure," by which they



mean the number of crimes that are not publically known, but which involve victims, offenders, or both. They discuss the sample survey as a tool for estimating the dark figure. The two opposing schools would use it differently, however, the realist would conduct surveys of citizens to discover unreported crime for the sake of computing the true victimization rate in a community; the institutionalist would use it to arrive at a better estimate of the offense rate.

The relationship between offense and victimization rates is unknown, as the authors explain. No simple adjustments of numerators or denominators will render the two comparable. If this is true, we are compelled to conclude the realist and institutionalist philosophies may simply have nothing significant in common.

## 7. Discussion

The authors do an admirable job of laying bare the realist and institutionalist schools of criminological statistics. They assert that neither is the one to which a person should subscribe, and that either one in the extreme is shallow. They conclude by proposing that both ought to be useful, jointly, as "a means of approaching truer approximations of phenomena that are difficult to measure."

It is no disparagement of this paper to express the wish that the authors had gone a step further than they did--to give some direction to the reader who would like to decide just where on the realist/institutionalist

spectrum he should be. Such a decision is of great practical importance. Data about crime are constantly in use in evaluating law enforcement (and crime prevention) activities. If one evaluates such activities in a before-and-after sense, perhaps it makes little difference, assuming that the same concept of what to count into the crime rate is used both at the baseline and at the evaluation stages.

The choice of concept may matter, however, depending on what external factors have bearing on the before-and-after difference. For example, the institutionalist type of crime rate is sensitive to changes in the law enforcement and criminal justice institutions. The realist view is vulnerable to changes in public perception of what constitutes crime, and public attitudes toward reporting criminal events. Which concept is more at risk of influences that would tend to invalidate before-and-after comparisons is a question worthy of investigation. Whether in fact it would ordinarily make any difference which philosophy is endorsed is perhaps the more general question, and, if a difference usually existed, whether one philosophy is consistently more conservative as an evaluation tool.

POLICY TOPIC: Police Administration and Management--Evaluation Statistics

TITLE: Surveys of Population Samples for Estimating Crime Incidence

AUTHOR: Albert D. Biderman

PUBLISHER: The Annals of the American Academy of Political and Social Science

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ABSTRACT:

A National survey and intensive surveys in three cities were undertaken for the President's Commission on Law Enforcement and Administration of Justice (hereinafter referred to as the National Crime Commission), to assess crime incidence by asking random samples of the public whether they had been victimized by crime. The major difficulties of these surveys arose from victimization's being an infrequent and usually not highly salient life event for most people. Even though these surveys found victimization to be far more common than suggested by national or local police statistics, they captured people's experiences selectively and incompletely. The immediate data from a victim survey naturally differ in form from police and other agency statistics. While these make the survey data distinctively instructive, they present problems for comparison with police statistics. Such comparisons as can be made suggest that a large volume of citizen complaints to the police are not reflected in published offense statistics.

## INTERNAL VALIDITY EVALUATION

### Surveys of Population Samples for Estimating Crime Incidence

Albert D. Biderman  
November 1967

#### 1. Research Goals, Objectives, Policy Issues

The object of this paper is to explain the informative potential, and the methodological problems, of victimization surveys. These surveys appear to have two major functions: (1) to provide an estimate of the prevalence of crime in a community that is independent of the data gathering and publishing activities of police and other law enforcement agencies; and (2) to assess the reliability and completeness of crime rates as reported by police departments. Both functions relate to the objective of finding out how much crime actually occurs--including crime that is not brought to the attention of law enforcement officials. Behind this, of course, is the assumption that crime rates are useful in evaluating the efficacy of law enforcement programs.

Specifically, this paper is aimed at explaining what was done in conducting a number of victimization surveys, and describing what was, and what was not, learned as a result.

#### 2. Face Validity Check

The author of this paper is plainly an advocate of victimization surveys, and yet this paper manifests a genuine concern for scientific inquiry. He gives every indication of fully accepting the principle that one can only put forward as scientific fact that which is empirically justified. In discussing the surveys that were done (one of which was apparently conducted by him) he scrupulously weighs the outcome against the methodological shortcomings. In fact, one gets the impression that he was as interested in the deficiencies as the merits, which is appropriate since he was discussing surveys that were among the very first of their kind.

It should be mentioned that the discussions and comparisons of data from the various sources considered do not explicitly take sampling variation into account. That is, comparisons are made; without benefit of estimated standard deviations. The samples used in the surveys, however, were large, which often simply means that enough precision attaches to the results without any need for quantifying sampling variability. In this instance the sample size, while large when contrasted with that of the run of the mill survey, may not be sufficient to waive such considerations since some of the crime rates to be estimated are presumably very small (e.g. homicide), so that quite large numbers of observations would be required for precision.

### 3. Methodology

The author's approach is to evaluate a number of victimization surveys jointly against police data embodied in UCR figures, and one against another from the point of view both of outcome and methodology. By considering a diversity of surveys, he is able to induce certain generalities concerning the subject of victimization surveys.

The surveys he analyzed were these: a nationwide survey by the National Opinion Research Center (NORC) covering 10,000 households; surveys in Boston and Chicago by the University of Michigan covering a total of 596 households; and in Washington, D. C., by the Bureau of Social Science Research covering 976 households. These were conducted during 1965-1966.

### 4. Data Requirements and Data Utilized

The ideal body of data for study of the true level of victimization in a community would be the reports of every member of that community of everything experienced in a stated time period that might conceivably be crime, such reports being given freely, completely and voluntarily to disinterested analysts. Barring this ideal state, we must depend upon samples of the community, who are confronted by interviewers or questionnaires. Even under present conditions, in which we depend upon police data to inform us of the level of criminality prevailing, our

information is coming from a selection of the populace, and presumably of all those who have been the victim of crime.

Ideally, the respondents in such a survey would report everything that happened to them that would be prosecutable, and for which a conviction would result if the facts were known. In reality, respondents must have imperfect knowledge of the law, and some events which are criminal will be omitted from the response. It is less significant that some non-criminal events would be reported, assuming that the response is verbal and descriptive rather than categorical and conclusory (e. g., thus-and-so happened, rather than a statement that there was a burglary, assault, larceny, etc.). It would be of great interest, in fact, to discover what kinds of private wrongs, if any, are often thought of as crimes. The relevance of such information to a legislature should be apparent.

The perfect respondent also would never forget any criminal victimization experienced. And so that there may be an accurate evaluation of police data as a source of crime rates, the respondent would be able to specify the time of occurrence. If the respondent is to speak for others as well as himself, he should have complete knowledge and memory of their experiences.

These considerations above outline sources of error in any practical attempt to find out how much crime actually exists in a population. What we must expect of any victimization study, then, is that efforts will be made to minimize (and estimate the effects of) the inaccuracies which cannot be totally avoided.



5. Experimental Design and Controls

The study plans differed among the surveys although they had much in common. All of them involved face-to-face interviews of members of randomly selected households in a prescribed geographical area. NORC's study extended over the entire nation, intending a comparison with nationwide UCR figures; the Michigan and BSSR surveys were limited to specific police precincts, intending a comparison with the rates published by the police in those places. All asked the respondents for descriptive responses, and asked for details on what losses or personal harm occurred, what the involvement of the police and the courts was, and obtained some socio-economic information about the respondents. All spoke to but one member of the household and asked that person to answer for every householder as well as himself. And all studies included some procedures for unfounding unlikely or noncriminal occurrences.

There were few differences in technique that seem remarkable. Unlike NORC, the BSSR and Michigan surveys had the benefit of pre-test that allowed for modifications in methods of instruments. Such pre-test showed, for example, that the respondents were much more thorough in relating their own experiences than those of the other household members. While this may be an innocent fact of human nature, its consequences in such a survey can be serious since interviewing, ordinarily conducted during the day, tends to over-represent housewives in the sample. In reaction to this finding, the BSSR and Michigan full-dress surveys focused

on a randomly selected member in each household (undoubtedly adding considerably to the expense).

Probably the only significant difference in interviewing technique was the intensity of examination. The NORC workers were instructed to limit the responses to two events per householder; the BSSR and Michigan studies had no such limitation on output. According to the author, the pre-test showed that if the questioning is pursued, many more events may come out. In fact, pre-test respondents with whom contact was maintained continued to have pertinent recollections over a period of days or weeks after initial interview. The author suggests that productivity of response may also depend a great deal on the pointedness of the question; of course, this must be true in any survey in which the respondents are asked to recollect the past.

An essential part of any victimization survey has to be the effort to eliminate accounts which are fictitious or noncriminal. The author describes how this was done in the NORC study (it is not clear, however, just what was done in the BSSR study). NORC interviewers were instructed to disregard responses if the respondent seemed unreliable, or if their stories were contradictory or otherwise invalid on the surface. The author considers this to a very imprecise validation tool, but notes that only 0.4% of the claimed victimizations were removed thereby. The more substantial tool was the review of the text of each account by policemen and lawyers to delete those that were insufficient on legal or evidentiary bases. Apparently the Michigan study also employed this technique.



Sample size is a crucial element of any survey plan. The relevant scientific consideration is the variability of what is to be estimated in the survey results, and the degree of precision that is desired. The author alludes to this, particularly in pointing out that UCR Index Crimes, Part I (homicide, burglary, etc.), occur much less frequently than the less serious offenses, and therefore a rather large sample would be needed to estimate such rates with precision. It is not explained how the sample sizes in the various studies were chosen, leading one to suspect that, as in most studies, the sample size determination was based on the resources readily available.

#### 6. Results and Recommendations

The author acknowledges that the incidence of victimization is confounded with reporting behavior. For example, White respondents seemed to be more productive of reports of less serious crimes (e.g., larceny under \$50 and simple assault) than non-White respondents; non-Whites more often than Whites reported Part I Index Crimes. It is not clear from this whether Whites are favored targets for less serious offenses, or whether they are simply more cooperative as respondents.

He also observes that powers of recollection may be a disturbing variable. The results of the studies, when analyzed to determine where within the year to be recalled the crimes tended to fall, showed a "J-shaped" distribution. The upward sweep of the J indicated that

more recent events were more likely to be recalled, while the dip of the J implies that events earlier in the year were often being forgotten. Perhaps even more serious, the upward hook at the front of the J suggests that events from earlier years were being brought forward and counted in at the beginning of the year.

The possible magnitude of underreporting of victimization was analyzed. In the Michigan study, a sample of citizens who reported crimes to the police were followed-up after some (unstated) period of time; it was found that 20% did not relate to the interviewers the event which they had communicated to the police. On its face, this fact suggests the hypothesis that an observed victimization rate is only 80% of the true rate. However, elsewhere in the paper the author points out that respondents manifested some hesitancy to report events which are embarrassing or in which the victim contributed to his own loss or injury. We have no way of knowing from these studies, but it is possible that citizens will report some things to police that they will not discuss with a lay interviewer, just as a person may confide in his doctor about some things that he would not mention to another person who might be presumed not to understand.

The role of the police in the reporting of victimizations also came under scrutiny in these surveys. It might casually be presumed that if the victimization rate in an area is higher than the reported crime rate, the difference must be due to the failure of victims to inform the police. Apparently in all studies the questionnaire asked whether or not a claimed

victimization was reported to the police. In the NORC study, in the context of Index Crimes, however, the crime rate computed solely on the basis of events said to have been reported (and this accounted for the majority of the events) was 35% higher than the UCR rate. Approximately the same differential was found in BSSR study, even after a series of downward adjustments were made in the victimization rate to correspond to police unfounding and classification procedures. From this the author conjectures that reporting failures of the police, rather than citizen reticence, may be the main ingredient in the difference between the rates of known and unknown crime.

The magnitude of the observed victimization rates differed between the nationwide study (NORC) and the precinct studies conducted in Boston and Chicago (Michigan group) and Washington, D. C. (BSSR). For Index Crimes, the NORC study revealed a victimization rate of 0.05, and is about twice that of the UCR. In the precinct studies the rate was four times that which was known to the police. In either category of study, the author feels that survey methods produced underestimates, and it seems likely that he is right. (Unfortunately, the author does not say whether the police data were those reported to the FBI for UCR tabulations.)

It is difficult to evaluate the precinct data as we are not supplied with tables. The NORC figures seem reasonable in the sense that the relative magnitudes of the victimization rates for Index Crimes is the same as in

the UCR for 1965. A further indicator of reasonableness is found in the close similarity of victimization and UCR rates for homicide and auto theft, events which probably very rarely go unreported. It is not surprising that the victimization rates would be substantially higher than UCR for rape, assault, burglary and larceny, and only moderately higher in the case of robbery.

POLICY TOPIC: Police Administration and Management--Productivity

TITLE: The Challenge of Productivity Diversity: Improving Local Government Productivity Measurement and Evaluation: Part I: Overall Summary and Recommendations; Part III: Measuring Police-Crime Control Productivity; Part IV: Procedures for Identifying and Evaluating Innovations--Six Case Studies

AUTHOR: The Urban Institute (Part III) and The International City Management Association

PUBLISHER: The National Commission on Productivity, Washington, D. C.

VOL. /NO.:

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NO. PAGES: 126 (Part III); 145 (Part IV)

ABSTRACT:

This is a report of a study directed at improving the measurement of productivity in solid waste collection and police crime control, and the development of procedures for identifying and evaluating innovative approaches to improved productivity.

Part III identifies procedures for estimating how police crime control productivity might be assessed nationally and makes suggestions as to how measurement might be improved at the local level. Illustrative data are presented. Past research is reviewed and suggestions are made for future research in the area.

As regards crime control, Part IV illustrates procedures for locating and evaluating innovations in the context of three areas: the use of non-sworn professionals in the Dallas, Texas Police Department; the use of helicopters in Los Angeles County, California, in operations Skyknight and Air Support to Regular Operations (ASTRO); and manpower resource allocation in the Kansas City, Missouri Police Department.

## INTERNAL VALIDITY EVALUATION

The Challenge of Productivity Diversity: Improving Local

Government Productivity Measurement and Evaluation:

Part I: Overall Summary and Recommendations;

Part III: Measuring Police-Crime Control Productivity;

Part IV: Procedures for Identifying and Evaluating Innovations--

Six Case Studies

The Urban Institute (Part III)  
and The International City Management Association  
June 1972

### 1. Research Goals, Objectives, Policy Issues

The substantive sections of this study which are reviewed here concern the problems of measuring the productivity of the crime control activities of police (Part III), and identification of innovative police programs (Part IV).

The major problem Part III concerns is the lack of any convenient objective means of deciding how much the public is getting for the money it invests in its law enforcement agencies, as respects crime control. Part IV addresses a problem created by the mutual independence of the many, many law enforcement agencies in this country: there is a profusion of differing police methods, some few of which must be worthy of emulation, if only their merit could be made generally known.

Both parts are intended to establish a research method which others studying police productivity might use to advantage.

### 2. Face Validity Check

A first reading of Part III gives one the impression that a great deal of work was done, but that the authors never really focused on a tangible subject. They seem not to have fully reduced their thoughts on the subject of productivity to a definite concept.

Part IV takes a case study approach, and differs from Part III's quantitative orientation in evaluating police programs primarily in qualitative terms with quantitative analysis entering in as the need is perceived for it. Much of the screening process in finding candidates for closer inspection are unfortunately not covered in the report.

### 3. Methodology

#### Part III

The main idea of productivity employed in this study is deceptively simple: what the results are of a given investment. The standard concept of measuring units of product or units of service delivered is said to be rejected in favor of taking into account the quality of what is produced, as well as the quantity. The authors decided to study departmental output in its entirety, rather than that of specific units or individuals. Likewise the entire investment, public and private, is to be considered. They do, however, propose to eliminate functions and units not directly related to crime control (e.g. traffic division).



The analytical procedure was to formulate certain summary measures of resource input and departmental output and see how well they correlate when tested with live data. There was apparently no hope of finding a single, unique and all-sufficient productivity statistic; rather it was expected that a combination of measures would be used jointly. In fact, it seems it was not really expected that the measures found would give definitive results, but would instead serve to select among various jurisdictions those deserving of closer scrutiny. Thus, the method would reduce itself to case study analysis, once the summary measures had been applied.

The authors lay out five measures which, at the outset of their study, they believed to be reasonable measures of productivity: five which are feasible in the sense that the data they require are currently available, and eight for which data would take some digging.

#### Part IV

The procedure for locating innovations advocated in this study consists of the following stages:

- (1) Review pertinent literature and contact professional societies and government agencies, to find candidates for evaluation;
- (2) Apply a standard set of questions to the data available for these candidates;
- (3) Choose those deemed suitable for more thorough investigation,
- (4) Evaluate innovations.

The questions addressed to candidate programs stressed costs, transferability and productivity as the essential criteria for deciding what programs are worth pursuing. The authors acknowledge that at this stage the information is highly variable (often journal articles) and it was necessary to rely to a considerable extent on verbal, quantitative data.

Nothing is said about how one would go about sorting out the good candidates from the bad, implying that the authors had in mind an essentially impressionistic process.

Once the candidate programs are chosen, presumably they would be approached afresh, going beyond merely the most convenient published data. Productivity is treated by and large as an intuitive concept, though the opportunity exists for introducing Part III into Part IV in this respect. (It appears that both projects ran in parallel with neither in a position to benefit by the results of the other.)

#### 4. Data Requirements and Data Utilized

##### Part III

The productivity measures formulated by these authors are the following:

- Population served per police employee and per dollar,
- Crime Rates and changes in crime rates for reported crimes (relative to dollars or employees per capita),
- Clearance Rates of reported crimes (relative to dollars or employees per capita),



- Arrests per police department employee and per dollar, and
- Clearances per police department employee and per dollar.

These measures were pre-tested in the sense of data availability and it is stated that an early phase of the project entailed contacting the police departments in ten cities to verify this.

The sources of data are UCR for crime rates--only Index crimes were considered to maximize uniformity of legal definitions among jurisdictions--census data for population data, and departmental information relative to costs.

While the main thrust was on comparisons among jurisdictions, the authors also propose evaluation of these measures over time, for the benefit of the law enforcement decision-maker whose concern about his own jurisdiction goes beyond comparison with others. Trend analysis is recommended for essentially before-and-after evaluation.

Also counted into the analysis were socio-economic data to weigh the question of whether jurisdictions should somehow be compared within certain categories.

#### Part IV

Description of data sources is not one of Part IV's strengths. As indicated above the search stage meant searching through "professional journals and national municipal magazines," as well as contacting individuals and organizations who might be expected to know of innovations

in specific subject matter areas. (The author's own organization is listed as one of the contacts used in this investigation.)

It is unclear whether more data were gathered once the candidates had been winnowed and the prime innovators were tapped.

#### 5. Experimental Design and Controls

Both of these studies are founded on the use of peer-group controls. That is, evaluation is not an absolute concept, but a relative one. In Part III, it is assumed that worthwhile police programs can be identified by ranking candidates on a number of quantitative measures; those coming out high are, in effect, saved for further evaluation and the others are thrown away. Similarly in Part IV when the procedure comes down to evaluation, the authors stress that virtue is a comparative matter; e.g. an innovation is good or bad in relation to what came before it. Thus, in either study the controls are integral elements of the procedure.

In addition, in Part III the authors investigated whether the comparisons among jurisdictions must include controlling for any of various socio-economic factors.

#### 6. Results and Recommendations

##### Part III

The authors investigated some of the properties of their proposed measures, using data relating to a substantial number of cities, all having

populations of at least 50,000. Principally, the results were negative. There was no attempt in this study to go beyond this stage to examine any jurisdiction with a high ranking.

The authors considered a number of socio-economic variables and computed correlations with Index crime rate, Index clearance rate and clearances per police employee, taken to be three prime measures of productivity. The correlations were generally unimpressive. The only factors making a significant showing was percent non-white in the population and percent black males in the 15-24 age bracket, when compared with Index crime rate, and even in these instances the relationship explained less than a quarter of the variation among crime rates. They were surprised to find that percent families below the poverty line and percent youths in the population were generally uncorrelated with the measures chosen for study (other researchers have been surprised by similar findings). Thus, there would seem to be little reason to control for socio-economic factors.

It is concluded, however, from the few significant correlations that occurred, and their distribution among the size categories of the subject cities that those with populations of 250,000 or more are different than those smaller and ought to be considered distinct. The showing is not dramatic and the authors are not able to offer any rationale.

As to the performance of the productivity measures themselves, considerable variation among cities was found. For example, among cities with the same crime rate, the per capita expenditure for police ranged from \$10 to \$42 in 1970. A significant correlation was found between crimes per police employee and clearances per police employee.

The report recommends an analytical procedure in which the analyst would evaluate each jurisdiction according to each productivity measure; rank all jurisdictions on each measure separately; determine threshold value for each measure and eliminate all those falling below it; and finally observe which cities, if any, rank high on multiple measures and denominate them as subjects for more intensive study.

#### Part IV

By and large the results of this branch of the productivity study are the manner in which information is organized. The project involved scrutiny of 25 candidate programs (13 relating to police) to see which six should be used as case studies. We are not told what these 25 are, nor how it was decided which six should be chosen.

The same general template was used to fashion each case study:

- Program description,
- Program objectives and purposes,
- Cost and manpower considerations,
- Effectiveness/impact,

- Implementation problems,
- Transferability, and
- Summary evaluation.

Subheadings under these categories varied with the individual case study. Nothing much seems to have been attempted by the authors in the way of measurement tools.

The case studies dealt with the use of helicopters, non-sworn personnel, and computer-assisted resource allocation. Very likely the most valuable product of this study was the format worked out for reevaluating innovations.

## 7. Discussion

Productivity and innovation are key terms in the manager's lexicon and there may be a tendency to grasp at any study touching on either of these subjects. They are immensely important and any research in these areas must be considered earnestly.

This reviewer is hard-pressed to find merit in either of the works reported here.

### Part III

The reader should not be misled into believing that a research project that makes use of a lot of data and which analyzes it in detail, as is the case in the productivity measurement study, is contributing anything worthwhile. The authors never come to grips with what productivity

means in the police context; neither do they conclude what it ought to mean. This is disappointing in light of the amount of time they spent drawing water from the wells of police productivity. Lacking any clear concept of what it is that they wanted to measure, the study fails to provide any focus. It is quite possible that they were distracted by their determination to concentrate on measures for which data were readily available. All of the aspects of quality (as opposed to quantity) of production, which were promised as a valuable departure from routine productivity evaluation, end up in the list of variable which would require special data channels (e. g. percent of arrests surviving probable-cause review). What remained to them were measures of doubtful relevancy to how well the police dollar is being spent (e. g. how many crimes occur, how many complaints lead to arrests, etc.). Ironically, though the authors remain hopeful to the very end about the utility of such would-be quantifiers of productivity, they do not miss their weaknesses and in fact lay them thoroughly bare.

Their study is also barren of any good ideas about how to make use of productivity measures. They propose the reliance on a number of measures jointly, but offer no procedure for deciding, ultimately, what a given police program is worth, or even whether it ought to be one of those selected for further study. Here again the lack of fruition may stem from the decision (possibly imposed by the source of funding) to restrict themselves to variables for which data could be gotten overnight.

#### Part IV

It is possible that the reader would benefit through exposure to the authors' system for organizing knowledge, as revealed in the published evaluation form and by reading the three case studies to see what it eventually yields. We are not shown how it works in the searching and preliminary screening stages and hence have no way of knowing whether it leads to the programs most deserving of study or whether there were gems discarded with the tailings. Those programs chosen for study, it seems, must already have been rather well known in the police community at the time of this undertaking; hence, it cannot be said that the technique has demonstrated any remarkable discovery power.

POLICY TOPIC: Police Administration and Management--Criminal Justice

TITLE: The Police Internal Administration of Justice  
in New York City

AUTHOR: Bernard Cohen

PUBLISHER: The New York City Rand Institute, New York, New York

VOL./NO.: R-721-NYC

DATE: November 1970

NO. PAGES: 84

#### ABSTRACT:

This report is a summary of a study of police misconduct and the operations of the police justice system from data relating to selection, assignment, promotion, and reward procedures in the New York City Police Department. This study utilized a cohort consisting of all officers who were appointed to the Department in 1957. The present analysis concerns the recorded allegations of misconduct for the 1,915 men in this cohort. These recorded allegations are followed through the police justice system in order to determine which offenses were brought to departmental trial and which were dropped. Then the final dispositions of those brought to trial are examined.



## INTERNAL VALIDITY EVALUATION

The Police Internal Administration of Justice

In New York City

Bernard Cohen  
November 1970

### 1. Research Goals, Objectives, Policy Issues

The question this study addresses is how well the police handle allegations of misconduct by police officers. Implicit in this is the proposition that the cognizant official does not, as a matter of routine, inform the district attorney, and then offer what investigative services will help resolve the matter--but, instead, the department retains the case, investigates and decides it, and metes out the punishment that seems appropriate. This leaves hanging the nettlesome question of whether a substantiated criminal case is subsequently passed onto the prosecuting authorities.

In this paper the author does not question the need or justification for the existence of a police justice system, but investigates the quality and quantity of justice that it produces. This is obviously an important matter, given the unavoidable conflict of interest in the police having jurisdiction over police misconduct. In this age of copious litigation, the law enforcement policy maker must be prepared to defend any system of administrative sanctions for which he has responsibility.

This study treats only the police justice system in New York City. There is no attempt made to generalize, though the results (to the extent of their own validity) at least pose the question of whether the outcome of similar studies would not be essentially the same in other major metropolitan areas.

More particularly, the author's focus was on the frequencies of the various categories of allegations registered against the NYPD class of 1957 in their first eleven years on the force, and on the frequencies of the possible kinds of case dispositions. Ancillary questions investigated include differentials attributable to race (Black vs. White vs. Puerto Rican) or type of assignment (detective vs. non-detective), whether the system is more successful in handling criminal or non-criminal allegations, and whether an informal police justice system exists.

### 2. Face Validity Check

This document does an admirable job of reporting a data-oriented study. It is thorough in accounting for the sources of raw data, how they operate, what their limitations are from a research point of view. It is candid in discussing the shortcomings of the data--the possibilities of over-inclusion and under-inclusion of material. Basic tabulations are given, much of it removed to appendices, out of the way of the main text. The tables are readily intelligible and present the information that the reader would naturally want to find. The basic data recording instruments are shown.



As regards to statistical technique, it is notable that the author seems to have felt no obligation to evaluate the significance of the magnitudes of the differences that interest him. There is, of course, no absolute scientific requirement for significance testing (e. g. Chi-Square tests, Student's tests, etc. with the 5% level of significance as the usual standard for rejecting hypotheses), and quite often when that approach is taken it is misapplied (or at least there are often grounds for suspicion). But the avoidance of significance testing very likely means that the analyst is going to apply a purely subjective standard. Under these conditions the analyst may find himself judging any difference (between means, percentages, etc.) to be significant, or no difference to be great enough to matter. This shows up in the present paper when, for example, the author finds the rates 0.2 and 0.1 to be significantly different, but the difference between 0.4 and 0.3 to be "extremely small," though the rates differ by 0.1 in both cases. There is no apparent reason, in the context of this study, for being impressed with one of these comparisons and not the other.

Significance testing is especially desirable where, as here, comparisons are being founded on samples of drastically different sizes. Statistical testing procedures are available that adjust for sample size disparities (though they tend to be computationally laborious).

### 3. Methodology

The author's method was to tabulate the records of misconduct for the police officers commissioned in New York City in 1957. This work was done in the late sixties, so that the 1957 cohort had gained over a decade of exposure (11 years) to the risk (and opportunity) of misconduct.

The class of 1957 was approximately 1,915 in number; 1,608 of these were still on the force as of the time of the study (termed "actives"), while 307 had dropped out or been dismissed ("inactives") after an average of 3.7 years in the New York Police Department.

There were two main points of interest: (1) incidence, and (2) dispositions of cases. In connection with incidence, the author studied only the 1,608 actives, so that the amount of exposure would be a constant. He also reasons that restricting himself to the 1968 actives assured that he would be able to study the violations that the department would tolerate, albeit with prejudice to the violator, but there is no further indication that he regards this as a welcome restriction.

When dispositions are considered, the total cohort is used (actives and inactives). Inactives are counted in on the strength of the assumption that some of the more severe penalties in the cohort would have been levied upon them. In actuality, as the author elsewhere observes, violations and penalties were rarer among the inactives, reasoned to be because the early years on the force present fewer occasions for misconduct than the later years when an officer has been assigned to a

specialized unit. This rationale, which seems quite sensible (though it is not backed up with any empirical data), would seem to indicate that the inactives should also have been counted into the data base for the incidence study.

The incidence calculations are intended to show the frequency of occurrence of complaints or allegations lodged against officers, and the frequency of multiple occurrences within an officer's first eleven years. As usual, the significance of computing rates of accusation or allegation is a mystery. From any reasonable epistemological point of view, it has to be nonsense. Yet we find it being done by respectable scientists. Apparently, allegation rates are to be regarded as a proxy for the frequency of what is being asserted, as a matter of practical necessity. But if we take it that allegation rates are to be used for comparative purposes only, it can be done legitimately if an explicit assumption is made about the relationship between the frequency of complaints and the frequency of misconduct; then, if it is further assumed that any assumed bias equally affects the subjects to be compared, the observed rates are rendered useful.

Suppose, for example, that one wishes to compare the rate of misconduct among patrolmen and detectives, having available the numbers of accusations registered over a specified interval. One makes the assumption that these rates over-state or under-state the truth to the same extent in both groups, and then the comparison of accusation rates

becomes the equivalent of comparing the rates of actual bad behavior. However, the form of the comparison depends on whether the bias is additive or multiplicative; if the former, the difference in rates would be indicated, and if the latter, the ratio of rates should be computed. To clarify this point, let us suppose that the bias is additive, and the rate of accusation ( $f_a$ ) equals the rate of misconduct ( $f_m$ ) plus some positive or negative quantity ( $e$ ):  $f_a = f_m + e$ . We should then compare patrolmen and detectives by subtracting one accusation rate from the other, as this will cause the bias term to drop. However, if the bias is multiplicative, the model would be  $f_a = e \cdot f_m$  and the bias term would cancel out only if one accusation rate is divided by the other.

In this study the author makes his comparisons in terms of differences and hence is tacitly employing the additive model.

#### 4. Data Requirements and Data Utilized

This piece of research is based on historical data gleaned from the files of various New York Police Department offices. The object was to locate, if possible, all records of complaints of misconduct implicating any member of the 1957 New York Police Department cohort, during the eleven years between 1957 and 1968. It is frankly conceded that there is no way of knowing just how much misconduct was brought to the attention of the New York Police Department but which for some reason did not become a matter of record. Some victimization research

has suggested that the police in an enormous number of cases make no record of complaints.<sup>1/</sup> To the extent that this is true of ordinary complaints, it could be expected to be even more of a problem when the complaints are against members of the department.

Further, the author notes special handicaps in getting data on case disposition: there may be no record if the matter is resolved short of departmental trial; if a case involves criminal prosecution, there may be no record; and of the 28 officers who were dismissed from the force, disposition data could be located for only five.

These seem like not unusual difficulties in an empirical study, and one should look for a frank admission of them, as is found in this study.

The data are kept separated according to the category of alleged misconduct: (1) criminal offense; (2) violation of departmental rule or procedure; and (3) civilian complaint. There is no tabulation or analysis that lumps them together. This distinction is entirely appropriate in light of the nature and handling of these allegations. For example, a departmental violation may only be a matter of improper uniform. Dispositions vary in that civilian complaints do not involve departmental trials, and in appropriate cases the matter is disposed of by conciliation, involving no adjudication whatever.

The author also chose to keep the data as to detectives and non-detectives (the latter being about 80% of the cohort) separate. The

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<sup>1/</sup> Biderman, Surveys of Population Samples for Estimating Crime Incidence.

reason for doing so appears less compelling, though the argument is made that detectives are far more at risk of being the subject of a misconduct allegation.

#### 5. Experimental Design and Controls

Controls exist in this study only in the sense that comparisons are made which show less than chasm-like differences between, say, actives and inactives, which tends to reflect credit on the data acquisition, processing and reduction. Controls are seriously lacking in the sense of similar studies done in different departments. The results of this study are useful outside of NYC only if assumptions are made about likeness or unlikeness of different police departments. This is difficult to evaluate, particularly as concerns disciplinary machinery.

#### 6. Results and Recommendations

As argued earlier, allegation rates as proxies for misconduct rates are useful only for comparative purposes, and then only once the relationship between the two has been modeled. However, much of the results are of a non-comparative nature; these will be passed with the caveat that they are epistemologically obscure.

- INCIDENCE--More than half of the 1957 cohort (non-detectives) had at least one complaint against him in eleven years; about half of them had more than one; the maximum was sixteen, and the author expresses

surprise that someone with so many complaints would still be on the force and suggests that the record system may simply be such that it was not known to his superiors.

- NATURE OF COMPLAINTS--The majority of recorded complaints were for departmental violations (64%). Among these the major category of delict is "absence (AWOL)" (21.1%); then comes "unnecessary force" (13.6%); the remainder were spread thinly across numerous categories. Only 9.5% of the complaints were indicative of criminal offenses.

- TRIALS--Departmental violations also preponderate in a percentage of cases brought to departmental trial. Some 59% of these reached the ultimate level in the police justice system. This is in contrast to only 15% of criminal complaints coming to departmental trial. From this the author draws the inference that the New York Police Department system functions primarily as a means of enforcing its own administrative rules and regulations.

Some caveats should be noted to this conclusion: the author noted elsewhere in the paper that dispositions often do not show up in the records of serious cases, which suggests that the above 15% may be an underestimate. Also, the author had observed that the complaining party in a departmental use is invariably a supervisory officer, and one would expect that the brass may be able to bring to trial most any complaint, if they so choose. Furthermore, it is not clear from anything in this

paper that it is in any sense better for a case to come to trial rather than being resolved short of that point.

- DISPOSITIONS--More than three quarters of the departmental allegations resulted in some sanction (primarily "minor fine") while only 3.5% of the civilian complaints were so disposed. This may suggest that complaining citizens are ignored while prosecuting superior officers run a kangaroo court when internal rules and regulations are the issue--but we have no way of knowing how many of these cases should have resulted in punishment.

- DETECTIVES vs. NON-DETECTIVES--The data show no remarkable difference in rate of incurring complaints when these categories of personnel are compared. However, a good many more of the non-detective cases fell in the departmental category, while detectives are heavier in criminal complaints. Further, case dismissals and disposition before trial and somewhat more common among the detectives, leading the author to question whether the police justice system favors detectives.

- PROMOTIONS--The similarity in records as to complaints suggests to the author that it acts as no barrier to promotion from non-detective to detective.

- INFORMAL JUSTICE--The author found basic similarity between complaint records of actives and inactives. He had postulated more "bad apples" among the inactives, with cases diverted from the police justice system via forced resignation, which would imply the



co-existence of formal and informal systems. This similarity, however, contraindicates an informal system.

- RACE--Black officers were found to have a large complaint rate (80%) while White and Puerto Rican officers were about 56-57%. The author explains this in terms of quality of assignments, with Blacks often doing plainclothes work with associated high complaint risk.

- CORRUPTION--The data showed only 131 out of 1,938 total complaints for non-detectives, attributable to corruptions, defined as taking gratuities, gambling, or consorting with criminals. Other studies would seem to suggest a much higher proportion.

#### 7. Discussion

This is a highly creditable work, once allowance is made for the well-documented limitations of the data. It is difficult, however, to attach much meaning to complaint rates, however, especially in light of the virtual certainty of gross under-reporting. The use of the percentage of cases going to trial, or percentage of cases resulting in sanctions, are very dubious measures of the quality of justice administered by the police justice system of the New York Police Department, since we have no assurance that trials are the best outcome nor do we (at this distance) know which cases call for sanctions. The author's approach is a good one, nevertheless, for comparisons such as on racial grounds or for different categories of personnel.

The author expresses some dismay at his observation that the police justice system seems to function most actively in the area of departmental complaints, on grounds that these are petty matters compared to civilian and criminal complaints. Yet it is probably just as it should be. It is an administrative system and logically ought to be geared toward adjudicating administrative matters. It is odd that it should impinge on criminal matters at all. It is anomalous that there should be "departmental trials" in cases of alleged burglary, rape, robbery, murder, etc. It would seem as though these should be routed directly to the criminal justice system proper. The meaning of criminal sanctions coming out of such departmental trials is unclear: is it to be the extent of one's liability, with the case thereafter to be buried in the files, notwithstanding its criminal nature? If it is not the end of the matter and it goes thence to the courts, why have departmental sanctions at all? Is it intended to punish those whose guilt cannot be established beyond a reasonable doubt but whose guilt is presumed anyway? Criminal offenses probably ought to be treated as strictly outside the scope of police administrative adjudication.



**CONTINUED**

**2 OF 10**

## INTERNAL VALIDITY EVALUATION

### Portable Police Pensions--Improving Inter-Agency Transfers

The College of Insurance  
December 1971

#### 1. Research Objectives, Goals, Policy Issues

This paper is directed at what is described as a major obstacle to the job mobility of law enforcement officers: the loss of pension benefits in leaving one job to go to another. There are several major policy issues apparent in this subject:

- The importance of job mobility to the law enforcement mission,
- Job mobility as an element of job satisfaction among police officers,
- Pension program as a job inducement, and
- Counter-productive effects of pension programs.

The problems which attracted the attention of the authors stems, in their estimation, from the fact that there are 40,000 law enforcement agencies, and virtually as many different pensions programs, many having no reciprocity provisions or other arrangements for preserving retirement rights if an officer desires to go from one agency to another. A preponderance of these agencies are quite small and often the pension plans are out-dated, unskillfully designed or poorly managed.

The authors believe that the agencies most in need of pension plan improvement are the least likely to endorse any change. From the point of view of mobility, they tend to view pension benefits as a means of keeping the personnel they have, and would oppose any plan that is intended to promote the free flow of employees among agencies.

The argument put forward in favor of job mobility, in this booklet, is essentially that the trend toward professionalizing law enforcement careers requires job mobility.

The work on which this paper was based involved surveying a number of police departments to learn the characteristics of their pension plans, and to devise and evaluate alternative pension schemes for promoting job mobility in the field of law enforcement.

#### 2. Face Validity Check

This booklet gives a thorough and (for the most part) very readable account of the subject of police pensions; it elucidates the basics of pensions, such as vesting, portability, and funding. It is perhaps what one should expect when one hires a person or institution of conspicuous expertise. But the potential drawbacks of relying upon subject-matter experts are also apparent: the tendency of the expert to have developed perceptions that are at least slightly idiosyncratic, and to emphasize authoritative opinion at the expense of observable fact.

The authors leave hanging some crucial matters, to wit:

- Is greater job mobility really needed? A positive answer to this is simply assumed. Justification for it would require some showing that at present in the law enforcement field there are a great many round pegs occupying square holes, and further, that this would be alleviated by enhanced freedom to seek out other jobs. One obvious necessary condition would be a high degree of specialization, with the accompanying risk that one's background does not quite match the job one is in, or that one is likely to obtain specialized training that would make a job elsewhere more suitable. Conversely, if most jobs require only general law enforcement training and experience, mobility would not seem to be an urgent need from the viewpoint of the law enforcement mission. This issue would require an analysis of law enforcement job categories, their relative frequencies and geographic distribution.

- Is lack of job mobility a felt need? The authors plainly believe that a great number of officers want to move. This is not documented. A survey was conducted to ascertain what factors might influence any decision move, but the respondent officers were not asked whether such a step would actually be desirable to them.

- Would pension improvements increase job mobility? The main objective of the survey mentioned above was to find out whether officers would move if they could take their pension rights with them. Oddly, they

do not ask this question in their survey. As close as they came was to query whether retirement pensions would figure prominently in deciding whether to take a better job elsewhere. Most respondents indicated that it would be important to some degree, but were not asked whether the existence of better jobs seems likely, nor whether there are countervailing factors of even greater importance. In this connection, it should be noted that as regards accepting or rejecting hypothetical better jobs elsewhere, the respondents tended to put the considerations of salary and ties to the home area ahead of pension benefits in importance. For all we know, major improvement in pension plans may overall have a minor effect on movement in the law enforcement job market.

### 3. Methodology

As indicated in the section above, a survey was done to find out whether retirement arrangements are standing in the way of job mobility, which apparently serves as the authors' empirical basis for concluding that they are. In our opinion, the questionnaire was not drafted in such a way as to answer that question.

Secondly, they made inquiries of 250 agencies as to their retirement pension policies, and received useful responses from 122 of them. The points covered in this inquiry were: vesting; age and service requirements for normal retirement; employee contributions; integration with social

security; and consideration given to other service. The results of the pension survey are tabulated and used to describe the range of pension plans existing in this country with respect to the features chosen for study.

The major source of information, however, seems to have been the authors' experience in pension techniques and their own perceptions of how they do, and how they should, apply in the law enforcement field. It seems to be primarily on this basis that they lay out ten alternative pension systems. Discussion of these alternatives constitutes the main bulk of the report.

#### 4. Data Requirements and Data Utilized

Empirical data were probably less substantial in determining the ultimate product of this study (the ten alternative pension systems) than the authors' experience in pension plan analysis and perceptions of the law enforcement field. The reader, however, is entitled to rely on the conclusions as stemming from the data, since the form of the investigation suggests at least superficially that it was to be a data-oriented study. These survey instruments thus bear closer scrutiny.

Both the employee perception and the pension plan surveys are grossly under-explained. As to the former, there is no rationale given for the choice of cities, nor why the survey was not (as it appears) designed to include police in small town, county and State departments. Those

excluded may well have attitudes toward job mobility that are quite different from their big-city brethren. It should furthermore have been stated what method was employed in selecting the respondents within the chosen departments, and whether they were sampled entirely from among, say, patrolmen and other line personnel or whether technical personnel also were counted into the sampling frame. It is stated that the respondents were chosen randomly and that they were "representative of all ages and ranks," but this stands as assertion and not justification.

Likewise there is a dearth of background given on the pension plan survey. It is admitted that the target of 250 plans is a small sample, in light of the fact that there are 40,000 law enforcement agencies and a comparable number of individual plans. Of the 250 only 122 gave sufficient detail to be incorporated into the analysis. Somehow the authors were able to draw the conclusion that those 122 "do cover a wide variety of typical plans in many geographical areas throughout the United States" (emphasis added). It would be a remarkable coincidence if this were the case. Apparently many of the 122 responses were quite incomplete, and tabulations of answers to individual questions were based on as few as 22 of the responses. Nothing is said of any efforts as follow-up of nonrespondents to ascertain whether they--nearly half of those polled--were materially different from the respondents.

As an empirical study, this one would have to rate as poor. This is not to say that the study is invalid in the least; it is to say that the reader should consider the basis of the ultimate product to be expert impression and opinion, rather than empirical science.

5. Experimental Design and Controls

In a study of this nature the appropriate control methodology would be the investigation of pensions in at least one field in which pension plans are better, to observe whether there is really any difference in mobility. This opportunity was open to the authors, who observed that both California and the State of Washington have statewide pension systems that allow law enforcement officers to transfer from one agency to another within the State without loss of accrued pension rights. Furthermore, these two States represent two different levels of improvement; the California plan is limited in several respects, especially since it does not include the cities of San Francisco and Los Angeles, whereas the Washington plan is offered (the entire statute reprinted) as the ideal for within-state mobility.

Unfortunately, nothing is said to indicate that the authors looked into the relative amounts of lateral transfer in these States, compared one against the other, or against some other State or States where such liberalized arrangements exist.

Some measure of control is present in this study, in the form of comparisons between police pensions and "industrial retirement systems,"

with which the authors presumably have great familiarity, but this kind of controlled observation is not entirely germane, nor is it done in any detail or given quantitatively.

6. Results and Recommendations

The effect of the foregoing is to question the validity of the data produced in the course of the study reported here. Subject to these doubts, the results will be summarized here. Thereafter the authors' recommendations (the actual bulk of the report) will be given in brief.

- Of the 122 pension plans studied, 66 (almost half) include no vesting rights. The term "vesting" means that an employee has some claim to the value of his pension prior to retirement, if he should decide to change jobs. Usually there is some "vesting period," which is the first so-many years of employment, during which no such right exists, even though the value of the employee's pension starts and continues to grow. The authors describe this as the "most astonishing fact which emerged from our study."

- Of the 66 with vesting rights, only 11 grant vesting in less than the first ten years with that employer. What makes this bad is that most police employers require that their employees contribute to the retirement fund from their salaries. A person leaving after, say, nine years, may have paid a substantial amount into the fund and yet would come away with nothing.



- Fifty six of the plans were nonfunded, even though they also required employee contribution. "Nonfunded" means that there is no reserve fund into which employer and employee contributions are paid, and which is invested, and from which pensions (or some part thereof) are paid. These plans depend entirely upon legislative appropriations, year by year, to pay retirement obligations. What feature employee contributions play in such a scheme is mysterious.

- Eighty-nine of the plans do not make any provision for new employees who were previously employed in other law enforcement agencies.

- The assets of police retirement funds tend to be small compared to "most major fields of employment." This is cited as a cause of high costs associated with managing police pensions.

High variability in plan features was observed. Specifically, the authors felt there was remarkable diversity as to age and service requirements for retirement, interest rates at which pension funds are invested, and percent of pension obligations which are funded as opposed to paid out of current appropriations.

As to recommendations, we will start with some of the main negative points:

- Recommend against trying to improve mobility by modifying vesting. The variety of plans implies a "recordkeeping monstrosity" if

mobility is to be predicated on being able to move one's accrued pension rights from one plan to another, and the differences in standards would be difficult to resolve. Vesting, however defined, still leaves the employee under the axe of the vesting period, which coincides with the presumed maximum mobility years, but which would tend to depress the willingness to transfer. Immediate vesting, as a cure, has proven undesirable in the instances where it has been tried, in that many, many tiny pensions are still on the books belonging to short-stay employees whose whereabouts are unknown.

- Recommend against full portability as a solution. The term "full portability" means that a transferring employee takes with him the full value of his pension--his contributions, plus those of the employer and the amount attributable to investment--and puts it into the plan offered by his new employer. Differing standards among plans again is cited as a hinderance to such a procedure. (Portability, which figures prominently in the title of the report, is really a minor aspect of the study.)

- Recommend against aggregation of funds. Pooling of the assets of lots of small and badly managed funds into a central fund handled by a competent investment institution implies reduced costs and greater earnings. The authors, however, argue against this on the grounds that setting up the machinery to accomplish the aggregation, and maintain it, would be prohibitive. No justification is offered for this assertion.

On the positive side, the following recommendations are made in the report:

- Statewide retirement systems should be legislated in each State. This would cut down on the diversity of plans and enhance the conditions for reciprocity, as well as providing full mobility within each State. A statewide retirement fund, covering all agencies, is recommended.
- States should legislate reciprocity agreement amongst themselves.
- The Federal government should promote reciprocity by acting as coordinator of State authorities and by offering financial inducements for States to join.
- Pension plans should adjust for differences in working conditions.

It is assumed that law enforcement work is more hazardous and taxing in cities than elsewhere, and therefore that those working in cities should build up full retirement benefits at an earlier age. The statewide plan should make allowance for the time an employee spends working in cities and the amount spent in non-urban departments. Two methods are put forward, though the exact mechanics are not well described for the layman.

## 7. Discussion

The authors of this report shy away from Federal involvement, except as a means of pulling the States together to talk about reforming police pension planning and furthering reciprocity, and as a source of

money to draw States into a voluntary nationwide program. To some extent this may simply reflect a States-rights orientation, or perhaps just a healthy fear of what happens when the Federal government takes over.

They appear, however, to rely mainly on a legal opinion produced by the Advisory Commission on Intergovernmental Relations to the effect that the Federal government lacks the legislative power to impose a police retirement program on the 40,000 law enforcement agencies throughout the country. There is no detail given on this opinion, so the rationale is unknown. This being the case, it seems worthwhile to suggest that, to the contrary, the Federal government does possess such power, and could use it to establish a uniform, nationwide police pension program that would promote job mobility, to the maximum extent that pension plans can do so.

This legislative power may reside in the Interstate Commerce Clause of the U. S. Constitution, which gives Congress the power to make laws regarding matters which cross over State boundaries. The U. S. Supreme Court is the body which is empowered to interpret the meaning of this Clause, and its applicability or non-applicability in given situations.

The Supreme Court long ago ruled that a State may not establish a law forbidding persons from entering that State from a sister State, on grounds that citizens must have access to the seat of national government. Freedom of persons to move among the States is virtually absolute. Much

more recently the Court voided State residency requirements--analogous to vesting periods--for welfare eligibility, as barriers to the freedom of persons to change their abode from one State to another.

The Court in interpreting the Civil Rights Act of 1964 said that persons in transit on interstate highways are moving in interstate commerce; consequently, motels and restaurants which would normally be used by interstate travellers come under the legislative power conferred upon Congress by the Interstate Commerce Clause.

The above suggests that Congress may pass laws that will promote the interstate transition of people, and that the courts will knock down State laws that inhibit such movement. If it is true that pension plans maintained by State and local governments inhibit police officers from moving from one State to another in search of better opportunities in the law enforcement field, those laws may be invalid. Furthermore, the Congress may legislate in the area of retirement plans for the purpose of assisting law enforcement officers in their desire to move from one State to another.

In fact, it ought to be shown, however, more convincingly than in this study, that there is the desire on the part of more than the isolated individual to enjoy interstate job mobility.

POLICY TOPIC: Police Administration and Management-Non-Patrol Activities

TITLE: Basic Elements of Intelligence: A Manual of Theory, Structure and Procedures for Use by Law Enforcement Agencies Against Organized Crime

AUTHOR: E. Drexel Godfrey, Jr. and Don R. Harris

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ABSTRACT:

The basic objective of this manual are: (1) to describe the process of intelligence and to point out how law enforcement agencies may apply intelligence to combat organized crime; (2) to explore structure, training, staffing, and security of intelligence units and to provide guidelines for commanders of law enforcement intelligence units to improve their overall management; and (3) to present trends in the law as they may now and in the future impinge on the mission and functioning of the intelligence unit of law enforcement agencies. The manual points up the changing nature of organized crime, and suggests how techniques from disciplines unfamiliar to law enforcement can be adapted effectively to aid in the fight against the organized criminal. One focus of the manual is on the needs of the head of the law enforcement agency.

## INTERNAL VALIDITY EVALUATION

Basic Elements of Intelligence: A Manual of Theory,  
Structure and Procedures for Use by  
Law Enforcement Agencies Against Organized Crime

E. Drexel Godfrey, Jr. and Don R. Harris  
November 1971

### 1. Research Goals, Objectives, Policy Issues

This document is intended to supply the police chief with detailed information on the nature and importance of an intelligence unit, and how to go about setting up such a unit in his department.

The authors define "intelligence" as "information that has been processed--collected, evaluated, collated, analyzed, and reported." The term "information" is defined as "written or oral reports or documents, short of long, telling of an event, or an activity." Reversing the usual operational definition, they stress that intelligence is a product, not a process. Yet there is a definitive series of steps through which raw data must go to become intelligence. By and large, in the authors' view, intelligence production is a matter of juxtaposing given facts to infer additional facts or relationships. To illustrate, the intelligence officer will take ABC and DEF and put them together to form ABCDEF; he will observe that in ABCEF D is missing; that if the final characters in ABF and DEC are interchanged, the right alphabetic relationships will be found, etc.

Several categories of intelligence are distinguished in this book, but all are minor except for strategic intelligence relating to organized crime. This form of crime is postulated to be extremely devious and hard to detect through ordinary police methods. It tends to operate behind a legitimate front; its high level chiefs are usually respectable citizens lacking criminal records; they are isolated from the criminal activities that they direct; its operatives tend to be more skillful and less prone to outright bungling than the run-of-the-mill offender.

Thus, for organized crime to be detected and exposed, it is necessary to put together a welter of seemingly unrelated bits of information. In other words, the presence of organized crime will be discovered through circumstantial evidence, rather than direct eye-witness testimony.

Strategic intelligence is to be distinguished from that of a tactical nature. The latter involves providing investigative personnel with information relating to on-going cases; the former (which the authors manifestly take to be "real" intelligence) is supplied directly to the chief to aid him in deciding how to deploy the resources of his department generally.

Essentially, intelligence is for the purpose of getting at crime that otherwise the police would not know of, and would not be dealing with. It is meant to expand the scope of police work, rather than to augment some aspect of the existing spectrum of law enforcement activities.



## 2. Face Validity Check

This is not a research document. It is not the result of a study into the efficacy of intelligence units operating within police departments. Nor are any such studies referred to. This is not an oversight, but by design. The LEAA employed the authors to write this book on the basis of their experience "in the processes and operations of intelligence at the national level." Given this governmental imprimatur, the authors proceeded to speak with considerable force and authority. We are to take it that their uncounted assertions about the virtues of having an intelligence unit are founded on the right kind of knowledge.

It is unfortunate that they do not tell us what happened when anybody added such a unit to an existing force. There is a bibliography included in an appendix, with some entries annotated very briefly, which suggests that the subject has been studied objectively.

The absence of any objective justification for the various assertions relating to the recommendation of an intelligence unit is especially serious in light of the authors' own statement that their experience is on the national level. They are advocating intelligence function on the local level. Certainly what works in a large and well-funded bureaucracy may prove impractical in a small-scale police department. The authors concede that an intelligence unit is expensive, its accomplishments are usually hard to identify in tangible form, and it requires numbers of highly

specialized professionals. These factors may rule out intelligence operations at the local level, notwithstanding any logical arguments as to its desirability.

Having an intelligence unit presupposes the presence of organized crime. Yet it takes an intelligence unit to find this out. Arguably, every sizeable jurisdiction has an organized crime problem of some dimension. Perhaps there is enough of it in any city to justify a special department to fight it, without any requirement for objective proof.

## 3. Methodology

The methodology of producing intelligence is divided into discrete steps:

(a) Collection--This is the process of gathering raw data. The authors seem to be of two minds on the question of who shall do the collecting. In some places in this book they emphasize data acquisition as a function of operating law enforcement personnel, supplemented by matters of record, such as newspaper articles, court proceedings, investigative files, etc. At other places it appears as though the authors intend that an intelligence unit should have an investigative staff of its own. In any event, patrol personnel must be a major source of data, and considerable space is devoted to the subject of enlisting their support.



(b) Collation--This is the process of bringing information together so that relationships can be seen. The procedure essentially is to set up files representing suspicious activities. For example, if the dry cleaning business in town is suspected of being a front, a file would be established to hold all items relating to dry cleaning. Or, a certain place may be suspect; for instance, a certain bar might be believed to be the meeting place for a criminal enterprise; all reports and observations relating to that bar would go into a file created for it. The nature of these files obviously feeds back to the collection stage, as the intelligence staff would wish to alert their sources to the places and activities of current interest.

(c) Analysis--This is the point at which the collated information is turned into evidence. The good information is separated from the bad, the useful from the unuseful, the reliable from the doubtful, etc. A case is thereby either built up, or is dismissed altogether. This may involve many different disciplines. The authors believe that psychologists and sociologists have much to contribute in analyzing data concerning personal and group conduct, as manifested by the intelligence files. The discipline of systems analysis is deemed useful for handling quantitative data. Accountants and economists are needed for evaluating financial information.

(d) Reporting--The object in all of this is to produce a report summarizing the findings of the intelligence unit, based on the collected data, as to the nature and extent of particular kinds of organized crime. It is the content of such a report that the authors feel should properly be signified as "intelligence."

(e) Research--This is a stage that differs not so much in kind as immediacy of interest, compared to the rest of intelligence work. This is work at the frontiers of the study of organized crime in a jurisdiction. It might entail the study of the organized crime function in general. It might involve study of new and evolving forms of organized crime. It might also include the drafting of legislation for the fighting of organized crime.

Intelligence is proposed as a staff function, with the head of the unit reporting directly to the head of the law enforcement agency. It is believed that the unit must be independent of law enforcement operations in order to be objective. This is important because of the scientific nature of intelligence work. It is also important because of the fact that intelligence reports may--at least on occasion--reflect adversely on the quality of some enforcement program, and may even implicate enforcement personnel in organized crime. Direct involvement in enforcement work may generate emotions that would erode objectivity. (The implication is that emotion is tolerable in enforcement work.)

The independence is to be complete, in the sense that intelligence is to flow directly from the unit head to the enforcement head, without any filtering and interpretation by intermediate officials. Of course, everyone with some special function that they want to perform tends to think it important to report directly to the top. In reality, however, most reporting is to staff assistants or deputies.

While the intelligence unit is to be administratively independent of enforcement, it is nevertheless to be "placed within the mainstream of the agency's life so that it does indeed become part of the vital activity of the agency." The authors apparently wish to avoid having intelligence regarded as being purely academic and detached from reality. They would have intelligence provide tactical data to their operational information sources, at least in part as a form of quid pro quo, subject to the constraint that intelligence must remain immediately responsive to the head of the agency.

#### 4. Data Requirements and Data Utilized

The authors believe that everything is grist for the mill while recognizing that an intelligence operation is worth nothing if it cannot differentiate between reliable and unreliable sources. They wisely recommend that intelligence personnel cultivate as data sources the enforcement people who seem to have the proper aptitude and interest.

According to the authors the typical intelligence unit of the olden variety is strictly a tactical unit, serving on-going investigations. The data files consist strictly of biographical files. That is, intelligence data is information about individuals, each item to be filed according to who the subject is.

In upgrading intelligence to the strategic level, function and activity files are added. The filing system itself therefore depends on what is already known about organized crime, and must be flexible to allow for change. The real genius of intelligence would seem to be in knowing what pigeon holes to set up, and how to adjust the array according to circumstances. The authors may overstress the importance of the analysts, relative to the data organizers. Intelligence is necessarily a paper shuffling operation and a premium must be placed on keeping things straight.

The main source is bound to be overt: the observations of patrol and detective personnel, who are alerted as to particular points of interest, and who are regularly debriefed by intelligence staffers. The authors include a number of examples of reporting forms that they believe would be helpful, though there is no indication as to whether they had ever tried them. Other overt sources they consider are police files, court records, newspapers, compaining witnesses, bank records, etc. The main work of intelligence is digging.

Also discussed is the use of covert agents, both those planted in criminal organizations by the police, and underworld members who are willing to inform.

Another source which is to be encouraged is the sharing of data between agencies. They do not underestimate the practical difficulties in this, however.

#### 5. Experimental Design and Controls

It would be highly desirable for the police chief who is potentially an advocate of having an intelligence unit to find some empirical evidence that it is likely to be worthwhile. Departments with and without the sort of units the authors envision should be compared; they might be paired to control for variables such as population size and density, and category of major crime problem. Budget and force size should also be taken into account.

Evaluation of the effectiveness of an intelligence unit would be made especially difficult if the unit, owing to its independent role, does not carry out the campaigns that it designs. Others make the arrests, and little if any mention may be made of the intelligence background. Some arrests may reasonably be attributed to intelligence, however, for example, large-scale or mass arrests (outside of the riot context) may be indicative of intelligence work, particularly if it involves the exposure of citizens therefore considered to be law-abiding. Arrests resulting in the

interdiction of a "ring," or mob, may well be counted to the credit of the intelligence unit, though it may reflect tectical rather than strategic work.

In any event, whether performance is to be judged by reviewing arrests from the outside and computing an intelligence batting average, or whether administrative sources within a department may be trusted to document the production of the intelligence unit, it should be possible to quantify the results of intelligence work. Given paired comparisons, it could then be ascertained whether in fact anything is gained by such a function. Budget analysis would also facilitate a cost-benefit comparison of those departments with and those without intelligence units.

Assuming some variation in funding level, it would also be possible to examine any possible relationships between funding and performance, e.g. whether number of attributed arrests goes up with funding level.

It is unclear whether any sub-national law enforcement agencies have actually implemented intelligence in the form described by these authors. It may be that there would simply be no subjects available for study. That would be a salient fact in itself.

#### 6. Results and Recommendations

Results there are none of, except in the sense that the publication results from the authors' experiences in the field of intelligence. The

entirety of the report constitutes a recommended form of an intelligence unit, with allowance made for variations according to local conditions. In essence, the recommendation is that local law enforcement should have an intelligence department if that community is the victim of organized crime. Unfortunately, we are given little guidance on how to go about deciding whether a given community is so victimized, although it may be that few chiefs of police would lack a firm opinion in that regard as respects their own jurisdictions.

Specific recommendations are more concrete in some places than others. An appendix on guidelines for the operation of an intelligence unit is a good summary of how the authors believe the job should be done. In some instances the recommendations are incomplete; for example, a major section is devoted to the subject of training in the intelligence function and operational support, but specific course content is lacking and it is assumed (apparently) that the interested reader will have the expertise in intelligence needed to flesh out the generalities.

## 7. Discussion

This manual evokes a sense of the impractical. This is the case in at least two respects. First, what is being touted is an elaborate and expensive enterprise--one that would certainly compete with existing law enforcement programs for dollars in a relatively fixed budget. To persuade a legislature that extra funding would be justified, it would

probably be necessary that intelligence be a consistent producer of material benefits. Yet as the authors describe it, intelligence typically means working long periods on cases that may not pan out. Those that succeed may result in numerous arrests and convictions, but there is no guarantee that these events will fall conveniently within funding periods. Further, in view of the proposed independence of the intelligence unit, the actual harvesting of criminals is done by someone else, so that the credit owing to intelligence may in any case be uncertain. These considerations suggest that intelligence may be difficult to sell to the source of funds, and funding support may also be hard to sustain. It is worth bearing in mind that the authors' experience in the field is on the national level; perhaps intelligence is appropriate only for the large, specialized bureaus, rather than the average police department.

Secondly, the separation of intelligence functions from enforcement operations may prove unwieldy. Apparently, the authors anticipate that the intelligence technicians and analysts will rely for their data on personnel who are not subject to control by the intelligence chief, even on an ad hoc basis. This is the price of independence. However, it would put intelligence at the mercy of the rest of the force. Given the right kind of social skills, the intelligence staff may be able to set up reasonable working relations. Maintaining these good relations may require an increasing emphasis on tactical intelligence, at the cost of



strategic work, though the latter is supposed to be of profound interest to the law enforcement head, who decides the intelligence budget. An objective and honest intelligence staff would run the risk of someday having to submit to the chief a report that is critical of the enforcement work of some of their sources of information. Thus, the unit would be in jeopardy of the loss of its sources, for reasons inherent in its own role.

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## EXTERNAL VALIDITY EVALUATION

### Police Effectiveness and Evaluation

The papers reviewed in this section reflect the two major concerns in measuring police effectiveness: evaluation of ongoing operations (see the papers, by Greenwood and Bloch) and evaluation of a new program (see paper by Fisk). Central to both concerns is the establishment of definitive measures that can be used by police administrators in a decision-making context and that can also be used by the public to measure the adequacy of police services.

Until recently, the basic measures have been the levels of crime as reported in the FBI's annual publication "Crime in the United States -- Uniform Crime Reports (UCR)". The inadequacy of these reports for measuring effectiveness are discussed in the report "Measures of Police Effectiveness", International Chiefs of Police (IACP), Gaithersburg, Maryland, 1973. The IACP study notes that the UCR includes only selected crimes and activities, focuses upon quantity rather than quality of activity, and does not enforce standardized audit procedures. As the UCR includes only reported crimes, a set of surveys have been undertaken by the Law Enforcement Assistance Administration (LEAA) to measure the extent to which individuals age twelve and over, households and commercial establishments have been victimized by certain types of crimes (see "Crime in the Nation's Five Largest Cities," Advance Report, LEAA,

Washington, D.C., April, 1974). However, it is felt that victimization rates, as well as the UCR data are not adequate by themselves for the evaluation of most operational and administrative police functions. The IACP report suggests the following range of measures: annual number of reported index crimes, annual clearance data on each index crime and in total, estimates of "true" crime rates including unreported crime, estimates of true clearance rates for index crimes including unreported crimes, annual arrests for each index crime, annual adult convictions associated with each index crime, felony arrests (for index crimes) that "survive" preliminary hearing in court of limited jurisdiction, number of days between report of incident and clearance for each type of index crime (average and range), data on citizen feeling of security, citizen satisfaction with police service, response time (minutes) between receipt of crime call and police arrival at scene -- by crime and whether in progress or not, police manpower for crime control-related activities, and police expenditures for crime control-related activities. We recommend as a key law enforcement research effort the defining of a set of police service indicators and the establishment of unambiguous procedures for their measurement and audit. Proper evaluation of police services can be a reality only if such research can be translated into operational use.

The measures of police service can be categorized in terms of measures of efficiency, effectiveness or equity (see the report "Aids to Decisionmaking in Police patrol," J.S. Kaklik and S. Wildhorn,

R-593-HUD/RC, The Rand Corporation, Santa Monica, California, February, 1971.) Efficiency deals with measures internal to the system, effectiveness implies measuring external effects, while equity considers how a service and its benefits are distributed among the population. Also of interest is the responsiveness of the police service to citizen needs. These concepts are difficult to define in the abstract, but can, we feel, be defined and measured for most specific problem areas.

The paper by Greenwood on the analysis of apprehension activities represents a straightforward approach to evaluating the ongoing detective function of the New York City Police Department. The problem investigated -- determining the effect of case workload on a detective's ability to close cases -- can be formulated in rather precise terms. Here the author defines a new measure called the detective arrest index that represents the fraction of cases assigned to a detective for investigation that eventually results in a detective arrest. The necessary data were, in general, readily available. In contrast, the paper by Bloch dealing with equality of distribution of police services (also a study of ongoing operations) faces the more difficult task of defining equality of services and measuring the level of equality by using data normally compiled by the police. The term equality of services has not been clearly defined, but Bloch recognizes that it is not just a single measure. There is some question as to whether all areas of a city must have "equal" service. Unlike twice-a-week garbage collection for every household, the need for police services is not a simple function

of total population, and the type and kind of services supplied should be a function of an area's crime geographic and demographic characteristics.

The paper by Fisk on the evaluation of the Indianapolis Police Fleet Plan confronts the serious problem of evaluating a change applied to an ongoing police activity. Fisk had the unenviable task of studying a program that had been initiated without any provisions for an evaluative component and to do it with little time and money. Thus, the objectives of the program were unclear, baseline data and measures were developed post hoc, and the conclusions reached are subject to interpretation. The Fleet Plan study does demonstrate an approach to the accomplishment of retrospective evaluations, but we suggest that this type of evaluation will always lead to interpretive difficulties and should not be undertaken in general. We stress that concurrent and independent evaluations must be made an integral part of a program that is expected to induce change.

Guides to and examples of evaluation in criminal justice programs are given in the LEAA studies by Albright et al. and Maltz (see references). Other discussions of police program evaluation are given in the sections on Weapons and Technology (helicopters) and Police Administration and Management (neighborhood team policing). The material in these sections, as well as the papers under review here, point out the difficulties in implementing controlled experiments in the law enforcement environment for the evaluation of new programs. To this end, we include in Section III, a discussion on experimental design for law enforcement programs.

POLICY TOPIC: Police Effectiveness and Evaluation

TITLE: An Analysis of the Apprehension Activities of the  
New York City Police Department

AUTHOR: Peter W. Greenwood

PUBLISHER: The New York City Rand Institute, New York, New York

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ABSTRACT:

The governing aim of this study is to develop criteria for evaluating apprehension efforts that are consistent with the overall objectives of the criminal justice system, and to apply these criteria to existing programs. The study concentrates on program leading to the arrest of Part I offenders: those who commit homicide, rape, robbery, assault, burglary, grand larceny, and auto theft.

After an examination of the possible evaluative data, the traditional "clearance rate" was rejected for this analysis because of its susceptibility to bias and the pressure it places on police officers to bargain with offenders. As a substitute, "probability of arrest" was adopted as a more accurate measure of apprehension program effectiveness. This concept is demonstrated as a means of determining the preferred allocation of manpower among apprehension activities, such as investigation, patrol, stakeouts, and tails.

The study also examines the uses and deployment of detective patrol. It was found that general patrol activity was more productive than tails or stakeouts during the period of time covered by the data.



INTERNAL VALIDITY EVALUATION  
An Analysis of the Apprehension Activities  
of the New York City Police Department

Peter W. Greenwood  
September 1970

1. Research Goals, Objectives, Policy Issues

The basic purpose of this study was to attempt to identify those nonarrest police cases which have a high probability of solution (arrest), given the application of investigatory resources. In a sense, it is directed towards furnishing police administrators with an analytical based decision process for the assignment of detective resources to a particular case. The approach taken goes beyond resource allocation, per se, as the author was also attempting to measure the effectiveness of existing investigatory activities.

2. Face Validity Check

The author does a rather commendable job of laying out the problem of the New York City apprehension activities and develops a methodology for analyzing these activities based on available data. The analysis dealt with index crimes (Part I offenses--criminal homicide, forcible rape, robbery, aggravated assault, burglary, grand larceny and auto theft), and how resources of the Precinct Detective Squads were allocated to investigate those crimes for which an arrest has not been associated.

Police folklore has it that detectives do little Sherlock Holmes type analysis and tend to work on and solve those crimes for which clues are readily available. Historically, we note that the FBI Uniform Crime Reports have indicated that property crimes of robbery, burglary, larceny and auto theft have a low clearance by arrest rate, while the crimes against the person of murder, rape and assault have a high arrest rate. One would then surmise, that as person crimes are the crimes of fear and since they appear to have a higher probability of being solved, i. e. arresting the appropriate offender, that the detective force should concentrate on person crimes and should be rather successful with that allocation of resources. Six month's of data (January-June, 1967) for the Manhattan precincts showed that for 6,461 robberies assigned to detectives, 337 arrests were made for a percentage of .052 arrests per robbery; for 4,047 assaults, 1,176 arrests were made for a percentage of .29 arrests per assault; and for 25,412 burglaries, 314 arrests were made for a percentage of .012 arrests per burglary, i. e. detectives appear to be successful for the assault type of crimes.

The author was interested in determining the effect of case workload on what he defined as the detective arrest index. The methodology of his approach is discussed next.

3. Methodology

The author felt that the traditional (and somewhat questionable) clearance rate measure of police effectiveness was not proper for this

study and gave evidence to support this, e. g., five precincts have an unusual average between 10 and 12 clearances per burglary arrest. As the purpose of the study was to compare apprehension activities so as to determine how resources, which are mainly manpower, should be redistributed, the author selected arrests per man-month (by crime type) as the measure of effectiveness. (Final disposition of arrests were not readily available, so there was no inexpensive way of measuring conviction rate.) The author defines an arrest index as the fraction of crimes that result in at least one arrest, and a detective arrest index as the fraction of cases assigned to the detectives for investigation that eventually result in a detective arrest. The indices may be interpreted as probabilities of at least one arrest occurring for a crime and for an investigation, respectively. For the data of the study, these indices are given in Table 1. He then investigates the effect of workload on the detective arrest index.

Table 1  
Clearance Rate, Arrest Index, and  
Detective Arrest Index for Part I Offenses

Crime	Cases	Clearance Rate	Arrest Index	Detective Arrest Index
Homicide	338	.7456	.7130	.6632
Rape	906	.5143	.4834	.3914
Robbery	15,847	.2203	.1327	.0558
Assault	13,392	.4936	.4599	.3075
Burglary	67,028	.1640	.0434	.0135
Grand Larceny	40,822	.1077	.0420	.0216
Grand Larceny, MV <sup>a</sup>	20,792	.1957	.0810	.0221

<sup>a</sup> Motor vehicle.

A detective squad's (average) workload is defined as the ratio of the number of crimes assigned to the squad divided by the number of detectives on the squad. A total of 22 squads from the Manhattan precincts were considered. Due to data limitations, it was not possible to analyze similar cases investigated by similar groups of detectives. We feel that individual workloads by crime type, not average, would have been more appropriate, but evidently this was not possible.

The 22 precincts were separated into two categories of case load, high and low. The detective arrest index was calculated for each category and a chi-square test was used to determine whether the observed differences in detective arrest indices were statistically significant.

Similar tests were conducted for property crimes to determine if the probability of arrest was a function of the value of the property lost. A detailed study of 600 crimes against property was made, half of which had been solved and the other half closed without results. This led to three interesting crime profiles for robbery, burglary and grand larceny which yield information on the probability of solving any particular crime, based on the type of evidence (if any) available. (The results and conclusions are discussed below.)

An analysis was also made of the average productivity of patrol and detective forces as measured by arrests per man-month. The results are given in Table 2.



Table 2  
Arrest Productivity

Activity	Average Arrest Productivity: Primary Arrests per Man-Month
Uniformed patrol	0.22
Investigation	0.86
Detective patrol:	
Burglary Squad	0.92
Neighborhood Task Force	2.15

In general, the methodology employed by the author is straightforward and direct. It is a good example of structuring the problem based on available data and reaching reasonable conclusions without stretching the data or one's imagination.

#### 4. Data Requirements and Data Utilized

Six months of data (January to June 1969) were collected from the standard crime and arrest reports of the New York City Police Department. A record was developed containing pertinent characteristics for each homicide, rape, robbery, assault, burglary, grand larceny and auto theft for that period of time. The constraints of the study required little development of new data and data sources, and although the study would have been strengthened if, for example, the arrest charge and final disposition were readily available, the author recognizes this and qualifies his results accordingly. To emphasize this point, the author did trace

258 offenders through to final disposition and found that, although less than 5 percent of the offenders were initially dismissed or arraigned on charges different from those recorded by the arresting officer, over 70 percent were not indicted for felony offenses, i.e. significant charge reduction occurred in every case which resulted in a guilty plea or a verdict.

The only special data collected was a two-month sample of detective squad activities in order to determine how detective manpower was actually used.

#### 5. Experimental Design and Controls

The study was not an experimental one and did not call for the establishment of a controlled situation. The type of study described here, can, in general, be run without an experimental protocol. However, if we were to investigate characteristics of detectives and their ability to solve cases, by case type, we would want to randomize the assignment of cases to detectives.

#### 6. Results and Recommendations

It was demonstrated that there is a great difference in the probabilities of arrest between the crimes against a person (homicide, rape, assault) and the crimes against property (robbery, burglary, larceny. (These probabilities are given in Table 1.) The majority of arrests for property

crimes are made near the scene or based on evidence available at the time the crime is reported. Assault arrests were more likely for detective squads which had a low caseload, than for squads which had a high caseload. This was not true for robbery and burglary, where there was basically no difference in the low arrest probabilities of high and low caseload squads. In general, crimes against property are not sensitive to average squad workloads. Also, detectives appear to be no more successful in solving property cases which have a high dollar value versus these with a low dollar value.

An interesting set of information is supplied based on the analysis of 600 cases against property, one half of which led to an arrest (solved) and the other half closed without results. For example, the aggregate of burglaries showed the following fractions for arrest: patrol arrest .032, detective pick-up arrest .005, no pick-up arrest .963. For the no pick-up arrest cases, evidence was obtained for .056 cases, and no evidence was obtained for .944. Of the evidence cases, .042 led to arrests, and .958 no arrests; while for the no evidence cases, .004 led to arrest, and .996 no arrests. Similar data are given for robbery and grand larceny cases.

The very few studies that have investigated the effect of response time by patrol units on the probability of arrest have showed that an inverse relationship exists, i. e. the shorter the response time, the higher the

probability of arrest. This appears to be true for emergency calls, e. g. robbery in progress, as well as nonemergency calls. The present study showed that for the investigative process the time of police notification about the crime (greater or less than four hours) and the existence of identifiable stolen property did not appear to affect the case outcome.

## 7. Discussion

This paper is internally valid in terms of its objectives, data analysis and methodology. It is of limited scope, but does represent a direct approach to the analysis of the detective function and is an attempt to structure analytical tools to aid in the allocation of this important and high cost resource.

One key element which should have been part of this analysis, but which was not investigated, is the determination of the number and types of crime which form an acceptable workload for a detective. The author does his basic analysis in terms classifying average detective workload as high or low and shows that low caseload squads have a statistically significant detective arrest index. It would also be of interest to analyze such relationships in terms of case profiles of high arrest detectives.

There will always be concern as to the set of indices used to measure detective (as well as other police unit) performance. There are severe data problems and it is most difficult to maintain. Also, plea

bargaining, probation reports and other elements of the judicial process confound any attempt to use arrests as the measure. Certainly more research is needed in this area.

In sum, the author's purpose of the study, to identify those cases with a high probability of solution, was accomplished. It bears out the general impression that people crimes are more readily solved than property crimes, and the results should give the detective administrators some additional insights as to how cases should be assigned. The report leaves open the basic question of what makes a good detective and how do we recognize a good detective in terms of acceptable measures of performance.

POLICY TOPIC: Police Effectiveness and Evaluation

TITLE: The Indianapolis Police Fleet Plan: An Example of Program Evaluation for Local Government

AUTHOR: Donald M. Fisk

PUBLISHER: The Urban Institute, Washington, D. C.

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#### ABSTRACT:

In the Indianapolis Police Fleet Plan, marked police cars were assigned to each member of the patrol force to drive off duty as well as on duty. The patrolmen drive patrol cars to and from work and use them for personal activities while off duty. They are expected to maintain radio contact and respond to emergencies in their immediate area even while off duty. In return, the city bears the expense of purchasing and operating the cars.

This report is based on an examination of eight months of operations under this new system. The major question addressed was: What benefits and what costs has Indianapolis incurred by implementing the Police Fleet Plan? To help answer this, data were collected for four major areas--costs, reported crime, police clearances, and traffic safety.

There are two purposes to this report, the first of which is to provide information for evaluating the Indianapolis Police Fleet Plan in ways that are useful to the city and other local governments. The second purpose is to illustrate an approach that cities can use to evaluate their ongoing activities.

## INTERNAL VALIDITY EVALUATION

### The Indianapolis Police Fleet Plan: An Example of Program Evaluation for Local Government

Donald M. Fisk  
October 1970

#### 1. Research Goals, Objectives, Policy Issues

This study was directed towards the evaluation of a major policy change in the operational aspects of police patrol car utilization, i.e. the use of patrol vehicles by off-duty officers, thus allowing each officer to have a city-paid vehicle for his private use, given certain restrictions noted below. A subsidiary value of the study was to illustrate an approach to evaluation of ongoing city activities.

#### 2. Face Validity Check

The author describes the results of his task in cautious words and states his conclusions with appropriate caveats. He was faced with the usual, serious handicaps which most analysts seem to encounter when working in the police (or general city services) area: a program has been initiated without any provisions for an evaluative task and the analyst, with little funds and time, must develop a retrospective evaluative framework which, hopefully, cannot be subjected to invalidating criticism.

This is, of course, an impossible task. (We note the study was evidently initiated not by the City of Minneapolis, but by the City of Fort Worth, as the latter city was interested in applying the fleet plan.)

As will be discussed further below, the major criticism of this report, and similar studies, is the attempt to impose statistical results under the implied assumption that the changes in crime statistics are related to the operational changes brought about by the new program and that all other operational elements have remained constant. The author does a commendable job in recognizing this aspect and lists findings which tend to negate as well as support the plan.

The author was required to deduce the program objectives retrospectively (they were not stated beforehand) and concluded that they were: (1) to prevent crime, (2) to increase the police clearance rate, and (3) to prevent automobile accidents and personal injuries and deaths from such accidents. Other, less important objectives were higher police morale, better public image of the police, and greater citizen-perceived security. Thus, the purpose of the evaluation was to assess the effect of the Fleet Plan on each of these objectives and to estimate the cost of the project. We shall emphasize the crime assumption and the crime-related results in our discussion.

Central to the study's analysis is the assumption that increased exposure of patrol officers and their vehicles will prevent crime. There



has not been any definitive studies which demonstrate this to be true. In fact, as the author notes, increased patrol or availability of patrol vehicles might cause more crimes to be reported. Also, the Kansas City study of preventive patrol showed that the relationship between patrol car exposure and crime levels was at best unknown. The author's evaluative approach hinges on changes in crime levels, by crime categories, and this is taken to be the main measure of effectiveness of the program, i. e. was crime reduced by the Fleet Plan?

We feel that attempting to measure the Fleet Plan in terms of crime impact is a wrong approach. There is no reason to believe that such a change in the use of the patrol units would affect crime statistics in any direction, and that certain outdoor crimes (auto theft, theft from autos, highway-alley robbery and purse-snatching) would be affected in particular. These crimes are, in general, spur-of-the-moment and it is unclear as to how the criminal would react to the publicity and knowledge of the workings of the Fleet Plan; i. e. were any criminals really deterred because it appeared as if more police were in the area? We submit the possibility that a criminal seeing a patrol unit in the area might be deterred from a particular crime. But, an auto with the keys in the ignition is still a good target after the patrol unit has passed by.

Another reason we feel that crime statistics should not have been used in this study is the inability of the analyst to obtain comparable data and the reliance on a Jerry-built set of data. For example, the Fleet

Plan was started in August 1969. A post-plan experimental "year" was defined as the eight months of September, October and November 1969, and January, February, March, April and May 1970. December 1969 was not included as statistics for the Decembers of previous years were not available. (It would be valuable to find out why that month's data were not available, as supposedly a complete set of eight years of monthly crime, data clearance and traffic data were available. Is December a high or low crime month in Minneapolis?) The end month was dictated by when the City of Ft. Worth required the results of the study. Note that no summer months are included in the study, the months when school is out and crime in urban areas usually increases. Preceding comparison year calendar data had to be converted to the eight-month Fleet Plan year and thus, comparisons and projections are not based on the true set of crime data. Even with care and good intentions, such manipulations of the data cause any results to be suspect.

Admittedly, we do not have the answer as to how to measure the impact of program changes such as the Fleet Plan. There are other sets of measures in terms of effectiveness, efficiency and equity of services. None of these were addressed by the study except that an analysis was made to show that Fleet Plan resulted in a 7 percent increase in patrol time, which is roughly equivalent to adding 28 men to the force. The 28 men would cost about \$280,000 per year, while the continuation of the Fleet Plan would cost about \$450,000 per year. This comparison is not



quite correct. Twenty-eight additional men to field and patrol would have a significant impact on response times (and beat size), where it is unclear as to what effect the Fleet Plan had on response time.

The author does point out that the results of this study do not mean a yes or no evaluation of the Fleet Plan: "There is no simple, unambiguous answer." We agree, of course, but the report can and has been used to support Fleet Plans in other areas, and we emphasize that this study does not warrant such conclusions.

### 3. Methodology

The first step in the evaluation process was to attempt to define the project's objectives. These were noted above. They had to be elicited from the Indianapolis officials as the Fleet Plan was initiated without such a statement of objectives and without an evaluation component.

The basic methodological approach was to collect pre-Fleet Plan data on crimes by type, clearances and traffic accidents, and to project these figures into the 1969/70 eight-month Fleet Plan year and to compare the projections to the actual observed figures. Three comparisons were used to measure the effect of the Fleet Plan.

The first method involved an analysis of changes through time. Estimates were made of crime, clearance rates, and traffic accidents that would have been expected without the introduction of the Fleet Plan. These estimates, based on previous trends were arrived at through the

use of two procedures. Initially, the average annual change of the historical data was calculated. This average was added to the data for the year preceding implementation of the Plan to provide an estimate for the 1969-70 period. This approach was used in the study and the estimates presented in the body of this report were derived by this technique. Later, after completion of the initial study, statistical regression analysis was used to determine the trend line that best fits the historical data, and this line was extended to the 1969-70 period. These two procedures provided similar estimates. Projected estimates were then compared with the actual data, and the significance of the differences was assessed by a standard statistical test. The second method was to compare the change in crime, clearance rates, and traffic accidents the year the Plan was implemented in Indianapolis with the change in different geographic areas, such as cities of comparable size. The third method was to compare conditions before and after the Plan.

It is unclear as to why the analyst decided to compare data based on the Fleet Plan year and not to compare each month of the Fleet Plan operation with the historical and predicted figures by month, or at least by quarters of a year. In this fashion, more data points and statistical tests would have been available and seasonal variations could have been observed and studied, e. g. does the Fleet Plan appear to work better in the Fall or Winter months in Indianapolis? The averaging process is just the extension of a straight line through the first and last data

points and extending the line for one year. This prediction process is quite crude and has little statistical value. The study's figures and conclusions are based on the comparison between this type of extension of the crime averages and the actual figures for the experimental Fleet Plan year of 1969/70. For example, auto theft in the eight-month year of 1963/64 was 2,038 and in 1968/69 it was 3,607. The average difference was 314, giving an average projected figure for 1969/70 of 3,921. However, the rate of increase of auto theft was decreasing in that for 1967/68 the figure was 3,590, and the averaging process did not take this into account.

The regression approach can also be questioned. To use regression to predict the impact of a change in the system (here the Fleet Plan project) we must assume that all other things which could possibly impact the outcomes (here the crime levels) are held constant. Although the author notes that certain basic changes were made in Indianapolis police operations, and recognizes their impact on the analysis, the regression was carried out as if the Fleet Plan was the only change. To be specific, 68 more policemen were added to the force in 1969 and on January 1, 1970 a new sector system of patrol was initiated in contrast to the old beat plan. These confounding changes, plus the comparisons to average projections, cause us to be rather critical of statements for or against the Fleet Plan.

#### 4. Data Requirements and Data Utilized

Crime, clearance and traffic accident data extending back to 1963 were used when available, and, in general, at least five years of data were available. We will discuss mainly the crime data. The crime categories under analysis were total crime and the individual crimes of larceny, burglary and robbery. In addition, the special category of outdoor crimes was established which included purse-snatching, street robbery, theft from an auto, and auto theft. Data for the standard set of crimes went back to the 1963/64 Fleet Plan year, while the outdoor crime data began with the 1965/66 Fleet Plan year. As noted, the author decided to perform comparisons on a defined eight-month Fleet Plan year instead of looking at comparable months or other monthly groupings over time.

We note that total crime statistics in Indianapolis from 1962-1966 were fairly constant, rising from 18,023 to 22,906. The 1967 figure was 27,056, 1968 was 31,286, and 1969 was 32,384. Also between 1967 and 1969, an additional 172 police officers were added to the force. Thus, something appears to have happened to the total crime picture in Indianapolis during that time (the individual crimes all increased sharply) to cause us to question the use of any data before 1967.

We note that larceny and auto theft appeared to be leveling out for the Fleet Plan years in terms of percentage change (on the order of +1 percent). Thus, to give an average increase to the auto theft projection

for the Fleet Plan year seems to us to be especially erroneous as it causes the projection to be on the high side. (As noted below, the decrease in auto thefts during the experimental Fleet Plan year is claimed as one of the successes of the project.)

Cost data were also collected in order to analyze the cost of initiating the Plan and for sustaining the effort. The total yearly operating cost of the plan was estimated to be \$250,000, with an additional \$200,000 for car replacement. It appears, however, that an increase of \$250,000 from 1969 to 1970 for the municipal garage budget was not included.

#### 5. Experimental Design and Controls

The Fleet Plan was originally established without any plans for evaluation, and without any design for data collection and analysis. For example, in determining the cost of the system one component would be the amount of miles driven while off-duty (each patrol officer used the same vehicle for on-and-off-duty hours). However, no provisions were made for clocking (and checking the accuracy) of the odometers during these times.

As the evaluation framework was established after the project was initiated (just when it started is not stated), the analytical approach was thus constrained by available data and post-initiation biases. These difficulties are recognized by the author and the reader is suitably

cautioned in interpreting the results. However, the front pages summary of the report extolls the apparent benefits of the Fleet Plan (e.g. automobile theft decreased) without cautionary comments. This is left to the final section on assessing the value of the program. Here the author faces the apparent pluses and minuses of the program, and puts this type of ad hoc evaluation approach into perspective.

#### 6. Results and Recommendations

The evaluation analysis was directed mainly towards determining if the Fleet Plan affected crime levels, increased clearance rates, and prevented vehicle accidents, deaths and injuries. In addition, police department morale, public image and cost of the system were investigated. The results are given below and are taken from the study section which assessed the program. With regard to the results the author notes:

"A variety of evidence emerged from this brief study. Before summarizing some of the major findings, it is well to keep in mind that the points are not of equal weight. One negative finding may overshadow four or five positive findings, or vice versa. Or a series of unknowns may require that both pros and cons be expressed tentatively rather than confidently. With these cautions, the evidence follows."



#### Findings that Tend to Support the Plan:

Marked decline in auto thefts, down 15 percent from previous year, down 22 percent from projected trend.

Purse snatchings down 21 percent from projections.

Outdoor crime index down 14 percent from projections.

Big immediate drop in many crimes at start of Plan.

Change in Indianapolis' auto theft and robbery compares favorably to other geographic areas.

High initial clearances of thefts from autos.

Traffic accidents down 14 percent from projections.

Fatalities from auto accidents down 33 percent from projections.

Increase in on-duty patrol time equivalent to adding approximately 28 patrolmen to force at no increase in budget.

Rare showing of no vacancies on the police force and refusals of patrolmen to accept higher paying jobs that would have meant giving up their patrol cars indicate higher attractiveness of patrol work.

#### Findings that Suggest Negative or Neutral Impact of the Plan:

Total crime continued to increase at past rate.

Larceny rose 16 percent above projections.

Burglaries continued to increase at past rate.

Initial impact, as indicated by a drop in crime the first month, was not sustained in subsequent months.

No significant change occurred in crime clearance rates.

#### Unknowns that May Bear on the Value of the Plan:

Reason that auto accidents and injuries started dropping before Plan was implemented not identified.

Relation between clearances and arrests by off-duty policemen not determined.

Addition of two new courts.

Shift from a beat to a sector system of patrol on January 1, 1970.

Causes for short impact on crime rates not clarified.

Addition of 68 policemen in 1969.

Locational factors, correlating where the police are and where crimes occur, not established.

Changes in the public image of the police, the public feeling of security, and the police image of themselves not surveyed.

#### Costs Related to the Plan:

In the simplest terms, the annual cost of the Plan is determined to be about \$450,000. The initial investment cost was \$650,000.

#### 7. Discussion

This study is a valiant and somewhat successful attempt to evaluate an ongoing complex program and to illustrate an approach to developing such an evaluative framework. Our review causes us to question the analytical approach in terms of the data used and the projection and statistical methodology. Using regression analysis, the author claims that changes in crime levels during the experimental Fleet Plan year were statistically significant, i. e. there is reason to believe that the change in the crime levels were a function of the Fleet Plan, in larceny, purse snatching, street robbery, auto theft, total accidents and total persons killed. In all except larceny, the levels were lower than projected by the regression equations. As we noted earlier (and as the author also noted), there were many activities going on within the police department which could also have had an affect on these levels. We know about the new patrol sector plan and the increase in police personnel. We do not know if an anti-auto theft publicity campaign was conducted during the test

period, or whether traffic patrol was increased (or decreased). (The 1969 GM Cars had new ignition locks.) Our point is that the operational environment was constantly in flux and we could hypothesize that these other influences could represent the independent variables of the regression and be "responsible" for the changes in the levels. We submit that unless the system is held constant except for the tested experimental change, such regression studies do not enable us to use the predictions to test for statistical significance. We feel that, in general, it is impossible to control the police operational environment and the success of statistical experimental models to evaluate most operational changes will always be in question.

Surprisingly, there was little discussion relative to the location of the residences of the police personnel involved in the Fleet Plan program. The use of the cars were restricted to the city and surrounding county. Thus, we assume that the participating police personnel live in the city-county area, but how many do live in the city is unknown. An attempt was made to measure the impact of where the police live by analyzing the crime levels for an area of the city which contained a high concentration of patrolmen's residences (how many had cars is not stated). The study was inconclusive. Other cities contemplating a Fleet Plan program should, of course, consider patrolmen home residences as an item for analysis. For example, many Washington, D. C. policemen live in Maryland and they should be restricted from participating in such a plan. But as

Washington, D. C. does not require its police to live in the city, such a regulation would, in effect, be a tacit requirement and would probably encounter resistance.

We must again comment on the data problems and cite the following as an illustration as to how certain conclusions can be forced. The author attempted to measure the initial impact of the program and gathered statistics for the previous seven year's Septembers (the program was fully underway in September 1969). It was noted that September 1968 was an unusually high crime month. Then instead of projecting crime for September 1969, as was done for the other crime analyses using the averaging and regression procedures, the author just compares the changes in September 1969 to September 1968, and concludes that there was an early impact which was not sustained in the succeeding months.

We would like to criticize the presentation of the results to the reader. The less careful statements regarding the evaluation of the Fleet Plan are contained on distinctive, colored pages at the front and back of the study, e. g. automobile theft decreased absolutely about 15 percent from the previous year and about 22 percent of that expected from past trends, and clearance rates continued at roughly the pre-Fleet Plan level, and the number of traffic accidents, the total killed and the total injured all decreased after the Plan was implemented. The absolute decreases over the previous year were 8, 29, and 1 percent respectively. The decreases from the projected trends were 14, 33, and 5 percent respectively. More cautious statements which do not rely on the



questionable analytical approach are contained in the body of the report. These are:

(1) The statistics are mixed. Any generalizations in assessing the value of the Indianapolis Police Fleet Plan as a deterrent to crime must be tentative. However, there is a thread of evidence that indicates that some outdoor crime has decreased since the Fleet Plan was adopted. The most dramatic changes in the statistics were the immediate decrease in reported crime following the introduction of the Plan and the continuing decline in car thefts.

(2) The study revealed no evidence to indicate that the clearance rates were significantly affected by the Plan.

(3) The 14 percent decrease in accidents and the dramatic drop in deaths during the Plan period are indicators of the effect of the Plan on reducing vehicle accidents. This must be tempered, however, by the fact that, for reasons not yet identified, the downward trend in accidents and injuries began some months before the Plan was put into operation.

In sum, the study represents a good try at the development of an evaluative approach to a project which cannot really be evaluated properly due to the lack of controls, data, and any initial evaluative framework. It does give some measures which might prove valuable to administrators, e.g. program costs, but the attempt to tie-in changes in the crime levels as a benefit is incorrect. One would hope that other cities, instead of

following the author's example, would not initiate such valiant tries at evaluation, but just recognize that certain programs cannot be measured in these terms in this manner. We stress that on-going, independent, concurrent evaluations are a must, and that other measures of effectiveness and efficiency must be considered. We cannot rely on crime statistics alone.

POLICY TOPIC: Police Effectiveness and Evaluation

TITLE: Equality of Distribution of Police Services--A Case Study of Washington, D. C.

AUTHOR: Peter B. Bloch

PUBLISHER: The Urban Institute, Washington, D. C.

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ABSTRACT:

This paper examines a variety of measures which may be used to determine whether police services are being distributed equally to two sections of the District of Columbia. The approach developed for this study is believed applicable to most large cities.

Measures that are discussed include input measures, which relate the number of police officers to the demand for their services, and effectiveness measures, which indicate whether police are accomplishing their objectives of controlling crime and providing police services. In the absence of sufficient accurate effectiveness measures, the paper infers police effectiveness from some imperfect indicators of effectiveness.

The District of Columbia is following acceptable management standards in its method of distributing police services between its relatively affluent area west of Rock Creek Park (District 2) and its relatively poor Anacostia community (Districts 6 and 7): police inputs are distributed equally; property crime rates in the two areas are now almost equal; property crime rates have followed more favorable recent trends in Anacostia than west of the Park; violent crime, which includes crimes between acquaintances and relatives, is reported to the police more frequently in Anacostia; clearance rates--representing the success of the police in identifying and apprehending criminals--are roughly equal west of the Park and in Anacostia; citizen satisfaction with police services, as measured by a recent survey, indicates a high level of satisfaction with police services in the city, including Anacostia; Anacostia appears from a citizen survey to have relatively poorer services, in respect to police response time, than some other sections of the city. The data on this score are only suggestive of a difference, however, and they bear further investigation.

## INTERNAL VALIDITY EVALUATION

### Equality of Distribution of Police Services--

#### A Case Study of Washington, D. C.

Peter B. Bloch  
February 1974

#### 1. Research Goals, Objectives, Policy Issues

This paper investigates one of the prime measures of public service as encountered in areas of Washington, D. C., i. e. it studies the concept of equality of police services by examining a variety of measures, the sum total of which purport to be an indication of whether such services are distributed equally.

#### 2. Face Validity Check

This paper is one of the few research studies which attacks the problem of equality of police services directly. It was initiated to investigate a specific charge (Burner vs. Washington--CA 242-71) in which the plaintiffs allege that whites living west of the Washington, D. C. area of Rock Creek Park receive public services superior to those received in the Anacostia section. These allegations were:

(a) The assignment of a disproportionately small percentage of police to Anacostia, considering the size of the area, the high incidence of crime and the general need for police services;

(b) Failure to provide "adequate protection," and

(c) Providing police protection and services which are "significantly inferior" to the area west of Rock Creek Park.

Using available crime and demographic data, the author studied the delivery of services in Police District 2 (west of Rock Creek Park) and in Police Districts 6 and 7 (the Anacostia community). He develops a number of measures of police services that yield information relative to equality of services (these are discussed below in the Methodology Section). Although the author does not break any new ground in the development of ways to measure equality of services, or to develop allocation procedures which can, for example, demonstrate that for certain measures services should be unequal, he does develop a valid approach in the use of available data and readily understood measures which can aid in a discussion of the service levels between areas. It is a minimum approach which other cities would be wise to emulate on a continuing basis. Further research in this area should be directed towards the establishment of measures, data requirements, allocation formulas, and standardized definitions.

#### 3. Methodology

The author attempts to answer the allegations by considering that the phrase "disproportionately small percentage" of police is an allegation that "inputs" are unequally distributed. (He notes that unequal is not necessarily a bad thing.) He develops a set of measures, the result of



which are discussed in the Results and Recommendations Section. For each area, the measures include: total police per reported robberies and reported crimes; number of police per population and square mile; number of supervisory police personnel to total police; historical and current robbery, burglary and index crime rates per residents; violent crimes and violent crime rates; and robbery, burglary and total index crime rates and percentage changes; clearance rates for robbery, burglary and total index crimes; and total number of calls for service and number of calls per patrol unit.

Where appropriate, statistical tests of significance are applied, e.g. in the important area of violent crimes, each of the four crimes occurs less frequently in District 2 than in Anacostia (chi square significant at .05 level). Where the chi square test cannot be applied, the measures are calculated, compared and interpreted in a narrative fashion.

The author attempts to impart some relevance to a previously accomplished Washington, D. C. citizen survey of police services, but we feel that results are interpretive and of no value to the main objective of resolving the allegations, and it tends to weaken the study. Certainly a citizen survey would be appropriate, but it should be specially designed and directed towards the equality of service issue.

#### 4. Data Requirements and Data Utilized

No special data was required beyond that readily available from police sources. Thus the author relied upon reported crime vs. actual crime (possibly obtained via a victimization survey), police clearance rates and personnel reports. The author notes this reliance upon possibly questionable data, and suggests that when the planned LEAA victimization study of Washington, D. C. is completed, that the resultant data be used to test equality assumptions and to improve police resource allocation procedures.

#### 5. Experimental Design and Controls

No experimental procedures were used.

#### 6. Results and Recommendations

Based on the measures described above, the author states the following conclusions in terms of equality of services:

- (a) Police inputs are distributed equally;
- (b) Property crime rates in the two areas are now almost equal;
- (c) Property crime rates have followed more favorable recent trends in Anacostia than west of the Park;
- (d) Violent crime, which includes crimes between acquaintances and relatives, is reported to the police more frequently in Anacostia;

(e) Clearance rates--representing the success of the police in identifying and apprehending criminals--are roughly equal west of the Park and in Anacostia;

(f) Citizen satisfaction with police services, as measured by a recent survey, indicates a high level of satisfaction with police services in the city, including Anacostia;

(g) Anacostia appears from a citizen survey to have relatively poorer services, in respect to police response time, than some other sections of the city. The data on this score are only suggestive of a difference, however, and they bear further investigation.

We take issue with the wording of some of the above conclusions as follows. The author develops a recent workload statistics table which compares the total police per area per hundred reported robberies and per hundred index crimes, and the number of police actually in the field each day per hundred index crimes. For robberies, a chi square test showed a significant difference between District 6 and District 2, and the author ignores this difference by stating "there is little reason, however, to allocate police only according to the number of robberies." Later on he notes with respect to violent crimes that "...with the exception of robbery, these crimes of violence are relatively difficult for the police to prevent" and that "the percentage of unreported robberies is lower than for most other index crimes." We submit that maybe robberies might be a good way to allocate police in that in terms of violent crimes in

Anacostia they represent about 60% of the total, and in District 2 they represent 77% of the total.

Also, in comparing total police per index crimes, etc., in the workload statistics table, the author ignores the fact that practically all of the police on patrol in Anacostia were in two-man cars, while in District 2 they were practically all assigned to one-man cars. If there is a difference in police crime deterrence based on the number of visible police units in the field, then the assignment of 75 of 81 officers in District 2 to one-man cars and the assignment of 8 of 83 in District 6 and 6 of 83 in District 7 would cause a change in both the crime levels and the level of service. This does show up in terms of level of service in a table comparing the number of police units per service call (here only a three month set of data was used, while most other data was for a full year). Total Anacostia (both Districts 6 and 7) had an average of 90 one or two-man cars and District 2 had 78. The Anacostia cars averaged 27.1 calls per car, while the District 2 cars averaged 23.5 calls per car.

Further, if we measure the average daily number of cars fielded to index crimes, robberies and burglaries we find the following for Fiscal 1972:

	<u>Anacostia</u>	<u>District 2</u>
Index crimes/car	107	82
Robberies/car	18	10
Burglaries/car	39	31



(We note that the author does not list or compare Anacostia total crimes to District 2 total crimes by categories and uses rates per 1,000 residents. Two different population figures are given for District 2: 119,400 (Table 1) and 102,945 (Table 6). We calculated the above table using the high, apparently correct population figure and determined total crimes from the crime rate Table 5. The author tends not to be consistent in his comparisons in that for some purposes he uses Anacostia vs. District 2, while in others he separates Anacostia into Districts 6 and 7.)

The above table shows a serious imbalance of patrol cars in terms of crimes--as distinct from total police personnel--in the two areas. The author's Table 2 (Recent Workload Statistics) shows that, in terms of total police, Anacostia is about as well off as District 2.

The crime data for Fiscal 1972 are as follows:

	<u>Anacostia</u>	<u>District 2</u>
Reported Robbery	1,600	807
Reported Burglary	3,516	2,464
Reported Index Crimes	9,631	6,426

(It would have been of interest to compute the index crime data without auto theft.)

The author downgrades the significant differences in violent crime by noting that "violent crime, which includes crimes between acquaintances and relatives ..." He assumes in the text that most violent crimes arise

out of the "passion of the moment." This is probably true for many crimes, but this assumption is based on police folklore and the only reference is to the 1967 Crime Commission report.<sup>1/</sup> We question this generalization and note that special police training appears to be effective in reducing assaults in family and other quarrels.

## 7. Discussion

The author's approach to the measurement of equality of police services is straightforward and is internally valid. We do have difficulty in trying to synthesize all the data and measures, and to reach any conclusion as to whether the services in the two areas are equal, unequal, or indeterminant. Thus, we suggest the need for research on equality measures--their definition, measurement and interpretation. We do think response time and workload elements are important, as well as citizen perceptions. We do not think that citizen perceptions are appropriate in the measurement of response times (as was done in a survey cited by the author) and such evaluations external to the police reporting procedures are required.

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<sup>1/</sup> The Crime Commission's statements are based on 1948 and 1952 studies and a limited study conducted in the District of Columbia, 1966. Even though such violent crimes are often committed against acquaintances, there is a possible positive role of the police in alleviating such crimes; see the review of the study "Training Police as Specialists in Family Crisis Intervention" by M. Bard.

We suggest that other police departments and researchers attempt to determine whether services are equal based on the author's approach, with extensions and refinements where appropriate. Such caluclations should be quite illuminating and we hypothesize they will tend to be inconclusive due to the state-of-the-art in this area.

## C. Crime Prevention--Architectural

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- Architectural Design for Crime Prevention . . . . . 279

POLICY TOPIC: Crime Prevention--Architectural

EXTERNAL VALIDITY EVALUATION

The study of the relationship between architecture and crime prevention took a quantum jump in sophistication in 1971 with the publication of Architectural Design for Crime Prevention, by Oscar Newman. Others such as Jane Jacobs in The Death and Life of Great American Cities, have addressed the subject, though only as one aspect of their work. No one has come close to Newman's depth of concentration, and we may safely take his book as representing the state-of-the-art.

To summarize what we know at the present time about the possible impact of architectural design on crime, we will compare Newman's work with that of William Fairley and Michael Liechenstein in Improving Public Safety in Urban Apartment Dwellings: Security Concepts and Experimental Design for New York City Housing Authority Buildings, also published in 1971. Their approaches differ substantially: Newman treats design as a variable which can be manipulated effectively to combat crime, while Fairley and Liechenstein take design as a fixed entity and concern themselves with security systems that may be added to achieve the same goal.

Both of these works focus on crime in public housing for essentially the same reasons: there is a great deal of it; much more is almost

certain to be built; it is generally recognized that public housing tenants experience considerable personal and property crime; and the New York City Housing Authority makes available intensive socio-economic data on its tenants and crimes reported in its projects. More specifically, their focus is on the crime that occurs in the public and semi-public spaces in housing projects, as opposed to that which takes place inside apartments.

These authors, having virtually identical data available to them, have come to certain conclusions in common: robberies tend to occur in elevators, larceny in lobbies, rape and other assaults in hallways and stairways. Newman conducted a survey of fear among NYCHA residents and found that they accurately know the loci of frequent crime and try to avoid these places. He found that when comparisons are based on similar tenant populations, high-rise projects have higher crime rates than low-rise projects, and independent of building height, those with many housing units are worse-off than those with few. These conclusions are not obvious, nor are the observations that tenants feel safer if their buildings open onto public streets rather than interior project grounds, and that among consumer items tenants would like, tamper-proof mailboxes rank at or near the top.

The objectives of these authors are alike in that they are searching for alternatives to massive police presence in maintaining order in public housing. But their philosophies are otherwise rather little alike.



Newman, who advises the use of architectural design (or modification) as a crime-fighting tool, believes that the key agents are the building tenants themselves. Fairley and Liechenstein, who advocate the use of equipment and/or guards, feel that crime should be prevented for the inhabitants by those who are expert in doing so. Newman perhaps has a more optimistic view of the crime problem itself, believing crime which is prevented in one place will not necessarily occur elsewhere, while Fairley and Liechenstein are more of the view that crime prevention (even prevention of crime of opportunity) can be expected to have spillover effects into other areas, or that it can be expected to transform itself from, say, property crime to crime against the person.

The validity of Newman's hypotheses about crime prevention depend in part on his assumption that it is the customary group attitudes and behavior of the victims that makes crime possible. Typically (he explains) in public housing space is thought of either as entirely one's own, or else as belonging to no one at all. This breeds a sense of isolation, outside of one's apartment, nearly everyone is a stranger. (In his survey of fear, he found that the intensity of fear varied inversely with the number of neighbors that could be named). Since the tenants are highly aware of the risk and ubiquity of crime, this feeling is furthermore one of alienation. The ambient population, therefore, is divided into a small number of

intimates, and a large number of potential enemies. As a consequence of this, the public spaces in a housing project are viewed as foreign and largely unfriendly territory. The public is free to come and go, uninhibited, unquestioned and unchallenged. Vandals and criminals may make what use they will of lobbies, hallways, walks and playgrounds, knowing that their acts will be resisted (if at all) only by their immediate victims. Carrying this reasoning a step further, a certain amount of crime will be induced by this climate which might not otherwise have entered the mind of the perpetrators.

Newman indicts design as a major factor in this crime-encouraging sense of alienation. Public housing is usually well-constructed to be durable and vandal-resistant, but the consequence of this is that the public areas have an institutional quality. For example, hallways are often unadorned cinder block or tile, rather than plaster, doors are plain metal slabs, overhead lights are glaring and shielded by steel grid--not unlike jails or state hospitals for the insane. It is unlikely that a tenant will feel any personal interest in such spaces, or in what goes on there. Similarly, public areas other than playgrounds are usually not equipped with benches, chairs, tables, or items of recreation, to suggest to the tenants that these areas are suitable for personal use or for socializing with one another. This sort of architecture creates stigma which acts as a magnet for outsiders (and insiders) bent on doing harm.



Newman's argument also relates to the subject of visibility. Crime flourishes in secluded places, such as halls with many abrupt turns, recessed doorways, windowless stairwells with soundproof fire-resistant doors, elevators whose doors open onto blank wall, lobbies obscured from public view, and paths that wander along the backs of buildings. If a place is hidden from view, that fact engenders fear; conversely, if it can be seen by others than the immediate user, the user feels safer in using it.

The ideas of the above two paragraphs are pulled together by Newman as follows: he would design and equip public areas to encourage personal and social use by housing project tenants, to inculcate a sense of proprietorship in these areas and hence a willingness to police it against intruders. He uses the term "territoriality" to describe this sense, and calls such tenant-policed areas "defensible space." To further promote defensible space, he would have designers endeavor to expose these areas to view to facilitate policing by protective tenants (here he employs the term "surveillance"), and to offer a feeling of security to users and a warning to would-be offenders that their actions are under observance.

Defensible space may simply be unachievable because of prohibitive costs, or because of unfortunate side effects such as an increase in crime owing to the increase in sociable use of public space, or because of excessive crime spillover or transformation, or perhaps because Newman is mistaken in his conviction that the typical project tenant can be induced to take personal interest in space which is not exclusively his or to be willing to

question the presence of strangers therein. If for no other reason, it is this possibility that commends the work of Fairley and Liechenstein.

Fairley and Liechenstein commence with the proposition that the building itself is a given. If it proves to be the site of a substantial amount of crime, the problem is to devise a security system which will deter the happening of crime, resist it when it is attempted, detect the occurrence, transmit notice of this event in accurate and decipherable form, permitting the opportunity for apprehension, obtaining of evidence useful for convicting offenders, and the restoration of property. The task of crime prevention, as they see it, is to make the best possible selection from among a number of alternative security systems, which consist in varying proportions of manpower (building guards, housing authority police, citizen patrols, etc.) and equipment (locks, armor, electronic monitoring and detection devices).

Fairley and Liechenstein make a number of valuable contributions. Foremost is their detailed and comprehensive definition of what constitutes a "security system." Their definition serves to make this point: that what system is best depends not on any abstract theory or doctrine, but on the realities of the situation in which it is to be placed. They stress that the right system is the one best suited to protect specified persons or property against particular threats, in light of given limitations in technology as well as social and legal constraints.

They develop an algorithm which embodies this definition. It lends

itself to the calculation of a weighted score (a priori performance estimate) for each of a set of alternative systems; it requires quantitative inputs that reflect the relative importance of the specific crimes to be prevented, the relative efficacy of certain countermeasures for combating each of these crimes, and a figure of merit representing the ability of each alternative to supply each countermeasure in combating each of the crimes considered. These quantities will necessarily vary according to the setting and intended use of the system. They test their algorithm against 15 alternatives in the context of indoor robbery and burglary in public housing, and the results are reasonable in the sense that they show that effectiveness varies directly with the cost of the system. The best system was a complex of electronics, alarms, door armor, TV surveillance, and full-time guard; it would have required a 37.7 percent increase in rent if the cost were to be passed on the tenants, however.

The major value of their approach to crime prevention may be in spelling out the complexity of the problem and then breaking it down into its logical components so that it can be approached in an orderly fashion. Much more than Newman, their ideas incorporate the law enforcement profession, as the quantitative inputs to their formula depend in large measure upon expertise in the field of crime fighting. This reliance on expertise is forced by the unavailability of purely objective information from which to develop inputs. It means that the choice of a security system is only as good as the educated judgments of the input contributors. This is

attractive, however, as a means of building the experts into the solution to the problem.

Like Newman, Fairley and Liechenstein take psychology into account. They observe that no system is going to be effective if it does not have the general acceptance of the persons to be benefitted. This is important since they observe that security systems must intrude to some extent into the privacy of the individual tenant. Further, their own demonstration of their performance-rating algorithm suggests that as effectiveness goes up, so does the degree of intrusiveness.

In weighing the two approaches discussed, it is clear that Newman's has the virtue of dealing more with the roots of the problem of crime in public housing, and it offers a theory which is substantive rather than participation. It is difficult to judge from the documents reviewed just which one would prove more economical. In that regard, it is possible that neither has contributed anything of ultimate value if their studies mean that one goal of public interest (crime prevention in public housing) can be achieved only by diverting substantial funds from other public programs.

These two works present us with this question: to reduce crime in public housing, is it better to manipulate architectural design or rely upon security systems? One would like to think that a possible combination of the two, or a differentiation between them to indicate what situations are appropriate for each, are subjects worth exploring in future research.

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In weighing the two approaches discussed, it is clear that Newman's has the virtue of dealing more with the roots of the problem of crime in public housing, and it offers a theory which is substantive rather than procedural. Fairley and Liechenstein offer a technique that draws upon numerous disciplines (assuming that consensus inputs are properly derived), and depends upon tenants for their acquiescence, rather than participation. It is difficult to judge from the documents reviewed just which one would prove more economical. In that regard, it is possible that neither has contributed anything of ultimate value if their studies mean that one goal of public interest (crime prevention in public housing) can be achieved only by diverting substantial funds from other public programs.



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POLICY TOPIC: Crime Prevention--Architectural

TITLE: Improving Public Safety in Urban Apartment Dwellings: Security Concepts and Experimental Design for New York City Housing Authority Buildings

AUTHOR: William Fairley and Michael Liechenstein

PUBLISHER: The New York City Rand Institute  
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ABSTRACT:

A theoretical analysis is developed which offers criteria for judging the effectiveness and operational suitability of alternative security systems for public housing projects. The requirements of a sound statistical design for testing such systems are discussed. To illustrate this analytical method, 15 different actual security measures are examined in detail. A study of crime experience in the public housing projects in New York City is also reported here. The report indicates the specific location within projects where various crimes occur and shows how the crime rates vary with the month, day, and hour, and attempts to analyze contributory factors.

## INTERNAL VALIDITY EVALUATION

Improving Public Safety in Urban Apartment Dwellings:  
Security Concepts and Experimental Design for New York  
City Housing Authority Buildings

William Fairley and Michael Liechenstein  
June 1971

### 1. Research Goals, Objectives and Policy Issues

This paper puts forward a concept of what a security system is, how to choose one from among numerous alternative systems, and how to evaluate how well it performs in actual practice. Security is analyzed in the context of public housing. This choice was made in recognition of the fact that public housing is and will continue to be the type of residence used by a substantial part of the population; also in recognition of the fact that public housing undisputably is the locus of a great deal of crime. Further, the choice is a logical one in light of the body of socio-economic data on public housing tenants available for the study, and the potential for government funding of experiments in security systems for the benefit of these tenants.

The present work is directed mainly at the prevention of crime, though to a lesser extent also at identification and apprehension of criminals, and the restoration of property that is the subject of crime. The approach taken to the subject of security is of particular interest

to law enforcement officials since it is intended to incorporate the experience and authoritative opinions of various disciplines, including law enforcement, and it offers a means of tailoring security systems to fit highly specific and concrete problems.

### 2. Face Validity Check

The authors of this paper deal with the subject of security in public housing primarily on a conceptual plane, working out a theoretical structure in detail, and discussing the statistical aspects of system evaluation. The paper evidences commendable depth of thought. It is uncertain whether their theories are workable, but they are of value in themselves for at least the following reasons: (1) they lay out a scheme for an orderly approach to the choice of a security system, which reveals the varieties of assumptions that must be individually addressed; and (2) they demonstrate an important truth, which is that security is not a monolithic subject, and that the choice of the right security system in a given context depends not on conventional doctrine, but on a great many factual particulars that must be taken into account.

Other than as a guide to organized thinking and planning, it is difficult to gage the utility of the authors' security concepts. Their method requires a wealth of quantitative input data, much of which may be lacking on objective form; hence the need to rely on expert opinion.

In this paper they apply their ideas to the evaluation of 15 alternative security systems of potential use in public housing. Except for equipment costs, the input data are impressionistic values drawn from sources outside of this study. Their conclusions have subjective merit, however, in that they tend to show that the more the security one wants, the more one must be prepared to invest.

### 3. Methodology

The authors build their method upon the following definition of "security system": "...an entity which interacts under external constraints with specific threats and protective elements to accomplish criminal deterrence and apprehension." (emphasis supplied) By "threats" they mean "the specific criminal activities to be curtailed." They introduce the term "protective domain" to "signify the specific property and persons to be safeguarded as well as the precise locations and times involved." The term "constraints" refers to "the relevant social, political, economic, technical, environmental, etc." limitations on what can be expected of a security system. They add to this the following rule as to the effectiveness of a system: that it "must act as a deterrent, provide resistance, and give an apprehension capability." A candidate system is to be evaluated not only in terms of effectiveness, as defined, but also in terms of cost and its compatibility with the environment and the habits and preferences of those who are to be benefitted.

Briefly, the procedure which the authors develop is as follows:

- (a) A set of candidate systems is chosen. ( $A_k$  denotes the  $k^{\text{th}}$  system).
- (b) One identifies the specific crimes which are of interest, and rates them according to relative importance. ( $c_i$  denotes the  $i^{\text{th}}$  crime category, and is the percentage value representing its importance; the c-values sum up to 100%.)
- (c) Security characteristics, or countermeasures, are defined which may be expected to have some impact on a particular crime (e. g. the impact of preventing building access on robbery inside the building). Within each crime category, the relative degree of impact must be specified for each such countermeasure. ( $f_{ij}$  represents the percentage value of the impact of the  $j^{\text{th}}$  countermeasure on the  $i^{\text{th}}$  crime category; the f-values sum to 100% for each type of crime.)
- (d) Figures of merit must be provided for each alternative system. As defined by the authors, a "figure of merit,"  $r_{ikj}$ , is the "estimated efficacy of the  $k^{\text{th}}$  remedy in providing the  $j^{\text{th}}$  security countermeasure to the  $i^{\text{th}}$  crime type." The figure of merit is defined along an arbitrary scale, adjustable to suit ones assumptions, ranging from a negative extreme for detrimental ratings to a positive extreme to stand for excellence.
- (e) With the above components, one can compute an overall performance expectation for each alternative by summing the product



$r_{ijk}^c f_{ij}$  over all the categories of crime and countermeasure. These may be used to compare and rank the alternatives.

(f) To obtain cost-benefit values for the various alternative systems, one simply divides each performance figure by its anticipated cost. In this study the cost figures were the dollar amounts that would have to be added onto a tenant's rent to defray the expense of implementing such a system.

#### 4. Data Requirements and Data Utilized

It is an obvious shortcoming of this approach that a great deal of information is required, in the substance of the c-, f- and r-values, as well as the cost estimates, which may be beyond the competence of any individual planner. The authors suggest that these inputs will necessarily be a mixture of objective and subjective data. The subjective inputs would appropriately come from the consensus of experts in various fields: i. e. housing experts, system equipment manufacturers, law enforcement officials, sociologists, criminologists, etc.

It is also apparent that the choice among alternatives would only be as good as these inputs. The necessity for a multi-disciplinary approach to quantifying the inputs (as well as specifying the set of crimes of interest and countermeasures) means that the selection of a security system for a housing project might be a larger undertaking than many would expect.

The authors point out that the comparative performance ratings obtained through the use of their algorithm are a priori estimates which may be adjusted based on experimentation or experience in actual use. They describe it as a heuristic tool for combining objective and subjective information. It is not clear, however, that this would be helpful if a chosen system were not readily replaceable or modifiable, though subsequent potential users might benefit.

The authors have not given us a method which can be used cheaply and easily. Possibly little is accomplished by a study whose outcome simply shows that resources must be moved from other public or private programs into the one considered. But even given this pessimistic view, this study is still valuable for what it can contribute to orderly thought.

#### 5. Experimental Design and Controls

The authors present a highly lucid discussion of what is required to evaluate a security system, once it has been put into use in a housing project. They discuss this in terms of experimentation, they explain the need for a control group, and in an appendix they present a linear regression model for covariance analysis of an experimental project, taking into account the experience of the controls. They also offer guidance on sample-size determination, by explaining how to estimate the precision of the results according to the number of housing projects included in the experiment. Further, they discuss some of the factors



that should be considered in deciding which housing projects would be suitable as experimental subjects.

It is their assumption (a quite reasonable one) that crime incidence data would be the main source of evaluation of how well a security system works. They point out that the period of experimentation must cover at least a year because of known seasonal variation in crime incidence, though perhaps this is simply another factor that might be included in their regression model, using overall precinct figures as a covariable. More importantly, they observe that time must be allowed to pass in order to minimize effects that may turn out to be transient, given the tendency of the criminal population to adjust to countermeasures. They also offer the caution that the experimenter must look for possible transference of crime from a housing project to other areas, or the shift of criminal activity from the crimes combatted to other categories.

#### 6. Results and Recommendations

The authors illustrate their technique by comparing 15 systems, in the context of two crime types (burglary and robbery--both indoors), and with eight countermeasures considered (e.g. prevention of building access, increasing crime visibility, facilitating rapid response by police or guard, etc.). Robbery was chosen as a crime of interest because it involves personal confrontation, is of great concern to public housing

tenants, and is not subject to much under-reporting; burglary was chosen as a crime which is especially amenable to reduction via tenant education and low-cost hardware.

The 15 alternatives fell into five categories:

- (1) Ingress limitation through lobby and apartment security devices,
- (2) Increasing Housing Authority police manning on project,
- (3) 1 plus remote surveillance of project lobbys by guard,
- (4) 1 plus personal signaling devices and burglar alarms, and
- (5) 1 plus a guard and monitoring equipment in each lobby.

These are listed in order of increasing costs; furthermore, the results show a trend toward increase in effectiveness as costs go up, whether we consider burglary alone, robbery alone, or effectiveness against both crimes jointly. Generally, effectiveness scores are higher against burglary than against robbery.

The least effective alternatives are intercom and locked lobby, or telephone call-up and locked lobby--strictly matters of hardware. The most effective is a complex of equipment and manpower: (1) intercom, (2) exit alarm, (3) apartment door armor, (4) individual apartment burglar alarms and remote indicator panel, (5) full-time TV lobby surveillance by remote guard, and (6) full-time lobby guard. It is estimated, however, that this most effective system would necessitate a 37.7 percent increase in monthly rent, if tenants were to cover the

costs, or an annual expenditure of \$36,620 per building if the Housing Authority were to do the underwriting.

Once expected benefits are balanced against costs, a different system may be indicated, but the exact outcome depends upon setting a threshold performance score and a ceiling cost figure to determine which alternatives are at least minimally acceptable. This, of course, adds yet another element of subjectivity to the method.

The authors concede that their input data were not obtained by means of a full-blown Delphi procedure for arriving at consensus values, but note that they are "reflections of the opinions and operational data of many security authorities and agencies." Unfortunately, they did not choose to offer any guidance as to how one might carry out this process, short of a full Delphi investigation.

They recommend, in an appendix by Alan F. Westin, that planners include some consideration of the impact of security systems on tenant privacy, and of the question of whether the resulting intrusions on personal sensibilities will actually be accepted by the persons to be benefitted.

## 7. Discussion

It would be rewarding to see the thought-organizing concepts of Fairley and Liechenstein tested in actual practice. But before any large investment were made in their ideas, some further analysis and development

is called for. For example, we should like to see the sampling variability inherent in their system performance predictor investigated. That algorithm, as presented, operates only on point estimates of crime importance, countermeasure effectiveness, and figures of merit; it should be extended to include interval estimates (i. e., upper and lower bounds). Since their technique must stand or fall, apart from the cost factors, on how well authoritative opinion is converted into input quantities, the procedures for doing so should be worked out in more detail.



**CONTINUED**

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## INTERNAL VALIDITY EVALUATION

### Architectural Design for Crime Prevention

Oscar Newman  
March 1973

#### 1. Research Goals, Objectives and Policy Issues

This book undertakes to explain the concept of "defensible space" and, to evaluate it with empirical data.

In essence, this concept holds that public housing projects can be designed to arouse the territorial instincts of its inhabitants in such a way as to engender the feeling that the public areas of their projects belong to them. The author feels that the consequence of such territoriality would be that the inhabitants would provide their own surveillance of lobbies, hallways, walks, playgrounds, etc., which would act as a potent deterrent to crime.

The overall objective of the study reported here is to find those aspects of architectural design which can enable public housing residents themselves to help keep their environments safe, and those aspects which will keep criminals from spotting opportunities for crime in public housing projects.

A preliminary study was done to develop specific design hypotheses. These are explained in detail, with illustrations. Then a survey of resident attitudes and an analysis of public housing crime data were conducted, and the results are interpreted in light of these hypotheses.

The law enforcement issues of interest here are, first, whether citizens unaided by police officers can safely and effectively combat crime through the surveillance of public or semi-public spaces. Secondly, and relatedly, we have the issue of whether variations in building design which may appear subtle to the non-architect can have a major effect in discouraging criminal initiative.

#### 2. Face Validity Check

By far the major thrust of this book is to put forward ideas, and, through logic, to persuade the reader of their reasonableness. On these grounds the book excels, perhaps due in part to the fact that the author is a highly articulate writer and that he elaborates his ideas by means of a great many actual examples. No important logical inconsistencies were encountered in the reading.

While the book should be considered primarily as a source of ideas, the author also offers some attempt at objective evaluation. Here the book is less impressive, but only in comparison with the author's performance as an expositor. The techniques--statistical and data processing--are not given in any detail. This necessarily leaves open the question of whether the author's enthusiasm for his own ideas may have colored the results to some degree.

### 3. Methodology

The author states that his design hypotheses came from a survey of authorities in the fields of housing, law enforcement, architecture, and various others. It was built upon a questionnaire which is not shown in the book. The results are reported only to the extent of saying that they indicated that others had been thinking along the same lines as himself. Apparently, the pool of respondents covered public housing throughout the country.

Briefly, the design hypotheses are as follows:

- (a) Building design can create feelings of territoriality (i. e., direct and personal interest in public or semi-public space).
- (b) Through proper design, public areas can be exposed to surveillance by residents.
- (c) Safety in project areas is enhanced by juxtaposition with public areas that are recognized as being safe.
- (d) Crime is increased by design which makes public housing projects physically unique from its surroundings and creates an aura of social stigma.

These hypotheses are subjected to evaluation through survey of the attitudes of public housing residents and the records of crimes reported to public housing police.

### 4. Data Requirements and Data Utilized

The author acknowledges that to have a scientifically pure test of the general hypothesis that architecture can prevent crime, it would be necessary to construct housing projects of varying design, and load them with identical populations subject to identical risks of crime. As is practically always the case, the ideal test is beyond the limits of the possible, or the feasible.

A good practical source of test data was found in the New York City Housing Authority (NYCHA). The NYCHA offered over 100 different housing projects of varying architectural design. Just as significantly, there is considerable socio-economic data on each tenant (numbering more than one-half million), compiled both at the time of admission and with annual updates; also available were NYCHA Police Department data on all crimes reported in the projects. This presented the opportunity to compare the crime rates for projects of different design, while controlling or adjusting for demographic factors.

### 5. Experimental Design and Controls

To investigate the relationship between architecture and crime, the author chose to carry out a tenant survey on fear of crime, and a statistical study of project crime data.

#### (a) Survey of Fear

It was conceded that fear of crime does not necessarily correlate with the incidence of crime. Its relevance, given the goals of

this study, were expressed by the author as follows: "The unfortunate consequence of ... fear is that undifferentiated mistrust of strangers ... Fear, in itself, can increase the risk of victimization through isolating neighbor from neighbor, witness from victim, making remote the possibility of mutual help and assuring the criminal a ready opportunity to operate unhampered and unimpeded."

Some 425 tenants in seven public housing projects were asked questions relative to the degree of fear they associate with various parts of the project (e.g., stairwells, lobbies, playgrounds). An arbitrary five-point safety scale was devised for the purpose. As an ingenious adjunct, "fear maps" were drawn up and given to the respondents, on which they would indicate what routes they would follow in crossing through the project grounds, and which areas they chose to avoid.

Practically no information is given as to how the survey was conducted--what techniques for choosing and contacting respondents, what rate of response was deemed adequate, whether there were any follow-up efforts on nonresponses, how the questionnaires were processed, what measures were taken to assure accuracy, etc.--other than to include a copy of the questionnaire.

(b) Statistical Study of Crime in Housing

Two New York City housing projects, Brownsville Houses and Van Dyke Houses were chosen for comparison of crime incidence, based on the similarity of their tenants in socio-economic terms, and on

a difference in physical characteristics. These two projects are adjacent to one another. Van Dyke is predominantly high-rise, and Brownsville is low-rise. Eight years worth of crime data were used for the analysis. Tables comparing the socio-economic character of the two projects show them to be quite similar. A cross-tabulation of category of crime and section of building or grounds is given for the two projects combined.

An analysis of variance was done on the crime rates for the two projects to test the effect of building height (in numbers of stories) and building size (in numbers of housing units). This technique involved arbitrarily setting up height and size categories. Nothing is said about the analysis of variance model employed, which is of some concern since attempts to apply analysis of variance to retrospective data (as opposed to prospective experimental data) often yield spurious results.

c. Consumer Survey

The fear-of-crime survey questionnaire included questions about the probable crime-deterrent effect of a number of specified structural modifications. These questions were tailored to each of the seven projects individually. Some of the potential changes are relatively minor and inexpensive (e.g. lock protection plates, building directories, elevator intercom), but most represent considerable investments of capital (e.g., new tiles in halls, redesign building entrances, tamper-proof mailboxes).

The respondents were asked to rate each proposal on a five point scale constituting a spectrum ranging from "excellent" to "poor."

Appendix C of the report gives a tabulation of mean ratings for each proposal, for each project.

## 6. Results and Recommendations

The major conclusions that the author derived from these investigations are as follows:

### (a) Survey of Fear

It was generally found that public areas (i. e. outside the apartments themselves) are considered unsafe. The perception of risk, however, seems to vary with building height, with low-rise inhabitants experiencing less crime anxiety than those living in high-rise buildings. The explanation offered for this building-height effect is that multi-story apartment buildings induce a sense of isolation, such that intruders are free to move about without any resistance or questioning by residents.

It was found that project dwellers feel more secure if their residence faces onto a public street, rather than a park, a school, or a project commons or playground.

### (b) Statistical Study of Crime in Housing

The paired-comparison of Brownsville Houses (low-rise) and Van Dyke Houses (high-rise) showed a higher incidence of crimes of all types in Van Dyke: felonies, misdemeanors, offenses, and miscellaneous mischief. This relationship is apparently confirmed in police data spanning the NYCHA. When buildings were grouped into four height

categories, a remarkable increase in felony rate is observed as height increases from about 5 stories to 13; at 13 and above, the rate is essentially uniform, just as it is at 5 stories and lower.

NYCHA police figures also show that the far majority of crimes occur in the interior building spaces that are accessible to the public--when burglaries are removed, of course. Elevators, hallways, and lobbies together account for about 38% of all serious crime, and the survey data suggest that these are locations greatly feared by inhabitants.

Another variable identified as having a significant main effect is building size, in terms of numbers of living units, although the conclusion is reached by means of a crude dichotomy (1000 units or less versus more than 1000).

### (c) Consumer Survey

It should be noted that this part of the questionnaire was not couched in terms of crime prevention, but rather in terms of what the project residents, as consumers, would like to have. Most, though perhaps not all, of the questions had crime prevention implications, however.

In the seven housing projects surveyed, uniformly high ratings were given to "tamper-proof mailboxes, lock improvement, hall lighting improvement, and new apartment door interviewers," all of which are directly related to security.



(d) Design Directives for Modifications to Two Existing Projects

Appendix E of the report describes specific plans for modifying the design of two NYCHA housing projects: Clason Point Gardens, and Bronxdale Houses. The emphasis at Clason Point will be changed to "intensify surveillance of public areas of grounds" by the tenants themselves, and differentiation of "grounds and paths into unambiguous zones of use." Clason Point is a complex of 46 rowhouse buildings covering 17 acres, with only 21% of the land occupied by buildings.

Bronxdale is a high-rise project, and there the focus will be on entrance redesign to control public access, and installation of electronic equipment to promote surveillance by project inhabitants.

This section of the report is particularly valuable since it expresses the concept of defensible space in the very palpable framework of actual changes to be made in existing housing projects.

7. Discussion

Some of Newman's recommendations would be quite costly, perhaps prohibitively so, to implement in existing housing projects. For example, it would be desirable to expose stairways, elevators and halls to the outside world by means of glazed exteriors, but this would mean major structural revision. The same would be true of the elimination of recessed doorways.

Where basic structure is concerned, undoubtedly Newman's ideas are principally applicable to future housing. For example, it appears that it is better to position a building so that its main entrance opens onto a busy public street rather than a park, a playground, or a school. And it is preferable to locate a lobby so that as many human conduits as possible will open onto it. These are matters which must be taken into account before a project is built. He points out the hazard of long corridors with doors on either side, served by a distant elevator, but it would be virtually impossible to alter this common design where it already exists.

Defensible space does not necessarily mean overwhelming cost, however. Benches, for example, are not major items, and yet they invite tenant use of public space and constitute observation posts. Paths through project grounds could be established and paved to follow a course maximizing exposure to view. In garden-type apartment projects token fences can convert trampled ground into front yards. Moreover, it is fair to say in every housing project subject to high crime rates, some modifications, however modest, could be made in applying Newman's theories without heavy investment.

Newman's ideas are largely unproven, reasonable though they may be. Undoubtedly there are real-world problems that his theories, as presently developed, do not cover. For example, if a public area is

successfully converted into a place of recreation, might not this tend to attract wrong-doers? Writing sometime before Newman, Jane Jacobs sounded precisely that note of caution, in describing the experience at one Brooklyn project where the corridors were opened to the air. These became quite popular as picnic spots, despite the attempts of management to discourage this, and the rate of crime in these buildings went up.

Certain questions are suggested that deserve consideration. For example, it would be worth investigating the possibility that the concept of defensible space could be applied outside of the public housing context. Since it is based on territoriality, some analogue to personal interest on the part of tenants would have to be found. Could architectural design be manipulated in planning department stores to encourage employees to police against theft with greater effectiveness and enthusiasm? May the design of a subway station influence willingness to come to the aid of a victim of crime? Could public buildings be designed or equipped so that public users would take an interest in protecting them against vandalism?

## D. Crime Prevention--Crime Statistics

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#### Internal Validity Evaluations

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POLICY TOPIC: Crime Prevention--Crime Statistics

EXTERNAL VALIDITY EVALUATION

When a statistical analyst purports to have carried out a study of crime prevention relevance, typically what he has done is to study the existing crime problem itself. The rationale appears to be that whatever crime prevention programs are to be undertaken, there should be an objective data base for planning prospectively and for subsequent evaluation of how well the programs are doing. This is undisputably sound reasoning; unfortunately, however, with but one exception (to be discussed further on), the work reviewed in this area contributes nothing to the planner's understanding of precisely how such numbers should be employed on the policy-making level, nor of how they should later be used for evaluation.

Clearly, the usual objective is to be able to state that  $n$  crimes occurred, and that of factors  $X$ ,  $Y$ , and  $Z$  that were examined in the study, some or all bore thus-and-so relationship to the magnitude of  $n$ . Too often, these factors are imbedded traits of a population (e. g., percent minority) or a place (e. g. percent one-room dwellings) which are beyond the control of policy makers, at least in the foreseeable future.

The inference remaining is that if we know the correlates of crime, law enforcement policy makers can then adapt themselves to these facts

in such a way as to lower the crime rate. In this respect, these investigations leave a considerable gap--though this may only reflect the fact that there is more to be done--in leaving the policy maker with the question of how to make a scientifically valid connection between crime statistics and crime prevention. This gap is an acute problem in those instances where the inference, at least by default, appears to be that the data show that to reduce crime, the police and the courts need only focus their might on some segment of the population, classified according to, say, race or income level or place of residence--a proposition that is fundamentally unacceptable in our country.

A remarkable exception is Some Determinants of Crime: An Econometric Analysis of Major and Minor Crimes Around Boston, by George B. Weathersby. Among other things, he conducted a regression analysis of the relationship between number of crimes against the person and the quantitative values of a variety of socio-economic factors. The regression equation is of this form:

$$n = a + bX + cY + dZ .$$

The connection between such an equation and crime prevention policy is as follows: Suppose that  $X$  stands for median family income, in dollars; if we increase  $X$  by one dollar, the change in crime incidence will be  $b$  crimes. Thus, the regression coefficient,  $b$ , tells the

planner what the payoff in crime reduction can be expected to be if there is a unit change in X. Weathersby acknowledges that some factors are out of the realm of direct and immediate governmental control, including median family income. However, if factor Y is the percent of the police force that is allocated to patrol duties, that is a factor that can be managed; in that case, the regression coefficient c predicts the change in crime incidence for each 1 percent change in manpower allocation to patrol. Furthermore, that is the amount that can be expected independently of all other factors.

The point is that Weathersby is exceptional in having thought statistical methodology through to the policy level. This is not to disparage the good work that others have done, but only to comment on the scope of it. Most of the work in this could appropriately be called crime epidemiology. And it should be noted that, historically, the field of preventive medicine is rooted in epidemiology.

Let us consider the epidemiology of burglary. As the reader may well know, epidemiology attempts to discover the agent that causes a disease by sifting through the experiences of victims and non-victims to see what distinguishes the two groups; that is, causation is investigated by finding what is associated with the occurrence and the non-occurrence of the disorder. This is a necessary prerequisite of any program intended to eradicate that disease-producing agent. There is, of course,

nothing new or unusual about drawing the analogy between disease and a crime such as burglary. We would very much like to know what causes it to happen, and this has been the object of a number of researchers, including the following:

- Theodore E. Fong, A Study of the Relationship of Demographic and Sociological Factors to Burglaries in the San Francisco Mission District (1973);
- Harry A. Scarr, Patterns of Burglary (1973);
- George B. Weathersby, op.cit. (1970);
- Anonymous, Burglary in San Jose (1972).

Each of these studies is analyzed in detail following this review, but at this point it may be worthwhile to consider what correlates of burglary, if any, they have identified in common. Briefly, the commonality is as follows:

- Both Weathersby, studying 19 Boston suburbs in 1967, and Fong, studying inner-city San Francisco in 1968-1972, found the amount of unemployment in a community to be positively correlated with burglary incidence. Weathersby did not consider total unemployment, but only that of males. Fong considered total unemployment as well as that of various ethnic groups; he found unemployment among whites, as well as total unemployment, to be a significant and positive correlate.

- Scarr studied metropolitan Washington, D. C., for the years 1967 through 1969. Both he and Fong found poor housing conditions to



be a positive correlate. Specifically, Fong discovered as significant indicators these neighborhood characteristics: premises vacant, or without plumbing, or without a kitchen, or renter occupied, or consisting of one room; conversely, he found owner occupancy, and a prevalence of many-room housing to be indicators of low incidence of burglary. Scarr found that neighborhoods with overcrowding (particularly among predominantly black neighborhoods), low-cost units and low-cost rentals, to be positive correlates. Like Fong, he found percent owner-occupancy to be a significant negative correlate.

In the San Jose study, a contrary result was obtained, as far as burglarization of houses is concerned. As in San Francisco, that study focused on the inner city. The finding was that house burglary was especially common in neighborhoods that were "predominantly upper-middle class with large households."

- Family status was found by Fong and Scarr to be significant. Specifically, Fong found family-occupancy, and Scarr found percent households with both husband and wife residing, to be positively related to burglary incidence.

- Race was discovered to be a significant indicator. Weathersby found percent non-white population to be a significant positive correlate. Fong and Scarr, while not finding non-white to be a significant positive correlate, each found percent white population to be a significant negative correlate.

- In the San Jose study, and Scarr in the Washington vicinity, showed that residential burglary is an afternoon phenomenon, while non-residential burglary usually occurs at night.

- In San Jose, nearly half of all burglaries (both residential and nonresidential) occurred on Fridays. Scarr's data showed the same tendency in residential burglary, to a less dramatic extent, but it was clear that it was a weekday phenomenon. Scarr found nonresidential burglary to be occurring on weekends, and the San Jose data showed a little of the same effect.

- Both Weathersby and Fong tested for a relationship between income level and burglary incidence, acknowledging a priori beliefs that neighborhoods where poverty prevails would be the major targets. And they both expressed dismay when their results were inconclusive on this point.

It is truly remarkable that, with the possible exception noted above as to housing conditions, there were no major contradictions among these studies. To some extent this may be an artifact of the somewhat limited overlap in the questions they chose to research. But there was enough in common that some discord might have been expected, particularly in light of the variations in their study techniques, and in the apparent variability in degree of scientific expertise. This is reminiscent of the Surgeon General's report, Smoking and Health, which covered many

hundreds of research documents published on smoking and cancer, some dating back to the early years of this century. Whether done well or done poorly, and whatever the methods and precise objectives, virtually all tended to show that smoking is a significant positive correlate of cancer.

Those who would undertake burglary epidemiology in the future should consider these things:

(1) Standards for measuring incidence. Among the authors reviewed here, strikingly different measures of incidence were employed. Scarr computed it as a rate per structure at risk, on the theory that burglary is a crime against habitation, and consequently number of buildings subject to burglarization during the study period was the appropriate denominator. Fong theorized, implicitly, that while buildings and property therein are the targets, it is people who are the real victims, and consequently he chose to calculate per capita rates. In San Jose, it was rate per square mile of city space. Weathersby in the Boston suburbs counted total occurrences in a community.

Where regression analysis (or multiple or partial correlation) is employed, the absolute number of burglaries would be the appropriate measure, since area, population, and number of premises can be joined into the equation along with the other factors whose relationship to the risk of burglary is to be considered. Otherwise, from a purely epidemiological point of view, Scarr's approach is preferable since a

proper incidence figure is the number of cases divided by the population at risk. If a per capita rate is to be used, with the population of humans as the denominator, the numerator should not be the number of burglary reports, but rather the number of humans who were affected by burglaries.

Since police departments are responsible for protecting both persons and buildings, as well as covering a certain amount of area, it would be desirable whenever possible for researchers to publish their data in such a form as to permit any of these to be used as the denominator.

(2) Definitions of burglary. In the old days burglary strictly pertained to inhabited dwellings during the nighttime. Gradually the scope of the offense has been enlarged, but it still varies substantially from one jurisdiction to another. For example, in some places daytime offenses are still not counted as burglaries and would not be coded as such for reporting purposes. In the State of California, burglary includes breaking and entering automobiles with intent to commit a felony therein, but in the District of Columbia, and most jurisdictions, it does not. The analyst should always include in his report the legal definition applicable to the area under study.

(3) Sources of data. A potentially important distinction exists between burglary complaints, and verified burglaries. It is easy to see that the former might be a considerably greater number than the latter. An argument can be made in favor of using total reports, which is that it

comes closer to the true prevalence of burglary in the community, given that many bona fide incidents go unreported, and verified reports will be a gross underestimate. In favor of only using verified reports, the point should be made that it is a much more accurate source of information about individual incidents is of interest, rather than purely the number of events that occurred in a given period.

In any event, the analyst should express in his report how much verification has gone into the data.

(4) Data quality-control and presentation. It is difficult to evaluate a piece of data-oriented research (and know whether to credit the author's conclusions) if the author holds back from reporting basic data. Highly abstracted and summarized tabulations alone will not give the reviewer or colleague-reader the material to satisfy himself that the conclusions are warranted by the data. The procedures employed in transforming data from source to analysis should be indicated, spelling out quality control procedures. This is particularly important when the data have been coded from files and then keypunched for computer processing. When the data have been given in the form of pre-processed records on tape or disk or card, some error-testing routines should be applied, and this too should be reported. Where there have been surveys involving the questioning of persons or records, a copy of the survey instrument should be included so that the reader may see the precise wording of the questions and the order in which they are given.

There are several observations that are pertinent to the funder or consumer of crime epidemiology. For example, it appeared in the reviewing of the works reported here that none of the authors knew of the work of any of the others. Prospective authors should be encouraged to make use of centralized bibliographic services, such as the National Criminal Justice Reference Service, and to make every effort to see to it that their work gets to these services, and at the earliest possible time.

From a substantive point of view, it should be realized that regression analysis is potentially of enormous value and should be used when possible in studies attempting to measure the interrelationship between variables. At the same time it must also be recognized that a regression equation, such as those computed by Weathersby, which has been developed from the data from a given time period, cannot be verified on the same set of data. Regression analysis may reject a factor as a genuine correlate, with a known risk of erroneous rejection; if a genuine correlation exists, it may be found in a subsequent study. The greater danger exists when an apparently close relationship has been found; whether that relationship is transient or real and lasting cannot be determined in the slightest until the data for future years is obtained. In short, a regression equation, to be verified, must be used to predict what will

happen in the future (or in other places), though this prediction should only be used for research purposes. Then the prediction must be compared with events as they actually occur.

An important relationship between epidemiology as applied to medicine and as applied to crime fighting should be noted. In the earliest days of the science of epidemiology, the factors correlated with disease (e. g., transportation and handling of food and water, disposal of human waste, uncontrolled movement of infected persons through populations, etc.) were deeply rooted in the way people lived. Plagues were largely a consequence of conditions in cities, such as housing and sewerage. These were large-scale economic problems incapable of any ready solution. To some extent, simple human ignorance and blind adherence to custom were causal factors that were only gradually overcome through education. But these were potentially soluble problems.

In the context of crime prevention, we should attempt to distinguish between those factors (given that true relationships exist) which are soluble and those which are not. Among those which are, which can be solved soon, and which must be left to essentially evolutionary forces? For example, Weathersby points out that the level of police patrol, as a correlate of crime incidence, is subject to almost immediate change; the same can be said of the level of unemployment in the community, though

this may involve many more decision makers. Some factors will depend upon economic change, such as the condition of housing, which cannot be affected in the near-term. Some other factors, such as the percentage of the population of a certain race or ethnic background, no matter how closely correlated with crime, are not subject to manipulation in our society. It is good practice of modern science in the investigation of problems such as burglary to cover all possible causative elements, regardless of political, economic or humanitarian implications, but the policy maker must draw the line between those things important to his task and those irrelevant or belonging to some future generation.

Finally, this reviewer would like to indicate two areas in which empirical research should venture to contribute to crime prevention. First, it is obvious that a coherent attack on the economics of burglarization is needed. In the papers reported here, it is handled in fragments, with apologetic arguments that economic causation exists to be a far greater extent than the data seemed to show. This may simply indicate that the economic thought that went into the work was relatively shallow.

Second, it is painfully obvious that empirical science by itself does not aid the policy maker. This is because policy makers usually are something other than empirical scientists by profession. It is more realistic to expect the empiricists to address the policy maker than vice versa. The question of how to relate crime epidemiology to the



policy making of crime prevention is something worthy of research in itself. One such approach would be to experiment with analytical tools which combine the experience and expertise of law enforcement officials with the product of data-oriented science. Bayesian statistics offer such a tool of the simplest possible kind: one begins by asking the expert to estimate the probabilities of crime occurring in a unit of time under specified conditions; one then observes the relative frequency of crime actually occurring under those conditions, and combines the a priori estimates with the observed data in a probability function (first described in an essay 200 years ago) which gives back to the expert his estimates as revised by scientific observation. The possible use of the Bayesian technique in making crime epidemiology more relevant to the crime prevention policy maker is deserving of serious consideration.

POLICY TOPIC: Crime Prevention - Crime Statistics

TITLE: Some Determinants of Crime: An Econometric Analysis of Major and Minor Crimes Around Boston

AUTHOR: George B. Weathersby

PUBLISHER: Department of Economics, University of California, Berkeley, California

VOL. /NO.:

DATE: September 1970

NO. PAGES: 28

ABSTRACT:

This paper reports on a three simultaneous equation model which describes the incidence of crimes in the Boston suburban area. The F.B.I. uniform crime reporting categories are aggregated into the two categories of major (bodily injury) and minor (property damage) crimes. Explanatory variables used include population, family income, education, other socio-economic factors and percent minority race and the number of police officers. This last variable is then considered mutually endogenous and a three equation model is estimated by two stage least squares using cross sectional data. These results are then discussed in terms of the effectiveness of policy options available to local decision makers.

## INTERNAL VALIDITY EVALUATION

### Some Determinants of Crime: An Econometric Analysis of Major and Minor Crimes Around Boston

George B. Weathersby  
September 1970

#### 1. Research Goals, Objectives, Policy Issues

The purpose of this paper is to demonstrate the utility of viewing crime prevention from the point of view of the social scientist. In particular, the author undertakes to show that if "policy makers (and policy analysts) recognize that crime is an important (negative) social attribute, and that its occurrence can be analyzed by the traditional tools of economics, then measures of criminal activity can be included in the general framework of public sector resource allocation which is a relatively well developed area of economics."

More specifically, it is the author's contention that regression analysis can be used to estimate the amount by which crime can be reduced through a given amount of change in some social or economic factor that bears a statistically significant relationship to crime incidence.

#### 2. Face Validity Check

Multiple linear regression has led many a person down the primrose path. This occurs because of an inappropriate choice of a

model (e.g., linear rather than higher-degree polynomial), wrong choice of predictor variables, or because of spurious data used in calculating the regression coefficients for the chosen predictors.

The author demonstrates that he is aware of these pitfalls, and he discusses all of them except for the possibility that a nonlinear regression might be better. Of the various predictors that he chose at the outset, certain of them were tried jointly and others were not, his criterion for making these selections is not described.

As for whether the proper data were used, little can be judged as we are not afforded any basic tabulations. The author does indicate what he believes some possible weaknesses to be in the data, but the reader will not be able to go much beyond the bare words.

Finally, it is much to the author's credit that he included a section entitled "Caveats in Interpreting Regression Results," in which he outlines the sources of possible deception, such as interrelationship of predictors or their correlation jointly with variables not considered, and the caution that regression studies may only reflect coincidences and it cannot be determined statistically whether cause-and-effect relationships obtain.

#### 3. Methodology

The author begins by hypothesizing that any of a number of socio-economic factors may serve, singly or in combination, to predict

the level of crime that can be expected in a community. These variables are, mainly, percent minority individuals in the population, median level of education, income level, and extent of male unemployment. He expected the first and last of these to be positively related to crime incidence, with the relationship being negative with respect to the second and third. He further posed the question of whether it would be useful to use property crimes (CAPRO) as a predictor when attempting to estimate the expected level of crimes against the person (CAPER), and vice versa. In addition, the number of police officers in the community, as a proxy for the level of law enforcement activity, was incorporated on the theory that increased police presence may encourage the reporting of more of the crime that actually occurs.

Next, regression equations are computed for various combinations of the hypothesized predictors, using the method of least squares to estimate the coefficients of the predictors. Each time, the coefficients were apparently subjected to standard procedures to ascertain whether any or all differed significantly from zero (zero signifying a total lack of predictive value).

There were three branches to this investigation: (1) to estimate the incidence of property crime as a function of the remaining variables on some combination; (2) to similarly estimate personal crimes; and, though its relevance is very doubtful, (3) to estimate the number of police officers in a community.

The author then argues that regression coefficients computed for significant predictors can be of enormous benefit to crime prevention planners and analysts. He points out this highly relevant fact about such a coefficient: that it can be construed to be a partial derivative. That is, in this context, it is the amount by which crime incidence can be expected to change per unit of change in the predictor variable, while all other predictors considered in the regression analysis are held constant.

$$\text{Coefficient} = \frac{\text{change in amount of crime}}{\text{change in predictor quantity}}$$

The relevance of this to policy makers is that, if a regression is obtained, the coefficients can be used as an objective means of assessing the pay-off that can be expected in crime reduction, attributable to putting a certain amount of resources into any given controllable predictor. Computationally, the pay-off per unit of additional resource is simply the negative reciprocal of the regression coefficient for the predictor in question.

#### 4. Data Requirements and Data Utilized

The data used in this study were crime data gotten from the 1967 UCR, and socio-economic data from the 1960 Census, "for nineteen

suburban communities in the Boston metropolitan area." What went into the statistical models apparently were nineteen sets of observations; e.g. for any given community, the number of property crimes in 1967, as reported to the FBI, and the percentage of its population which was minority in 1960, the number of police officers in that community in 1960, etc.

Unfortunately, we are not told what communities these were, nor are the data for them included, except in the form of a statistical "average community," and some means and standard deviations computed across all nineteen.

The author admits to some uneasiness about combining 1967 crime figures and 1960 population figures, but that is the sort of problem many investigators face. It would be desirable in such situations to examine some intercensal sample surveys to see whether or not the composition of the study population was shifting much or little between the two years; the author apparently did not do this.

#### 5. Experimental Design and Controls

No experimentation was done in this study. As discussed above, controls appear as an inherent attribute of regression analysis. This is not gold made out of lead, however. The coefficient associated with one of the independent variables indicates whether or not a lot of change could be expected for a given magnitude of change in that

independent variable. This applies even if other variables are included in the equation. But this presupposes that the independent variables in the equation are in fact mutually independent. When this condition is not fulfilled, the predictive value of the model is doubtful.

In this study the independence assumption can be explored to some extent by using the correlation matrix that the author includes in the report. This shows the correlation between each variable and each of the others, separately. Lack of information about sample sizes means that we cannot test the hypothesis that any individual sample-estimated correlation coefficient is essentially zero. Some general observations can be made, however. For example, correlations appear consistently low for income and median school years achieved; hence, an equation using them as predictors would probably be valid from the point of view of the independence requirement. Population size correlates highly with most of the other socio-economic variables, so it should be ruled out. In all other cases the results are ambiguous.

#### 6. Results and Recommendations

As a preliminary to the regression analysis, the author computed a correlation matrix to see which factors, if any, correlated pair-wise to any significant extent. The matrix is included in the report. He offers these observations:



\* "The number of police officers is significantly and positively correlated with all types of crime except non-negligent manslaughter."

\* "The non-white population was highly correlated with robbery, assault, rape and auto theft."

\* "The median school years completed were negatively and weakly correlated with all crime indices while median family income was virtually uncorrelated with any crime index or demographic variable."

The author carried the regression analysis through the partial derivative stage only with respect to crimes against persons. This involved averaging regression coefficients for each predictor over certain of the regression equations which apparently seemed to him to be the best ones. (His criterion for so choosing is not explained). These are the results:

CHANGE IN PREDICTOR NEEDED TO REDUCE NUMBER OF  
REPORTED CRIMES AGAINST PERSONS BY ONE UNIT

Predictor	Change Needed
Police Officers	2.08
Crimes Against Property	-29.4
Proportion Minority	-.0002
Non-White Population	-24
Median School Years	2.7
Income	-\$3,333,333
Male Unemployment	-31.25

This says, for example, that an increase of the police force by two officers should reduce the number of personal crimes in a year by one, independent of any other changes that might be made. A minute reduction in the minority proportion of the population should accomplish the same thing. Likewise, reducing male unemployment by 31 individuals should result in a unit decrease in personal crime.

This table illustrates the lack of relationship between income level of a population and incidence of crimes against the person, as revealed in these calculations, as it shows that a \$3.3 million reduction in median family income would be required for a marginal change in the personal crime picture.

The author notes that, from a policy-making point of view, only three of these predictor are relevant: (1) Police Officers, (2) Median School Years, and (3) Male Unemployment. He argues that of the variables considered, these are the ones which might be subject to control through political or economic action.

The reader should bear in mind that the reliability of these regression results is an unknown. Perhaps the best method of validation is to apply the regression coefficients obtained from the data from one year to the population figures in the same geopolitical area for a later year to observe just how accurately they predict. This form of validation was not undertaken in the present study.

7. Discussion

The main contribution of this paper is its illustration of what regression analysis can offer the crime prevention planner, the numerical results themselves are of doubtful value in themselves, in the present case. That is to say, it conveys a worthwhile idea without also communicating worthwhile statistical results. It may be that the figures published here have merit; the difficulty lies with the inadequacy of documentation.

One shortcoming of the regression approach is suggested by the author's admission that of the factors treated as independent variables, only the number of police officers in a community can be deemed controllable. This is unfortunate, since the planner is helped but little by a model which predicts crime level as a function of things the planner can do nothing about.

If by "planner" we mean legislator, many more variables are at least potentially controllable. For example, the author's data purport to show that for every 31 males supplied with jobs, a unit reduction in reported crimes against the person can be expected; it is within the realm of the legislature to decide that employment shall go up, although an agency head such as a police chief would be powerless to effectuate any such increase. Some variables are beyond the reach of any office or institution, such as the proportion minority population--which the author's data characterize as a potent predictor of crime.

POLICY TOPIC: Crime Prevention - Crime Statistics

TITLE: Burglary in San Jose

AUTHOR: Anonymous

PUBLISHER: LEAA, NILE/CJ, Washington, D. C.

VOL./NO.: Report No. LEAA NI 70-023 B; PB-211 789

DATE: February 1972

NO. PAGES: 111

ABSTRACT:

This is the second in a series of reports to describe and analyze crime patterns in San Jose, California. The report covers burglaries which occurred during a four month period in 1971 as reported to the San Jose Police Department, and which were coded according to the Baseline coding scheme. Location, premise, crime target, victim/offender relationship, value, victim/offender characteristics, number of participants, day of week, time of day and other information are included. By organizing and interpreting such information, the study provides the underpinnings for the development of new and more effective crime control programs in San Jose. It pinpoints high crime areas and high risk burglary targets. This is intended to aid in developing new prevention strategies and intervention techniques. The data also provides baseline data to serve as a benchmark for measuring the performance of future burglary reduction programs.

## INTERNAL VALIDITY EVALUATION

### Burglary in San Jose: Technical Report

Anonymous  
February 1972

#### 1. Research Goals, Objectives and Policy Criteria

This report is a digest and analysis of 2,827 burglaries reported to the police in San Jose, California, during the period from January 1 through April 22, 1971. The key to converting crime reports into data in this case was the Baseline Offense Reporting System, funded by NILE/CJ to serve these purposes: (a) as a diagnostic tool for identifying geographic and time components of the burglary problem in a given area, as well as information on burglary targets; and (b) as an evaluation tool to test out the efficacy of crime reduction programs. Essentially, Baseline is a coding scheme that should make possible more valid and reliable comparisons of different geographic areas and different categories of crime.

In the author's words, "Burglary in San Jose provides information which leads to obvious implications for preventative patrol strategies, for suggesting more effective crime prevention intervention strategies, and for 'hardening' the crime target."

While it may not have been an express goal of this study, it might be said that the efforts were also directed at showing what citizens might do for themselves to combat burglary.

#### 2. Face Validity Check

It is important to judge how well a report of this kind lays out the background of the study, the basic research instruments, the data handling and interpretational problems which are bound to occur, and whether appropriate caveats appear to have been stated.

It is not difficult to fill in the background of the study, though it is only referred to sketchily. The reader will recognize it as an element of LEAA's drive toward building the means of evaluating crime programs that are government-funded and to do so on a nationally uniform basis. No specific programs are mentioned in this study, however.

Unfortunately, the Baseline coding scheme is not presented, except as it becomes relevant to the discussion. By and large, the references are to idiosyncrasies of the scheme that serve to explain unexpected relationships in the results.

As with background, it is probably expected that the interested reader will have access to the full description of the system by means of some other document. (This reviewer does not, however.) By and large the author's tone is one of objectivity and scientific thoroughness.

Problems in data handling (apart from coding) receive little mention. Either we must believe that there were none, or we must

take it on faith that the problems were handled appropriately. The former is a virtual impossibility, but the latter seems reasonable in this case, particularly in light of the author's willingness to express doubts about the reliability which are based on quite small samples.

On substantive grounds, it should be pointed out that the study addresses essentially the same patterning variables that one would expect based on what is generally found in the growing field of crime epidemiology, as well as some investigation of the characteristics of victims and offenders. The major drawback is that the study is based on only four month's worth of cases. No explanation is given as to why more--at least a year's worth--could not have been used. (One suspects that someone was responding to pressures to demonstrate the utility of the new coding procedures as a means to producing data.) This created serious inferential problems when cross-tabulations to look at detailed relationships spread the data thin.

One highly desirable feature of the study (and coding system) was that it had been refined to eliminate unfounded complaints.

### 3. Methodology

This is an entirely empirical study, directed at building up a body of knowledge about burglary from the police reports of actual incidents. There is no place in this approach for authoritative opinion, except as it bears on the decision as to what questions will be posed of the data.

The technique chosen to do this was to squeeze as much information as possible (or feasible, given time and resource constraints) out of police data on reported incidents. The corpus of knowledge was to consist of these parts: (a) geographic location of burglary incidence in San Jose, (b) types of premises struck, (c) types and value of property taken or damaged, (d) time of occurrence and of reporting, and (3) demographic and social characteristics of offenders.

### 4. Data Requirements and Data Utilized

As stated above, the data used in this study was restricted to reported burglaries (minus unfounded complaints), processed according to the Baseline Offense Reporting System. The cases were for the period January 1 to April 22, 1971.

The geographic incidence of burglary in San Jose was investigated by superimposing on the map a grid that divided the city into blocks one mile square, and recording the number of incidents occurring in each during the four-month study period. The reason for this approach was, first, to look for clustering (something of obvious relevance to police work), but also to take advantage of the fact that the author had considerable knowledge about the kinds of people and places in the various parts of town. As with the Baseline coding scheme, this information about the grid squares only comes out piecemeal in the



discussion, and there is no material in the report that will enable the reader to assess the accuracy of the statements about the city. This is unfortunate since much is based on what is "predominant" in a grid square (e.g. predominantly residential, predominantly working class, etc.).

As an analytical device, the author formulated a ratio which is percent of burglaries divided by percent of city area. For example, the author identified those grid squares which were "predominantly upper-middle class or affluent neighborhood," computed the percent of all burglaries which were attributable to those squares (18.6%), computed the percent of the area of the city which those squares covered (3.6%), and then computed the ratio of the former to the latter as "greater than 5:1." Presumably this device was aimed at getting around the problems of computing a proper rate in which one divides the number of incidents in a certain area by the number of premises that were at risk of burglary therein. The statistical properties of rates (e.g. sampling variation) are readily analyzed; they are not in the case of such ratios, in part because the author's statements of the constituencies of the various blocks are impossible to evaluate, given only the study report. This being the case, the ratios should only be taken as rough comparative indicators, and only differences of dramatic magnitudes should be credited at all.

When not computing ratios, the author was citing relationships based on which squares had high frequencies of burglarization and which did not, though whatever rule was followed (if something other than ad hoc impression) in making such distinctions was not stated.

The report continually makes reference to blocks X, Y, and Z. These are rectangles, one within another, which encompass what the author takes to be the high-crime area of San Jose, which is, roughly, the central city, when all reported property crimes (of which burglaries totaled somewhat over one half) are considered. When one goes from X (7 of the city's 47 square miles of area) to Y to Z, one moves into smaller rectangles of increasing property-crime density. Ratios are computed for each block when any comparison is made; e.g. when types of premises victimized are compared, the ratio for each type is computed for X and for Y and for Z. It is not clear that anything was gained, and perhaps something was lost, by basing comparisons only on the experience of a small part of the city.

The author also overlays onto his grid the outlines of the city's police beats; these are given separately and are of obvious interest to the San Jose police, but probably no one else.

This system of blocks and ratios is used to study the incidence of burglary by type of premise and according to demographic variable. When the study gets down to other matters, such as property type and value, and day and time of occurrence, simple cross tabulations of the

reports were used, all of which are a good deal more readily comprehended than the ratios and discussions of grid squares.

Certain peculiarities in the Baseline System, as it applied during the study period, were noted by the author. For example, if an incident involved homicide, robbery or assault as well as burglary, it was not coded among the burglaries; if a burglary involved the loss of a number of items, and one had a reported serial number, only that item was coded as a loss, while otherwise "the most significant" was coded; if an interval estimate was reported as time of occurrence, the earlier time was coded. Such arbitrary coding rules are not pleasing to find, but they may be necessary to lend some order to the coding process.

#### 5. Experimental Design and Controls

This was a purely retrospective study, involving no experimentation. Neither were control utilized, though they might have been. For example, instead of focusing solely on the section of San Jose thought to be the high-crime area (and hence of maximum interest to the police), observations and calculations could have been done for the presumed low-crime sections of town as well. The figures for the latter could have served as controls, as patterns (apart from magnitudes) in the data for the main area of interest could be verified in the control data. That is,

certain patterns might be postulated (e. g. time-of-day distribution for nonresidential burglaries) which should not depend on how much crime occurs in an area; if such patterns appear quite different in the controls, one knows to look closer at study methodology.

#### 6. Results and Recommendations

On the whole, the work is credible and seems conscientiously done. Consequently, it is worthwhile to pass on some of the more remarkable observations that can be drawn from the data.

- Nearly half of the reported incidents occurred on Fridays. (The author was able to distribute the data to show that this was not an artifact of the coding rule for interval estimates.)

- Burglarization of houses and apartments was concentrated in the afternoons, while nights were the rule in commercial and other non-residential premises.

In about one quarter of the cases entry was gained without the use of force, and among most types of premises no-force entry was most often an afternoon occurrence, suggesting that sheer carelessness may account for a substantial amount of the victimization.

- The reported offenders were far more often adults than juveniles (nearly a two-fold difference), though age category was known in only a quarter of the cases.

7. Discussion

This study, as reported in this publication, falls short of achieving its stated goals.

(1) The reviewer finds nothing in it which "leads to obvious implications for preventive patrol strategies." Four month's worth of data on how much crime occurs in a particular section of town is information that is still far removed from knowledge as to how crime can be prevented.

(2) For the same reason, the study fails in "suggesting more effective crime prevention intervention strategies, and for 'hardening' the crime target." This study shows how much happened, when and where, and of what kind. Perhaps it is "suggested" that patrol resources ought to be distributed so that more goes where more crime occurs, but there are a great many distributions that would fit this directive.

The author very likely had not given much thought to the goals as he stated them. Or he may have felt that a police chief who is supplied with the sort of numbers this study produced is able, on the basis of experience, to see how they apply to the subject of crime prevention, intervention and target hardening. In either event, the outcome does not connect well to the ostensible beginning.

POLICY TOPIC: Crime Prevention - Crime Statistics

TITLE: Patterns of Burglary (2nd Ed.)

AUTHOR: Harry A. Scarr

PUBLISHER: U. S. Department of Justice, LEAA, NILE/CJ,  
Washington, D. C.

VOL. / NO.:

DATE: June 1973

NO. PAGES: 320

ABSTRACT:

This is an empirical study of burglary in three neighboring jurisdictions--the District of Columbia, Fairfax County, Virginia, and Prince Georges County, Maryland-- during the years 1967-1969. The major emphases are the geographical and socio-economic correlates of burglary incidence, and a survey of victims (paired with non-victims) to determine what happened, when, under what conditions, and how it might have been avoided.

## INTERNAL VALIDITY EVALUATION

### Patterns of Burglary

Harry A. Scarr  
Second Edition, June 1973

#### 1. Research Goals, Objectives and Policy Criteria

This book presents the outcome of a multi-pronged empirical study of burglary in three neighboring jurisdictions: the District of Columbia (DC), Prince Georges County (PGC), Maryland, and Fairfax County (FC), Virginia. The objective quite plainly is to investigate the conditions under which burglaries occur so as to be able to ascertain what preventive measures would be effective. Secondly, the implication is that such information would be useful to law enforcement officials in determining how best to use their resources to combat this particular type of crime.

In the author's own words, the "goal of this research is reducing burglaries. The conceptual tool we suggest is the interdiction of the burglary cycle [running from need, to opportunity, to act, to satisfaction, to reinforcement of burglarization tendency, back to need again], taking those actions based... on whatever we discover to be the empirical situation..." with findings to be presented "which are relevant to interdiction by manipulating the opportunities in the environment in which a burglar operates."

#### 2. Face Validity Check

This book evidences a considerable amount of effort and a consciousness of what is required for good scientific work. The fine details of how things were done appear at some points where they are of interest, and are absent at others, but by and large one gets the impression that the project was handled well at the working level.

The author takes pains to distinguish between results that can be taken as fact, and results whose utility is in the area of hypothesis formation. He points out the inherent limitations in empirical studies, but (in prefacing a section which lays out his conclusions) notes that to contribute anything to policy-makers, it is necessary to be willing to venture informed opinion.

Generally, it appears that in gathering data the author has taken cognizance of the most important variables: differences in burglarization which might be attributable to time and space, in particular, as well as type of structure victimized.

In a work of this sort, that attempts to influence both theory and practical crime prevention policy, it is worth inquiring into possible bias on the part of the author that may overly influence his inferences derived from the data. The author's profession is not clearly stated, but is apparently a social scientist employed by a company having no direct responsibility for law enforcement in the three jurisdictions in



which data were drawn. This should signify impartiality. Furthermore, the author is not listed in his forty-page annotated bibliography on the subject of bibliography, suggesting that he may well have approached this study free of any "pet theories" on the matter that he intended to study empirically.

### 3. Methodology

The author's commitment in this study was to offer objective data on which basis an understanding of burglarization may be formed or modified. There were two major avenues:

a. An investigation of the patterns of burglary with respect to characteristics of time and place of occurrence (e.g., urban-versus-rural incidence, residential-versus-non-residential structures victimized, frequency by month within year, day of week, and time of day). This covers a number of consecutive years to look for time trends. This branch of the study also is concerned with demographic characteristics of the population according to magnitude of the burglary problem, as well as the prevailing quality of housing.

b. A sample survey of individuals whose homes or buildings have been victimized, to analyze the characteristics of these structures and surrounding environs, kinds of protective measures employed, and perceptions of the crime situation and the role of the police in

combating burglary. Each interviewee was paired with a non-victim to afford controlled evaluation of the survey results.

There were also two lesser avenues followed:

c. Unstructured interviews of some unspecified number of burglars and law enforcement officers who have dealt with them. The main purpose in this apparently was to develop (in expository form) a comparison of amateur and professional burglars.

d. Interviews with 57 criminal justice personnel in the jurisdictions under study to develop for each a scenario showing what happens from the occurrence of the crime to the ultimate judicial disposition of the case.

### 4. Data Requirements and Data Utilized

a. Patterns of burglary. The author made use of reported burglaries contained in police files in the three jurisdictions, augmented by UCR data to provide general crime profiles. The time period covered is the three-year interval from 1967 through 1969, though records were unavailable for DC in 1967. All cases were counted in for DC and FC, as the data could be had in machine-readable form; for PGC a 30 to 40 percent sample was used since the records had to be processed manually. Thus, the source records were police reports on each incident, rather than summaries drawn from earlier research.

Little is said about data processing and the inevitable problems of handling data, so we are left to take it on faith that appropriate quality-control procedures were employed.

The data were coded according to census tract of occurrence, so that 1970 Census figures could be used to obtain social and economic pictures. Thus, both geographic and socio-economic variation could be studied, and the correlations, if any, between these factors and burglary incidence.

The data were then converted into rates and frequencies according to census tract. Rates could be computed per 1000 residences. This could not be done for non-residential burglary as the number of such structures at risk could not be determined within the confines of this study; therefore, raw frequencies had to be used.

The rates or frequencies were then ranked. Within each jurisdiction and category of structure, the ten tracts with the highest rates or frequencies were taken as the high-crime areas; the lowest ten were taken as the low-crime areas.

b. Victim survey. In each jurisdiction the listings of 1969 burglaries were sampled to get a battery of 100 potential interviewees who were deemed to be within reach of a survey. Four such batteries were assembled in each place, classified according to high-crime/

low-crime and residential/non-residential distinctions. The addresses were randomized and the interviewers were instructed to go down the list until 15 interviews had been completed; for each such interview completed, the interviewer was to scan the neighborhood for a similar structure that had not been victimized, and to ask the inhabitant the same array of questions, to provide comparative data.

We are not given the survey instruments themselves, which is particularly annoying since the vast majority of the data published in this report stems from the survey. Oddly, in the first edition of this report the author stated that copies were included in an appendix; for some reason the appendix was omitted. Good practice of survey science requires that the precise questions asked be put forward for the readership to see, and the failure to do this casts a pall of suspicion on the results, although the report in almost all other respects tends to build a feeling of confidence. It is quite possible that the author felt the questions could be adequately inferred from the wording of the tabulations.

c. Interviews of burglars and court personnel. These are not productive of quantitative data, and though they make interesting reading, they could well have been left out of the study. Very little background information is given relative to these subprojects. For the court study, a table is included showing the categories of personnel

interviewed (e.g. numbers of judges, prosecutors, etc.). Inasmuch as the resulting scenarios of the apprehension and prosecution of burglars is of doubtful relevance to the crime-prevention objectives of this work, probably no background is needed. For the interviews of burglars and law enforcement officials, none of the subjects are identified, except that it is stated that some of the members of the "Beltway Gang," and certain of their apprehenders or other police personnel, were questioned to see how professional burglars operate.

#### 5. Experimental Design and Controls

This project did not include any experimentation. However, as noted above, a large part of the data came from a survey done as part of the project. The subjects were drawn randomly from the available listing of burglary victims for 1969. Controls were introduced by pairing each of the subject habitations in the sample with a non-victimized habitation in the same neighborhood. This matching of study and control was left to the interviewer, though there were a number of observable traits on which basis the controls were to be selected. Obviously, an element of discretion in the control selection process raises the possibility of bias, though in all likelihood the use of such controls is far better than having none at all, given the care and circumspection evident in this study.

#### 6. Results and Recommendations

The results cover 30-some pages of text (exclusive of pages devoted to burglar and court interviews) which is organized well and is quite readable. The text is backed up by 150 pages of tables and figures. The figures are maps of the three jurisdictions studied, showing the locations of the high-crime and low-crime census tracts for residential and non-residential burglary in each of the years 1967-1969. Most of the tables are concerned with the victim survey.

The author offers six pages of "generalizations." These are observations based on his data. Except for the procedure for identifying high and low burglary census tracts, no attempt was made to found conclusions on formal statistical tests of significance; whether this is a shortcoming depends entirely upon one's philosophy of science. (The reader must realize that significance testing is the preference of only one among numerous schools of statistical thought, though it is by far the most influential school.)

Of the many relationships that appear in the data, a few of the more important ones will be mentioned here:

- Residential burglaries often strike corner houses that are somewhat obscured by trees or other structures.
- Residential burglaries tend to occur on weekday afternoons, while non-residential burglaries are weekend and nighttime events.

science. (The reader must realize that significance testing is the preference of only one among numerous schools of statistical thought, though it is by far the most influential school.)

Of the many relationships that appear in the data, a few of the more important ones will be mentioned here:

- Residential burglaries often strike corner houses that are somewhat obscured by trees or other structures.
- Residential burglaries tend to occur on weekday afternoons, while non-residential burglaries are weekend and nighttime events.
- In an urban environment (DC), burglary rates and frequencies may be higher among the poor and the minorities than the rich and caucasian. (Elsewhere, the author observes that in DC burglars seem predominantly to be male, poor and black, trying to support a drug habit, and tending not to stray far from their own neighborhoods to commit their crimes.)
- Victims are more interested in stepping up police efforts to combat crime than are non-victims.
- Victims take more precautions to prevent burglary than do non-victims, though their protective measures tend to be upped only after being victimized.

A number of recommendations are also put forward. Essentially, what the author suggests is that better locks should be installed, lighting the outside of homes or buildings, and taking measures to create the appearance that someone is there during the high-crime hours of the day or night. His recommendation to the police is that they actively encourage citizens to protect their homes and buildings thusly, to eliminate the amateurish burglaries and free themselves to concentrate on the fewer skilled and professional burglars.

#### 7. Discussion

The author puts forward a view of the subject of burglary, though he fails to integrate it into a unit. (The sections on theory, and interviews of police, burglars and court personnel are distinct and isolated).

The most valuable part of the study certainly is the victim survey, even with its ad hoc system of choosing controls. It makes this study unusual in contributing information of interest to ordinary private citizens (particularly the results pertaining to characteristics of victimized households, their locations and surroundings, along with data on attitudes of householders toward security and prevention measures taken, or not taken). More than any other, it is this aspect which is worthy of duplication by other researchers.



It should also be noted that the author computes burglarization rates for private residences as number of burglaries per household at risk. This is entirely consistent with the legal definition of burglary in every state. That is, burglary is a crime against structures, not people, even though people are in fact victimized, so that from a legal point of view it is the form of a rate that is most relevant. Other authors base such rates on number of people in the area under study, or the square miles of space included therein. Presumably any kind of rate is pertinent to some sort of inquiry, and no one approach to rate calculation will suffice for all interests.

POLICY TOPIC: Crime Prevention - Crime Statistics

TITLE: A Study of the Relationship of Demographic and Sociological Factors to Burglaries in the San Francisco Mission District

AUTHOR: Theodore E. Fong

PUBLISHER: Unpublished M.B.A. Thesis, Graduate School of Business Administration, University of California, Berkeley, California

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ABSTRACT:

In this paper the relationship between burglary incidence and socio-economic factors in the Mission District of San Francisco is studied. Burglaries in the years 1968 through 1972 are distributed through the census tracts in the Mission District, and are related statistically to such factors as unemployment rate, quality of housing conditions, stability of family conditions, and concentration of ethnic minorities living in poor socio-economic conditions. The analytical techniques used are correlation and multiple regression. The validity of the results was investigated by comparing them with the prevalence of such factors in census tracts identified by San Francisco police as either high or low-burglary areas.

## INTERNAL VALIDITY EVALUATION

### A Study of the Relationship of Demographic and Sociological Factors to Burglaries in the San Francisco Mission District

by Theodore E. Fong  
June 1973

#### 1. Research Goals, Objectives, Policy Issues

The purpose of this study was to provide some objective data which could be used to evaluate the effectiveness of the Burglary Abatement Program which was implemented in March 1972 by the San Francisco Police Department. This abatement program consisted of increasing uniformed patrols, undercover agents, and community involvement. The SFPD chose the Mission District of San Francisco as an appropriate location for this experiment on the grounds that it has a good cross-section of the city's population and "has a very high burglary rate."

The author's immediate objective in this study was not to evaluate that program, but rather to evaluate the burglary problem as it existed in the Mission District during the years 1968 through 1972. His avowed purpose was "to discover, if possible, relationships between burglary rates and socio-economic factors." He further stated that it was his intention to see whether a number of assumptions made by the SFPD in choosing the Mission District as its pilot area were correct. Those assumptions were that certain variables, all well represented in the

Mission section, are closely associated with burglary incidence: i.e., employment status, income status, and housing status and conditions.

#### 2. Face Validity Check

This report includes none of the raw data, nor any tabular summaries, but only the results of correlation and regression analyses; it is practically impossible to know what to make of the latter without some of the former.

However, the author is generous in accounting for the dirty-linen aspects of the study: that is, shifting definitions that affect what gets counted into the data base from one time to the next. Nothing is said about controls imposed over the data processing itself to assure quality; it appears likely, as is so often the case, that the analyst simply accepted a data tape compiled by an operating department and assumed it to be essentially error-free. But at least he inquired about definitions.

It is difficult to judge how well the author understands the statistical devices that he chose to rely upon, as his explanations of them are opaque. This may mean either that he is not a good writer, or that he undertook detailed descriptions because he was enamored of some new-found technical learning.

It is to the author's credit that he built into his study the experience of law enforcement, by carrying out additional calculations based on informed input for an evaluation of his correlation and regression results. There are only two drawbacks in this: first, his source of authoritative opinion was but a solitary police official; and second, in his discussion of conflicting outcomes (particularly, the significance of "poverty" as a burglary predictor) it is uncertain who won.

### 3. Methodology

Essentially, the technique used in this investigation was to divide the burglary data into the 19 census tracts within the Mission District and then relate these figures to the socio-economic composition of those tracts.

The assignment of incidents to census tracts was readily accomplished because the police districts did not overlap from one tract to another.

The burglary frequencies were converted into rates by dividing by census tract population total. Thus, the author choose to work with per capita rates. This has some subjective appeal when we think of burglarization as affecting people, but burglary is an offense against habitation, and an area with a small population could experience a high frequency of the crime simply because it contains many buildings.

The socio-economic predictor variables were similarly normalized. For example, rather than examine across the 19 census tracts the correlation between burglary rate and number of unemployed blacks, the number of unemployed blacks in each tract was first divided by the total black labor force therein.

The author first computed correlation coefficients between burglary rate and each of 52 socio-economic variables, to see which correlations were high, and whether they were positive or negative.

To corroborate these results, he next carried out a regression analysis in which groups of predictors were compared jointly with burglary rate. There were two major regression analyses: first, he jointly regressed those with significant partial correlations, and second, regressed those variables that "seemed relevant." The first approach was disturbing in that a number of variables that seemed positively related to burglary rate in the correlation analysis now appeared to be negatively related, or vice versa. The second approach resulted in fewer such conflicts. This switch-over effect is known as "multicollinearity" and is customarily attributed to the shadowy influence of important variables that have been left out of the analysis. Such a finding signifies a greater complexity of reality than is allowed for in the statistical model chosen to represent reality.

Finally, the author compared his statistical outcome with the experiential knowledge of SFPD, as represented by one Officer Greco. This officer was asked to divide the 19 tracts into high and low-burglary categories, based on the impressions he had developed as a police officer. Then the author contrasted the levels of various predictors as they prevailed in the high and low categories.

#### 4. Data Requirements and Data Utilized

For his burglary incidence figures, the author relied upon the SFPD. There were two possible sources: the Bureau of Criminal Information, which apparently counted all reported incidents without any subsequent cleansing to remove unfounded complaints; and the Burglary Division which counted only verified complaints. For the study years 1968-1971, the former source was used because (apparently) the records had been computerized while the Burglary Division had only manual files; for the final year, 1972, which was when the study was done, the data were obtained from the Burglary Division. The author was persuaded by his police advisor, Officer Greco, that the discrepancy between the two counting mechanisms was insignificant for the purposes of this study. This was probably reasonable since the calculations were done for each of the five years separately.

Population figures for the census tracts were gleaned from the 1970 Census. Apparently the same figures were applied to the pre and post-1970 study years. The author felt this was justified based on his comparison of census figures for 1960 and 1970, but conceded that the effect was unknown.

The data on socio-economic factors were gotten from U. S. Department of Labor publication. More detail was gotten from a U. S. Department of Labor publication on manpower.

The population variables considered were over 50 in number, and came under three six headings:

- Race (white, Spanish surname, black, other)
- Employment (total work force and number unemployed by race and sex)
- Housing (owner/renter, number of rooms, value, etc.)
- Family (whether sole occupant, husband/wife, family, etc.)
- Income (median family income, or poverty level)
- Age (by sex and 5 or 10-year age categories)



5. Experimental Design and Controls

The approach used here was analysis of historical data, with no experimental manipulation of variables. Some attempt was made, however, to facilitate controlled observation, in the form of analytical controls. This was done by computing the correlation coefficients for numerous socio-economic variables in each of the five study years separately, which makes it possible to observe whether given high or low correlations truly exist or are the chance occurrence of a single time interval.

6. Results and Recommendations

Correlation and regression studies tend to produce a welter of numbers. To offer what conclusions seem warranted, we will consider those predictors with statistically significant coefficients in both the correlation and regression analyses. Then we will lay out the author's own conclusions.

The list will be broken down into residential and nonresidential burglaries, and the factors on the left side of the page are those positively related to burglary rate, and those negatively related. ("Positively related" means the rate goes up as the percentage prevalence of the factor in question goes up, and down as it goes down. "Negatively related" means the rate and the percentage prevalence of the predictor tends to go in opposite directions.)

Statistically Significant Predictors

Positive Relation

Negative Relation

Residential Burglaries:

\*Unemployed whites  
(minus Spanish surnamed)

\*Family occupancy

\*One-room premises

\*Owner occupancy

\*Premises with no kitchen

\*Five-room premises

\*Vacant premises

Nonresidential Burglaries:

\*Nonwhite, nonblack population

\*Six-room premises

\*Premises with no kitchen

\*Vacant premises

The author was particularly troubled that his statistical analyses did not show (1) percent family at or below poverty level of income, and

(2) percent of population male and in the 15 to 24 year age bracket, to be significantly and positively related to burglary incidence. He concluded, however, that the poverty and male 15 to 24 variables are strongly related to other factors that do correlate with burglary and hence states that these factors "are also strong indicators." It is not clear how much this inference results from the author's own thorough sifting of the data apart from the published numbers, and how much it is due to his own belief or that of his police advisor.

The author concluded that the results of his own correlation and regression analyses, and those from the comparison of high and low-risk census tracts as selected by his police advisor, are quite compatible, and offers this final observation: "Higher burglary rates are indicated in a census tract when (1) there is high unemployment, (2) there are poor housing conditions, (3) there are unstable family conditions, and (4) there is a higher concentration of ethnic minorities which live in poor socio-economic conditions." In the opinion of this reviewer, these observations go far beyond the essentially inconclusive data published in this paper.

#### 7. Discussion

When someone has gone to substantial trouble and expense in doing a certain piece of research, there is some natural tendency to read it strictly by its own lights. And so viewed, this is not a skillfully

done job. More often than we do, we should ask whether it was worth doing at all. Viewed in this way, the conclusion still is unfavorable. Consider the title of the report: "A Study of the Relationship of Demographic and Sociological Factors to Burglary ..." (emphasis added). Demographic and sociological factors are chief among the immutable characteristics of a population--at least in the short run, and certainly as far as police policy makers are concerned.

There would seem to be little practical value in discovering, for example, that the incidence of burglary correlates positively and strongly with poverty, unless the objective is to appeal to the legislature to eliminate crime by eradicating poverty. If the conclusion is that poor people are the most frequent victims, the implication for the police is that they should focus their resources on that part of the population, at the expense of protecting the more politically active and influential segments of the population. No sensible police chief would be willing to do this on any significant scale.

If instead the conclusion is that it is the impoverished who are the culprits (the author made no assertion about who the burglars are), the implication for the police is that they should announce a policy of maximum surveillance of the poor, as potential criminals, or establish such a policy sub rosa. For quite obvious reasons, a police chief who valued his job would avoid any such policy, even though, in fact, some of his subordinates may carry out their assignments as though such were in effect.

It would make better sense to take as the object of a crime incidence study those factors which genuinely relate to police work. In the context of burglary, there should be logically neutral factors such as place of occurrence (geography), type of target (e.g. residential), time of day, day or week, season of the year, etc. Such studies may contribute data which, properly analyzed, can indicate how law enforcement resources can be used to good advantage.

## E. Police Technology

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## EXTERNAL VALIDITY EVALUATION

### Police Technology

Due to the increased availability of government funds caused by the serious rise in the nations's overall criminal activities, we have witnessed over the past few years, a movement by law enforcement agencies and industry to extend the use of technological advances in the police environment. There has been much activity in the investigation of how both old and new technology can be applied to law enforcement problems. The items of interest include, among others, Dick Tracy communications devices, personal alarm systems, vehicle tracking, computers, fingerprint matching, voice prints, airborne vehicles and non-lethal weapons.

In general, we found that the research studies in these areas do not lend themselves to internal validity review as they were mostly expository in nature or described a highly specific technological development. However, we did analyze two papers which attempted to develop an approach to evaluating the effectiveness of helicopters for police patrol. In fact, these two papers represent one of the few instances for which we can apply the ideas of external validity in that they both analyze the same basic problem area.

The internal validity reviews of the helicopter papers emphasize the difficulties of performing an analysis of ongoing police operations, especially in the area of police patrol. In one instance (The Project ACE)

(Riverside Study), we felt that the evaluators exhibited a bias in favor of helicopters. We also questioned that study's statistical and research methodology and the resultant conclusions that the helicopter patrol was responsible for reductions in the number of robberies, burglaries, auto thefts, and that from a cost-benefit point of view, helicopters were given a higher rating than the equivalent number of patrol units. In the second study (The Washington, D.C. Report on Crime Reduction Through Aerial Patrol), we had strong reservations as to the validity of the total paper. Here it was claimed that the presence of the helicopters increased the total number of arrests and that crime was greatly reduced in the areas patrolled by the helicopters. This paper assumed an experimental framework that was false. We note that both studies claimed reductions in crimes and while the Riverside study concluded that helicopters did not affect the number of arrests, the Washington, D.C. study did make such a claim. As we felt that the studies lacked precision and that the authors made incorrect assumptions or ignored important difficulties, we could not conclude from these studies that an expenditure in the purchasing and maintenance of a helicopter fleet for police patrol is a proper one.

There are, of course, many specific instances for which police departments have found a helicopter to prove invaluable (a number of them reported in the studies). The two studies attempt to justify helicopters as a crime deterrent device and we believe that this is the wrong approach. In addition, we feel that it is practically impossible to measure the impact



on crime by helicopters due to the difficulties in performing a controlled experiment and in filtering out the many internal and external factors that impinge on crime control operations. We recommend that a definitive study be undertaken that investigates the use of helicopters in context of a total public safety advance, and that strong consideration be given to the requirements of different geographic areas, i.e., urban, suburban, rural, desert, coastal. Thus, we might find helicopters to be of value in a cost-benefit sense in certain areas and for certain tasks. If helicopters are to be evaluated as just a police patrol device, then there is serious question as to whether the equivalent number of patrol vehicles and men (in terms of dollar expenditures) would not make a stronger impact on crime control.

There are a number of other studies and reports concerned with the use of helicopters and other aircraft for law enforcement and these are cited in Appendix B: Additional References. In particular, the Department of Justice report "The Utilization of Helicopters for Police Air Mobility" summarizes how helicopters are currently being used in the United States in support of law enforcement activities.

There is proper concern that many law enforcement agencies have used their new monies to purchase a wide range of equipment without demonstrating the value of the equipment in the crime control process (see the analysis of the LEAA disbursements made by Common Cause).

Certainly, much police equipment, especially communications systems, have been long out of date. However, we have seen, for example, large expenditures for personal portable radios for use by the patrol force without the integration of this advance into the total dispatching activity of police departments. (In some cases the central dispatcher cannot communicate to these units). Law enforcement agencies need a procedure by which new technology cannot only be tested in an equipment sense, but also in terms of how such equipment can improve the overall operations of the department. There appears to be too much technology (equipment) for technology's sake. The use of helicopters appears to be a case in point.

We do not mean to imply that valid scientific work is not being done in applying technology to law enforcement problems. For example, the automation of the most difficult problems associated with fingerprint searches has been steadily advanced by the National Bureau of Standards working with the FBI (see the references by Wegstein and Eleccion). This fingerprint research project is an example of the proper coupling of resources and scientific and law enforcement personnel into a continuing, long-term developmental and evaluative project. We hope this will happen in other technological areas.

POLICY TOPIC: Police Technology - Helicopters

TITLE: Project ACE (Aerial Crime Enforcement), Riverside  
Police Department, Final Report

AUTHOR: P. M. Whisenand, R. O. Robinson and R. E. Hoffman

PUBLISHER: Institute for Police Studies, California State  
University, Long Beach, California

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ABSTRACT:

This study contains the report of a twelve month study of the police helicopter patrol program, Project Aerial Crime Enforcement (ACE), of the Riverside (California) Police Department. This study was directed at the following subjects: portion of helicopter airborne time that is spent on patrol; time devoted to handling various types of crime; response time per call for service; helicopter effectiveness as measured by change in crime rates; cost/benefit analysis of police helicopter versus radio cars; community attitudes toward police helicopters; and attitudes of police personnel towards helicopter operations.

## INTERNAL VALIDITY EVALUATION

### Project ACE (Aerial Crime Enforcement)

Riverside Police Department

by

P. M. Whisenand, R. O. Robinson and R. E. Hoffman  
June 1972

#### 1. Research Goals, Objectives, Policy Issues

The object of this study was to assess the impact and use of police helicopters as a technological adjunct for combatting crime in Riverside, California. The study team performed the tasks of project evaluation, monitoring and consulting, and training and orientation. As there is a need to clarify the role of any major technological innovation, we would have hoped to have found the study team concerned with the determination of the proper role of helicopters. However, as one of the stated purposes of this study was to uncover the principles or requirements underlying a successful program of aerial crime enforcement, we find instead a bias towards the use of helicopters in police operations.

#### 2. Face Validity Check

The study approaches the analysis of helicopter operations assuming that the operational and data environments are appropriate for formal statistical analyses. An analysis of critical incidents, e.g. crimes in

progress, was made in order to evaluate the quality and quantity of helicopter operations. Also, crime data during the program period were compared to similar data for comparable periods so as to determine if the helicopter operations had any effect on crime activity. Here the assumption was made that aerial patrol would decrease robberies, burglaries and auto thefts. Standard statistical significance tests were made which can be interpreted as indicating that the helicopter was responsible for reductions in these crimes, but was also responsible for increases in thefts. Comparable statistical analysis indicated that helicopter patrol did not affect the volume of arrests. The authors thus claim that the Riverside helicopter patrol was responsible for improvements in selected crime areas. However, the study's ability to perform proper statistical tests due to the difficulty in controlling the operational environment raises serious questions as to the validity of these conclusions.

The researchers develop an evaluative approach to aid Riverside officials to determine if the helicopter program should be continued. The procedure used a subjective scoring procedure which, for example, rated crime deterrence of helicopters 160 vs. 80 for patrol units, and 160 vs. 40 for officer safety, and 120 vs. 30 for response time. It is unclear how response times are comparable in that, even though the helicopter crew arrives sooner, they are in the air and their ability to service is highly constrained. A factor on the evaluative process was

person-to-person contact which was cited as being of minor importance. The helicopter was given a 20 and a ground patrol unit a 30. With some departments stressing the importance of citizen contact (neighborhood team patrols), it is clear that this evaluative cost-benefit analysis is very dependent on the researcher's biases. We also note that the researcher was the person to estimate the factor values, not police personnel.

Overall, the study presents an interpretation of data collected during the helicopter operational period, makes strong statements as to the efficacy of helicopters to reduce certain crimes, but we feel that the methodological approach has not been proven and thus, the conclusions are not justified.

### 3. Methodology

The approach used to determine the effectiveness of the helicopter units was to apply statistical significance tests. A ten year retrospective study was made in order to determine regression equations (second-order) for individual crimes, e.g. forcible rape, burglary and arrests. The predictions obtained from these equations were then compared to the actual crime and arrest figures for the ten month study period. Conclusions were then reached on whether the helicopters were responsible for changes in the crime and arrest rates based on these comparisons. It

was hypothesized that helicopters would decrease crime levels for robbery, burglary and auto theft (category B crimes), and would not have any effect on other crimes (category A crimes). During the test period, category B crimes did decrease and category A crimes increased. Predicted arrest rates did match the actual.

The statistical methodology used and its assumptions must be questioned. We wonder why the predictive process went back to January 1960 and thus included rising trends which have since been dampened out. FBI data shows a steady percentage rise in robbery, burglary and auto theft until 1971. In fact, auto theft was on the down side earlier and this can be attributed to the new ignition and transmission locking systems which were initiated in 1969 GM models and all models after 1970. (Thus for the Riverside experiment to claim that helicopter patrol reduced auto thefts is another example of assuming a controlled experiment is being undertaken and ignoring significant events which impinge on the assumptions.) By using the very dated time history of 132 months, we feel that the predictive formulas would tend to overestimate. (We assume that a second order quadratic form was necessary because of the downward trend of data for the last three years, but this would probably not compensate for the large amount of old data.) Also, as crime is seasonal, it is unclear how the projection formulas differentiated between a July with school out and November with school in



session. No indication is given as to whether the prediction formulas were tested in their ability to project future crime levels. With respect to arrest predictions, arrests tend to be a function of the number of police in the field and we would expect a predictive formula to be reasonably accurate, given a constant level of field officers.

A survey was conducted on the surrounding communities to determine if there was a displacement of crime and it was concluded that no displacement occurred and in fact, auto thefts in the two contiguous areas decreased. Community attitude surveys were made to determine if the populace felt more secure with the helicopter patrol and were in favor of it. We feel that such surveys are unwarranted in that they only reflect subjective impressions, and a 72 percent response indicating that the populace felt it had a better police department since the addition of helicopters is really no information at all. How do they know it is better and in what sense?

As noted above, a cost-benefit analysis was conducted to aid the Riverside officials in determining whether they should continue the helicopter patrol. One of the assumptions was that two helicopters would supply 18 hours of air and administrative time in a two shift operation. However, during the 10 month test period only 3.8 hours per shift were obtained. On a cost basis the helicopter operation is equivalent to 4.9 patrol cars (each car on a 17 hour day). A ten factor evaluation was performed, most of it subjective, and the rating of helicopters vs. the

equivalent number of patrol cars was 880 to 554. We feel that this evaluative procedure is quite misleading. For example, the cost-benefit analysis rates crime deterrence as the most important factor and it is assumed that crime deterrence rests upon the visibility theory and that a helicopter is ten times more visible to persons on the ground than a conventional patrol unit. Also a helicopter spends a larger proportion of its flight time on patrol ("72% compared to a meager 20% for a ground unit")--we note the 72% figure applies only when the helicopter is airborne and this was 3.8 hours per shift. Recent studies in Kansas City apparently refute the concept of preventive patrol as a deterrent factor, thus putting the above assumption in question.

A survey was also taken to analyze the attitudes of the Riverside police personnel in terms of the city's crime problems, job support provided by the helicopter, personnel involvement with the helicopter program and suggestions for improving the helicopter project. Ninety-four officers out of a force of 213 were surveyed, including five officers on the helicopter program. Random selection of officers was evidently not attempted. We shall not discuss the validity of the survey except to note that 98 percent of the officers surveyed believed that the helicopter improved law enforcement in Riverside and one of the questions was "Do you, as a field officer, feel more secure while performing certain hazardous field functions if the helicopter is present?"

#### 4. Data Requirements and Data Utilized

To perform the appropriate statistical analyses required the designing of an experimental situation in which the only variable was the new role of the helicopter patrol. Since the helicopter flew over the entire area, no controlled area existed and thus, the researchers were forced to use predictions to represent the level of crime if no helicopter patrol was flown. We noted our objections to this above. The basic data collection needs were that of gathering actual crime statistics for the months of the study and the previous 11 years. We assume that these data were collected via the usual reporting procedures, are accurate, and represent the only hard data of the study.

It has been demonstrated in other studies (by the St. Louis Police Department) that exponential smoothing procedures which weight the observations by their currency are accurate predictors of crime levels. It would seem that this type of analysis might have yielded more information for the project evaluation, especially in attempting to account for any seasonal effects.

The study also analyzes the helicopter's crews effectiveness in handling what are termed critical incidents. Data on 449 incidents were collected from forms, nearly all (92%) of which were filled out by the helicopter crews. Of course, the evaluation of critical incidents was pro helicopter.

#### 5. Experimental Design and Controls

Although statistical methodology was applied which required the need to control the experimental environment, no indications of this are given in the study, and no discussion of this need is presented. It is assumed that all that was required to be done was to fly helicopters and record the results and compare them to untested predictions. We noted that auto thefts, one of the crime categories in which a decrease was hypothesized, was decreasing at that time for other reasons. Also, why we would expect robberies and burglaries (especially night-time crimes) to decrease because a helicopter is flying all over the City of Riverside for an average of 7.6 hours a day is unclear. After ten months, one would think that if the criminal element had been deterred by the helicopter in the early months of the program, they would learn how to beat any apparent advantage by the later stages of the program. No monthly comparisons are given.

#### 6. Results and Recommendations

The authors' purported main results and recommendations are as follows:

- a. Statistically significant reductions in the offenses of robbery, burglary, auto theft and total Part I offenses are attributed to the helicopter patrol. However, thefts between \$50 and \$200 increased

during the helicopter's test period. The authors are willing to credit the helicopter patrol as the apparent cause of the increase and note that a trade-off between a rise for this crime and a decrease in the other crimes is acceptable.

b. The volume of arrests did not seem to be significantly affected in either direction by the use of the helicopter patrol.

c. Crime decreases in the City of Riverside did not simply displace crime into the surrounding areas.

d. To determine if the observable reductions in the crimes of robbery, burglary and auto theft in the City of Riverside are of a temporary or lasting nature, it is recommended that if helicopter patrol is adopted as a regular police program, a continuing evaluation component be built into the program.

e. In a cost-benefit analysis, helicopter units received a much higher rating than the equivalent number of patrol units.

## 7. Discussion

The data in this report do not substantiate the conclusion of the authors that helicopter patrol has resulted in a significant decrease in crime.

The study focuses on robbery, burglary and auto theft because "based on previous helicopter research and on the nature of certain

crimes, only [these] offenses would be materially reduced." But, no previous research is cited. This is crucial because these are the only three crimes that showed a significant decrease after the introduction of helicopters.

The study attempts to predict what the rates for each crime would have been in the absence of helicopters. Curvilinear regression is used, but no tests of significance are performed for the coefficients. "It was determined by observation that the second degree equations provided the best fit." In the case of burglary the coefficient of  $x^2$  is extremely large so that the predicted rate with no helicopter is enormous. As a result, the observed value with the helicopter is far less and a t-value of -13.15, extremely significant, is cited. The application of a t-test at this stage is absurd. The predicted value of 514.16 burglaries per month is changed tremendously if different historical periods or other techniques of prediction are used. For example, if exponential smoothing is applied to the yearly percentage increases, using a smoothing constant of .5 to correspond roughly to a three year moving average, the predicted value is only 440.

The authors purport to have performed a test of hypothesis predicting that each of the three crimes noted above would be significantly reduced whereas other crime would not. "The hypothesis was correct in two out of four predictions. Such results could occur by chance less than five

times out of one hundred." It is not clear what the authors thought they were testing or how they come up with a 5% level of significance. But, it is clear that they were arguing after the data had been collected, and, as noted above, there is no citation to support their interest in just these three types of crime.

Also, the results for Riverside do not seem to be very exceptional when compared to the surrounding areas. One of the three neighboring areas showed a greater decrease in the three types of crime noted without a helicopter.

The main emphasis of this report is that helicopter patrol should and does have a deterrent effect on the crimes of burglary, robbery and auto theft, and a cost-benefit analysis demonstrates that a helicopter patrol would be as effective as about five patrol cars. We submit, however, that maybe the five patrol cars would be more effective in deterring the vicious crimes of murder, rape and aggravated assault, the fear crimes. We might want to trade-off more burglaries for less muggings. The authors do not consider such possibilities in their evaluation. In sum, we feel that the results and recommendations of this report are not substantiated and the report is not internally valid.

POLICY TOPIC: Police Technology - Helicopters

TITLE: Crime Reduction Through Aerial Patrol

AUTHOR: Anonymous

PUBLISHER: District of Columbia Metropolitan Police Department,  
Washington, D. C.

VOL. /NO.: PB-215 711 (NTIS)

DATE: 1973

NO. PAGES: 114

ABSTRACT:

This investigation of the use of helicopters as patrol vehicles gives detailed information on logistics, equipment and training associated with such use. It also covers operational methods and costs. The effectiveness of the helicopter in apprehension of suspects is studied. Statistical data are given which relate the use of helicopters to change in crime rates and their impact on on-the-scene arrest rates.



## INTERNAL VALIDITY EVALUATION

### Crime Reduction Through Aerial Patrol

by

Anonymous (D. C. Police Report)  
1973

#### 1. Research Goals, Objectives Policy Issues

This research was directed towards evaluating the role of helicopters in the prevention and reduction of crime, and the change of arrest patterns as a function of having a helicopter on the scene. As new technology is introduced into the police environment, there is a need to have an evaluative process which (1) enables a police department to evaluate the proposed use of the technology against other alternatives or other uses of the funds prior to the implementation of a new program and (2) enables the department to evaluate the impact of a newly implemented program on the measures of police efficiency, effectiveness, equity and responsiveness to citizen needs. This study approaches the second point as a statistical experiment with the objective of determining if the implemented program of using helicopter patrol as primarily a quick-response surveillance vehicle had any effect on overall patrol effectiveness as measured by the number of arrests and changes in crime levels.

#### 2. Face Validity Check

The overall style and recommendations of this report are quite disturbing. The study describes the use of three helicopters and support personnel and their role in police operations, in particular as quick-response surveillance vehicles. The basic assumption is that such vehicles will have a positive effect on criminal behavior and police operations, and an evaluative framework to measure such effects was established. The report gives the impression that a statistical experiment was conceived and implemented, and although it cites a multitude of reasons for negating the total experiment, calculations and additional assumptions are made so as to bring to the study an appearance of correct statistical methodology. There is no reason for believing the stated conclusions, and it is disturbing that the report becomes accepted and disseminated without caveats. The title alone gives false impression.

#### 3. Methodology

Three helicopters were purchased by the D. C. Police Department in 1971 and pilots were trained by the U. S. Army. It is not clear how the pilots were selected from the officer ranks. The first year costs were \$493,652, with second year costs of \$454,134; almost a million dollars over a two year period. (Average yearly costs of a 24-hour scout car versus a 1200 hour flight time helicopter are \$90,774 and \$142,460, respectively.)

As a means of evaluating the role of the helicopters, this study gathered data dealing with the number of arrests in those incidents involving helicopters and the change in crime levels, index crimes except larcenies (why larcenies were excluded is not stated). The city was divided into six helicopter zones and the pilots were to patrol these areas on an alternating basis, and to respond to certain calls which could possibly benefit by a helicopter on the scene, e. g. suspect in the area. The evaluation is described in two parts: the apprehension test and crime prevention test.

The apprehension test was to determine if the helicopter made a difference in the number of on-scene arrests. Two types of calls were analyzed: those calls to which the dispatcher sent a helicopter and those to which the dispatcher would have liked to send a helicopter, but was unable as none were available. The basic data used to determine if the helicopter aided in an arrest was narrative and interpretive information given by the arresting officer and the helicopter observer. How differences in opinion were resolved is not known. Also, as this reporting procedure was initiated after the program was in for two months, a total of 237 calls and 46 associated arrests were analyzed on a retrospective basis by an evaluator (not the officers) using the historical arrest narrative. Twelve of the 26 arrest situations (i. e. 46%) in which the helicopter's role was deemed to be decisive occurred in this first two-month

period. One would expect the learning curve phenomenon to cause the later months to have more decisive situations. In contrast, in the crime prevention test, the first two months of data were not used, with lack of experience cited as a factor. A comparison is made against the number of arrests for helicopter on the scene crimes (803 calls - 127 arrests) and those in the control group (helicopter not available) (2646 calls - 273 arrests) and a conclusion is reached that 6.1 more arrests per month were due to the helicopter. Of the 127 arrest situations to which the helicopter responded: in 26 arrest situations fresh pursuit was already in progress; in 56 situations ground units were already there; and in 56 situations, 27 arrests were made prior to the arrival of one helicopter. Of the 26 calls with arrests for which the helicopter's contribution was judged to be decisive, the helicopter was the first unit on the scene 21 times. Whether arrests would have been made in any event is not known. It should be noted that dispatch discipline was not maintained in that a helicopter crew could initiate their own response on calls for service by notifying the dispatcher when they responded. We assume that they went where the action was and thus, these self-initiated dispatches biased the type of calls in the arrest study. No external observers were used to track actual events.

An attempt was made to devise a formal experimental model in which the city was divided into experimental and control areas. The helicopter was to patrol the experimental zones and every two weeks, two different

zones were selected for patrol. Many things interfered with the process; not enough pilots were available for the planned patrol coverage between 7:00 A.M. and 11:00 P.M.; 9.4 flying-hours per day was the average for the three helicopters; two-helicopter patrol coverage was achieved on an average of 18 hours per month; weather conditions cancelled many tours; maintenance problems occurred; the radio system was such that receiving was done on VHF and transmission on UHF, and, as the central dispatcher had to turn off the UHF quite frequently, effective two-way communications, and thus dispatching control, was not possible; the data collection process caused much of the data to be discarded as the data processing group recorded data by the hour starting on the half hour and could not match data with actual helicopter flight time.

It was assumed that the helicopters were the only elements which could change the crime levels. Control areas were defined over which the helicopters would not fly, but in a given two week period a control area could become an experimental area, and vice versa. Comparable days were selected to contrast the experimental area crime figures with the control area crime figures. In many instances the control days were many time periods back and although the same day of the week was selected, no consideration of weather and seasonal aspects were considered; e.g. a December 15 flight was compared to a November 3

control period day. The data were subjected to a significance test to test the assumption that the helicopter had no effect in inhibiting crime. The test was inconclusive, but through some legerdemain a statement is made that the helicopter does have an effect. In sum, the proposed experiment was not carried out, but results are given as if it had been accomplished in its assumed statistical garb.

#### 4. Data Requirements and Data Utilized

As noted above, a strange mixture of narrative and hard data were collected and subjected to analysis. No controls on the data were established and the interpretive data, e.g. was the helicopter responsible for arrest, was left to the program evaluator, who was member of the D. C. Police Department.

#### 5. Experimental Design and Control

There were basically no controls on a poor design.

#### 6. Results and Recommendations

The main results as stated are as follows: (1) calls in which the helicopter participated produced 0.158 arrest situations per call, while comparable calls in which the helicopter did not participate produced 0.103 arrest situations per call, and this was translated to 6.1 more arrest

situations per month due to the presence of the helicopter, and (2) the presence of helicopters as flown in the test resulted in an 18.5 percent decline in projected crimes over the area flown by the helicopters. We note that it was estimated that the helicopters flew 22% of the time outside of the designated patrol zones. No recommendations are given.

## 7. Discussion

We are concerned here with a report which has just enough flavor of authentic statistics to cause the results to seem true and thus used by others to justify the use of helicopters for police patrol under the guise of a crime prevention and apprehension advance. The methodology assumes that statistical testing procedures can be carried out in a field environment as if we were planting seeds and testing fertilizer. report, as noted above, indicates that so many things went wrong in the process that we must ignore any purported factual data. This report cannot be considered to be internally valid.

Helicopters probably do have a place in police operations and emergency services in general, but we do not understand why they must be justified in terms of crime decreases and arrests. The study notes that 1200 flying hours for one helicopter will buy the equivalent of almost five, 24 hour patrol cars. It would be appropriate to compare arrest rates and crime deterrence power (if they are known) of these patrol units versus the single helicopter.

## F. Resource Allocation

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## EXTERNAL VALIDITY EVALUATION

### Resource Allocation

The allocation of police resources is concerned mainly with the determination of the number of personnel to be assigned to the active patrol force, i. e. those units which are responsible for answering emergency calls for service and for performing preventive patrol and directly related crime enforcement activities. The majority of papers reviewed and abstracted in this section focus on the patrol force size problem.

The basic procedure is the forecasting-queuing approach developed by the St. Louis Police Department (see reviews of papers by Crowther and McEwen), and marketed as a computer program by IBM under the acronym LEMRAS (see review). Some positive value can be obtained in applying such an approach, but whether a successful implementation could be accomplished for a specific police department is unclear. There is value in that a commitment to a resource allocation program would cause a department to give serious new thought as to how it organizes its patrol beats, the use of variable beats, the need to collect and analyze crime data based on a geographic structuring of the city, and related operational concerns such as dispatching of calls based on priorities and the stacking of calls. However, our present volume of knowledge as to what would cause a program to be a success is rather empty. There has been little research

# CONTINUED

## 4 OF 10

to determine how resource allocation procedures can be best implemented for a particular police department. (What should be the characteristics of the city? Are there any legal constraints? Political constraints? Personnel or police union resistance? How much money, people power and computer power are required? What guidelines should a department follow?) There appear to be no unequivocal successful implementations of such procedures. We would not really expect a complete success, but we should have some idea as to how to plan and implement approaches to resource allocation based on the newer mathematical and computerized procedures.

In addition to the St. Louis procedure, the work of the NYC Rand Corporation (see reference by Kakalik and Wildhorn) and the work of Smith et. al. (see review) should be noted. These papers describe different mathematical formulations to the resource allocation problem of determining the number of patrol units to field during a particular shift or time span. Although these approaches have been implemented to some degree, we do not have any real evidence as to their effect on police operations. Those departments contemplating the use of advanced resource allocation procedures are advised to discuss them with the appropriate departments and to review reports issued subsequent to this discussion.

Each resource allocation method requires some measure of effectiveness in order to be able to differentiate and select an allocation plan which appears to be the best one. There is no standard measure and we find

the proposed methods use the one which is adaptable to the specific mathematical formulation, e. g. the number of units required to answer 85% of emergency calls without delay (St. Louis queuing procedure). We do not mean to imply that one standard measure can meet the goals and objectives of every department, but we feel that increased research is required to formulate and justify an appropriate measure. It should be recognized that any measure is in reality just a means of aiding the police administrator to compare alternative allocation plans. We cannot really state that the chosen plan will cause the patrol activity to function in a manner wholly consistent with the theoretical measure of effectiveness. There are too many external factors impinging on the day-to-day police operations, i. e. we are not working in a laboratory and a controlled situation.

In terms of external validity, resource allocation research cannot be compared and discussed as to which research approach is best for a particular department. We do not have enough results to reach such conclusions. Also, if the available methods were applied to the same problem for a given police department, we would not be able to state which set of results would be best. Much research is needed, especially in validating the methods already developed, and extending, adapting and implementing these methods to a specific police department.

In addition, research must be addressed to the more basic problems of resource allocation: (1) On what criteria should a department determine

the total number of personnel required to sustain a specified level of service and crime control? (2) How should the total police force be split between the various functions, e. g. detective, patrol? and (3) How should the force be scheduled on a day-to-day basis and how should the department respond to changing personnel availability and requirements?

Resource allocation and scheduling problems are related to the problem of determining the number and size of patrol beats, and as noted in the section on patrol beats, there is a need for departments to consider changing beat plans on a periodic basis. We cannot conduct research in these areas without being concerned as to how the methodological approach and results impinge upon the total personnel problem of a department.

Throughout all the papers reviewed in this section, one point is clear: there is an explicit requirement for accurate data that reflects the complete activities of the patrol force (this is also true for much of the research reviewed in this publication). Without a strong commitment to the collection and analysis of this type of such data, the use of advanced resource allocation models should not be considered. With such data, a department should be able to improve its procedures without the use of high-powered mathematics or computer systems (see the review of the paper by Mitchell). Research in the resource allocation, beat design and patrol simulation areas has given us enough insights into the form and substance of the operational data needs of a police department. It is incumbent upon all reasonably

sized departments to initiate a geographic based, reporting area data collection procedure that processes, on a daily basis, the total crime history of the municipality. A department which attempts to apply advanced procedures to the allocation area without such a data base is doomed to failure.

In resource allocation research, as well as in many of the areas that are concerned with research on operational problems, we find little effort directed towards measuring the changes brought about by implementing the results of the research (see the section on Police Effectiveness and Evaluation). It appears as if most researchers assume that any change will make for an improvement. As part of the research, the researcher must establish a plan for measuring the effectiveness of the patrol force prior to any change (assuming an acceptable definition of effectiveness can be made and measured), collect pre-implementation baseline data, and conduct an ongoing evaluation. Such a comprehensive plan requires time, money and personnel, resources that are usually in short supply whenever any research activity is mounted (especially in law enforcement research). Without such efforts we will learn very little from individual experiences, and we will find departments attempting to implement new procedures without the benefit of valid knowledge from previous implementations. How to fund research activities in this and other law enforcement areas so as to collect and disseminate the gained knowledge is a serious, open question.

An implied theme that runs throughout all the research in the resource allocation area is that a police department must recognize that the implementation of the results will require changes to its operational procedures, some of which might be in conflict with other activities of the department, e. g. the use of LEMRAS and the Los Angeles Basic Car Plan. Thus, it is imperative that a department does not compartmentize a resource allocation project, but instead analyzes its impact throughout the organization during the early stages of the project, and initiates concurrent procedures that will cause the implementation phase to be understood and accepted by the affected personnel.



POLICY TOPIC: Resource Allocation

TITLE: The Use of a Computer System for Police Manpower Allocation in St. Louis, Missouri: Part 1, Manpower Requirements for Call Answering Services

AUTHOR: R. F. Crowther

PUBLISHER: Indiana University, Bloomington, Indiana

VOL. /NO.:

DATE: June 22, 1964

NO. PAGES: 78

ABSTRACT:

This is the initial and pioneering report on the use of computerized statistical and queuing theory procedures for the assignment of manpower to motorized patrol for the St. Louis, Missouri police department. The methodology is described by which forecasts of future calls for service by priority groups can be determined, and the use of this information to determine the number of patrol units required by a district to meet a specified level of service. The service criteria is that of being able to assign a departmental objective of  $x\%$  of the calls for service can be assigned without delay. A series of computer programs have been developed but are not given. Also, there is no discussion on experimental verification or implementation.

## INTERNAL VALIDITY EVALUATION

### The Use of a Computer System for Police Manpower Allocation in St. Louis, Missouri: Part 1, Manpower Requirements for Call Answering Services

R. F. Crowther  
June 22, 1972

#### 1. Research Goals, Objectives, Policy Issues

This is an early, pioneering research effort to develop mathematical and computer procedures to aid in determining the proper number of patrol officers (motorized units) to assign during a given time period (a shift) for answering emergency calls for service. The main objective is the establishing of a criterion for comparing and evaluating alternative manpower schedules. To accomplish this, the tasks of the research were (1) to predict the distribution of calls for service by class of calls, (2) to compare the results of manpower schedules which are deemed feasible to meet the schedule of calls, and (3) to determine costs and other criteria to aid in selecting a particular manpower schedule to implement.

#### 2. Face Validity Check

The author sets up reasonable objectives which are accomplished under basic assumptions concerning the statistical properties of the

time and location of calls for service in an urban environment (St. Louis, Missouri) and the times to service these calls by patrol units. In addition the author defines a simple, measureable criterion for comparing alternative manpower schedules, i. e. maximizing the probability that a call will be serviced without delay by assigning it to some free patrol unit. There is some discussion on the use of utility functions and costs for establishing a criterion, but this is not pursued to a satisfactory conclusion. (Subsequent research reported in this study and elsewhere improve upon and augment this criterion, e. g. response time considerations.) The methodology proposed is developed and explained and presupposes the availability of a well-organized data base. Such police data bases were rare when this paper was written, but are becoming increasingly more common. The emphasis is on the use of a computer system ("modern large scale computer"). Although a computer is required to perform the calculations, it is the mathematical descriptions and approach which should be emphasized. The paper does not report on any actual implementation of the procedures.

#### 3. Methodology

The report applies the methodological procedures of exponential smoothing for forecasting future levels of calls for service and the M/M/C queuing formulation to determine the probability that a call will

be delayed. ( The first M represents the assumptions that the arrival rate for calls for service can be represented by a Poisson probability density function, the second M represents the assumption that the service times are represented by an exponential density function, and C represents the number of service (patrol) units. )

Central to any manpower scheduling procedure is the forecasting of the future workload. For police operations, this mainly concerns the number of calls for service expected from a given area. As the calls are geographically distributed and sectors of a city produce calls for service at different rates, and these sectors must be related to patrol beats and unit workloads, forecasts are required by individual sectors by hour. (These sectors, termed reporting blocks, are small, contiguous areas within a city which tend to produce calls for service at a uniform rate.) The exponential smoothing process takes into account the fluctuations caused by the hour of a week and week of year seasonal effects. In addition, the forecasts are made by type of call, e.g. crime against a person, traffic, etc. The average time to service each type of call is obtained from police records and this information is combined with the forecasts to obtain the expected amount of service minutes required to service the forecasted calls during the forecast period.

The queuing problem is viewed in terms of facilities (patrol units) assigned to service the radio emergency calls, with each type of call requiring an average service time. Under the general assumption that patrol units in a district can service calls outside their beat, the report establishes formulas which relate the percentage of calls serviced without delay to the number of patrol units (servers) assigned to the district. We emphasize that the criteria is based on a dispatcher finding a unit that is in service (e.g. on preventive patrol) and assigning the call which just came into this free unit. The assignment is assumed to be made without concern as to beat boundary and response time. However, if the patrol unit corresponding to the beat in which the crime occurs is free, then that unit is assigned.

The report considers the establishing of priorities for the different classes of calls and generalizes the objective of a manpower schedule to be that of maximizing the weighted expected total of non-delayed calls, where each class of call is given a specified weight, with the more important calls having a higher weight. As this objective does not recognize personnel and other administrative constraints, the approach used is to allow a weighted service level to be set by the police department for each hour and district and calculate the number of patrol units required to meet this level.

A number of reports are generated by the computer programs. A forecast of calls for service and associated workloads (total service times) can be produced for any hour, day or week combination. For a fixed number of men in each district or citywide, the operating characteristics in terms of delays can be developed in order to judge present manpower assignments. The main report, which represented a new advance in information available to police department administrators, yields the number of men who can provide a predetermined level of service over the forecasted period of time. The level of service is expressed as a weighted sum of the numbers of events in each of the fifteen classes which are serviced without delay. Sensitivity analysis about this desired level is also accomplished so that the police administrator can determine the marginal utility of adding or dropping a patrol unit in a particular district. Output in each case consists of tables of arrival rates, workloads, flow of delayed and undelayed events, and the distribution of delays for all events by priority class.

#### 4. Data Requirements and Data Utilized

This paper is a first attempt to apply advanced statistical and queuing procedures to law enforcement manpower allocation problems. Assumptions on the statistical distributions are the usual ones made in simple queuing situations, and the assumptions are backed up by any data analysis. This type of approach--history of calls for service by reporting block and service times--requires detailed data needs and a commitment by the police

department to maintain such a data base on a continuing basis. The establishment of such an information file would be a positive benefit for any department as it is required by almost any advanced planning methodology. At the time the report was written, St. Louis police department had established such a data file. The paper does not report any evaluation of the forecasting procedure or experiments designed about the manpower schedules produced by the methodology. (See other reports in this section for implementation discussions of this method.)

Reporting of actual service times is developed from the radio dispatch cards. These cards are also processed to determine the historical record of calls by reporting block by priority of call.

#### 5. Experimental Design and Controls

This is a research report describing how specific methodology could be applied to the development of manpower schedules and resulted on the development of a set of computer programs. Evidently no experimentation was accomplished to test out the statistical assumptions. However, plans were given as to how any implementation of the schedules should be tested and evaluated. The author does state his concern as to the validity of the forecasts, and we should recognize that this report is a first and much of the data to test assumptions and validity were not available.



We should emphasize that experimentation in the law enforcement area is difficult, but any such research should attempt to develop and implement a formal plan of experimental validation and such a plan should be part of the research report.

#### 6. Results and Recommendations

The basic output of this study is as follows, although no supporting evidence was given to support these recommendations:

- a. The statistical forecasting technique of exponential smoothing can be applied to predicting future levels of calls for emergency service.
- b. Assuming standard properties of queuing systems with respect to distribution of calls for service and times to service these calls, by priority classes, the M/M/C queuing formulation can be used to determine how many patrol units should be assigned during each time period to achieve a stated desired level of service for the forecasted calls for service. The level of service is defined in terms of maximizing the sum of the number of calls, weighted by priority, which can be assigned to a patrol unit without delay.
- c. The queuing procedure can be used to vary the number of patrol units available during a time period so as to determine the effect of adding or subtracting a unit on the level of service.

#### 7. Discussion

The paper establishes a measure by which alternative manpower schedules can be evaluated and offers for the first time a means of determining the marginal value of a patrol unit in terms of this measure. The level of service to be attained is left to the individual department and can vary depending on circumstances, e. g. the number of vehicles available for patrol. Thus, a department can state that it wants to service x% of calls without delay and determine how many units required by each district to attain this level. There is some question as to whether the specific number of required units should be fielded without further adjustment.

For example, no concern is given for response time as the methodology assumes that any available unit can respond to any call and thus the measure does not differentiate between a distant car vs. a closer car being assigned to a call. Also, no consideration is given to in or out of beat assignments and the amount of preventive patrol available. Operational problems need to also be considered in that the establishing of priorities requires that the dispatcher stack calls, but makes sure that low priority calls are eventually taken and not delayed beyond departmental regulations. As the measure is a function of the weights given to the priority of each call, some experimentation is required to establish what should be the proper weights.

In sum, this is a pioneering research report and should be reviewed in that light. The methodology described has since been implemented and this aspect is reported in other reviews of this section.

POLICY TOPIC: Resource Allocation

TITLE: A Mathematical Model for Prediction of Police Patrol Workload

AUTHOR: J. Thomas McEwen

PUBLISHER: St. Louis, Missouri Police Department  
St. Louis, Missouri

VOL./NO.:

DATE: 1968

NO. PAGES: 31

ABSTRACT:

In this paper a mathematical model which presently provides the management of the St. Louis Police Department with predictions of future workload in their various patrol areas is presented. In addition, queuing tables are being produced and used in planning operations. Based on predictions, these tables give an indication of the distribution of calls delayed if varying numbers of patrol units are available. Thus, a police department can state a measure of service in terms of desired level of calls delayed, i. e. no patrol unit available to assign a call, and determine the number of patrol units to field to achieve that level. No validation or operational considerations are discussed. The model assumes that the factors which influence the number of calls for service change slowly over a period of time. The prediction process is accomplished by maintaining distributions of calls over the hours of the week and the weeks of the year, and using this information in conjunction with exponentially smoothed averages on geographic subdivisions of the city. The procedure requires a detailed calls for service data base.

INTERNAL VALIDITY EVALUATION  
A Mathematical Model for Prediction  
Of Police Patrol Workload

J. Thomas McEwen  
1968

1. Research Goals, Objectives, Policy Issues

This research reports on the use of exponential smoothing and queuing procedures to aid in the allocation of patrol manpower. It describes the implementation by the St. Louis Police Department (see review of research by R. F. Crowther). The approach evaluates different levels of manpower allocation by the criterion of delay in assigning a call for service, i. e. x% of calls can be assigned without delay. The objective of the research was to improve service, based on this measure, by implementing and testing a mathematical approach for projection of future workload and determining the number of patrol units required to reach a departmental service objective.

2. Face Validity Check

The author describes in some detail the mathematical approach taken and indicates that the necessary assumptions are not severe and that the approach appears to work for St. Louis, and, in fact, can be applied to other police departments. The author states that the predictions of future workload, i. e. calls for emergency service and the time

required to service these calls, has proven accurate enough to be employed in formulating patrol beats. The patrol beat problem usually assumes that we want to develop beats which have more or less the same workload. It is unclear how the results of that application can be applied to the one under consideration. A 10% deviation in beat workload might be acceptable for the beat problem, but could lead to a different result in manpower allocation. This research does not report on the accuracy of the predictions for manpower allocation or discusses the sensitivity of the results to errors.

We note that the technical approach does appear to work within the assumptions and objectives, but no experimental verification is given.

3. Methodology

The methodology of this research is described in the review of the paper by Crowther and thus, will not be repeated here. It is applied in this paper to produce a projection of calls for service, a corresponding workload and a set of tables which for each day of the week show (1) the level of service attained in relation to the number of units and in terms of the expected number of calls serviced without delay (assigned to some unit) by class of emergency, and (2) the service levels in relation to the number of units assigned for four-hour periods of a given day. These tables, which are the result of applying multi-service queuing procedures, aid police administrators in determining the worth of an

additional patrol unit in terms of percentage change of delayed calls. It should be clear that this measure of worth--expected number of calls which can be immediately assigned to a patrol unit--does not consider response time in and out of beat assignments and level of preventive patrol. However, it is notable that this and related research "bit the bullet" and stated a measureable objective for the service function of a police department.

#### 4. Data Requirements and Data Utilized

The use of the smoothing prediction and queuing procedures requires crime data by crime type and geographical area over time. The St. Louis Police Department developed a new set of geographic subdivisions by which the city is divided into 480 geographic areas of approximately 1/12 of a square mile each. The prediction system predicts crime level for each area for an entire week, adjusted for week-of-the-year seasonal characteristics, and then breaks the week's predictions by hour-of-the-week to adjust for daily characteristics. The necessary distributions to enable predictions by week-of-year, hour-of-week, and geography are obtained by studying historical data, and these distributions must be periodically adjusted based on more current data. This requires an information gathering, processing and analysis system which is not standard for most police departments.

#### 5. Experimental Design and Controls

The report does not indicate any validation of the theoretical model against actual operation. The approach appears to come up with reasonable projections, but no error analysis is given. Also, no information is given on how the queuing procedures actually worked and how the system was integrated into the operations of the department. The St. Louis procedure has been in use for a few years and adapted by computer manufacturers and software firms for use by other departments. This report and others dealing with this procedure do not offer any model validation or implementation discussions. Also, the use of percent of calls delayed as an appropriate measure for determining manning levels has not been evaluated.

#### 6. Results and Recommendations

This report does not state any specific recommendations, but implies that the procedure does work for the St. Louis Police Department and can be adopted by other departments. As noted above, other departments have used it. How the procedure is actually used is not reported, e.g. degree of accuracy, reliance of queuing results for manning, operational considerations.

#### 7. Discussion

This paper describes the approach taken by the St. Louis Police Department to apply previous work by Crowther (see review) for the



prediction of calls for service and the application of queuing procedures to determine manning levels to meet a specified service level for calls for service. The structure of the mathematical approach appears to be adequate and reasonable. However, as no experimental verification of the approach is offered and no operational considerations and problems reviewed, the report cannot be said to be internally valid. This early paper is typical in that regard in that although researchers with proper scientific background were involved, the police environment (their needs, funds and overall lack of scientific heritage) did not allow and/or cause the work to be pursued in the usual scientific mode. We can conclude, however, that the St. Louis approach could be an appropriate planning aid to many departments, but each department must validate for its operation. Again we emphasize the stringent data requirements.

POLICY TOPIC: Resource Allocation

TITLE: Law Enforcement Manpower Resource Allocation System (LEMRAS) Application Description Manual

AUTHOR: Anonymous

PUBLISHER: IBM Corporation, White Plains, New York

VOL./NO.: H20-0629-0

DATE: September 1969

NO. PAGES: 52

ABSTRACT:

LEMRAS is a set of commercially available computer programs designed to assist the law enforcement administrator to determine his manpower requirements for answering the public's calls for service. It requires geographic and time oriented input data and provides the police administrator with information concerning the projected average calls for service with corresponding average workloads on a near-term basis. It also develops tables which indicate the number of calls for service which can be assigned to a patrol unit without delay. This report describes the implementation of the St. Louis Police Department resource allocation efforts as described in this section (see works by Crowther, Heller, and McEwen). This manual reviews the need for improved methods of deploying and directing the police agencies' most expensive resource--manpower. The capabilities of the LEMRAS approach for achieving this improvement are described, including sample reports and suggestions as to the kinds of decisions which might be made on the basis of these reports. Attention is given to the requirements for implementing LEMRAS, including staffing, data capture and control, selection of event classes, and geographic coding. Cautions relating to certain limitations of the LEMRAS forecasting techniques are also outlined.

## INTERNAL VALIDITY EVALUATION

### Law Enforcement Manpower Resource Allocation System (LEMTRAS) Application Description Manual

Anonymous  
February 1969

This report is not typical of the research and other works included in this study as it represents a descriptive manual of computer programs available from a commercial computer firm. It is included here as the reviewers felt it is of value to the police community as these related computer programs are being used or have high potential of being used by many police departments. The Law Enforcement Manpower Resource Allocation System, here termed LEMTRAS, is basically the procedures developed and tested by the St. Louis Police Department. That material is reviewed in this section under the paper by McEwen. In what follows, we shall not review and discuss methodological points as related to internal validity (the reader is referred to the McEwen paper), but we shall describe briefly our views of the LEMTRAS material and role in law enforcement.

LEMTRAS represents an early effort to extend basic research in law enforcement to the general law enforcement market place. It is an unusual attempt in that past practices in law enforcement have been parochial in that each department felt that their situation was unique and different, and what worked for one department would not necessarily

work (even with suitable adjustments) in another department. (Witness that some departments use civilians and women for radio dispatchers, while others feel that a badge-carrying officer is a must for that job.) This situation has been alleviated somewhat, especially in the application of computer procedures to the administration and management of police departments. As most medium and large departments, 70% of cities over 100,000 population, and 23% of cities under 100,000 population<sup>1/</sup> have computers, their ability to manage all resources, especially, manpower, is greatly enhanced; and software firms and computer manufacturers have pursued this area with diligence. In particular, LEMTRAS, whose mathematical and computer concepts were evolved in the early 1960's and adapted by IBM in 1969, represents the first rather complex data analysis procedure designed for police departments which has the opportunity of being widely accepted and used. As such, we offer the following comments.

It should be made clear that the implementation of LEMTRAS requires a strong commitment to the development of a geographically oriented data-base which divides a city into small reporting blocks and relates each radio dispatched call for service to its origin block. This historical data file is necessary to project future calls for service and its implementation requires a computer, dollar and manpower resources on a continuing basis. Such geographic files are basic, not

<sup>1/</sup> Colton, K. W.: "Use of Computers by Police: Patterns of Success and Failure," Urban Data Service, Vol. 4, No. 4, April 1972.

only to LEMRAS, but to any rational procedure for administering and evaluating the patrol activity. It should be emphasized that LEMRAS is first a data-processing system and is only as good as the procedure for capturing the data. The LEMRAS historical files indicate exactly what type and how many calls for service originate in each reporting block, and this information can be summed to determine the beat and sector workloads. ( However, instead of a historical file (on a yearly basis) what is needed is a daily report of crime by reporting block by patrol unit responding. )

The other aspect of LEMRAS is its ability to project the level of crime by reporting block over the next period (week) of time and to translate this prediction into time required to service the calls and the number of patrol units required to service a specified percentage of calls without delay. Where the manual under review stresses the data processing requirements and indicates the above in a few tables, it is felt that LEMRAS' major contribution is its ability to develop decision-making information for police administrators. Based on the day and hourly projections, the police administrator can determine the marginal effect of adding or subtracting a patrol unit for the service percentage. The disutility of a patrol unit in repair can be measured, or the utility of buying new units or shifting units from low activity to high activity

shifts can be evaluated. The use of such information within police circles--where any decision-making data are rare indeed--has not been fully explained or emphasized.

There is a tendency to just implement the computer program and leave it to the data gatherers. LEMRAS-like systems to be of full value must be made part of the everyday thinking of police administrators. As final comments on LEMRAS we quote the following: <sup>1/</sup>

"Evaluation of Resource Allocation--It is difficult to evaluate fully the success of many of the resource allocation efforts. A number of variables are involved, both technical and behavioral, and in many cases it is still too early to tell. Critics are skeptical, but most departments still seem enthusiastic. For example, Kansas City has been working for over a year on a program of computer-aided deployment related to traffic enforcement. Between 1969 and 1970, with this program in action, the city experienced a 5% reduction in traffic accidents, even though there were fewer men on traffic patrol. The department did not claim that there was a direct correlation between selective enforcement and reduced accidents because of the difficulty of isolating causal relationships in such a case, but there were 'strong suspicions' that a correlation existed.

"However, resource allocation in traffic control is probably easier than allocation of manpower in the prevention of and response to crime.

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<sup>1/</sup> Ibid.

In the case of traffic control it is possible to isolate troublesome roads and corners and to saturate those areas at critical times. Further, it is easier to influence the type of enforcement which occurs. Police work in general is highly discretionary. Although instructions can be given from the top, the major part of law enforcement work is carried out by the 'man in the street.' The public's image of the police is based on whether a particular policeman responds rapidly and efficiently to a call and whether or not he writes that ticket. The police department is more likely to be able to determine and maintain a successful approach to traffic control than it is to establish a system in most areas of criminal apprehension or investigation. As a consequence, the use of computer analysis seems better suited to the allocation of resources for traffic enforcement than to other areas of law enforcement.

"Allocation of resources for criminal apprehension and patrol, for example, seems more difficult. For a start, it is often difficult to understand the relationship between the resources used and the effect which they have. Because so many factors influence the crime rate, it is very difficult to predict what influence an increase or decrease in the number of policemen in the field will have on crime prevention. As a consequence, it is by no means always easy to assess the impact of resource allocation efforts.

"Some of the experiments to date seem to have achieved less than had initially been hoped of them. In St. Louis, resource allocation efforts began around 1966, and in 1970 the city began using its city-wide deployment program. However, reactions and the actual impact on the department have been mixed. The precise distinction between cars for preventive patrol and cars responding to calls for service has been dropped.

"According to one source, it was discovered that policemen who were assigned to cars answering calls for service felt they should do only that, while those assigned to preventive patrol felt that their activities should be limited to patrol. When the work load demanded that preventive patrol cars should respond to calls, or vice versa, the men were dissatisfied. As a result, a compromise was evolved. Now a determination is made of the number of cars needed in a district to respond to calls. This number is allocated, and where possible extra cars are provided which can be used as the district commander desires (e.g., for preventive patrol). A precise distinction is no longer made between cars for patrol and cars for calls for service. In fact, the work load is often such that, in the busier districts at least all cars have to be utilized to respond to calls, patrolling on the side where possible. It was also discovered that when changes were suggested in the times of shifts, etc., there was strong resistance from patrolmen, thus



demonstrating that behavioral considerations are an important factor in implementing computerized resource allocation.

" Still, St. Louis continues to utilize the resource allocation program. Twice a year 'maps' outlining alternative and suggested beats for each shift are prepared by computer and distributed to each district. Whether these maps are used is a decentralized decision left to the district commander. (At one point control over implementation of the resource allocation program was centralized.) Attitudes toward the system vary. As one of the people who has been working on the project for some time has put it: 'Just tell me what you want to hear [good or bad] and I can take you there [someplace in the department] and you can hear it.' While several people in the department offered glowing reports, one district commander responded: 'Resource allocation? Oh, I thought we gave that up!'

" However, whether or not all details have been accepted, it is clear that the overall philosophy of resource allocation has caught on in the St. Louis police department. As one person put it: 'The big thing that they've accepted is a variable number of beats for a district,' depending on time of day, week, and year. The basic approach has become a fact and a way of life. This in itself is a major change from the early stages of the project and reflects the significant impact on the department.

" Some law enforcement people feel that the time may come when specific patrol beats will be discontinued. An officer reporting for duty will simply call in and be assigned to patrol or to answer calls in a particular area--an area which had been designated through the analysis of available information and the aid of computer technology. However, other law enforcement people feel strongly that such a move would be a backward step. To them it is important that the officer have a beat and get to know the residents on it. An entirely fluid or moving force would prevent, or at least hinder, the development of appropriate relationships between police and local citizens. The potential is there for the computer to have a depersonalizing effect on the law enforcement task.

" The resource allocation efforts to date in Los Angeles give some indication of the basic dilemma which can arise. The Los Angeles police department has been using the IBM package. LEMRAS (Law Enforcement Manpower Resource Allocation System), on an experimental basis in 1 division over the last few years. In this division the program is set so that 95% of incoming calls for service can be answered without delay. Other cars are assigned to preventive patrol. In one study of evaluation it was found that forecasts predicting the number of calls for service were 95.5% accurate. It was also found that 95.2% of the calls for service were answered without delay. Further, a comparison of crime statistics for arrests before and after the introduction of LEMRAS indicated an observable increase in efficiency.

" However, there were problems. Although response to some 95% of calls could be accomplished without delay, that figure was an average one, and for some people in the division it was not enough. Officers cited what they felt were too many occasions each day when backlogs of calls would occur, as a consequence of which citizens would have to long a wait for police service. It was felt that LEMRAS was too inflexible and did not consider enough variables in arriving at its predictions. Calls for services did not seem adequate as the primary determinant, and additional suggested factors included number of arrests, response to crimes observed by the police, station calls for administrative business, and other administrative duties (e.g. court attendance, which would make an officer unavailable for patrol).

" The main problem cited, though, was that LEMRAS sometimes conflicted with the Los Angeles police department's Basic Car Plan. The Basic Car Plan is a program under which one Basic Car is assigned to a geographic area. Enough men are allocated to the car to staff the vehicle 24 hours a day, and 1 officer is made responsible. This car is expected to spend 50% of its time working with the people in the area. The idea is to improve police-citizen relations and to build a trust and pride in law enforcement service.

" However, it was found in one rough survey in the division utilizing LEMRAS that the Basic Cars were responding to calls outside their area

about 30% of their time, thus making it almost impossible for them to spend half their time working with their local people. Although effective overall allocation was being provided (as illustrated by the statistics in response to calls for service cited above), for at least some of the men in the division the plan meant a decreased opportunity to work with people and a decreased emphasis on the sometimes forgotten human side of police work. The solution offered by a particular officer was to use LEMRAS but to set the program to respond to as close to 100% of calls without delay as possible. This would mean taking most, if not all, cars off preventive patrol and putting them into Basic Areas, thus allowing for smaller Basic Car beats and increased manpower to respond to calls.

" In conclusion then it should be clear that benefits and costs of computerized resource allocation are still mixed. The reality does not live up to all of the glowing reports which have been made. However, at a minimum, planning and deployment efforts have already done much to show that there are more ways of fighting crime than simply 'getting more men out on the street.' Naturally, most chiefs will continue to ask for more men and, in some cases, rightfully. However, this approach will be supplemented increasingly by the concept of achieving a better utilization of the men available. In fact, according to the International City Management Association survey, resource allocation and deployment was the area in which police felt that the computer had had the greatest effect to date.

" It must be borne in mind, however, that there is a difference between simply generating better data and providing real law enforcement payoffs. People are still the key in utilizing any information acquired. New techniques can be devised, but if people are unable to use them little change will occur. For example, a police officer in one of the cities visited felt that computers would really have little impact on decision making in his department--at least with the current administrators. 'They're used to making decisions based on their seat-of-the-pants judgment. Having a computer won't change that, not with these people.' Or, as another officer put it, the potential is there, but there are only a few police departments in the country that are really ready to put the computer to use in anything more than the provision of rapid retrieval of information."

POLICY TOPIC: Resource Allocation

TITLE: Patrol Manpower Allocation and Distribution

AUTHOR: Phillip S. Mitchell

PUBLISHER: Sheriff, San Diego County, California

VOL./NO.:

DATE: January 1972

NO. PAGES: 62

ABSTRACT:

This report describes the analysis and results developed during a seven month study of the manpower allocation and distribution procedures of the San Diego County Sheriff's Department. The study was initiated at the behest of the Sheriff in an attempt to apply some computer based techniques of manpower analysis to the Department's manpower problems. The study was intended to indicate the scope and extent of any disparities in manpower distribution over shift and beat. Recommendations based on statistical and mathematical analyses are made which would appear to decrease the disparities in manpower assignments over time. Also, recommendations are given for the establishment of a basic, but necessary information system which would produce management and operational data on a timely and continuing basis.

## INTERNAL VALIDITY EVALUATION

### Patrol Manpower Allocation and Distribution

Philip S. Mitchell  
January 1972

#### 1. Research Goals, Objectives, Policy Issues

This study was directed towards the development of more effective procedures for the allocation of patrol manpower, given a preliminary study which showed that average response times and the time required to service emergency calls for service vary considerably between patrol beats, and that the number of calls for each beat also showed wide variation. (The average response time was over 21 minutes and the average time at the scene was over 28 minutes.)

The objectives of the study were to perform:

- (a) An analysis of current data collection methods and procedures with respect to their usefulness in the decision process, as opposed to mere record keeping.
- (b) An analysis of current demand for services as exemplified by both the number of calls (incidents) recorded and the service time requirements for patrol units.
- (c) An analysis of the response and service time characteristics under the current manpower allocation scheme.

(d) An analysis of current manpower allocation procedures by both shift and beat with respect to the demands for service developed above, and the development of a more efficient manpower allocation scheme based on this analysis.

(e) An examination of future manpower needs based on current trends in the demand for law enforcement services.

The study addresses the key issues of police manpower allocation as viewed by the public (response and service characteristics) and a key issue of the patrol forces (equalizing the workload).

#### 2. Face Validity Check

This report typifies the basic statistical study which can be accomplished at low cost for almost all urban and suburban police departments. A basic set of incident data were gathered and analyzed in terms of response times, service times, number of incidents per beat, time distribution of incidents, manpower scheduling versus calls for service, etc. We submit that most departments could perform profitably similar studies which will give some validity to what are usually assumed to be manpower allocation inconsistencies and which will yield hard data to support recommendations and changes usually



considered, but not implemented, e.g. beat plan redesign and the matching of manpower to the level of calls for service over a day. The study makes certain recommendations based on simple statistical tests which involve a small data base. This point and related ones are discussed next in the methodology section.

### 3. Methodology

The basic analytical approach used in this study is straightforward statistical analysis. Averages of workload, travel times, etc. were found, along with associated standard deviations. In addition, frequency graphs and tables are used to good advantage in pointing out the discrepancies between the workloads as given by the data and actual beat manpower allocations. In addition, a mathematical program approach, designed to minimize the disparities between the number of men on duty and the number of calls received, was developed and results obtained based on the collected set of workload data. (The mathematical description was not supplied.) The data showed that there was a considerable relative oversupply of manpower in the early morning hours, with a resulting undersupply during the mid-morning hours. The mathematical model allocates manpower in a way which overcomes these disparities.

The author also makes recommendations for new beat plans, although his methodology is not stated. In terms of total manpower needs, a simple relationship is established which attempts to correlate the total number of cases cleared vs. total crimes per authorized deputy. San Diego County had been experiencing a low rate of crime clearances (21.5% in 1970) and a graphical view of the historical trends does show a correlation between total percent of cases cleared vs. crimes per authorized patrol deputy. It would have been more appropriate if the author investigated the correlation between crime types (e.g., street crimes, burglaries) and manpower in that patrol forces have varying degrees of effectiveness for certain crime types. Also, the relationship between detective force and certain crime types would have been of value. The author makes certain recommendations for manpower increases and observations between the clearance rate manpower which have not been established experimentally. However, these basic type of analyses can aid police administrators to obtain a more quantitative view of their force structure and thus, they should be encouraged, but the apparent results must be treated with caution and subjected to validation experiments.

### 4. Data Requirements and Data Utilized

The study used two sets of data. A one month record (February, 1971) of 5013 standard call cards, which contained the date and time of

call, the time of actual dispatch, geographic location, and the time service was completed, were analyzed by hand. These data were augmented by two months of data (March and April, 1971) and these 7,850 records included the preceding information, plus the time of arrival on the scene. Obviously, both sets of data are not consistent, but the author justified their being averaged due to the large number of total incidents. There was no independent evaluation to determine if the times given by the patrol unit (time of arrival and time to complete service) were accurate.

The author gives special mention to the difficulties in obtaining data in the format necessary to perform meaningful statistical analyses. Geographical (location) recording had to be initiated and a small sample of data had to be used as the data collection methods restricted the amount of analysis which could be performed. Studies of this sort should, of course, cover a much longer time period in order to take into account seasonal variations and to observe other time-dependent trends. The author makes a strong plea for the development of better and more complete data collection procedures which would both aid administrators in the day-to-day operations of a department, as well as aid the accomplishment of further analyses.

## 5. Experimental Design and Controls

As is the usual case in studies which are constrained by low cost and manpower (this was basically a one man, seven month study), this study did not contain any experimental design component. The author makes strong recommendations (see below) which are based only on statistical analyses of a small and restricted data sample, and reinforced by intuition, i. e. a more equitable workload and daily manpower distribution should yield better response and service characteristics. Local operational requirements, geographical and demographic conditions (e.g. highways and population served) must also enter into the total decision process. If a similar study was made on a randomly chosen medium-sized law enforcement agency, there is a high probability that similar discrepancies and recommendations would result. But without any experimental verification, we would, at this point in law enforcement research, hesitate to say that they will result in the hypothesized improvements.

## 6. Results and Recommendations

The basic results of this study demonstrated that the daily manpower allocation and beat workloads were not consistent with the rate and location of calls for service. New manpower allocations to minimize these disparities and beat structures were proposed. In

particular the manpower allocation by shift was shown to be "quite inefficient." Based on a comparison of incidents over time and the actual manpower shift allocations, the author proposed a different manpower loading which eliminated overlapping shifts. Although overlapping shifts allow for better manpower allocation, especially as the rate of incidents change in the early afternoon, they do require a stronger organizational and communications management, plus the ability have a fluctuating number of beats. It would seem that this added flexibility should not be ruled out based on the limited analysis of this study.

The author also makes a strong recommendation for the study of the possible use of the four day - 10 hour shift plan. It is unclear why it would be applicable.

The author makes a special plea for the development of a low cost, but effective information system which will collect, analyze and disseminate crime and related operational data on a daily and summary basis. We can only second this plea by noting that most law enforcement agencies do not have daily operational data (i. e. available the next day) which reflects where crime is occurring by beat and lower order geographic reporting blocks, workloads of patrol units, travel and service times, etc. How departments can manage their operations

without knowing who is doing what and where it is happening has been one of the unanswered questions of law enforcement research.

As noted earlier, the basic methodology and recommendations would be applicable to most departments. However, a more detailed data base, plus experimental verification must be included in such projects. It would be appropriate to follow-up this report (as well as most others) to determine how the results were received by the sheriff's office and if any of the recommendations were implemented; if yes, what were the results, and if no, why not.

#### 7. Discussion

We may classify this study as being the expected result produced by an operations research analyst who is let loose (with limited funds) to analyze the operational aspects of a police department. It involves basic data gathering, statistical analyses and interpretation of the implied results in terms of the analysts limited sphere of concern and basic recommendations for improvement, usually in the resource allocation area. Such studies are a necessary first component for getting law enforcement agencies involved in modern decision-making procedures. What is missing from such studies is the stronger commitment, both immediate and long term, in supporting personnel to make more detailed analyses, perform experimentation based on the results of the analyses, and refinement and broadening the areas of concern.

We cannot state that the study here is internally valid in that the recommendations made are based on a small sample of data, do not concern themselves with how the organization in question can implement the recommendations (bureaucratic and organizational concerns sometimes must override apparent strong analytical results), the study does not call for an evaluation or even an experimental trial. However, with caveats as to accepting recommendations from such limited studies without evaluating their full impact, we would hope that most law enforcement agencies would encourage similar, but continuing projects as part of their ongoing functions.

POLICY TOPIC: Resource Allocation

TITLE: Computerized Scheduling of Police Manpower:  
Methods and Conclusions

AUTHOR: Nelson B. Heller, et al.

PUBLISHER: Board of Commissioners, St. Louis Police Department,  
St. Louis, Missouri

VOL./NO.: Volume I

DATE: March 1973

NO. PAGES: 135

ABSTRACT:

This is the report of a project to develop computerized techniques for constructing work schedules for police officers. The research was divided into three components: (1) development of a computerized procedure for allocating police manpower by watch and day of the week in proportion to the demand for service (including procedures for allocating both on-duty and off-duty days); (2) development of computer programs for designing equitable work schedules which produce the desired distribution of on-duty and off-duty manpower, and which also incorporate a set of additional attributes tailored to the needs of the unit for which the schedule is being designed; and (3) development of procedures for day to day administration of the computer-designed schedules once implemented, including procedures for scheduling compensatory days off for overtime worked, and for minimizing the schedule's sensitivity to absences.

The report describes typical schedule situations and development of individual schedules which have been accepted and utilized by units of the St. Louis Police Department.



INTERNAL VALIDITY EVALUATION  
Computerized Scheduling of Police Manpower:

Methods and Conclusions

Nelson B. Heller, et al.  
March 1973

1. Research Goals, Objectives, Policy Issues

The objectives of this study were threefold--(1) development of a computerized procedure for allocating police manpower by watch and day of the week in proportion to the demand for service (including procedures for allocating both on-duty and off-duty days); (2) development of computer programs for designing equitable work schedules which produce the desired distribution of on-duty and off-duty manpower, and which incorporate a set of additional attributes tailored to the needs of the unit for which the schedule is being designed; and (3) development of procedures for day to day administration of the computer-designed schedules once implemented, including procedures for scheduling compensatory days off for overtime worked, and for minimizing the schedule's sensitivity to absences. Thus, this study is an attempt to develop and introduce mathematical scheduling procedures based on actual workload as an alternative to the almost universal employment of equal manning schedules on all watches (shifts).

2. Face Validity Check

This work is based on the mathematical procedures of project director's (Heller) Ph. D. thesis.<sup>1/</sup> It addresses the basic problem of manpower allocation in the police environment, i. e. how to schedule manpower based on historical workloads so as to assign a schedule to each officer which causes each officer to work a comparable work pattern with comparable workloads. The mathematical procedures are not given in this study, but they are based on the solution of a integer quadratic-programming problem. Volume II of this study contains evaluations of the project and a user's manual for the computer programs. The technique has been applied to units of the St. Louis Police Department (evidence technician and traffic safety units) and comparisons to previously developed manual schedules indicate that the computerized schedules have better attributes. The advantages of the new approach are: (1) an equalization of the workload per man over the watches of the week, easing the strain on officers during busy watches and reducing the boredom experienced on quiet watches; (2) a decreased sensitivity to absences, particularly on the busy watches. This permits the scheduling of vacations and other planned absences on any watch; and (3) faster police response times on busy watches and less wasted manpower on quiet watches.

This application of this type of advanced procedures to police manpower scheduling is a first and it appears to develop proper schedules.

<sup>1/</sup> J Heller, N.: "Proportional Rotating Schedules," Ph. D. Dissertation U. of Penn., Aug. 1969. Available from University Manufacturers, 300 N. Zeeb Rd. Ann Arbor, Mich. 48106 - order No. 70-7804.

It includes consideration of operational problems--absenteeism, compensatory time off, and implementation. However, it does not report on its application to the important calls-for-service patrol units.

### 3. Methodology

As noted, the mathematical description is not discussed in this volume, but the basic process follows and extends these lines of attack. An integer quadratic programming model is used to determine the manning levels and number of persons on recreation (days off) for each of the watches of the week. A cyclic graph model is then used to determine the lengths of and days of the week included in each recreation period. Finally, a numerical array, termed a separation matrix is used as the basis for a branch-and-bound optimization procedure for constructing the actual work schedule. The process allows for interaction with the police administrator and can account for most of the real-world constraints encountered in scheduling a 24-hour 7-day week. The final product is a set of proportional rotating schedules which assigns each officer to the same basic schedule. The only difference between the schedules for any two officers is that one officer is some number of weeks ahead of or behind the other in the schedule's basic watch rotation and recreation pattern. Thus, every officer has exactly the same pattern of work periods, watch changes, weekends off, etc., as every other officer.

### 4. Data Requirements and Data Utilized

The basic input to the process is a historical distribution of workload broken down by day of the week and watch. Here workload can be defined in any appropriate units, e.g. calls for service, number of accidents. The proportional rotating procedure develops schedules such that the manpower is proportional to the given historical workload by watch and by day of the week. For the units for which the procedure was applied to, as reported in the paper, the necessary data was readily available. Other data included desired characteristics of schedules, e.g. minimum length work period. There is some question as to how to interpret workload if the procedure is applied to the patrol forces.

### 5. Experimental Design and Controls

The approach did not involve any comparative analysis in terms of experimental design and controls. However, the computer-designed schedules were compared with previous manually-derived schedules and the former were deemed to be superior as measured by desired attributes, e.g. officers have same schedules only time-phased differently, length of work periods between days off. A survey of officers using the new schedules indicated a preference for them. As noted, proportional rotating schedules were accepted by units of the St. Louis Police Department.

## 6. Results and Recommendations

The authors state that their scheduling procedures represent the first known computerized schedule design system for police manpower in the U. S.; and the utility of the system rests on (1) its comprehensiveness, including the explicit control it permits of a schedule's important attributes, (2) the capability it gives a schedule designer to trade-off significant attributes against one another when design constraints will not permit simultaneous optimization of all of them, and (3) the rapidity with which schedules may be designed and revised, using the related computer programs. It appears as if the procedure is appropriate for the scheduling of some units of police departments, and does allow for real-world contingencies, e. g. sick leave, days of leave due to court appearances. However, its application to the development of schedules for a large group of patrol officers is unclear. Here the procedure must be integrated with beat assignments and rotation, and be able to react to problems inherent in operations concerning a large group of people. It is felt that the procedures given here should be investigated by other police departments in that it should aid them in routinizing many aspects of their manpower scheduling problem.

## 7. Discussion

This paper describes the application of mathematical scheduling procedures to the problem of scheduling police to watches. The mathematical structure is not described, but it has been embodied into a set of computer programs which do generate very acceptable individual office schedules for small units (20 men). These schedules are tailored to the characteristics desired by the unit commander. We can say that the approach is internally valid and it should be pursued by other departments. It is unclear as to how it can be used by the patrol division, although, if we consider a police district (precinct) and its allotment of men as a unit, the process should apply.

This work by the St. Louis Police Department is an example of pioneering basic research into police operations and as such should be reviewed and analyzed by all comparable police departments to determine its applicability. The programs and user manual are contained in Volume II.

The officers' moral aspects of determining more equitable manpower schedules needs to be stressed. The proportional scheduling discussed here can insure better workload leveling, weekend and recreation time splits, etc. and thus possibly increase the efficiency and effectiveness of the officer and the unit. We tend to assume police officers are super human and must respond to their job in a fashion

similar to the military in the time of war. This is, of course, unrealistic and efforts such as the one described here, even though its relationship to crime control appears to be tenuous, can contribute greatly to the overall law enforcement problem.

Volume II of this study (Evaluation and Program User's Manual) contains evaluative comments made by the staff of the fund granting agency, i. e. the National Institute of Law Enforcement and Criminal Justice. These comments are directed towards determining whether the project met its stated grant application objectives. The Institute concludes that they were met, but expressed the following:

1. Liaison between the technical staff and police officials was inadequate,
2. The need to schedule vacations, and
3. The difficulties associated with getting the department and line officers to accept the computerized approach.

The project was funded for a year at a cost of \$27,558. There were no additional funds to sustain the project and pursue its implementation in other units of the St. Louis Police Department, to perform an in depth evaluation of the process and its acceptability, or to insure that the completed work would be tested by other departments. This inability and indifference to sustaining such pioneering efforts is a failing of the grant process. It is one thing to hope "that

a pilot project, preferably in a police district, will be conducted in the near future, whether in St. Louis or elsewhere" (Vol. II). It is another thing to give impetus to such efforts by a stronger funding process.



POLICY TOPIC: Resource Allocation

TITLE: SUPERBEAT: A System for the Effective Distribution  
of Police Patrol Units

AUTHOR: S. B. Smith, et al.

PUBLISHER: Illinois Institute of Technology, Chicago, Illinois

VOL./NO.:

DATE: October 1973

NO. PAGES: 206

ABSTRACT:

This study represents an attempt to combine and extend research dealing with police manpower allocation and beat design and to develop operational computer procedures which can be implemented by medium-size cities at a low cost. The basic objective of SUPERBEAT is the deployment of patrol units to minimize response time. The initial development of SUPERBEAT was for the city of Aurora, Illinois and new patrol beats and manpower schedules produced by SUPERBEAT were implemented in Aurora on May 1, 1973. An evaluation of the first four months of operation was to begin in September, 1973. This was a fifteen month effort and is representative of the current state-of-the-art in mathematical and computer aids available in the general area of police manpower allocation. It is a first in that it encompasses the following items into an integrated system: statistical analysis of calls for service (CFS), forecasting of CFS, optimal scheduling of patrol manpower, semi-automatic designing of patrol beats, automatic plotting of beats, determination of fastest routes and travel times, analysis of response times as a function of manpower level, and the simulation of the urban configuration and patrol activity. This report describes the development and organization of SUPERBEAT and subsequent studies are to be made to evaluate its use and efficacy.

## INTERNAL VALIDITY EVALUATION

### SUPERBEAT: A System for the Effective Distribution of Police Patrol Units

S. B. Smith, et al.  
October 1973

#### 1. Research Goals, Objectives, Policy Issues

The purpose of this project was to develop a system which could be used to increase the effectiveness of urban police patrol forces. An integrated approach was taken for distributing patrol manpower and related equipment geographically and over time. The system was named SUPERBEAT: Scheduling Units of Patrol for Effective Response with Optimal Beats.

The project objectives were as follows:

- (1) To develop a generally applicable, computerized system which would:
  - (a) Analyze calls for service (CFS).
  - (b) Forecast future CFS.
  - (c) Schedule optimally patrol manpower and equipment.
  - (d) Design optimal or near optimal beats.
  - (e) Output beat designs automatically on a plotter.
- (2) To develop a computerized system for projecting performance as a function of manning strength as an aid in planning.
- (3) To implement the system in Aurora, Illinois for test and evaluation.

- (4) To develop a simulation model of police patrol which would provide the capability for research in alternative patrol strategies.

#### 2. Face Validity Check

The work of this report represents an extension and joining together of past research efforts so as to make these research efforts available to police departments in an operational context. As such, it is a proper representation and should be studied carefully by other police agencies considering the adoption of similar mathematical and computer-oriented systems.

The basic assumption for SUPERBEAT, as well as many similar studies, is that a proper measure of police effectiveness is response time. We feel that response time alone should not be the driving force in police operations and that response time has not been proven to be the main police criterion. The report notes that "response time has some strong advantages as a measure of effectiveness" as (1) the probability of arrest increases sharply as response time is reduced, (2) response time is easily measured, and (3) response time is policy sensitive. The first reason is based on a very limited study performed in 1966 for the President's Commission on Law Enforcement and Criminal Justice and much further validation of the relationship between response time

and arrest is need; response time is not easily measured as the reporting procedures are functions of the individual patrol units and there is some question as to the validity of the times obtained by having the patrol units report on themselves (few cities, if any, have reporting procedures which capture response times and special studies must be initiated); and although response time is policy sensitive, so are many other measures. Response time is an important measure to the person in distress and to the image of the department. Equalizing response time in all parts of the city may be appropriate, but certain high crime areas which have many face-to-face street crimes should probably have a better response factor than low-crime residential areas. This study chose to minimize average response time throughout the city in all time periods, subject to a constraint that maximum travel time will nowhere exceed a specified upper limit. This approach was taken as the minimizing of average response time would lead to heavy concentration of patrol units in heavy-crime areas and sparse deployment in low-crime areas. The authors claim that this could lead to unacceptably long response times for calls from low-crime areas and add to a rise in crime in these areas. There is no validation of the latter assumption.

The authors also feel that since SUPERBEAT reduces travel times in answering calls, preventive patrol time will be improved. However, as recent research (Kansas City study) has seriously questioned the need for preventive patrol, we should be concerned with improving patrol response in the absence of a requirement for preventive patrol.

### 3. Methodology

The authors of SUPERBEAT describe it in terms of an integrated data collection, statistical, and mathematical computer system. The mathematical assumptions are stated and verified, e.g. assumption that the number of calls for service received in a given time period follows a Poisson probability distribution. The procedure for forecasting the calls for service is based on seasonally adjusted exponential smoothing, a technique which has been verified by other research studies.

The main methodological contribution, besides the system integration feature of SUPERBEAT, is the development of a mixed-integer programming model for determining the number of personnel to assign to a week's shifts such that the total system response time is minimized, subject to a restrictions on manpower availability and that maximum travel time will not exceed a specified upper limit. The model assumes that the patrol units will be distributed throughout the city optimally (sic), that the calls occur uniformly over the city and throughout the shift, and that travel is according to rectangular paths at a constant rate of speed. These assumptions do not hold in the real world, but if we recognize that the solution given by the model represent planning information which is to be used by the administrator to make his final allocation, then the restrictive assumptions do not appear to be too severe. We note that the authors do not impose any such caveats as to the use of the model results. The response time for varying levels of manpower are

calculated by standard queuing procedures and these times are then used to develop the model's objective function. The model does not attempt to determine how many men are required to maintain a specified response time service level, but takes as input the total number available over a day (for Aurora this was 57) and allocates this total to a day's shifts so as to minimize the average response time. (Note that the St. Louis manpower allocation process determines the number of men required so that 85% of the calls are assigned without delay.) The SUPERBEAT model can, of course, determine the impact of adding or subtracting patrol personnel. The computer manpower allocation was put into operation (May 1, 1973) for a six month test. (The actual Aurora schedule was "nearly optimal.")

Based on the model, it was determined that with 65 men available for patrol during a day that the average response time would be 6.02 minutes; with 100 men it would reduce to 4.58 minutes, i. e. with a 54% increase in men, only a 24% decrease in time could be expected. There is no discussion as to what an acceptable response time figure should be, nor what it was in Aurora before the model solution was applied.

Part of SUPERBEAT includes a simulation model which can generate calls over a city defined by distinct points and which can be used to evaluate the manpower allocations and new beat configurations so as to evaluate their impact before field testing. (See section on simulation models for further discussion of this approach.) The study does not report on any simulation results.

#### 4. Data Requirements and Data Utilized

The study analyzed a full year of calls for service by type, location, time of day and week, service times; also, patrol unit average speed in Aurora was determined to be 20 m. p. h., and travel time between areas were calculated. The city was divided into 174 nodes or reporting blocks and the frequency of calls for service for each node, by priority and service times were determined. The Aurora data were keypunched from the usual radio log cards.

The data requirements for SUPERBEAT and their availability would support other needs of a police department. However, most departments do not have the data in ready form and they should be encouraged to develop a recording and processing system which would support administration and operation needs, as well as models like SUPERBEAT.

#### 5. Experimental Design and Controls

The authors note that an evaluation period has begun which will include before and after comparisons and analyses of response time, delays due to unavailability of a patrol unit, travel distances, travel times, out-of-beat assignments, and utilization of patrol units. It is unclear from this report what, if any, controls and experimental procedures have been adopted to insure that the validation is proper. This is especially critical in the area of response time changes.



A three month analysis of actual response times showed an overall time for all shifts to be 4.11 minutes, while the computer solutions were about 4.05 minutes. We would have hoped to see in this first report of SUPERBEAT a procedure and detailed baseline data to support a validation study. Such material should be an integral and initial part of similar projects.

#### 6. Results and Recommendations

The results of this study included a set of manpower allocation figures to be used in scheduling manpower to each of three shifts during a day. The project will continue to supply such data and we assume the Aurora Police Department will utilize them (or make explainable adjustments) over a four month test period. The impact and effectiveness of the program will be reported in a subsequent study.

The authors claim that SUPERBEAT could be applied to any city. Certainly, the basic concepts could be applied (and are being applied), but it is unclear as to how SUPERBEAT could be used for say Boston, Massachusetts. (Aurora has only 2,165 index crimes (1972) and 128 police personnel and a population of less than 100,000, and a yearly total of 35,000 calls for service.) The concept of SUPERBEAT is a fine one, but it must be fully tested and validated before claims are made that it can and should be used by other cities.

#### 7. Discussion

We can state that from the theoretical and applied points of view the paper cannot be said to be internally valid. It is an initial report of a study whose results were being implemented at the time the study was issued. Hopefully, proper experimental procedures will be applied to the continuing study to produce combined reports which are internally valid.

As noted above, we are disturbed at the broad claims made for SUPERBEAT without validation. The relationship of the law enforcement field to research is too tenuous to have it beclouded by unsubstantiated claims. Further, although not discussed above, the acronym SUPERBEAT brings forth an image of an optimum beat analysis procedure; while SUPERBEAT does enable the analyst to construct beats subject to constraints on resources and travel time, it does it in a nonoptimal, but acceptable fashion.

There is an assumption by researchers that systems like SUPERBEAT should be available and used by most cities and that their development should be encouraged. We submit that their efficacy has not been proven as yet and steps should be taken to demonstrate their value once and for all.

G. Patrol Operations - Patrol Beat Design

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## EXTERNAL VALIDITY EVALUATION

### Patrol Operations - Patrol Beat Design

Police patrol beat design problems are concerned with dividing a geographic area into a specified number of non-overlapping subareas, with each subarea generating a measurable workload for police services. Two aims of the design process are to equalize each unit's workload and to organize the beats in a manner that is consistent with acceptable patrol practices. The designing of patrol beats is the logical step that follows the solution of the resource allocation problem (see corresponding section), i.e., in resource allocation we determine the total number of patrol units to be fielded in a given time period, while the beat designs indicate the areas in which the units are to be assigned.

As evidenced by the papers reviewed in this section, the basic beat design problem can be solved successfully, and the solution is a valid application of mathematical and computerized procedures that are new to the police environment. Two basic methods have been proposed -- the transportation/heuristic approach adopted from previous research in Congressional redistricting (see the papers by Gass and Dean), and the integer-programming set-covering approach, also previously developed for political districting (see the papers by Heller et al.). Both methods require a completely defined geographically-oriented data base that

includes crime and demographic data. Without suitable testing, we cannot say which method produces superior beats. The integer-programming approach does allow for the inclusion of a number of constraints that would cause the beats to reflect certain design parameters more accurately than the transportation/heuristic method (see also the abstract by Bammi and Smith). However, it is not clear how refined a process is required to yield beats that are acceptable and superior to the present ad hoc procedures presently in use by most police departments.

Both methods produce, in general, more than one set of acceptable beat plans and it is left to the police planners to select the single set to implement. The papers by Campbell and Larson propose a queuing method by which sets of plans can be evaluated in terms of travel time, percentage of time a unit answers calls in and out of its beat, etc. In contrast, the papers by Heller et al. use a simulation model to perform this evaluation. Both evaluation procedures require more testing in order to determine how they can be best used for specific situations, e.g. the Campbell/Larson approach is computationally efficient for about a ten unit patrol division. We suggest that research into combining beat generation methods and evaluation procedures would result in a valuable planning tool for a police department. The research should include an interactive computer terminal, operated by a police planner, to determine how it could aid in the development of a man-machine procedure that combines the mathematical and experiential elements of beat design and selection.

The work reviewed in this section assumes that the problem of beat design is an important one in police operations. One would certainly believe that is the case as the patrol unit and its territory form the basic operational structure of just about all police departments. Indications are that police planners do consider it important (see discussion of survey results), but to our knowledge very little is really being done by departments to update and change their beats. (We know of one department that has been studying its out-of-balance beats for four years.) There are a number of reasons for this apparent lack of action, some of which require basic research for their resolution, and some of which deal with basic administrative and organizational problems. The changing of beats on a periodic, seasonal, daily, or shift basis requires a strong commitment and discipline by all elements of a police department. This is especially true for the dispatch activity, as well as each individual patrol unit. We need to know the trade-offs between a patrol unit's familiarity with a beat and the need to balance the beat workload and change the beats; we need to determine a proper measure of beat workload and beat compactness; we need to determine how often and when the beats should be changed; and how should beat size be related to response time and equity of response, i.e. should all parts of the city have the same response time. These points and questions have been with law enforcement planners ever since motorized patrol units and radios were standardized in the 1930's. They

will remain unanswered unless the work reviewed in this and other sections are subjected to the trials of scientific research methodology. To this end, we propose that cognizant organizations furnish funds by which a central analytical research group can attack such questions in a concerted manner. We envision a testing and service center, with appropriate computer facilities, that can be used by police departments to answer their specific beat design and related patrol problems, as well as being a center that can address the more basic problems related to police patrols. The center could develop an experimental, computerized city to test and evaluate new methods for police patrol using simulation and analytical procedures. The center could then make such results available and be instrumental for supplying technical assistance to a department for implementing the results of the center's and other organizations' research. It is imperative that the current body of knowledge, although limited in many respects, is coalesced into products and services for the law enforcement community.

Given that beat plans can be developed and selected for implementation, we need to conduct controlled field experiments to determine how these new plans change the operational characteristics of the patrol activity, i.e. even though analytical methodology exists for solving the beat design problem, we must always recognize that the ultimate proving ground for the results of such research is the field. There are numerous concerns related to controlled experimentation in law enforcement. These are discussed in the sections on evaluation and statistics, and in Section II.



POLICY TOPIC: Patrol Operations - Patrol Beat Design

TITLE: On the Division of Police Districts Into Patrol Beats

AUTHOR: Saul I. Gass

PUBLISHER: Proceedings--1968 ACM National Conference

VOL./NO.:

DATE: 1968

NO. PAGES: 25

ABSTRACT:

It is the purpose of this paper to bring appropriate problems within the law enforcement area to the attention of the analytical community of operations research and computer personnel and to describe an approach to solving one of these problems. In particular, the work discusses political redistricting by computer, and relates it to the problem of patrol beats. Computational results are given for a police district in Cleveland. Other problem areas of interest to scientific personnel are also described.

POLICY TOPIC: Patrol Operations - Patrol Beat Design

TITLE: A Preliminary Systems and Allocation Study in the  
Cleveland Police Department

AUTHOR: Burton V. Dean, et al.

PUBLISHER: School of Management, Case Western Reserve,  
Cleveland, Ohio

VOL. /NO.: Technical Memorandum No. 180

DATE: February 1970

NO. PAGES: 77

ABSTRACT:

This study develops a systems description of the information flows in the Cleveland Police Department relating to the Bureau of Operations. A suitable response and assignment queue is defined as a sequence involving the citizen waiting time from the observation of an incident to communication with police headquarters, a police dispatch queue, and a patrol assignment and report queue. A mathematical model for the allocation of patrol resources is developed so as to minimize an objective function based on patrol-response time and the values of different police services to the community. Recommendations for testing and implementation of the model within a single district, as well as suggestions for future projects, are presented.

INTERNAL VALIDITY EVALUATION

On the Division of Police Districts Into Patrol Beats

Saul I. Gass  
1968

A Preliminary Systems and Allocation Study  
Of the Cleveland Police Department

Burton V. Dean, et. al.  
February 1970

1. Research Goals, Objectives, Policy Issues

These papers are reviewed together as they study a similar problem as found in the Cleveland Police Department, that of developing beats with equal workload. The first paper limited its investigation to the adaptation of a mathematical procedure for developing Congressional districts to the police area, while the second paper studies an extension of that approach plus the development of a systems information description of the Department.

The papers have the basic objective of pointing out how operations research methodology appears to be applicable to some police problems and illustrates this assumption by specific applications.

2. Face Validity Check

Both these papers suffer from their cursory discussion of how specific methodology can be made operational in a police department.

However, the research encompassed is meant to be exploratory and the papers cannot really be subjected to an internal validity study. We include them here in order to discuss the methodology, results and recommendations and to make general comments.

### 3. Methodology

The problem framework is the division of an area (police district, precinct) into police beats such that each patrol unit can expect to have the same level of work. A key need is the measurement of work, which is still an open question. The Gass paper illustrates the mathematical procedure used for Congressional districting using a number of workload definitions which are functions of crime, population and area, and shows that the procedure does work in that acceptable beats are found, i. e. a number of beat plans for a district are given. The purpose here is not to find an optimal set of beat plans, but to give the police planner an automatic means of generating police beats under changing conditions and allowing the planner some flexibility in applying his intuition and experience. Both papers use Cleveland census tracts as crime is collected for these units. Such tracts are really too large and restrict the ability of the methodology to determine more equitable beats (see the discussion of the St. Louis procedure in this section).

Where the Gass procedure uses distances between tract centers to force compact and contiguous beats, the Dean procedure uses travel time between tracts and minimizes a function of time and weighted number of calls from service originating in each tract. Then developing a relationship between the minimum value and the number of beats in a district, a dynamic programming formulation is used to determine how a given number of patrol units should be assigned between districts. The method is partially illustrated for artificial and small examples. Associated with the Dean procedure is a need to weight a tract's number of calls for service by weight termed the average community value per service call. This weight is designed to aid in allowing the workload measure to differentiate between tracts with more serious crimes and those with less. The community values are to be obtained by the application of the Delphi method of forecasting. The Delphi method is also proposed as a way to determine the maximum number of patrolmen in a district.

### 4. Data Requirements and Data Utilized

Both studies require a geographic-oriented data base which divides the city into small crime reporting units. In addition, population, area, travel time, etc. data are required, and, as noted in other

discussions, this type of data file should be a requirement for all police departments.

The Gass study used 1966 actual crime data as recorded in the City of Cleveland police annual report and constructed sets of nine beats from District 2's 38 census tracts.

#### 5. Experimental Design and Controls

Both studies did not call for a research design which included the use of the results in a controlled test. The professed results are still further examples of methodology waiting to be proven. We note that the Gass paper was done as an independent study, not associated with the Cleveland Police Department; while the Dean study was a joint Cleveland Police Department and Case Western Reserve faculty and student project, done at no cost to the Department.

#### 6. Results and Recommendations

The Gass paper makes no specific recommendations as to the use of tested methodology, but indicates that further work is required to test out the concept of workload and to make the procedure operational within a department.

The Dean paper claims that its approach would be far superior to the current method, and other approaches considered by the project

team, that the model will provide the most effective means of fighting crime with present available police patrol, and that it is more realistic than previously reported models. There is no evidence put forth in this report to back up these statements. The approach, as reported, was not tested with any semblance of real data, and was not compared to the manual or other procedures. The authors do propose a cost-effective analysis of the implementation of their approach, but do not call for any field testing or comparisons.

#### 7. Discussion

We have in these papers a methodological approach which appears to appropriate for a critical police problem. Here, as well as in the other papers reviewed in this section, we have not seen any research design put forth which test and evaluate the methodology in an operational setting. We are concerned that such papers are viewed by the authors and the general public describing proven results just waiting to revolutionize the police world.

It is important that research personnel do investigate and publish their preliminary results, but care must be taken explicitly so that police personnel, untutored in their ability to interpret scientific reports, do not expect too much and become disenchanted with scientific personnel mucking about their precinct houses. More formal and experimental studies, with manpower and funds necessary to reach valid conclusions, are required.



POLICY TOPIC: Patrol Operations -- Patrol Beat Design

TITLE: Computer Design and Evaluation of Police  
Patrol Beats

AUTHOR: N. B. Heller, B. Phegley, J. Rother, K. Schmidt

PUBLISHER: St. Louis Metropolitan Police Department,  
St. Louis, Missouri

VOL. /NO.:

DATE: October 1970

NO. PAGES: 38

ABSTRACT:

Crime statistics and forecasts of called-for-service workload are suggested as input to a computer program which, using political districting techniques, partitions a police district's reporting areas into a specified number of beats. The design criteria include balanced workload and crimeload, compactness, and contiguity. A computer simulator, using actual time series data on the arrival and servicing of calls, is used to evaluate how well a given beat plan would have held up during the periods from which the data were collected. Output from the simulator includes the fraction of their total service time cars work in their own beats, overall readiness, and response delay. Design and evaluation are illustrated for a police district in St. Louis.

POLICY TOPIC: Patrol Operations - Patrol Beat Design

TITLE: Partitioning of Police Districts Into Optimal Patrol Beats Using a Political Districting Algorithm; Model Design and Validation

AUTHOR: N.B. Heller, R. E. Markland, J.A. Brockelmeyer

PUBLISHER: St. Louis Metropolitan Police Department,  
St. Louis, Missouri

VOL. /NO.:

DATE: October 1971

NO. PAGES: 29

ABSTRACT:

One very challenging and complex aspect of police resource allocation concerns the partitioning of police districts into patrol beats in such a way that police effectiveness is maximized, that beats are convenient to patrol, and that beats contain approximately equal shares of the workload. This paper summarizes the results of the study in which a computerized political districting algorithm has been employed to design police patrol beats, using input data provided by the St. Louis Metropolitan Police Department. The computerized model has been used to derive patrol beats which are optimally defined in terms of being compact, contiguous, and having a proportional amount of geographical area, crimeload, and workload. The model output is validated by comparing the computer designed patrol beats to the patrol beats which are presently computed manually, and by critically evaluating the computer designed patrol beats with respect to conflicts concerning street layouts, traffic patterns, and ease of patrol.

INTERNAL VALIDITY EVALUATION

Computer Design and Evaluation of Police Patrol Beats

N. B. Heller, B. Phegley, J. Rother, K. Schmidt  
October 1970

Partitioning of Police Districts Into Optimal Patrol Beat

Using a Political Districting Algorithm:

Model Design and Evaluation

N. B. Heller, R. E. Markland, J. A. Brockelmeyer  
October 1971

1. Research Goals, Objectives, Policy Issues

We review these two papers together as they relate to the same research results that were developed by the staff of the St. Louis Police Department. The research recognized the basic policy issue of developing police beats so that the workloads of the individual patrol units will be equalized (in some sense), while at the same time restricting the size and configuration of the beats so that the expected response time will be optimized (in some sense). Thus, the objective was to develop and test a mathematical and computer-oriented approach that would enable police planners to generate and evaluate alternative patrol beat geographical configurations.

## 2. Face Validity Check

These research reports are straightforward attempts to adapt methodological procedures developed in another context (here the division of a State into Congressional districts) to a comparable police problem. The authors define the basic police problem, review the standard manual way of constructing beats and previous research directed towards beat construction (some of which are described in this section), and relate their experiences in applying and evaluating a specific methodology to a St. Louis police district. We cannot say from the results of these preliminary studies that an automated process of beat development has been proven out and are as efficient and effective as manual methods based on heuristics and experience. However, it appears that the process described in these papers can produce acceptable beat patterns. There is still some basic research and development needs that have to be addressed, as noted below.

## 3. Methodology

The procedure used to divide a police district (precinct) into a given number of "equal" patrol beats is based on the work given in "Optimal Political Districting," by R. S. Garfinkel, Graduate School of Management, Report #6812, University of Rochester, New York, October, 1968.

The mathematical procedure is an integer-programming set-covering problem, subject to additional constraints. It is assumed that basic to good beat design (or political districting) are the requirements of compactness and contiguity. The computational procedure is designed to force beats not to be elongated nor split into parts. In addition, defining workload to be the time to service the forecasted crimes in a beat, an additional constraint is required so that resultant beats do not deviate widely from the desired average workload (if  $n$  is the number of patrol units to be placed in a district and  $T$  is the total time to service forecasted calls in the district, then the average workload is  $T/n$ ). A similar constraint is added for the area of a beat and forecasted number of calls for service. The tested procedure then determines all optimal beat plans, where optimal means minimized maximum deviation of any beat's workload from average and where each beat meets the contiguity, compactness, crimeload and area constraints. We note that compactness of a beat is measured by the number  $d^2/A$ , where  $d$  is the distance between the centers of the two reporting units in the beat which are furthest apart (a beat is formed by the joining together of smaller reporting units) and the  $A$  is the area of the beat. As this ratio increases the beat is said to be more compact. Although the beat generation process is founded on an analytical formulation and associated computational algorithm, there are still many areas in which experience

and heuristic forces influence the final outcome, e. g. the setting of the crimeload deviations.

The algorithm first generates all feasible beats, where feasibility indicates meeting the contiguity, compactness, and the other constraints noted above. The second step then determines sets of  $n$  feasible beats which cover (includes) each reporting unit exactly once and minimizes the maximum deviation of any beat's work from the average beat workload.

The design parameters such as compactness index, and acceptable deviations from average workload, crime load and area are set to reflect the preferences of the field commanders. The output is a set of beats, with each set meeting all of the constraints. A commander then has some flexibility in his selection of a beat plan to implement.

#### 4. Data Requirements and Data Utilized

As is the case for just about all analytical efforts dealing with police patrol operations, this methodology requires a detailed set of data. The area (city, district, precinct) to be divided into beats must be subdivided into crime reporting blocks or units. Some cities have done this using census tracts, but as smaller groupings of city blocks allow for more accurate analysis, other cities (e. g. St. Louis and Washington, D. C.) are now organized into appropriate small reporting

units. For St. Louis, this includes 490 units for which basic crime and demographic information is required. For each unit, we require the geographic coordinates of its center point, the area in square miles, a list of adjacent (contiguous) reporting units, the forecasted workload as measured by the total service time per shift by shift of the week, and the forecasted number of index crimes by shift of the week. The latter two items must be updated whenever new beats are to be developed. The gathering of the geographic data is a one time job, although it can take a bit of effort. However, this information is also basic to any viable operational information system for a police department and its use is thus multi-purpose.

#### 5. Experimental Design and Controls

The reported research was not designed to a formal experimental program and as such only limited statements can be made as to its validity and worth. This is true for most research conducted in the beat plan area. The methodology was "validated" by developing three sets of beats for three St. Louis police precinct (an 8, 10 and 12 patrol units) and comparing them to the comparable manually prepared plans. The comparison leads one to believe that the computer-generated plans tend to be much better. However, no field testing of these beats were reported. A second approach to validation, that of evaluating the beat



plans by a computer simulation of the operational environment (the section describing research in this area), is described. This approach produces much indicative information by which optimal beat plans can be compared against one another and to the current operational plans, e.g. information like the percent of the total number of calls to which cars responded that occurred in their beats. We submit that this approach to testing the plans should be taken prior to any field test, i.e. the simulation can enable the planner to make a more informed selection. We note that the second paper states that the new beats have been utilized by field commanders, but no discussion of operational results is given.

#### 6. Results and Recommendations

The authors rightly state that methodological and computer aids do exist which can aid police planners to develop beat plans which can be utilized in the field. This ability is especially important if a city wishes to use variable manpower allocation procedures (i.e. not field the same number of units during all shifts throughout the day, week and year). For a police department to develop such a capability, they must recognize that it requires a commitment to maintaining a complete geographical crime data base, a means of forecasting crime, a testing and evaluation procedure, and the involvement of field commanders who must interact with the developers and the computer system.

#### 7. Discussion

These papers represent a proper attempt to extend work developed in another context to similar application areas in the field of law enforcement. The methodological approach and associated analysis is straightforward and the results lead us to believe that the proposed approach can provide very acceptable beat plans under changing requirements. What is lacking here, as in the other studies reviewed in this section, is a study plan which includes actual field testing and comparisons to manually produced beats. It is only via such experimental evaluation studies that we can obtain a fuller understanding of the parameters required to produce acceptable beats and, even more important, to understand what are the characteristics of acceptable beats.

POLICY TOPIC: Patrol Operations - Patrol Beat Design

TITLE: A Spatially Distributed Queuing Model for Police  
Patrol Sector Design

AUTHOR: G. L. Campbell

PUBLISHER: Operations Research Center, M.I.T.,  
Cambridge, Massachusetts

VOL. / NO.: Technical Report No. 75

DATE: June 1972

NO. PAGES: 130

ABSTRACT:

A spatially distributed queuing model is formulated as an analytic tool for studying deployment and dispatching of police patrol forces at the district level. The two major uses of the model are the following: (1) an analytic tool used to investigate alternative methods of deploying and dispatching police patrol forces; and (2) a decision aid for patrol sector design which police planners can use to calculate measures of performance which are helpful in the evaluation of proposed alternative designs.

The model focuses on the two major activities of patrol forces that of preventive patrol and response to calls for police service. It incorporates the specific travel time characteristics and spatial distribution of calls for police service which occur in the district under consideration. Output of the model includes: average patrol car response time to all incidents, equity in distribution of response time within the district, workload balance among patrol units, and average number of dispatches that require each patrol car to leave its own sector.

The model is applied to three hypothetical districts. The effectiveness of utilizing incident location information in the dispatching process is analyzed. The trade-offs in response time vs. intersector dispatching for a simple system of overlapping sectors is studied.

A case study involving District 14 of the Boston Police Department is used to illustrate the use of the model as a decision aid in patrol sector design. Data are supplied by the Boston Police Department. The present sector configuration is compared with one alternative proposed by police personnel from District 14, and one alternative proposed by the author. Measures of system performance are calculated for each design. Because of the limited number of alternatives, it is recommended that additional designs should be analyzed prior to implementation.

POLICY TOPIC: Patrol Operations - Patrol Beat Design

TITLE: A Hypercube Queuing Model for Facility Location and Redistricting in Urban Emergency Services

AUTHOR: R. C. Larson

PUBLISHER: The New York City Rand Institute, New York, N.Y.

VOL. / NO.: WN-7959-HUD

DATE: August 1972

NO. PAGES: 52

ABSTRACT:

This Note proposes and develops a spatially distributed queuing model that can be useful in aiding administrators or urban emergency services to locate their vehicles and design response districts for their city. The proposed computationally efficient algorithms allow one to evaluate numerically the performance characteristics of systems having up to 12 emergency response units. This requires the formulation and solution of a set of simultaneous linear equations with up to 4096 unknowns.

The measures of performance computed analytically by the model include the following: region-wide mean travel time, workload imbalance, and fractions of dispatches that are interdistrict dispatches; workloads of each response unit; mean travel time to each geographical atom and to each district; mean travel time of each response unit; fraction of responses into each district that are interdistrict; fraction of responses of each response unit that are interdistrict. This mixture of performance measures allows one to focus simultaneously on several region-wide objectives while assuring that spatial inequities in the delivery of service are maintained at an acceptable minimum. The user has the option of assuming a zero-line capacity system, which effectively models the case in which "overflows" are treated by special reserve units (perhaps located outside the region of study), or an infinite-line capacity system, in which case delayed calls are handled in a first-come first-served manner by the regular units within the region.

Illustrative computational results using a PL/I program are presented for up to  $N = 12$  response units, and the method appears very feasible for even such large problems. A concluding section discusses promising extensions and generalizations.

INTERNAL VALIDITY EVALUATION

A Spatially Distributed Queuing Model

for Police Patrol Sector Design

G. L. Campbell  
June 1972

A Hypercube Queuing Model

For Facility Location and Redistricting

In Urban Emergency Services

R. C. Larson  
August 1972

1. Research Goals, Objectives, Policy Issues

We review both papers together as they represent extensions and application of the same methodology. The basic objective is the development of an analytical approach to the evaluation of alternative police patrol beats, as well as other emergency service districting designs. These works address the problem of how should a region be partitioned into areas of primary responsibility (beats) so as to best achieve some level or combination of levels of service? Their purpose is not design beats, but given a set of proposed beat plans, to define and calculate measures of effectiveness by which police planners can select a particular beat plan to implement. This analytical approach is contrasted to proposed simulation evaluations discussed in this and other sections.

## 2. Face Validity Check

The combined papers describe the details of a mathematical model which, based on standard queuing theory assumptions, leads to a probabilistic model for calculating a set of measures appropriate for evaluating and comparing proposed beat plans. The authors describe the need for further refinements and for imposing alternative, more realistic assumptions, and although they feel that their model is appropriate for use by police planners, caution its use without further testing and evaluation. We agree with the cautionary note, but raise the question of how detailed and precise must the model's assumptions be in order for the process to produce results that are accurate enough for planning and operational use. In particular, the model does not differentiate between the priorities of calls and related stacking of calls, a distinction which other evaluative procedures (simulation in particular) do consider.

The Campbell paper describes the model's use to evaluate a current 4-patrol unit beat plan versus alternative 6-patrol unit plans. The results are consistent with intuition. Of interest, is the ability of the model to compare alternative designs on the basis of equity of response time to various parts of the district.

## 3. Methodology

The basic methodology utilized in both papers is a finite-state continuous time Markov process whose steady-state probabilities are

determined from standard equations of detailed balance, i. e. the steady-state rate of transitions out of a state are equal to the steady-state transitions into the state. The model assumes that the underlying queuing elements, the calls for service and the servicing of the calls, fit the usual Poisson assumptions. The model extends the multi-server M/M/C queuing results by being able to keep track of each individual server (patrol unit) and calculate for each server the average workload (i. e. the fraction of time that the unit is busy on call-for-service assignments), the proportion of dispatches that a unit makes outside its sector, and the proportion of calls arriving in a sector that are answered by a car outside of the sector. Also calculated are the average travel time to all incidents; the average travel time to incidents in each area, where the areas are small crime reporting blocks; and workload imbalances.

The solution of the balance equations calls for an efficient algorithm as the related matrix for  $n = 10$  patrol units has over one million elements. Thus, computational and computer storage problems arise for relatively small beat plans. Campbell's paper describes successful solution of plans with six units, while Larson's modifications allow for solution for up to 11 units. However, as some city beat plans have twice as many units, e. g. Washington, D. C. with 22, the successful use of the hypercube queuing model would require a two segment solution in which the police division is arbitrarily split into two parts.



The methodology and its translation into a computer program is another example of how a rather complex tool can be successfully transferred from its theoretical domain to work on new applied problems.

#### 4. Data Requirements and Data Utilized

The model assumes the availability of a great deal of data, most of which is oriented to the geographic reporting units that comprise the city area, and is the same set of data which forms the basis for most studies of police patrol and operations. Thus we require a city to be divided into reporting areas; the number or percentage of calls which originate in each area; the (x, y) coordinates of each area and the average travel time between each area; the proportion of time each patrol unit is expected to spend in each area; the mean rate of calls for service; the mean service time of a call for service. Much of this information can be obtained from historical records, some calculated directly, while the rest is based on experience of the planners or fixed by assumption.

The Campbell study tested the model on hypothetical situations, plus beat plans for a Boston district comprised of 68 reporting areas. A full year of calls for service was used to determine appropriate rates, although the analysis contrasted different rates which reflect varying the workload. The actual beat plan (4-unit) was compared to two other plans (6-unit). The Larson extension of the model was tested out on simple hypothetical models, but for beat plans which utilize up to 11 units.

#### 5. Experimental Design and Controls

These studies are basically research reports and no attempt was made to formalize an experimental test of the results. The evaluation of the Boston district is encouraging, but until a plan is field tested under a controlled environment, we will not know how accurate the model reflects the real-world conditions. Such testing is a most difficult area in the analysis of police operations. But it is only by such testing will we be able to learn how to construct models which will be of value to police planners.

#### 6. Results and Recommendations

The authors are appropriately cautious in their recommendations and suggest that further effort must be devoted to the evaluation and implementation of the model. The results of the Boston study are encouraging, but are limited in their scope and no implementation or experimental field tests were conducted. The Campbell procedure appears to be efficient, in a computational sense, for evaluating districts which have up to six beats, while Larson's extension appears to be valid for up to 11 beats. The computer costs for evaluating a specific beat plan, exclusive of data preparation and processing, appear to be quite low.

The mathematics and its manifestation as a computer program are rather complex, but, given a tested and working model, a police

planner can use it without having to understand the mathematics. An interactive process is proposed with which the planner can make rapid changes and evaluations of new beat plans. However, for this approach, we suggest the investigation of combining the model under discussion with a procedure which actually produces sets of beat plans, as discussed in the other parts of this section. The Campbell/Larson discussion appears to rely on the police planner or analyst to hypothesize good beats and then subject them to evaluation by the hypercube model. As the beat plan generator model and the hypercube model use the same geographic and other data files, it would be appropriate to test out the concept of automatic beat plan generation and evaluation, subject to an overview and interactive changes by a police planner.

#### 7. Discussion

The hypercube model is a procedure for developing measures of effectiveness for evaluating and comparing police (and other emergency vehicle) beat plans. It is an analytical approach in that the measures can be solved for explicitly. This is contrasted to the use of a Monte Carlo simulation procedure that requires a series of computer runs in order to obtain estimates of the same values (see the section that describes simulation models). The simulation model requires the same data inputs as the hypercube model, but can introduce more realism into its

# CONTINUED

## 5 OF 10

evaluation, e.g. priorities and stacking of calls, administrative down time for patrol units. Simulation procedures have been used to test out beat plans, but it is unclear as to which approach will be best in that a whole range of data must be considered, e.g., cost per computer run, cost of implementation, computer availability, programming procedures, accuracy of results, etc. A computer program of the hypercube model should be fairly inexpensive to implement and use. Such a program should be tested further and, if appropriate, made available to other law enforcement agencies on a computer time-sharing basis or via an agency's computer services. Again we note that in order to use such a program, a strong commitment must be made to the continuing collection of the required data base and the maintenance of the data file.

In terms of internal validity, the Campbell paper does lead us to conclude that the model, although limited in its realism by restrictive assumptions, is a proper approach to resolving the question of beat plan selection. Further, field testing is required. We need to determine if this procedure can really aid the police planner, what are the complexities of implementation; and make actual comparisons of the computer measures of a beat plan versus comparable field collected measures for the same plan. The Larson paper is basically a technical extension that yields a more efficient computational procedure and thus makes the model more useful.

## H. Patrol Operations - Emergency Response

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## EXTERNAL VALIDITY EVALUATION

### Patrol Operations - Emergency Response

The area of police patrol operations that tends to attract the most interest from the analytically-oriented (operations) researcher is the process termed the police emergency response system. This process was first treated in some detail in the report of the Science and Technology Task Force of the President's Crime Commission (1967), and extensively discussed in the pioneering book "Urban Police Patrol Analysis," by R. C. Larson (1972). The police emergency response system involves five basic, interrelated elements: (1) the occurrence of an incident requiring a police response, (2) the detection of the incident, (3) the reporting of the incident to the police, (4) the processing of the incident information and the selection of a response by the police, and (5) the servicing of the incident by the police which could involve many activities, e.g. arrest, search, reports, etc.

There are a wide range of specific problem areas associated with each of these steps and many have been solved by analytical and advanced mathematical and computerized processes. (See Larson's book and the additional references in Appendix B.) In this section, we only discuss emergency response research dealing with the application of computer simulation procedures to command center and communications

aspects of the Los Angeles and St. Louis Police Departments, and the use of random patrol procedures as a way of scheduling preventive patrol activities.

The use of computers to simulate aspects of the emergency response system has been taken up by many researchers. This procedure appears to be one of the most promising means of affording researchers and police administrators a better understanding of the complexities and interactions of the activities that form the major function in the delivery of police services. To date, reports on these procedures have been either rather technical or descriptive, without much being reported as to how simulation procedures have actually aided a particular department. As we feel that we should emphasize here the research possibilities of computer simulation, we present, at the end of this section, a description of the general structure and use of simulation models extracted from a paper by Larson.

Even though elements of the emergency response system do admit to analytical descriptions of related research problems, many of which are amenable to solution, it is unclear at this data as to how this research has been of benefit to police departments. To clarify the efficacy of this research, we suggest that a formal reporting procedure be established that would indicate areas of success and failure, including backup documentation. Such a process would improve the ability of a department to determine if a procedure, developed elsewhere, would be of value to

the department's related problem area. This type of clearinghouse (possibly run in conjunction with the Department of Justice National Criminal Justice Reference Service) would be an invaluable source to both police administrators and researchers.

In the internal reviews of the papers by Bennett and DuBois, Elliott, and Rosenshine, we noted a research requirement to establish a firm understanding of the relationship between response time and arrest and clearance rates, response time and crime levels, and to determine how (or if) response time should vary by crime and location. A great deal of resources are spent to maintain (at least theoretically) a certain response time by a police department. Given a clearer understanding of the impact of response time, we might find that we can be more efficient with our police resources and increase police productivity.

As noted in the external validity evaluation of the Patrol Beat Design section, there is a need for a research center at which new police research methodologies and processes can be developed, tested and evaluated. To accomplish its main task, i. e. evaluating new ideas prior to actual field testing, such a center would need to develop a simulation model of a generic city. To indicate how such a simulation model would be used and to emphasize the importance of this research tool, we next present a description of police simulation models due to Larson.

## A Simulation of Urban Police Patrol and Dispatching<sup>1/</sup>

In the following paragraphs we describe a simulation model of police patrol and dispatching. It was developed under NSF support at MIT several years ago and now is being implemented in several police departments in the United States and Canada.

The simulation model is constructed to allow users to replicate to a very great extent the actual dispatch and patrol operations of most urban police departments. It provides thereby a tool to assist in answering a wide range of allocation questions. Police administrators should find simulation models valuable for the following purposes:

- They facilitate detailed investigations of operations throughout the city (or part of the city).
- They provide a consistent framework for estimating the value of new technologies.
- They serve as training tools to increase awareness of the system interactions and consequences resulting from everyday policy decisions.
- They suggest new criteria for monitoring and evaluating actual operating systems.

Overall Model Structure--This section outlines the structure of the model; the simulation works in the following way. Incidents are generated throughout the city and distributed randomly in time and space according to observed statistical patterns. Each incident has an associated priority number, the lower numbers designating the more important incidents. For instance, a

<sup>1/</sup> "Resource Allocation in Public Safety Services," R. C. Larson, Report No. JR-05-74, Operations Research Center, MIT, Cambridge, Massachusetts, May 1974.

Priority 1 incident would be officer-in-trouble, felony-in-progress or seriously injured person; a priority 4 incident could be open fire hydrant, lock-out or parking violation. As each incident becomes known, an attempt is made to assign (dispatch) a patrol unit to the scene of the incident. In attempting this assignment, the computer is programmed to duplicate as closely as possible the decision-making logic of an actual police dispatcher. In certain cases this assignment cannot be performed because the congestion level of the force is too high; then, the incident report (which might in actuality be a complaint ticket) joins a queue of waiting reports. The queue is depleted as patrol units become available.

The model is designed to study two general classes of administrative policies -- the patrol deployment strategy, and the dispatch and reassignment policy.

The patrol deployment strategy determines the total number of patrol units, whether units are assigned to nonoverlapping sectors, which sectors constitute a geographical command and which areas are more heavily patrolled than others. The dispatch and reassignment policy specifies the set of decision rules the dispatcher follows when attempting to assign a patrol unit to a reported incident. Included in the dispatch policy are the priority structure, rules about cross-precinct dispatching, the queue discipline and so forth.

The model tabulates several important measures of operational effectiveness. These include statistics on dispatcher queue length, patrol travel

times, amount of preventive patrol, workloads of individual patrol units, the amount of intersector dispatches, and others.

The simulation program is organized to reflect the spatial relationships inherent in patrol operations, as well as the sequential time nature of events which is common to all simulations. First, the spatial or geographical structure is discussed, then, the time sequence of events.

Geographical Structure -- The city, of arbitrary shape, is partitioned into a set of "geographical atoms." Each atom is a polygon of arbitrary shape and size. The atoms are sufficiently small so that any probability density function can be considered uniform over the atom. Such functions depict, for instance, the positions of reported incidents. This partitioning does not restrict accuracy of results, because the atoms can be arbitrarily small.

A patrol unit's sector is a collection of atoms. The atoms in the collection need not be contiguous (spatially) or consecutive (in the numerical ordering of atoms). In general, each atom may belong to any number of patrol sectors, which are overlapping.

A patrol command (for instance, precinct, district, or division) is also a collection of atoms. Each sector must be fully contained within a command

Time Sequence of Events -- The simulation is an event-paced model. That is, once a certain set of operations associated with one event is completed, the program determines the next event that occurs and updates a

simulation clock by adding, to the present time, the time until the next event. The program then proceeds with the set of operations associated with that event. Once the clock reaches some maximum time ( $T_{max}$ ), the simulation is terminated and summary statistics are tabulated and printed. One completed run of the simulation entails inputting data, initializing simulation status variables, executing the program for an equivalent time  $T_{max}$  and printing the summary statistics.

The details of the various dispatching algorithms or patrol deployment policies are not included here. But a brief discussion of the important parameters at each point in the simulation is provided.

The main type of event that occurs is a reported incident or a "call for police service". The times of occurrence of calls are generated as in a Poisson process with rate parameter LAMBDA (equal to the average number of calls per hour). The greater the value of LAMBDA, the more likely it is that the system will incur congestion (saturation) of resources. The location of the call is determined from historical patterns which indicate the fraction of calls that originate from each atom; given the atom of the call is determined from historical data which may vary by atom.

Once the position and priority of the incident are known, the program executes a DISPATCH algorithm, which attempts to assign a patrol unit to the incident. This algorithm is governed by the dispatch policy specified by the user. One component of the dispatch policy specifies the geographical area from which a unit may be dispatched:

OPTION 1: Only assign a unit whose patrol sector includes the geographical atom containing the incident (a sector policy).

OPTION 2: Only assign a unit whose precinct or district designation is the same as that of the incident (a precinct or district policy).

OPTION 3: Only assign a unit whose division designation is the same as that of the incident (a division policy). A division consists of several precincts of districts.

The particular option on a given run usually is specified at the start of the run, although the user may alter the dispatch policy during the course of a run.

Given that a patrol unit is within the correct geographical area for a particular incident, the algorithm then determines whether the unit is considered eligible for dispatch to this incident. This determination focuses on estimated travel time to the incident, the priority of the incident and the current activity of the patrol unit. In general, the user may specify a dispatch policy that allows very important incidents to preempt (interrupt) patrol units servicing incidents of lesser importance. In addition, the importance of preventive patrol may vary with each unit, thereby giving the user the capability of assuring at least some minimal level of continuous preventive patrol.



If no unit is found eligible for dispatch, the reported incident is inserted at the end of a queue of other unserved incidents. There may be separate queues for each command and each priority level.

If at least one unit satisfies the eligibility conditions, it is selected for dispatch according to a prespecified criterion such as minimal expected travel time. The assigned unit's priority status and position are changed accordingly.

A second major type of event occurs when a patrol unit completes servicing an incident. A REASSIGNMENT algorithm then is executed that either reassigns the returning unit to an unserved incident or returns the unit to preventive patrol. The eligibility conditions regarding priorities, travel distances, and geographical areas are necessary to specify a dispatch policy. They also constitute an integral part of the reassignment policy. In addition, it is necessary to specify how one unserved incident is given preference over another. This part of the reassignment policy, called the reassignment preference policy, parallels the queue discipline in ordinary queuing systems.

Location Estimation--If not all available position information is used or if the unit is performing preventive patrol, the method of estimation of patrol unit position must be specified. Three options are available. One simulates the information provided by an automatic car locator system. The other two simulate estimation guessing procedures that are commonly found today in most police operations.

Simulation Variables--The simulation program can tabulate statistics on any algebraically defined variable. The variables that have been recorded most often are:

- Total time required to service an incident, that is, travel time plus time at the scene.
- Workload of each patrol unit, measured in total job assignments and in time spent on jobs.
- Fraction of services preempted.
- Amount of preventive patrol.
- Travel time of a unit to reach the scene of the incident.
- Dispatcher queue length.
- Dispatcher queue wait.
- The number of intersector dispatches.
- The fraction of dispatcher and/or reassignment decisions for which the car position was estimated, rather than known exactly.
- The fraction of dispatch decisions which were nonoptimal, in the sense that there was at least one available unit closer to the scene of the incident.
- The extra distance traveled as the result of a nonoptimal dispatch assignment.

At the time of this writing (January 1974), the simulation model described above and several other models are being implemented or are planned for implementation in the following cities: Boston; New York; Washington, D. C.; Quincy, Massachusetts; Newark, New Jersey; Cambridge, Massachusetts; and Lowell, Massachusetts.

The work with Boston, Cambridge and Quincy focuses primarily on various analytical models for sector design, dispatch selections, and preventive patrol allocation. The remainder of the implementation work, supported by various other agencies, utilizes the simulation model described above and, in one case, a resource allocation algorithm. The abstracts of this section describe some of these simulation activities.

POLICY TOPIC: Patrol Operations - Emergency Response

TITLE: Random Patrol

AUTHOR: J. F. Elliott

PUBLISHER: General Electric, Electronics Laboratory  
Syracuse, New York

VOL. /NO.: R67ELS-77

DATE: September 1967

NO. PAGES: 12

ABSTRACT:

This paper is intended to present the theory of random patrol so that it can be applied directly by police administrators to specific police problems. It seeks to determine a patrol force size which will insure a given probability of immediately apprehending the perpetrator of a crime that takes place at a accessible location. When these conditions have been made clear, a police administrator can place a definite dollar value on the cost of controlling crime, at a given level, by means of a patrol force. As an example of the application of the Random Patrol, the theory is applied to the burglary problem. The theory is used to design (1) a patrol that would minimize the cost of burglaries to a city, and (2) a patrol force whose cost is not greater than the dollar loss in goods due to burglaries.

POLICY TOPIC: Patrol Operations - Emergency Response

TITLE: Contributions to a Theory of Patrol Scheduling

AUTHOR: Matthew Rosenshine

PUBLISHER: Operational Research Quarterly, Great Britain

VOL./NO.: Vol. 21, No. 1

DATE: 1970

NO. PAGES: 7

ABSTRACT:

The problem considered in this paper is that of scheduling police patrols in a random pattern. This involves generating patrol routes as well as schedules for dispatching patrol vehicles. A solution to this problem is obtained by specifying minimum average patrol requirements on each route segment in a network and then developing a procedure which meets these requirements while minimizing the total patrol effort. Introducing vehicles into the network in a Poisson stream results in Poisson streams in each route segment and so ensures that an observer cannot use previous history for predicting arrival patterns. This solution also has the property that the number of patrol cars in the network is a Poisson random variable for which the steady-state can be achieved immediately. The steady-state distribution function is also used to determine the number of patrol cars required.

POLICY TOPIC: Patrol Operations - Emergency Response

TITLE: Scheduling and Routing of Random Police Patrols

AUTHOR: Matthew Rosenshine

PUBLISHER: The Pennsylvania State University  
University Park, Pennsylvania

VOL./NO.:

DATE: December 1971

NO. PAGES: 16

ABSTRACT:

This paper is intended to demonstrate a method of scheduling and routing police patrol units so as to achieve random patrol. It is also shown that while some of its requirements are somewhat unrealistic, random patrol can be obtained nonetheless.

## INTERNAL VALIDITY EVALUATION

Random Patrol

J. F. Elliott  
September 1967

Contributions to a Theory of Patrol Scheduling

Matthew Rosenshine  
1970

Scheduling and Routing of Random Police Patrols

Matthew Rosenshine  
December 1971

### 1. Research Goals, Objectives, and Policy Issues

These three papers address the goals of crime repression and offender apprehension by means of deploying, scheduling and routing a force of police units for the purpose of preventive patrol. The studies by Rosenshine are concerned with the scheduling and routing of patrol so that randomness may be achieved. J. Elliott's work is an attempt to answer the question, "Given random patrol, how many police units should be deployed?". The policy issue is thus the allocation of resources to patrol operations and the means to make the allocated resources effective in repressing crime and apprehending offenders. Both authors assume that random patrol (usually named preventive patrol) plays a vital role in reducing the overall crime level.

### 2. Face Validity Check

The fundamental hypothesis that preventive patrol reduces crime is part of the folklore of police operations. There have been no studies which have conclusively demonstrated either the utility or disutility of preventive patrol.

As formulated in Elliott's paper the goal of justifying a level of patrol in terms of minimizing the combined cost of burglary and patrol appears false. A check using data for the District of Columbia shows that but 5 patrol units would be justified. The current deployment in Washington, D. C. is 138 dispatchable patrol units, plus numerous special units.

Rosenshine's rather elaborate mechanism designed to assure that patrol be "as random as possible" makes an implicit and rather dubious assumption that police units devote full time to patrol, taking time neither to handle emergency calls-for-service nor to take breaks. A great degree of randomness is probably not necessary in any case. As long as the effort to predict the next pass of a police unit is sufficiently difficult, any routing will suffice. Indeed, given the complex set of tasks that patrol units perform, prediction appears to be impossible. In other words, the random nature of call-for-service arrival times and the dispatching of police units to events an appreciable distance from their current location would appear to ensure sufficient randomness of movement to thwart prediction of patrol routing. Hence, before implementing sophisticated



and cumbersome procedures to ensure random patrol, it would be sensible to ascertain whether or not the usual procedures are adequate.

### 3. Methodology

Both of these papers represent analytical studies. Rosenshine's work is illustrated by a hypothetical example, while Elliott supports and explains his methods using data from Syracuse, New York.

Irregularity of patrol schedules will for a given patrol rate increase the awareness of the general population that patrol is taking place, and

Randomness of the patrol schedule will discourage the potential criminal who wants to but cannot assure himself that he will not be detected by a patrol car.

From this basis, it is concluded that patrol should be "as random as possible." As noted above, the inference is dubious. Granted this reasoning, however, Rosenshine proceeds to develop a network flow formulation whose solution is shown to provide scheduling and routing for random patrol.

Elliott, assuming that patrol is "as random as possible," presents Koopman's theory of random search in the context of police patrol. When tested against data from Syracuse, New York and Los Angeles, California, the theory cannot be verified with precision though it appears to be correct within an order of magnitude.

Assuming that Koopman's theory is in fact applicable, Elliott uses it to derive a formula expressing the total cost of burglaries per night,

including the cost of random patrol designed to apprehend burglars at the scene of the crime. By counting the full cost of patrol, without giving credit for other functions the patrol serves (besides burglary prevention) the formula must of necessity understate the desired number of police units.

### 4. Data Requirements and Data Utilized

Rosenshine's patrol randomization scheme requires an excessive amount of detailed data for full implementation. For each street segment, the connecting segments and the required flow must be specified. The data requirement is excessive in that for an average large city such as Washington, D. C. one must set up a network of approximately 5,000 nodes and 16,000 arcs. The author has confined himself to a hypothetical example of 18 nodes and 27 arcs.

Elliott's formula requires data of more modest proportions, principally the costs of patrol and burglary, and some operational data such as the velocity of patrol vehicles, miles of road, and the time during which a burglar is visible to patrolling police units. The formula is rather sensitive to the velocity and time components which cannot be accurately measured. Thus if the visibility time changes from 3 to 5 minutes, while patrol velocity increases from 10 to 15 minutes, the desired D. C. patrol force changes from 0 to 7.

5. Experimental Design and Controls

These two studies are both analytic in nature and no attempts appear to have been made to test the results by means of experimentation.

6. Results and Recommendations

The primary result of Elliott's paper is the tentative conclusion that Koopman's theory of random area search is correct to within at least an order of magnitude. The prime thrust of Koopman's work appears to have been neglected, however. Koopman's results indicate that given the size of the deployed patrol force, search should not be uniform over the area of interest and that the allocation of patrol across the area does not increase in proportion to the crime level. The other conclusion drawn by Elliott, i. e. the optimal size of the patrol force, is derived under restrictions which are too narrow to yield implementable information.

Rosenshine demonstrates that random patrol is theoretically possible and that it can be effectively obtained, in particular by the network formulation he proposes.

7. Discussion

In assessing the internal validity of analytic studies such as Elliott's and Rosenshine's, a modified standard must be applied. Certainly, one must expect the analysis to be correct, but additional questions must be faced: are the assumptions valid and are the results realizable?

Both Elliott and Rosenshine make assumptions which, while they cannot be readily verified, do appear reasonable in terms of a preliminary investigation of the problems posed. However, serious reservations must be raised with respect to realizability. Rosenshine's patrol randomization scheme seems too cumbersome and too complicated to warrant field experimentation. Before embarking on a massive project to assure that preventive patrol is "as random as possible," one should attempt to determine the degree of randomness that is required in order to achieve the goals of preventive patrol. Perhaps a campaign amongst patrol officers to constantly vary their routes and schedules would show greater cost-effectiveness.

Elliott's study is too limited in its approach. His formulas do show that preventive patrol, at least at the level conducted by most police departments, must be justified on bases other than the minimization of the cost of burglary.

POLICY TOPIC: Patrol Operations - Emergency Response

TITLE: Los Angeles Police Department Operations Simulation

AUTHOR: David L. Bussard

PUBLISHER: Fourth Annual Symposium on the Applications of  
Computers to the Problems of Urban Society  
(Association for Computing Machinery)

VOL./NO.:

DATE: October 24, 1969

NO. PAGES: 34

ABSTRACT:

This paper describes a digital computer Monte Carlo simulation of the environmental inputs and system operation of the Los Angeles Police Department Parker Center and its associated divisions. The simulation has been produced for determining system response, for system evaluation, and as an aid in the design of the planned Los Angeles Emergency Command Control and Communication System. As examples of the simulation's capabilities, it has been used to determine the sensitivity of LAPD responses to many no response calls, resulting from a sonic boom, to various environmental input rates, and to different patrol unit speeds. Simulated system performance outputs include time series of important system state parameters, such as queue lengths, and for an observe time following a transient fill time, mean and maximum utilizations of human operators, equipment, radio frequencies, and patrol units; queue delay time distributions; mean and maximum queue lengths; the distribution of patrol unit travel distances to incidents; patrol unit travel times for incidents of each priority; and the number of patrol units from each division assigned to incidents occurring in each division.

## INTERNAL VALIDITY EVALUATION

### Los Angeles Police Department Operations Simulation

David L. Bussard

October 24, 1969

#### 1. Research Goals, Objectives, Policy Issues

This simulation has been produced, according to the author, for:

- determining system response,
- system evaluation, and
- aiding in the design of the planned Los Angeles Emergency Command Control and Communication System.

In view of the emphasis of detail, the model's primary goal concerns departmental operations, i. e. the cost-effectiveness of the planned system. The author states that the simulation is not sufficiently realistic in modelling areas other than the communication center to allow broader conclusions to be drawn from simulation experiments.

#### 2. Face Validity Check

Even though at the end of the study report some of the proper caveats are stated, the bulk of the report vacillates between the stated goals which can be met: to aid in the design of the planned control center, and the author's evident desire to investigate patrol operations. Assuming that the simulation model's detail emphasis reflects the accurate portrayal of control center operations as presented in the study, the simulation

results may be assumed to be valid. However, due to the specificity of the configuration assumed, little of general import beyond the L. A. F. D. can be inferred. Indeed, the results of these investigations are not reported in detail.

Patrol operations are unfortunately inadequately modelled. The geography of each police division is approximated by a rectangle, and beats are semiautomatically generated by the program using the number of "columns of beats" as specified by an input variable. Other investigations have shown that the important measure of effectiveness, response time, tends to be dominated by its travel time component. Travel time in turn is sensitive to patrol geography. Hence the results reported with respect to patrol operations must be viewed with caution.

A major failing of this study lies in the neglect of comparing simulation model output results with actual field operations. To assure a model's validity it is not enough to verify self-consistency, nor to certify accurate inputs. In other words, even though inputs may be the same, and outputs may be consistent, the question remains: Is the model a fair representation of the "real world" or have the inevitable assumptions seriously degraded the model's predictive value?

#### 3. Methodology

The methodology of simulation modelling used in this study, though not explicitly stated, appears to follow the generally recognized approach



with the exception of the above noted failure to perform a thorough validity check. It is important that a simulation model reflects its intended use, i. e. that detail is incorporated where critical for the proposed use of model output. To build a single model which will accurately simulate all aspects of police operations is a task beyond the current state-of-the-art. Hence, a research analyst must choose his model's focus carefully. Furthermore, he must guard against the temptation to use the model for purposes outside the focus area. The L.A.P.D. operations simulation is not designed to investigate "overall system response" as stated in the abstract. Before such use can be contemplated the expansions to the model proposed in the last section of the report must be implemented.

#### 4. Data Requirements and Data Utilized

Simulation input data in this study was divided into two categories: environment and system. Environmental inputs included geography and incident rates by location and type. System inputs as defined by the author comprise the response configuration (e. g. divisions, car plans), personnel (e. g. dispatchers, patrol units) and procedures (e. g. frequency usage, priorities).

The data utilized by the author for running the simulation is extremely uneven. For example, data relating to the command control and communication system is far more accurate than data on travel speeds.

Furthermore, the data was collected over a period of two years. Thus mean car travel time was obtained (from Isaacs) in September, 1966, while divisional incident frequencies were sampled in June 1968. The frequency and location of incidents each have a strong influence on other response parameters as well as upon each other. Hence field input data samples should be obtained concurrently to be certain that incompatible data is not utilized.

Several data sensitivity runs were made, leading the author to conclude that better empirical data is required before valid inferences can be made from simulation runs to field operations. This observation cannot be stressed enough. Before making recommendation regarding changes in police operations can be made, researchers must prove the simulation is not an example of garbage in - garbage out.

#### 5. Experimental Design and Controls

This study reports no experimental design or controls. Indeed, except for a discussion of transient response to an overload of incoming no-response calls and some sensitivity testing, no experimental results are reported.

#### 6. Results and Recommendations

The main recommendation of this study is that the simulation be expanded and that better data be obtained. Both of these suggestions should be heeded before valid conclusions can be drawn from simulation program output. In particular

travel speeds, divisional car plans, and field operation times must be obtained with far greater precision than currently available before simulation models such as reported in this study can have a valid impact on "real world" patrol and dispatch operations.

#### 7. Discussion

The value of this simulation model of the Los Angeles police department operations to police research in general is the contribution it makes in highlighting the need for more and better data. As demonstrated by simulation sensitivity analysis, for such a model to be valid, greater accuracy than currently available is required for travel speeds, call for service rates, and patrol unit geographic distribution.

In terms of aiding in the design of the planned Los Angeles Emergency Command Control and Communications System, the simulation has no doubt proved useful to the L.A.P.D. This type of situation characterized by well defined processes with accurate data available, is most amenable to analysis by means of simulation. Other police departments should not hesitate to use such scope-limited simulations to assist in similar planning tasks.

#### POLICY TOPIC: Patrol Operations - Emergency Response

TITLE: The Use of Probability Theory in the Assignment of Police Patrol Areas  
AUTHOR: Wayne Bennett and John R. DuBois  
PUBLISHER: U. S. Department of Justice, LEAA, NILE/CJ, Washington, D.C.  
VOL./NO.: PR 70-2  
DATE: July 1970  
NO. PAGES: 49

#### ABSTRACT:

The goal of the study reported here was to develop for the police department of Edina, Minnesota, a system of random patrol assignments, based on probability theory, that would reduce the time for a patrol car to arrive at the scene after receiving a call. A brief descriptive outline of the project report follows: First, the general technique of using probability theory to assist in dispatching police cars is presented. Next, the background of using the technique in Edina is discussed. That is followed by a complete description of the methods, goals, and variations of the project. Next, the results of the project are presented and that is followed by an evaluation of the project. The final section is a discussion of the generalized random patrol model suitable for use by other police departments.

## INTERNAL VALIDITY EVALUATION

### The Use of Probability Theory in the Assignment of Police Patrol Areas

Wayne Bennett and John R. DuBois  
July 1970

#### 1. Research Goals, Objectives, and Policy Issues

The goal of this study was to develop a convincing posture of effective police presence, to aid in offender apprehension, and thereby to assist in repressing crime. The objective chosen to make these goals possible was the reduction of response times by patrol units to emergency calls. The reduction of response times was to be achieved by means of improved patrol unit allocation and a "random" patrol technique.

#### 2. Face Validity Check

The foreword to this report states that "[s]tudies have shown that as the response time goes down, the clearance rate goes up because of the increased ability to make on-the-scene arrests." In addition, it is implicitly assumed that increases in the clearance rate will lead to a reduction in crime. We are aware of one study which attempted to analyze the relationship between response time and the clearance rate: "A Study of Communications, Crimes, and Arrests in A Metropolitan Police Department," by Herbert H. Isaacs. This was a report for the Science and Technology Task Force of the President's Commission on Law

Enforcement and The Administration of Justice in 1967. Isaacs' conclusions were that his "evidence does not directly imply that faster response time will result in more arrests, it does appear to support that view ...". Thus the basic assumption upon which the current study rests is by no means proven, indeed Isaac's conclusions rest upon but a limited number of observations (e.g., fewer than 10 emergency responses under 4 minutes). Furthermore, Isaacs makes no mention of on-the-scene arrests.

Another study assumption which appears dubious is the hypothesis that if patrol units are randomly assigned within areas of equal crime potential then response time will be at a minimum. Larson<sup>1/</sup> has shown that this assumption is in general false. The study under review is thus based upon two assumptions; one unverified, the other unfounded.

#### 3. Methodology

In addition to the above-noted assumptions, the basic methodology used in the Edina study involved the projection of the crime data of the previous year to the experimental year. The area patrolled by the Edina Police Department was divided into 1/4 mile by 1/4 mile blocks, and each block's crime potential was calculated. The blocks were then grouped into sub-zones of equal crime potential (in a variation of the experiment a formula using crime seriousness weights was used). Police

<sup>1/</sup> Richard C. Larson, "Urban Police Patrol Analysis." The MIT Press, Cambridge, Mass., 1972.

units were then assigned to patrol the sub-zones within their designated area on a random basis. The length of the experimental portion of the project was one year, during which four variations to random patrol were tried out for three months each.

#### 4. Data Requirements and Data Utilized

The primary data collected for this experiment was the incidence of calls for service (by time, type, and location) and the response time. We feel that two important data elements were ignored: arrest/clearance rates and travel times and speeds. Since one of the basic assumptions of the experiment was the increase of arrest and clearance rates by means of reduced response times, the omission of these rates constitutes a serious omission.

Reduced response times could be due to factors other than the random patrol technique. In particular, increased travel speeds provide a plausible alternative cause. Since the experimental group and the control group had similar average response time reductions, the lack of travel speed data means that no reliable conclusion can be drawn regarding the efficacy of random patrol.

#### 5. Experimental Design and Controls

The entire uniformed police force of Edina was involved in the experiment. Two of the four zones were patrolled using the random

technique and the two were patrolled in the conventional manner. The experimental and control zones were interchanged weekly. Patrol assignments were made so that if an officer was in a control zone one day, he would be in an experimental zone the next day. During an extension of the project, the whole village was placed under the random patrol technique and thereafter under the conventional patrol method.

Inasmuch as the patrol officers were acquainted with the random patrol technique, it is not clear that the conventional patrol method was in fact used in the control zones. Indeed, the authors note that officers in the control zones tried to "beat the computer" and may have been using less formalized random patrol techniques.

#### 6. Results and Recommendations

The report notes a dramatic decrease in response time of 40% (from 7.05 minutes to 4.22 minutes). The decrease was found both in the experimental and the control zones. During the experiment year, Part I crimes in Edina increased by 11% while the surrounding country showed an increase of 17%. Once the experiment was concluded, a slight rise in response times occurred. As might be expected, a variation on the basic experiment, the addition of two additional patrol units (an increase of 50%), also resulted in reducing response times.

#### 7. Discussion

Based on this study, it is not possible to conclude with confidence



that random patrol reduces response time or that reduced response time increases the arrest and clearance rates or that increased arrest and clearance rates decrease the crime rate. We can conclude, however, that by emphasizing response time, by involving patrol officers in an experiment, by enticing them to "beat the computer," significant decreases in response time can be achieved. The full import of such decreases are not clear however. While it appears reasonable that quick response should have the effect of reducing crime, the amount of crime reduction has not been related to the response time. The basic question thus remains: How much time, effort, and money should be spent to reduce response time in order to decrease crime by a given amount. In other words, if we decrease response time by x%, how will the crime rate change? A more comprehensive study in Edina using clearance rates and more detailed crime data might have provided at least a clue to the answers.

POLICY TOPIC: Patrol Operations - Emergency Response

TITLE: The Use of Simulation in Planning Expansion of the St. Louis Police Real-Time Motor Vehicle Inquiry System

AUTHOR: Nelson B. Heller and Richard Kolde

PUBLISHER: St. Louis Metropolitan Police Department  
St. Louis, Missouri

VOL./NO.:

DATE: October 1970

NO. PAGES: 35

ABSTRACT:

A computer program, coded in GPSS, has been written to simulate the computer aspect of the operation of the St. Louis Metropolitan Police Department's real-time motor vehicle inquiry system. Four types of inquiries are handled: vehicle (or license) checks, and additions, deletions, and modifications to stored information. Communications channels, four computers and eleven terminals are explicitly represented in the simulator; other system equipment and types of inquiries are implicitly represented. Four experiments with the simulator are reported. These involve changes in terminal equipment, the message assembly procedure, the priority system, and system loading.

INTERNAL VALIDITY EVALUATION  
The Use of Simulation in Planning Expansion  
of the St. Louis Police Real-Time  
Motor Vehicle Inquiry System

Nelson B. Heller and Richard Kolde  
October 1970

1. Research Goals, Objectives, Policy Issues

This research study was intended to increase the efficiency of the St. Louis police with respect to offender apprehension and property recovery in auto theft cases. The goal of increased efficiency was addressed by investigating a small set of alternative configurations for the police department's computerized real-time motor vehicle inquiry system. In particular, the study attempted to ascertain if any of the alternatives could reduce terminal response time and which of these options could handle an increase in the number of inquiries without a significant deterioration in response time. The overall goal therefore was to determine the configuration of an improved inquiry response system by means of a GPSS simulation.

2. Face Validity Check

While the study appears valid, it is questionable whether the full problem is being addressed. The critical aspect of the inquiry system is the processing of requests by patrol units on the street for the purpose

of determining if a vehicle is listed in the stolen file. The patrol unit's inquiry is transmitted to police headquarters where it is formatted and entered through a terminal. The computer's response returns via the terminal, where upon the answer is radioed back to the patrol unit for possible action.

The average time which elapses between terminal entry of the inquiry and the appearance of the computer's response at the terminal (i. e. terminal response time) is about one minute for all alternatives. The maximum terminal response time is about 3 minutes. The total response time to the patrol unit, which was not modelled, is perhaps as much as 15 minutes. Because it is precisely the response time to the patrol unit that is critical, a change of a few seconds in terminal response time is not meaningful when swamped by the long delays encountered in getting the answer to the inquiry from the terminal to the officer in the street. It must be concluded therefore that the alternatives investigated in the study are of little consequence in terms of increasing the effectiveness of the patrol officer.

Nevertheless, the study does have some value to the St. Louis police department in that it demonstrated that an increased number of inquiries could be handled by the current system without significant deterioration in response times.

The results of this research have no broad policy implications for other police departments, most of which do not have the same equipment

and program configuration as St. Louis. What is perhaps of general value is that the study demonstrates the usefulness of a technique--simulation--to answer questions such as: Can the present system handle an anticipated increase in its workload?

### 3. Methodology

The method generally followed in simulation modelling consists of analyzing the system to be investigated, synthesizing the system into a model, verifying that the model is logically correct, validating that the model is a fair representation of the system, and finally utilizing the model to explore alternative system configurations. The St. Louis motor vehicle inquiry system simulation broadly followed this procedure. The authors state however that the important validation step was limited to checks for consistency and independent evaluation of the model by staff members of the police department. Checks for consistency are better described as verification, i. e. the model's logic appears to be correct, and independent evaluation tends to be subject to superficial judgments.

A better check on the model's validity could have been made if the response time of the current system had been sampled and then compared with model output. The researchers would thereby have demonstrated the validity of the simulation and would in addition have information regarding the range of accuracy of model results.

The experiments conducted with the simulation were well executed, observing the proper caveats with respect to statistical significance for most experiments. As was done for other experiments, it would have been useful to display t-values for the experiment involving increased system loading.

### 4. Data Requirements and Data Utilized

Much of the data required for this simulation concerns the operational characteristics of the data processing machines being modelled. This data was drawn from information gathered by the machines themselves as part of their normal functioning. Other data such as the length of messages was estimated based on the experience of police staff. Finally a number of surveys were conducted to fill out the data requirements set. These surveys were conducted at different times. An important assumption underlies this procedure, namely that the incidence of various types of inquiries are independent of each other. Though quite likely correct, it would have been preferable to state and test this assumption.

Two inquiry types vary widely from day to day and the researchers have chosen a single busy day as a data source. Since these inquiries are rather frequent it might have been proper to sample several days to make certain that the chosen day was not statistically atypical.

5. Experimental Design and Controls

Four experiments were conducted, each involving a comparison of the simulated current system with a simulated alternative system. No experiments were conducted to estimate model sensitivity to estimated input parameters. As noted above, the simulated current system, which served as a control, was not properly validated. Nevertheless, though limited in number the comparisons were carefully conducted and (within the framework of the assumptions made) appear sound.

6. Results and Recommendations

The specific results of this study's simulation experiments concern the type of terminals and the type of programs to be used for the St. Louis motor vehicle inquiry system. As such, the recommendations have little value external to the St. Louis police department.

7. Discussion

This study is best characterized as a demonstration of simulation as a useful technique in certain police planning situations. It unfortunately also illustrates the common shortfall of addressing not the full problem but rather a non-critical portion which is amenable to solution. A more comprehensive view of the modelled system, including the full response cycle to the patrol unit, would have produced more incisive results.

Concommitantly, a considerably greater data acquisition effort would have been required. An approximate model of the overall system is often preferable to an accurate model of a non-critical problem segment, especially when the results of the sub-problem are not significant in the context of the full system.



I. Patrol Operations--Traffic

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POLICY TOPIC: Patrol Operations--Traffic

EXTERNAL VALIDITY EVALUATION

The research to be done in the area of police traffic patrol operations should depend in every instance on the researcher's understanding of what this kind of patrol is supposed to accomplish. Smith and Espie, whose work is reported in Guidelines for Police Services on Controlled Access Roadways (1968), formulated their research by defining nine activities which together are intended to account for all of the time spent by police personnel who have patrol responsibilities. Then they conducted time and motion investigations in several police departments that cover limited access highways, to observe how time is actually distributed among these nine activities, finding slightly more than half devoted to patrol itself. It emerges in their report that they feel that time not spent out on the road is time wasted, and further, time on the road properly spent does not include supplying motorist services. Theirs is a reasonable view of what highway patrol should do, but one that is not universally accepted. For example, the Los Angeles Area Freeway Surveillance and Control Project places major emphasis on providing such services as information on traffic congestion and auto repairs for stranded drivers.

Elsewhere (in Police Traffic Responsibilities (1969)), Smith, et al., advocate that traffic patrol should do as the outstanding traffic patrol

forces do. They enlisted a panel of police experts to recommend for intensive study a number of departments that in their judgment are particularly effective in the area of highway patrol. Then they measured what those departments do. Of particular interest to them was manpower devoted to patrol, and its relationship to other variables. Through regression analysis they arrive at a mathematical model for predicting manpower requirements for given levels of highway mileage and traffic density. This is consistent with the view of Smith and Espie that the proper work of patrol officers is patrol. Unfortunately, their analysis never confronts the question of precisely what it is that a well-functioning patrol force is supposed to do well, which unavoidably leaves us uncertain whether the number of patrol units and manhours spent on the road are truly important factors.

A more focused concept of patrol objectives is found in the work of Jones and Joscelyn, Computerized Allocation of Police Traffic Services: A Demonstration Study (1972). It is their view that raison d'etre of highway patrolling is to minimize traffic law violations and traffic accidents. Very likely this is the most commonly-held view of what this category of police activity is supposed to accomplish. It also seems likely that conventional wisdom connects violations and accidents, more particularly holding that violations cause accidents.

With this as their basic understanding, Jones and Joscelyn investigated the question of whether improved means of allocating highway patrol

resources will result in fewer violations and accidents. The tool they used for experimentation is the Computerized Highway Traffic Information System (CHTIS). This consists of sensors implanted in the roadway at selected locations, connected remotely to a computer that is programmed to compute speed, direction and length of the vehicles passing over the sensors, as well as to distinguish (by virtue of other equipment) between patrol cars and other vehicles. This computer is connected to output display devices located at the police command post, and traffic flow information, such as traffic volume, velocity and density, are available to patrol officials and personnel on a real-time basis.

On logical grounds alone, it is difficult to dispute that this traffic monitoring system is an improved tool for allocating patrol equipment and manpower. Officials may use it to find out where the speeders and tailgaters are, where the traffic obstacles are (e.g. accidents), and whether patrol assignments are being carried out. They may query these matters at any time, and at the end of a shift may obtain summaries relating to these variables. Jones and Joscelyn set up a CHTIS installation for the Indiana State Police (ISP) in Monroe County, Indiana, with sensors implanted in the four major highways leading in and out of Bloomington. The ISP made daily use of CHTIS, apparently with much enthusiasm, for a period of four months. Yet when they compared the numbers of violations and accidents occurring during that time with the same four-month interval one year earlier, they found no appreciable differences.

Rather than indicating the ineffectualness of CHTIS, the experience of the ISP and Jones and Joscelyn illustrates the futility of holding highway patrols responsible for the occurrences of violations and accidents. This reviewer would like to suggest that the influence of police work on the happening or non-happening of such events is indirect, at most. In fact, the authors showed in this study, and in more detail in an earlier work-- A Study of the Effects of Law Enforcement on Traffic Flow Behavior (1970)-- that the effect of police patrol on drivers is limited to the immediate vicinity of the patrol vehicles, and only during the time when these vehicles are present. Any substantial and lasting impact on the incidence of violations and accidents would require a virtual picket fence of patrol cars bordering highways everywhere.

The proper objective of police work in the conduct of traffic patrol operations is to detect and apprehend as high a percentage as possible of the law violators. As mentioned above, the very high success rate would require an enormous patrol force, given the current prevalence of speed and headway violations (as well as equipment violations). It is easy to speculate, however, that a high and lasting success rate in a locale would have the salutary effect of diminishing violations and accidents. Traffic patrol is one area of law enforcement where detection is a relatively simple matter, especially when aided by electronics. Furthermore, it is a unique field in that "arrests" are almost always followed by "convictions." But there would always exist the exceptions, the instances

where adverse personal or psychological or social influences would overwhelm any fear of law enforcement, so that a 100% elimination of violations is theoretically an impossibility.

As the foregoing suggests, research into the subject of highway patrol should be oriented around the goal of increasing the rate of capture of traffic law violators. Correspondingly, the ideal measure of the value of any modification of patrol operations should be the degree of improvement in this rate.

Admittedly, measurement of such a rate would not be a casual undertaking, but the CHTIS system brings it into the realm of possibility. Whether it is also within the realm of feasibility depends upon the resources that are available. It may not be practical when research receives modest funding.

The way in which CHTIS might be used will be suggested here in barest outline. Before an intended program is implemented, CHTIS sensors and computer would be installed to read traffic flows on the roads that will compose the testing ground for that program. Over a period of time two numbers would be observed: (1) number of vehicles in violation, via CHTIS output; and (2) number of captures, in the form of warnings and citations issued, as obtained from police records. These two numbers would be combined to yield a rate of capture: say, captures per hundred violations. When the experimental program has been implemented, and

while it is running its course, the same observations would be made.

The utility of the program could then be evaluated through a before-and-during comparison of capture rates. If the program were meant to having lasting effects beyond the test period, a before-and-after comparison would be appropriate.

One additional factor--at least one other--would have to be taken into account in such a comparison of rates: that is the fact that CHTIS, described by Jones and Joscelyn, would not enable the analyst to determine how many of the captures relate to violations recorded by the sensor/computer system. This is so even if the rate were based only on warnings and citations issued in the places and times under monitoring. False captures are bound to occur owing to (hopefully infrequent) human error on the part of the patrol officers themselves. There is also the risk that patrol officials would be influenced by knowledge of the evaluation procedures to urge a more aggressive policy in hopes of promoting an experimental program that they favor; or such influence may be subtle rather than overt, and may also effect the vehicle-stopping practices of the individual patrol officer.

Concomitant estimation of the rate of false capture would be advisable. This would involve drawing from a listing of captured motorists a sample to be contacted and questioned as to their perceptions of the validity of their capture. If this were done both in the before and the during (and after, if appropriate) stages. The difference in percentage



of captured motorists protesting their innocence could then be incorporated as a covariable in the analysis of the experimental program. Obviously, this would enable the researchers to compensate for any change in capture policy or practices attributable to patrol self-consciousness.

This evaluation procedure could be recommended no matter what the content of the program under consideration, as long as it is frankly directed at improving traffic patrol operations. This is not to say that other forms of evaluation would be inappropriate: analyses of cost effectiveness, legality, public acceptability, administrative convenience, compatibility with other law enforcement systems, etc., would be separate from capture rate comparisons. It would not necessarily be desirable if other and subordinate law enforcement missions are the object of research, such as providing services to motorists, or interfacing with other agencies (e.g. apprehending fugitives from justice).

Jones and Joscelyn in their report do not indicate the expense entailed in setting up and operating CHTIS, but it must be considerable. Thus, capture rate evaluation would not be available to the researcher who wants to test some new idea on a small scale, as a preliminary or pilot investigation. If ideas that are subject to major investigation (at a level justifying CHTIS-like evaluative efforts) are first tried on a small scale, this would certainly mean that novel and meritorious patrol innovations must first be considered on grounds other than those that are of ultimate interest.

POLICY TOPIC: Patrol Operations--Traffic

TITLE: Guidelines for Police Services on Controlled Access Roadways

AUTHOR: R. Dean Smith and David A. Espie

PUBLISHER: International Association of Chiefs of Police  
Gaithersburg, Maryland

VOL./NO.:

DATE: April 1968

NO. PAGES: 150

#### ABSTRACT:

This report presents the findings and conclusions of a three year study of police operations on controlled access highways in the United States. The objectives of this study were to (1) examine in detail the operational and administrative processes of police systems servicing controlled access roadways and (2) to develop guidelines for policy making and ultimately, decision making at all levels in the systems. It consisted of four major efforts: the collection, review and abstraction of available and pertinent literature; the construction, distribution and compilation of a comprehensive questionnaire covering all anticipated information and data needs; intensive on-site study of six selected state police or patrol agencies with emphasis on time consumption analysis and "work" profiles; a synthesis of developed information and data and preparation of guidelines for policy construction and decision making.

## INTERNAL VALIDITY EVALUATION

### Guidelines for Police Services On Controlled Access Roadways

R. Dean Smith and David A. Espie  
April 1968

#### 1. Research Goals, Objectives, Policy Issues

This volume offers a set of guidelines, standards, or perhaps norms, relative to police patrol of limited access highways. The authors' express intention was to formulate these on the basis of an extensive collection of operational and administrative data of this category of patrol from state and city police departments throughout the country. The issues may be inferred from the headings under which the guidelines are grouped: (1) manpower, (2) records and information, (3) administration, (4) training, (5) patrol (subdivided into traffic law enforcement and motorist services), (6) collision investigation, (7) equipment, (8) communications, and (9) facilities.

#### 2. Face Validity Check

This book gives an enormous amount of advice, all of which is very lucidly expressed. It appears to represent an amalgamation of the data received from police departments, analysis of these data, and the authors' own expert judgments. Indeed, there is a convincing tone of authority,

and much of what is recommended appeals to one's common sense (e.g., patrol vehicles should stay within the speed limit, should push stalled vehicles out of traffic lanes, should not be substitutes for ambulances, should not be used to transport VIP's, etc.). But in many instances it is impossible to tell what facts, if any, the judgments are based on.

#### 3. Methodology

As concerns the objective input to the guideline-formulation process, the apparent basic tenet is that a police department should do as most police departments report they do. This is a regressive philosophy, in the sense that it tends to overlook recent and worthy innovation, unless it is coupled with expert overview to identify and incorporate isolated ideas that have potential merit. But in principle we should expect that the average performance at any given time is based on accumulated experience and by and large measures up to what the public requires.

The authors conducted a three year study in which they attempted to survey by questionnaire the state police and highway patrols of all fifty states (those not responding were Alabama, Delaware, New Mexico, Nevada, Rhode Island, South Dakota, and Tennessee), and twenty five medium-sized or large cities. Thereafter they did an intensive on-site study in six (unnamed) states.

Following the data gathering and analysis, the authors developed a battery of guidelines. (To the extent that these represent the determination of what "most" departments do, they would more aptly be termed "norms.") Each guideline is fleshed out with recommendations of a specific nature, and commentaries which are an unstructured collection of observations from the study (e.g., out of X states, Y of them do such-and-such). The authors also work into the commentaries the results gleaned from an extensive literature search on the subject of highway patrol; the bibliography is included in an appendix.

#### 4. Data Requirements and Data Utilized

The nationwide survey was implemented by means of a questionnaire that is not included in the study report. From the commentaries it might be possible to reconstruct it; otherwise, we know only that it was aimed at eliciting operational and administrative data (including budget) on police operations on controlled access highways. Certainly no report deriving from a survey should be published without giving the critical reader the benefit of seeing precisely what questions were asked, and the instructions supplied to the respondent.

The authors state that the major source of their data was the on-site phase of the study. This involved staff visits to the departments in six states; we are not told what states these are, nor how they were selected. The method of selection is vital information if we are to believe that inferences may be drawn from six states to the entirety of the nation.

The purpose of the on-site study was to find out how highway patrol officers spend their time, and thereby develop "work profiles." In part, this entailed actual observation of events by research staff members, and in part the filling out of a log called a Temporary Daily Activity Report (TDA) by patrol officers each day, over an unspecified period of time.

Unlike the survey instrument, the TDA is shown in the report, accompanied by the user's instruction sheet. The instructions inform the officer that "We wish to know the start and finish times to the nearest minute for everything you do during your tour." In addition to recording the times (and computing elapsed time--hopefully checked by the staff for arithmetic errors), the officer was to give a verbal description of what he was doing.

Along with the TDA we are given a list of codes that presumably used by the research staff to translate the activities into numerical codes, the better to be processed by machine. In all there are 80 codes, combined under the following headings: (1) administrative, (2) court, (3) traffic enforcement, (4) accident investigation, (5) motorist services, (6) patrol, (7) miscellaneous services (e.g., providing transportation, giving driving tests, etc.), (8) non-traffic investigations/arrests, and (9) assist or contact other unit/agency.

Other data used came from the literature review. In some instances the literature is quoted and cited; in other cases outside studies appear to be used without being footnoted. (Oddly, some of the references that are footnoted are not included in the bibliography.)

5. Experimental Design and Controls

This project did not include any experimentation, nor was it predicated on any a priori formal modeling. The study design did not incorporate controls. Probably no controls would be needed, although analytical "controls" would have been desirable, in the sense of relating the observations to the conditions bearing on a department. For example, patrol conditions may differ in a mountainous state as compared with those in a flat state such as Kansas, although the nature of controlled access highways may minimize such differences among states. It is also possible that in some states the highway patrol may have statutory obligations unrelated to patrol functions, while in another state patrol may be an essentially autonomous function; if so, that is a factor that should be isolated either analytically or (preferably) in the selection of the states for on-site study.

6. Results and Recommendations

In the way of hard data, the major result of the study is the "work profile" of a typical patrol officer on a typical day. This derives from tabulation of the coded TDA's filled out day by day. It shows how the time on an 8 1/2 hour shift is distributed. The percentage distribution is as follows:

Administration	16.75%
Court	1.70%
Enforcement	10.94%
Traffic Accidents	3.80%
Motorist Services	2.96%
Patrol	57.57%
Miscellaneous Services	2.23%
Non-Traffic Invest./Arrest	0.93%
Assist or Contact Other Unit/Agency	1.09%

These add up to only 97.97%, leaving about ten minutes of the archetypal shift unaccounted for.

It is perhaps the major finding that almost half of a patrol officers time is spent on matters other than patrol itself. It is worthwhile to note what the coders were to place in the patrol category: routine patrol; portal to portal; remove debris or dead/live animals from road; rest area check; property check or inspection; check/tag stopped, parked, unattended vehicles (no services rendered); impound vehicle(s); and patrol other than on controlled access.

It is surprising that only 16.75% goes into administrative functions, as other research in general police departments have shown considerably more, although there may be definitional differences.

Further, the survey results showed that when days off are taken into account (regular days off, sick leave, vacation, and holidays), "each officer actually represents on the average only 61 percent of one man day



for manpower availability purposes." Lacking data on other kinds of police specialities (or other occupations) it is difficult to decide whether that is remarkable.

For the six state police agencies studied in depth, it was found that when time spent is tallied, and presumably distance of controlled access road is accounted for, a patrol unit covers on the average 20 miles per hour. The authors modestly suggest that this may not be universally applicable, and that each department should make such a calculation for itself. They proceed to lay out the algebraic calculations that would enable one to determine from such average, and depending on the mileage to be patrolled, the number of patrol units needed, or alternatively the miles that can be covered by a given number of units. It is unfortunate that they supply us with none of the backup data so that this 20-m.p.h. figure can be evaluated, particularly since validity of any estimated number of units required depends, among other things, on the variability of this mean.

The authors also demonstrate a cost/benefit procedure for evaluating various patrol strategies, in terms of percentage of violators apprehended and total cost to the department. This is illustrated in detail using data obtained in the study, but again they chose not to give any of the background, apparently preferring that any would-be user duplicate their scantily-documented efforts.

They state that they entered into the study with the expectation that they would end up recommending more time spent on some things and less

on others. Their recommendations along these lines seem to boil down to this: patrol officers should spend less time behind desks and more on the road, and when on the road, more time spent attending to the flow and interruptions in traffic.

## 7. Discussion

This document is much more a didactic treatise than a scientific report. A novice could probably learn a great deal about the operations and administration of highway patrol departments, at least as regards controlled access highways, and that may be its chief value. Possibly it is unfair to require a scientific report in this instance, particularly since the authors make apologies overtly for their research and caution the reader that it is all entirely preliminary; but they nevertheless put forward the numbers they chose to publish and cited a good deal of objective information in their commentaries. It may be that the purpose of the study was simply to further inform the authors as experts in the subject matter, to enable them to enrich their understandings through impressionistic research, in that event the value of the guidelines depends exclusively on their wisdom.

POLICY TOPIC: Patrol Operations--Traffic

TITLE: Police Traffic Responsibilities

AUTHOR: R. Dean Smith, et al.

PUBLISHER: International Association of Chiefs of Police  
Gaithersburg, Maryland

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ABSTRACT:

This study provides both a detailed analysis of police traffic systems data and a synthesis of these data into specific manpower allocation models. The data were collected from nine sites of various political jurisdictions known to have outstanding traffic services. The data were analyzed, supplemented, verified and then structured into a taxonomy of function, subfunction task and manpower data that serve as a qualitative and quantitative personnel requirements inventory for each site. In addition, descriptions of the properties and the variables of each site which could impact on police traffic systems was developed. The analysis of functions and interrelationships was then substructured into a number of manpower allocation models of various levels of abstraction and verified for internal consistency. The most specific models are complete studies of the departments in question and are most applicable when they are dealing with comparable sites. The intermediate models describe the services and allocations characteristic of the state police, state highway patrol, county police and city police traffic departments. The general model provides a graphic and mathematical formulation for allocating manpower for all systems irrespective of the individual site properties and political jurisdictions.

## INTERNAL VALIDITY EVALUATION

### Police Traffic Responsibilities

R. Dean Smith, et al.  
July 1969

#### 1. Research Goals, Objectives, Policy Issues

This project had two main goals: (1) in consultation with a panel of experts, work out a definition of police traffic responsibilities in terms of goals, missions and specific tasks; and (2) following this first step, obtain objective data on which to base a manpower requirements model for police traffic functions. As regards modeling and data acquisition, it was intended to work within jurisdictional types--state, state highway patrol, county, and city--and model each, as well as to attempt formulation of a general model applying to all. For this purpose, the study's panel of experts were asked to nominate nine jurisdictions (representing all four jurisdictional categories) for intensive study, such nominees to be places where traffic-handling by police is outstandingly good.

The ultimate aim in all of this was to develop a method by which the police decision-maker can compute a reliable estimate of the work force needed to manage traffic, given the traffic conditions and related factors bearing on his department.

The project was to stop with the development of a requirements model, its use in determining optimal force levels to be taken up in a continuation phase of the study.

#### 2. Face Validity Check

The authors are not stingy in sharing with their readers the objectives, procedures, and results of their study, although (as often happens) they have not supplied us with examples of their basic observational instruments. Much backup data relative to the statistical models they recommend are included for the critical reader. The authors are appropriately modest in discussing possible limitations on reliability, however. For example, they note that their time and motion study was done during summer months, when vacation schedules may tend to disrupt the normal handling of tasks; they point out that the regression model that they compute from the results may not apply to small police departments; and that their sample sizes were quite small.

#### 3. Methodology

The project panel of police experts broke the spectrum of traffic responsibilities into seven major functions: (1) traffic control and direction, (2) accident management, (3) traffic law enforcement, (4) auxilliary services (e.g. aiding disabled motorists, inspection, abandoned vehicle control, etc.), (5) support, (6) justice systems interaction, and (7) regulatory activities. These are further divided into a total of 55 subfunctions. This served as the framework for recording data in the observational phase of the study, and for analyzing it.

The panel named these nine jurisdictions as the traffic management exemplars at the state, county and city levels: Oakland, California; Dade County, Florida; Baltimore County, Maryland; Dallas, Texas; Albany, New York; St. Louis, Missouri; Phoenix, Arizona; Arizona Highway Patrol; and California Highway Patrol. Each of these departments was then subjected to "comprehensive performance analysis" in the form of time and motion studies by the research staff. These were conducted in the time between August 1, 1968 and December 31, 1968 (though elsewhere the authors state that the work was done during the summer). Obviously, if there are any significant seasonal variations, this study was not designed to detect them.

Staff members performed the work measurement with respect to personnel on patrol, and devoted a major portion of their time to riding with accident and radar units to get "maximum exposure to traffic activity."

Descriptive information about the force and road and traffic conditions were obtained by means of a questionnaire to be filled out by department personnel.

The outcome of these investigations were to be synthesized into manpower allocation models, for each jurisdictional level and in general. As far as jurisdictional levels are concerned, it is unclear what this modeling consists of, other than tables of means and standard deviations describing the activities and working conditions of patrol. The general model, however, is the application of regression analysis to the problem of relating various factors to observed manpower levels.

#### 4. Data Requirements and Data Utilized

The major data sources were the time and motion records and department questionnaires mentioned in the preceding section of this review. An additional source was the administrative and support personnel: they were asked to fill out time and motion forms on their own, although it does not appear that any use was made of this information.

Not much is said about actual acquisition and processing of the work-measurement data. The basic record itself filled out by officers, the accompanying instructions, and coding details are not given. These last-named items can be found in an earlier IACP publication, Smith and Espie, Guidelines for Police Services on Controlled Access Highways (1968), since that relates to a similar time and motion study of police traffic work, assuming that the methodology had not been abandoned.

The kinds of data used, therefore, were the amount of time spent in various patrol-related activities, as classified under the seven function headings derived by the panel. Two additional variables, which turned out to be of considerable significance, were:

- o Average daily traffic: This is defined as "simply congestion or traffic density." Congestion itself is defined as "volume in vehicle miles per mile of road."

- o Billions of vehicle miles: This is the total number of miles travelled throughout the network of roads for which the department has traffic management responsibility.

Virtually nothing is said about how these things were measured.



5. Experimental Design and Controls

There was no experimentation involved in this study. Controls were built in by stratifying the sample to cover four different kinds of departments.

6. Results and Recommendations

A great deal of information is given for each of the nine case studies in the form of totals and averages for the variables under observation. Much descriptive data are given, also. For example, in each case the man-years allocated to each of the 55 functions defined by the panel is provided, along with total hours, and in some instances the frequency of task performance, time per event, and percent of force allocated to task, are tabulated. There are summaries by jurisdictional type of a number of service (e.g. enforcement contacts, motorist assistances, and patrol units per 10,000 miles of vehicle travel) indicators, and performance (e.g. accidents, fatalities, convictions per fatality) indices, as well as percent of total force performing patrol functions. For jurisdictional types, both means and standard deviations are published.

Overall, means and standard deviations are shown for each of the seven patrol functions. This shows the major time consumers to be support (e.g. administration, research, training, serving warrants, providing transportation, etc.) and traffic law enforcement. Support

accounts for slightly more than half of the time in the county departments, and about a third for the others; traffic law enforcement accounts for about half at the state and highway patrol levels, 38% at the city level and 19.6% at the county level.

The findings show a considerable disparity among the four department types in total man-years per billion miles of vehicle travel. These manpower figures are as follows:

Type	Manpower in Man-Years
State	60.7
Highway Patrol	133.0
County	148.0
City	158.0

The authors state that the main reason for such variability among types is the factor of traffic density, and point to the results of their correlation/regression analysis to back that up.

The major result is a regression model relating man-years required per billion motor vehicle miles of travel to average daily traffic density as a predictor of manpower levels. They show that when density is plotted on a log scale, against man-years per billion miles traveled (on a linear scale), a remarkably good linear relationship is revealed between these two variables. As is often the case, the points around the middle are closer to the regression line than the points further away on the horizontal

axis. The Coefficient of Correlation (square of the correlation coefficient) is about .85, meaning that about 85% of the variability in the observations is accounted for by the relationship between these variables. The authors caution that each point (for some reason only 8 of the 9 case studies were entered into these calculations) may be as much as 10% - 15% in error, though it is not explained how they know this.

Apparently, the authors tested the relationships among a number of variables, seeking one or more that related to manpower. They state that the relationship between miles of vehicle travel and patrol manpower was greatly enhanced by the inclusion of the density variable; hence, their observation that manpower variability among department type is mainly a function of how packed the roads are with cars (a conclusion that should find support in common sense).

## 7. Discussion

This report contributed a good deal of data on what goes on in the field of traffic management at various kinds of police departments. But considering the objectives of the study, the principle accomplishment must be the regression formula for predicting manpower requirements in terms of the amount of road to be policed and the density of the traffic. Aside from the quality of the research, the predictive value of this formula depends on the judgment of the panel of experts that the departments studied are indeed worth imitating (otherwise what is predicted is perhaps

the force level required to do a less than splendid job). It is in its favor, also, that the researchers encompassed such a wide variety of departmental types.

The potential user of this predictive formula should bear in mind the fact that it is computed from a sample of eight observations. There appears to be no reason to doubt the quality of the work that was done (though more should have been said the measurement of road use and traffic density), and consequently the quality of these eight numbers seems acceptable. By and large, however, it is a good rule to follow when regression models are offered to regard them skeptically until they have been verified by seeing how well they would have predicted reality as demonstrated in some other body of data.

The user should also be aware that we have no way of knowing objectively whether the manpower projections that the regression model will predict are in fact unique to exemplary performance. This doubt exists even though it may reasonably be assumed that the selection of the departments in this study actually succeeded in identifying nine that do exceptionally good jobs of highway patrol. It may be that the variables isolated for the purposes of prediction (road mileage, traffic density, and patrol manpower) are not related to the quality of performance. If this is the case, a departmental chief deciding manpower on the strength of such predictions may not observe the expected improvement in

performance. To investigate this unfortunate possibility, it would be necessary to perform the sort of time and motion study reported in this paper on departments deemed to be relatively inferior highway patrollers to determine whether their manpower levels do or do not match those that would be predicted for superior performance.

POLICY TOPIC: Patrol Operations--Traffic

TITLE: Computerized Allocation of Police Traffic Services:  
A Demonstration Study

AUTHOR: Ralph K. Jones and Kent B. Joscelyn

PUBLISHER: U. S. Department of Transportation  
National Highway Safety Administration, Washington, D. C.

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ABSTRACT:

A study was conducted to develop and implement a computerized highway traffic information system (CHTIS) for use in allocating police traffic services. The information system utilized a computer-sensor system to gather, process, store and display traffic flow information from 25 key highway locations in Monroe County, Indiana. The resulting information was provided to a local Indiana State Police post for use in conducting traffic law enforcement operations. It was concluded that the system is a highly useful operational tool for traffic law enforcement agencies. It was quickly and enthusiastically accepted by the police officials and was used regularly in assigning patrols so as to reduce traffic risks. The study recommends (1) the establishment of a continuing traffic resource allocation laboratory utilizing a CHTIS and (2) the initiation of a program to analyze the unique data base made available by the system.

INTERNAL VALIDITY EVALUATION  
Computerized Allocation of Police Traffic  
Services: A Demonstration Study

Ralph K. Jones and Kent B. Joscelyn  
March 15, 1972

1. Research Goals, Objectives, Policy Issues

The directive of this study was to adapt an automobile sensor and computer system to the purposes of supplying police with traffic data. Specifically, it was to supply traffic flow information: how many cars passing certain sensors on particular highways are travelling how fast at what hour of the day. The stated purpose in having such data is to allow traffic patrol managers and troopers managers and personnel to decide, day by day, where to put their patrol resources.

The authors indicate a preference for solving the resource allocation problem (in the traffic patrol context) by simply compiling traffic flow data and letting the police do the allocating based on knowledge gained through practical experience. It is their opinion that theoretical modeling has not yet advanced to a useful stage of development, and that highly theoretical resource allocation models are not accepted.

A secondary objective of the study was to set up a way of linking traffic flow data and police data on traffic accidents, so as to be able to

measure the risks associated with specific traffic conditions. In fact, the authors observe that traffic managers will analyze risks for themselves, using traffic flow information.

More remotely, it was intended that the resulting data system would be useful for research applications, such as investigating theoretical models for resource allocation and accident prevention; and further, that it would provide data of value for educating the public on the subject of highway safety.

2. Face Validity Check

This is a readable document that seems to give a fairly thorough account of the work that was done. The analysts worked closely with the intended users of the system during the planning and implementation stages, as opposed to working in academic isolation. They give plenty of data describing what was done. They seem to make a real effort to convey the concepts behind the system. They demonstrate considerable familiarity with mathematical and statistical theory relating to the subject under investigation.

3. Methodology

From the point of view of law enforcement, the technique considered here is one of giving police traffic managers and patrol personnel data each day on the prevailing traffic conditions in the area for which they are



responsible. This means live data on where the traffic is heavy, and where it is too fast or with too much tailgating. The system that was developed--Computerized Highway Traffic Information System (CHTIS)--supplies this information in two forms: (1) a computer printout summarizing traffic flow data on the various roads for each hour in the day just ending; this is used by a patrol supervisor to predict where the patrol resources are going to be needed the following day (e.g. where the traffic is fast but thin, which indicates where to put the radar units; where the percentage speed violators is high, which suggests saturation patrol); and (2) a cathode ray tube (CRT) computer display for real-time data on traffic conditions, to be used the following morning, and presumably throughout the day, to verify the predictions made on the strength of the printout for the preceding day.

In actual practice, these decisions were made not only by supervisors, but by patrol personnel themselves. The authors point out that this is highly desirable as a means of improving morale by including the working force into the decision-making process. It also apparently enhanced the attitude of the police toward this computerized system.

From the point of view of hardware, the system was built up from the level of magnetic sensors in 25 locations on four main highways leading in and out of Bloomington, Indiana. At each location, and on either side of the road, there were two rectangular plots resembling flower beds surrounded by small hoop fences. These were wired to a

transmitting device off the side of the road. When a car passed over the loops and penetrated one of these rectangles, a signal was transmitted; when it had passed entirely through both rectangles, the elapsed time received at a central location could be used to compute the vehicle's (1) speed, (2) direction, and (3) length. In addition, the system was wired in such a way as to differentiate between police patrol and private vehicles, to generate information on how heavily each location is patrolled, and whether patrol assignments are being carried out.

The signals were conveyed by telephone lines from the 25 locations to a computer operating in a time sharing mode to receive inputs, perform calculations, and display or printout results upon request. (Input had the highest priority.)

#### 4. Experimental Design and Controls

The CHTIS was set up for the Indiana State Police (ISP) in Monroe County, Indiana--in particular, sensors were placed in 25 locations on the four main roads leading in and out of Bloomington. (Apparently none of these were divided, or controlled-access highways.) CRT display and printout devices were installed at the ISP Monroe County post. Duplicate output equipment was located with the authors at the Institute for Research in Public Safety, Indiana University at Bloomington.

CHTIS was evaluated on the basis of experimentation. The entire project extended from December 1970 to February 1972; the hardware

was fully operational at the ISP post only during September-December 1971. During the operational period, the police made daily use of CHTIS sensors and computer output in deciding where, when and how to patrol the four Bloomington main arteries. Apparently the authors and their research staff did not intervene in regular patrol planning and operations; the CHTIS was used as the ISP saw fit.

The main hypothesis involved the question of whether the risk of traffic accidents would drop during the CHTIS test period, as compared with the comparable period of the preceding year (September-December 1970). The data for 1970 was contained in ISP computer tapes, giving details (56 variables) on the accidents reported during that time.

A special one-day test of the "short-term effects of a concentrated warning-citation program in the vicinity of a CHTIS sensor site" was conducted. The results of saturation patrol during the morning hours-- 7:00 a.m. to 11:30 a.m. --were measured in terms of mean vehicle speed, percent speed violators, headway, percent headway violators, and variability of speed. These variables were measured within hourly intervals over the full 24 hours of the day. These figures were then compared with the same measures for the immediately following day, and for a day approximately one week earlier that was chosen as "representative" (the selection criteria are not explained).

#### 5. Data Requirements and Data Utilized

The data required for police patrol of highway traffic, whether real-time or daily summaries or (as in CHTIS) both, are those that will enable the police to do the most good. What "doing good" consists of depends on what philosophy of law enforcement is embraced: (1) the offender orientation (catching violators), or (2) the victim orientation (preventing accidents). The authors consider the accident-prevention mission, but observe that from a practical point of view, the main analytic contribution to police work, at least in the highway patrol context, was to be the former--helping the police discover where the violators are likely to be, with enough specificity to assist them in deciding what patrol strategy to use (e.g. radar, if the traffic is fast but sparse; ordinary vehicular patrol if it is dense).

From this point of view, the authors have devised a nearly ideal data generator--a machine that informs the police how fast each vehicle is moving past selected spots on the roads in their jurisdiction, doing so on a real-time basis, with the capability of producing summaries covering any desired interval of time. The appropriateness of the particular sensor devices employed depends on engineering considerations that the report does not include. (The authors acknowledge that sensor failure was a factor that had to be taken into account in their analyses, but it appears to have been insignificant).

The manner in which the computer-processed sensor data were used leaves some questions unanswered. Apparently, ISP officers would take home each evening summaries of traffic flow output for the day, to use in drawing up patrol assignments for the following day. This must be premised on some relationship existing between one day's traffic and that of the following day. Nothing is reported about any such relationship, however. It is difficult to imagine what the traffic on a given Friday would tell about the probable traffic for Saturday, unless the data for a large number of Fridays and Saturdays had already been analyzed to reveal any correlations that might normally exist. It is possible that the users had this sort of information developed through experience, taking the form of educated intuition. Perhaps, then, they had nominal patrol strategies in mind and examined the data for exceptions (disruption in the normal flow caused by road maintenance or construction started or completed, adverse weather, public events, etc.), or even for trends in traffic conditions attributable to population shifts in the form of new housing, shopping centers, factories, etc. It is unfortunate that data utilization is not described.

The daily summaries, and predictions founded thereon, were reviewed the following day through traffic spot checks, taking advantage of the CRT and the system in its time-sharing mode. It is not made clear how this was done, though it seems reasonable to assume that the CRT would have been consulted as the day progressed to determine whether assignments should be revised.

Apparently the troopers themselves made some use of these days in deciding how to execute their assignments. It may be that they played some role (greater, or lesser, than before?) in formulating and modifying their assignments.

Hopefully, the authors intended publishing at a later time some fuller account of how the police who used the CHTIS in this test went about doing so.

#### 6. Results and Recommendations

The outcome of the test of concentrated patrol showed desirable effects only during the four hours of the test: average speed, and percentage of violators immediately returned to pre-test levels, as compared with the before and after days. The absence of any carry-over effect of a four-hour saturation should hardly surprise anyone. It is puzzling that the authors even thought that such a test was worth doing. Surely a fair test of whether concentrated patrol can influence driver behavior after patrol is relaxed would require a longer period of application to allow development of public awareness of the enforcement practice. Probably the main achievement of this test was that it tends to validate the CHTIS sensors, computers, and processing and analytical routines.

The investigators also looked for indication that CHTIS might be associated with a reduction in accident risks. They compared the

September-December 1971 test period with the analogous period in 1970, with respect to numbers of accidents and injuries (fatal and non-fatal), costs resulting from same, numbers of warning and citations written, and man-hours dedicated to highway patrol. Essentially no difference in numbers of accidents or injuries was found between the two years. The only possible difference shown was in numbers of citations, which was much greater in the final month of the test than in the preceding year--but when the increase in patrol man-hours is accounted for, the citations per hour is about the same for both Decembers.

Thus, there was no statistically demonstrable advantage in using CHTIS. This may be why the authors take such pains to report the enthusiasm of the ISP in having CHTIS and their regret at losing it once the test came to an end. Certainly it is a virtue of any law enforcement device that it is accepted by the police, but it is a virtue that, standing alone, will not get them the money they need to buy it.

The following statistics on CHTIS accuracy are reported: the standard error of estimate is 3.6 m. p. h. for vehicle speed, 4.2 feet for vehicle length, and 2 milliseconds for headway; further, 4.5% of vehicles were improperly counted (equipment malfunction, failure of vehicle to pass over both sets of loops, etc.).

The authors devoted substantial time, and report space, to considering mathematical models bearing on traffic. They believe such models to be gross over-simplifications of reality and hence of no

predictive value; nevertheless they feel that CHTIS can generate data useful for their development and evaluation. They pay particular attention to the conjecture, found in their literature review, that variability in speed during a day is a reliable indicator of whether accidents are likely to occur. This is based on the assumption that "the greater the variation in speed of any vehicle from the average speed of all traffic, the greater its chance of being involved in an accident" (attributed to D. Solomon). The authors call this speed deviation variable "the only traffic flow relationship identified by past studies as a really promising predictor of accident frequency." They investigated this variable by comparing the standard deviation in vehicle speed for time periods within 45 accident days in 1970 with "comparable" days in which there were no accidents. The frequency distributions of speed standard deviation for accident and non-accident days were found to be virtually the same, however.

## 7. Discussion

What is reported in this paper is obviously very competent research. The reporting appears thorough and forthright. The undertaking was based on what plainly seems like a good idea (i. e. supply highway patrol with real-time data on what the traffic is doing). It is at least a mild surprise that the study shows no greater objective justification for the sensor/ computer system. This raises the question of what measure of evaluation should be used. Clearly, whether or not the police "like" it is of limited



significance. In fact, any development that is warmly greeted by managers and operating staff must be suspected of contributing nothing new. And so it may be in the case of CHTIS.

This review would be incomplete if it did not offer some suggestion as to how CHTIS should be evaluated.

First, the following will be suggested as means that should not be used: (1) before and after apprehension totals, in light of the not-remote possibility of factors which are entirely beyond police control that will affect the number of violations occurring, and since the police, if they wish, may arrest many motorists, or few; and (2) before and after accident totals, since the most direct and immediate causes of accidents may or may not include law enforcement practices. These, of course, are the methods that the authors used.

By any reasonable standard, it must be said that the law enforcement mission is to detect law violations and apprehend the violators. If CHTIS is useful to the state police, it must be because it enables them to catch more of the traffic violators than they are presently able to do. This means that the percentage of violators who receive a warning or citation must increase when CHTIS is added to the armamentarium. This would imply operating CHTIS for a time with data going only to the research center, so that the number of violators could be ascertained; this could be correlated with the number of warnings and citations given out to motorists on the same roads during the same period. (For obvious

reasons, it would be desirable to disguise this operation from the police, or barring that, to collect data only randomly selected days over a long interval.) This would indicate the percentage of violators that are apprehended without CHTIS outputs (with some assumptions required as to apprehension of non-violators). Following this, CHTIS hardware could be installed in patrol HQ, and the rate of violator apprehension with CHTIS employed could be observed. This would yield a proper before and after test of CHTIS.

One possible complication of such evaluation would be the attitude of the user. It would not matter that the police would choose to work harder with CHTIS at their disposal, and turn in more apprehensions for that reason, as that effect might justify the expense. What would matter would be a heightened apprehension campaign of ticketing motorists regardless of guilt to inflate the measure of success. It seems unlikely that false-ticketing could occur to any significant extent without public protest reaching the evaluator's eyes or ears.

## J. Personnel Selection, Evaluation and Training

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## EXTERNAL VALIDITY EVALUATION

### Personnel Selection, Evaluation and Training

The papers in this section all deal, of course, with means to obtaining a police force of consistently high(er) quality. The specific problems confronted however differ among the studies. One very basic problem researched in this area was the relationship between various personal characteristics and subsequent performance as officers. In order to screen new applicants effectively, recruiters must be aware of which factors are, in fact, related to performance--age, education, various personality traits (which can be gauged with specially designed tests). In turn, this suggests another problem area covered in this research, i.e., the problem of evaluating job performance itself, first for the sake of research linking predictors to performance and, second, as a tool in on-going evaluations of officers for promotion and transfer. A third problem area covered was that of ensuring sufficient applicants possessing the desired characteristics and also ensuring their progress through the appointment process. Only one paper analyzed the issue of actually effecting changes in attributes, in this case attitudes, after recruit appointment.

Of the nine papers included in this section, most were concerned explicitly with various aspects of recruiting and screening new applicants. Not all treated the same aspects of the recruiting-screening process, and several used experienced policemen as their data bases, but all were essentially concerned with ensuring a high quality of appointees. In one case, the quality factor was specified in terms of more balanced racial composition (Hunt, Cohen) which, in turn, should enable the Department to function more effectively in minority populated areas. The same concern was the basis for a second study (Chaiken, Cohen) in which the researchers presented empirical data on the differential pass rates for ethnic groups taking the written civil service examination. These studies approached the problem of increased minority appointments from the point of view of first, increasing minority applications, and second, decreasing attrition en-route to final appointment. Little attention was paid to background characteristics of the applicants aside from ethnic-racial group; the desirability of increased minority representation was accepted a priori.

On the other hand, four studies focusing on recruitment and selection were concerned almost exclusively with refinements in screening procedures. The basic approach was an attempt to relate officer performance measures of various types to data which might be obtained at the time of application. Three studies (Baehr, et al.; Furcon et al., a follow-up to the preceding study; and Cohen, Chaiken) all centered on the correlations between the two types of variables. The first two studies, on Chicago police officers, included

predictor data obtained from specially administered tests designed to measure personality traits, aspirations, etc. as well as objective background data. The third study contained no specially administered predictor instruments but relied, instead, on background data, civil service examination scores, and performance as a trainee. In all three studies, performance measures were varied and included such "objective" indications as ratings by superiors. In addition, the first two studies included a more scientifically designed performance measure, i.e., paired-comparison ratings in which superiors were asked to rate pairs of patrolmen so that a single patrolman would be compared to several of his peers by several superiors. This method should have given a broader based indication of performance than, for example, number of arrests, and be more unbiased than the ratings supplied by a single superior officer.

The fourth study relating background to performance was designed as part of a larger project relating predictor variables to performance, but concentrated only on the development of more objective measures of performance. The first three studies were based either on a group of narrow measures of performance (number of awards, absenteeism) or a broader measure of overall performance (the paired comparison ratings) which apparently did not distinguish the various components of behavior. This fourth study thus attempted to fill the void in performance measures by devising a scale of behavior-ranking, essentially a Guttman scale, for each of several facets or dimensions of police officer behavior. Furthermore,

the scales were designed separately for several job categories (patrolman, investigator, etc.). Such scales were envisioned not only as tools in relating predictor variables to subsequent performance, but also as means for actually evaluating officers within a department for promotion and transfer.

In addition to the above six studies explicitly concerned with the recruitment and screening process, one more study (Lefkowitz) might be construed as part of this group. This latter study was an analysis of job attitudes and their relation to background characteristics of policemen. Attitudinal variables included such factors as extent of dogmatism, job satisfaction, and racial prejudice; background variables included age, education, etc. The next phase of the research is designed to link attitudes and job performance. If completed, the full study will show the correlations between background factors and attitudes and, then, between attitudes and performance. Indirectly, the relationships between background and performance will also be noted as they connect via attitudes. This seems a round-about way of linking background to performance, explored explicitly and directly in other studies. The second half of the study linking attitudes and performance, however, might be useful in itself since it would allow post-recruitment assessment of officers for new assignments and promotion. Rather than "branding" officers by their backgrounds, assessment would be based on the more current (and more relevant) data on attitudes gauged at the time of job transfer/promotion.

In addition to the above studies dealing explicitly with character



determinants/predictors of performance, a study done in Washington, D.C. (Block et al.) focused on the sex-related differences in performance.

The objective was an evaluation of the job-effectiveness of a subgroup of officers, i.e., women. Various approaches were used to determine whether or not women are equally effective as men in the same assignments and, thus, whether or not women should be subjected to special training or screened out altogether with respect to some jobs. This, too, is a study which therefore affects screening procedures since it relates an objective attribute - sex - to job performance.

The last study in personnel (Sterling) was concerned only with the post-appointment changes in perceptions which may adversely affect subsequent performance. It was felt a priori that many young recruits come out of training and early on-the-job experiences with perceptions changed, and that these changes may lead to later role conflicts and job dissatisfaction. Thus, the changes were measured at several points in the young appointees' careers. The reasons for such changes were not detailed nor were the mechanisms of changes. The study nonetheless concludes that some of the changes ought to be countered during training. The study is concerned with behavior not from the point of view of prediction given various traits but, rather, with affecting the traits themselves.

All of the studies mentioned above and reviewed in this section are relevant to the general objective of improved quality of police staff, though they may approach it from different aspects. More research is warranted

in this area, however, to validate the various findings of these individual studies and to extend the results to a more general population base. First, most of these studies use data from urban police departments and very few studies are based on more than one city. Little if anything was done to note differences between urban and suburban or rural departments which might affect the universality of the study results. And, although a number of cities were involved in these studies, no one study covered all the cities with the same predictor and/or behavioral measures to see if they were even valid for all urban environments. Perhaps the study with the broadest geographic base was the one which developed behavioral rating scales (Heckman et al.) and even this was limited in its extent. Thus, we feel research should be designed which uses a much broader data base to assess the relationships between predictor variables and performance. The data should be organized and analyzed by strata defined by geographical and community-type characteristics to note whether different relationships hold in different settings and over what strata the same predictor relationships are valid. More than one urban area must be studied in a given research project to validate various predictor instruments for use in urban settings. And suburban and rural areas should be analyzed using the same data instruments.

Second, the attempts to relate background measures and test scores to officer performance were based, for the most part, on samples of experienced policemen. Assuming that the more appropriate predictor variables are those derived from various tests of temperament, attitudes, etc.

rather than objective background data (age, birthplace), it would seem that the studies should be designed as longitudinal analyses of new recruits who are followed through their careers -- predictor instruments administered at the time applicants are originally screened and subsequent performance evaluated at various points thereafter. A set of tests administered to experienced officers and correlated with their performance measured simultaneously will not be fully effective in predicting future behavior of inexperienced applicants if, as is possible, scores on predictor instruments change with age and experience. Given this, we feel that future research should be extended to longitudinal studies to establish which tests are valid predictors when administered to new recruits or applicants, tested on new recruits not experienced officers.

Third, we note that many of the performance indicators used are narrowly based. They are either only partial indications of performance quality, e.g., absenteeism, or manifestations of certain aspects of performance, e.g., complaints, which are indications of citizen evaluation and, as well, a function of the assignments made. Other indicators used are subject to bias, e.g., awards and ratings by superior officers as part of periodic reviews. The method of paired-comparison ratings is one attempt to avoid the biases of a single rating officer; the Behavioral Observation Scales rating system devised in one study is another approach to more objective and systematic evaluation. Such research should be encouraged and

expanded. Future research in this area should, first, consider the various police roles and conflicts among them, second, the fact that different population segments (citizens, other police officers, ethnic subgroups) may evaluate the same officers differently, and, third, proceed to establish an objective, systematic rating structure which takes these considerations into account. Rating systems should also consider the fact that different roles and behavior criteria may be relevant in different types of communities, i.e., that a nationally standardized rating system is not possible. Perhaps some combined rating system can be devised which considers all police roles, which explicitly considers citizen opinions, and which is either universally applicable or is a system composed of parts applicable to each of the several strata defined in the Nation.

Last, we suggest that probably more research is warranted in the area of training itself, finding ways to affect the determinants of behavior (i.e., police attitudes) between selection and graduation so that more favorable behavior patterns may be ensured. If ways can be found to effect changes in those traits which influence behavior, then screening criteria can be more liberal with regard to these traits and concentrate, instead, on those traits not amenable to change during training.

**CONTINUED**

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Performance Rating and the specialized paired-comparison rating techniques developed by the Industrial Relations Center staff) and several objective measures of performance (tenure, departmental awards, complaints, departmental disciplinary actions, attendance, and number of arrests made).

## INTERNAL VALIDITY EVALUATION

### Psychological Assessment of Patrolman Qualifications in Relation to Field Performance

M. E. Baehr, J. E. Furcon, E. C. Froemel  
November 5, 1968

#### 1. Research Goals, Objectives, Policy Issues

(a) Law Enforcement Goal--applicable to furthering all Chicago Police Department goals.

(b) Objective--increased effectiveness of patrolmen/officers on force.

(c) Policy Issue--scientific selection of police officers based on performance.

The study focuses on the application of scientific selection techniques to patrolman selection with emphasis on the use of psychological assessments and performance measures in attempt to:

- \* develop effective procedures for and establish standards for the selection of patrolmen, and,
- \* identification of distinctive "patrolman types" found to exhibit different patterns and performance styles in the field and not adequately described by the "average" patrolman concept.

#### 2. Face Validity Check

This study is an extremely thorough attempt to validate a series of testing instruments against several performance measures for members



of the Chicago Police Department, and to identify the personality characteristics of several subgroups of officers which differed in performance. Selection of tests, criterion measures, and subjects from the CPD all appear to have been appropriate and well conducted. Analysis and reporting of results are generally sufficient for reader examination and substantiation or dispute with findings. In general, recommendations and conclusions of the study appear sound and consistent with the results. Some questions arise with respect to the concept of the "average patrolman" as a comparison basis for the other eight defined groups of patrolmen.

This is a study of concurrent validation of the tests rather than predictive validation, as was pointed out by authors, and should lead to a predictive study. The study suggests several useful additional research aspects which should be followed up. These alone may prove worthwhile to other police departments.

### 3. Methodology

The study was intended to:

(1) Lead to a useful selection instrument based on the development and validation of a battery of psychological tests which would be predictive of successful performance as patrolmen in the Chicago Police Department (CPD) and

(2) Increase the body of relevant information used in selection and placement of personnel by identifying those personality and background

characteristics most closely associated with different modes of performance (both good and bad). The basic study encompassed the detailed testing of 490 patrolmen and the analysis of data appropriate to answering these goals.

The study began with an analysis of the patrolman's working environment to acquaint the investigating team with the basic elements of the patrolman's job and the characteristics under which he must operate. This analysis then was used as a partial basis for both test selection and criterion development for the study. The analysis consisted of field observations and interview sessions used to develop a description of the jobs and the districts in which they worked.

Eight performance measures were selected including two major subjective measures (a paired-comparison rating of overall field performance and the average semi-annual police department ratings of total performance) and six objective measures (tenure, no. of awards, no. of complaints, no. of disciplinary actions, no. of arrests, no. of absences).

Tests for validation were selected in three basic areas to yield: motivational measures; intellectual measures; and behavioral measures. Because of the conditions of the study and the testing situation, tests selected were to be group administered paper and pencil tests with provisions for objective scoring. Tests were administered to patrolmen selected from ten districts, with 242 patrolmen from five tested in Wave I and 248 from the other five districts tested in Wave II, approximately

six months later. Testing was accomplished in a single four hour session for each Wave, with alternation of timed and untimed tests for variety.

Patrolman selection was based largely on the results of the paired-comparison ratings of officers by their Supervising Sergeants and Field Lieutenants. Supervisors compared all possible pairs of the patrolmen they knew in terms of the question: "Which of these two men is the better performer on the street...in terms of better performance in the field?" Patrolmen selected for participation, after volunteering, had to have been evaluated by at least two supervisors; have had acceptable degrees of consistency and agreement in the supervisory ratings; and have a "performance index" value placing them in either the lower third or upper third of the total rated group. (The performance index is a standardized score derived from the paired-comparison rankings of the supervisors.) (The report documents the consistency and agreement of the raters used to determine the acceptability of patrolmen for selection; the interrater agreement appears quite acceptable in relation to available "standards," i.e., current practices.)

Validation of the tests with respect to the prediction of performance criteria was the next step. Initially, the overall predictability of all eight criteria by all tests was examined. Since Waves I and II had some identical tests and some unique tests, one interest was to assess the degree of prediction for the common as well as for the unique tests. Also important was the question of differential prediction for different racial

groups. A preliminary multiple regression analysis investigated these questions and resulted in the decision to continue the analysis separately by both wave and race. To do this, each wave was randomly divided into two parts and then each part was considered in terms of the Negro, White and total subsamples. The separate parts were for cross validation purposes.

At this point, the researchers modified their study design: (1) they determined to drop the last five of the "more narrowly defined" performance measures and work only with the two ratings and tenure as their criteria for test battery validation (to accomodate the expanded design resulting from the splits of the waves into two parts); (2) because of the large numbers of slightly predictive variables found in the preliminary regression analysis, it was decided to restrict the variables entering the regression equation to those with significant correlations in the primary sample which also retained the same sign for the cross validation sample. (This is based on the argument that consistent correlations are more meaningful for later predictive studies so this study should emphasize locating variables showing this tendency, and also on the fact that such inconsistent variables were contributing little to the prediction, or acting largely as supressor variables in the predictions.) While both of these steps are questionable they are not so serious as to invalidate the rest of the study. Although some spurious effects in regression coefficients might result from these variable restriction procedures, the effects

should not be large. Similarly, exclusion of the minor criterion variables from further consideration seems justifiable based on the preliminary regression coefficients (see page 100).

Cross validation procedures were carried out, under the restrictions above, using multiple regression techniques and normal cross prediction and correlational analysis. Cross validation was performed both ways, i.e., with each part of each subsample used as a primary sample and the regression equation then used for predictions for the other part as the cross validation.

Following the concurrent validation of the test battery, the investigators analyzed the results to identify the test variables which were predictive of each of the three criteria for each racial group. Racial differences are discussed and presented as meaningfully related to prediction of success in patrol work. These differences are then discussed in relation to the differences in validities of the test battery for the Negro and white groups. The conclusion is drawn that the separate development of prediction equations by racial group is the preferred technique and should yield consistently better predictions of performance criteria than using predictions based on the total group.

Finally, the technique of nodal analysis, a variation of cluster analysis, was used to identify groups of patrolmen with similar performance patterns. Clusters of patrolmen were derived by grouping those with the most similar patterns first. This process, though not clearly spelled out in the report, proceeds until no additional persons with similar performance

can be identified (according to a criterion of difference not specified here). At that point additional clusters are begun and become separate subgroups of the total group. Eight clustered subgroups were identified, with four being common to both Waves I and II while two others were unique to Wave I and the last two unique to Wave II. Some remaining, non-clustered, patrolmen were found to have performance patterns with mean scores equivalent to the total sample. This group was identified as showing a "basic performance pattern" for the CPD. Differences between the eight subgroups and the "basic pattern" group were analyzed for all performance criteria and for the predictor test scores. Statistical "t" tests were used.

Differences in performance and in psychological test scores were contrasted and discussed for all subgroups. The conclusion was that all eight subgroups were distinctive in performance and were at least minimally differentiable from the "basic pattern" group. Discussion of the differences on the various tests found for the different subgroups is intended to provide basis for possible identification of potential good and bad performers in future selection efforts.

#### 4. Data Requirements and Data Utilized

A performance prediction and validation study requires the careful collection and appropriate analysis of multiple data sets about each person studied. The critical aspect of data collection is the determination of the optimal set of independent or "predictor" variables and the "test" performance variable(s) to serve as the criterion variables.

This study follows tradition in personnel selection and classification research in selecting a set of psychological and personal measures as the major predictor set to validate against patrolman performance. While these specific tests and instruments are not necessarily widely used, they have been used in other studies by the Industrial Relations Center (the present authors) and are highly similar to instruments used in many other studies.

With respect to the performance measures used as criteria, it appears that the authors attempted to use as many objective measures as were available which would be indicative of level of performance. That is, tenure, awards, arrests, complaints, absences, etc., constitute most of the standard records that are maintained on the individual policemen. The subjective ratings of performance by supervisors are also a routinely maintained measure which apparently has significance for the Chicago Police Department. The other major criterion variable used was a derived measure, based on an application of a highly respectable psychophysical technique, the method of paired comparisons. This technique usually yields a quite stable estimate of the relative valuation of the entities judged, in this case, the patrolmen in terms of their field performance.

The test selection procedures and criterion development activities as described in the report appear to be entirely adequate. Thus, the data set utilized should be basically adequate to attempt to answer the questions being studied.

## 5. Experimental Design and Controls

The basic design for a concurrent validation of psychological characteristics of currently employed patrolmen as potential predictors of performance was adequate and well conducted. The techniques used and the analysis reported were appropriate. The techniques used to obtain the sample of Chicago policemen were also adequate and resulted in a sample apparently quite representative of the high and low performers in the Department. This sample also reflected fairly well the racial composition of the Department.

The major weakness of the design is that it was necessarily a concurrent validation study instead of a predictive validation (as the authors point out and hope to achieve in the future). A predictive validation would have assessed all patrolmen prior to entering on duty and all applicants (excepting those physically, mentally, or morally unfit) would have been employed. Then the performance of all these patrolmen would have been studied to estimate the predictability of the performance based on the psychological assessments.

Some good points to be mentioned are:

-- The Industrial Relations Center of the University of Chicago is a reputable and independent organization, highly skilled in design and conduct of such research as the present study.

-- Inconsistent data developed in the patrolman ratings for selection of subjects were eliminated within reasonable limits.



-- The selected sample of patrolmen was demographically and racially representative of the CPD.

-- The tests selected for use in the study cover a wide range of psychological characteristics and the tests used were varied between Waves I and II because of data examination from Wave I, yielding more information across waves.

-- The preliminary analysis of the results and regression equations were used to determine the final analysis of data by separate waves and by races. Equations were found to predict more strongly within the racial groups.

-- Findings of the study are discussed in terms of possible implementation of the testing battery as a selection device in the CPD and elsewhere, but the authors note the need for extensive local validation studies, and for further research and predictive validation in the CPD as well.

Some bad points are:

-- The authors attempt to compare characteristics between eight cluster subgroups (defined by tenure and performance) and a nonexistent average patrolman group, defined by the patrolmen who did not fit into any of the groups and whose scores corresponded closely with the total averages. However, the selection of subjects eliminated the middle third of the basic group from testing, therefore none of the truly average patrolmen were in the tested group (see Section 7, Discussion, below).

-- For several reasons stated in the text, the authors chose to eliminate the basic objective measures of performance in the CPD from further consideration after the preliminary analysis. Thus, subsequent predictions were derived only for the two subjective ratings and for tenure in the CPD.

-- Being a concurrent validation of the tests, the study did not include testing of persons who were rejected by the CPD. Thus, we do not know whether or not these persons would have shown scoring patterns significantly different from those persons accepted by the CPD. However, even if we had scoring data for the rejected applicants, we would only know whether the current screening practices result in rejection which is consistent with the tests administered; we would still not know if such rejection were in fact valid since those rejected never became officers and thus there is no on-the-job indication of their level of performance.

-- Several of the figures used to present results and comparisons are misleading and occasionally actually erroneous; especially in Chapter VIII, comparing performance of the patrolman "types". (See 7, Discussion, below.)

## 6. Results and recommendations

The results of the study are reported in relation to the

two separate aims of the study: development of a selection battery and standards; and, identification of discriminable types of patrolman for selection and placement purposes.

Validation of Selection Battery. In the initial regression analysis, generally acceptable values of corrected multiple correlations ( $R'$ ) were found for most of the attempted predictions (range of  $R'$  was .29 to .96). The lower values were found for predictions of the total group within a wave and using those tests common to both waves. Higher correlations were obtained when using wave-specific tests and predicting for only one racial group. The preliminary results of cross validation between waves suggested that breaking the waves into four racially-determined subgroups, i. e., Wave I-nonNegro, Wave I-Negro, Wave II-nonNegro, Wave II-Negro, would yield higher multiple correlations ( $R'$ ) and thus a higher probability of correct predictions. When this was apparant, the cross validations were performed on this disaggregated basis. The revised cross-validation design was carried out for only the three "major" performance criteria: the paired comparison supervisor's ratings, the CPD performance ratings, and tenure. Also, the variables allowed to enter the regression equations were limited to those having significantly non-zero simple correlation ( $r$ ) in the primary sample and having the same sign (+ or -) in the cross sample. Under these rules, both the number of

multiple regressions and the potential number of predictive variables in a given equation were restricted to reduce the size of the problem.

In the cross validation, sets of regression weights were established on randomly selected parts of the total, racially-mixed, group, and on the white and Negro subgroups separately. The best prediction of performance was found when equations developed on a subgroup were used for predicting criterion scores for the other half of the same group--this was particularly true for the Negro group. The poorest cross validation predictions were obtained when the regression weights developed for one racial group were applied to the other. This directly implies the use of entirely separate validation and selection models for the two racial groups in further study. This is in accordance with other data and with recommendations of the Equal Employment Opportunity Commission as well.

It is interesting to note that the tenure criterion is best predicted by the regression analysis and holds up best in cross validation also. The next most predictable criterion is the Chicago Police Department performance rating and the paired comparison rating is mainly the least predictable. These results are generally true for both white and Negro groups and consistent across Waves I and II, also. Thus for this battery of tests, and this sample, it is easier to predict how long the patrolman has worked than it is to predict his performance. This may be an artifactual relationship, based largely on correlation between tenure and age and between age and test performance.

Identification of Patterns of Patrolman Performance. Through nodal analysis (a form of clustering persons with similar patterns of response), eight separate performance subgroups of patrolmen were tentatively identified. A ninth group, the remaining group of 202 patrolmen who did not fit into any of the eight clusters, was used as a standard of comparison. When the eight clusters were examined, eight "types" of patrolmen were identified--based on differences in performance. These were characterized as (1) short-tenure--excellent performance; (2) short tenure--good performance; (3) short tenure--poor performance; (4) average tenure--excellent performance; (5) average tenure--poor performance; (6) long tenure--excellent performance; and (8) long tenure--good performance.

The authors have made the assumption that the non-grouped patrolmen represent a "Basic Performance Group" and draw comparisons between each of the other eight groups and this one. They base this assumption on an apparent similarity of patterns of performance criteria of this group and the total sample. As stated, p. 188: "...the mean scores of this group were compared with those of the original sample and found to be equivalent." This assumption will be considered in the Discussion section below. For the moment only the results of the comparisons will be discussed.

The important predictors found in the study were from all areas of measurement used in the test batteries. Among the motivational measures, those derived from the Personal History Index were found to be more important for prediction than those in the Work Interest Index. Even so, the work interests were found to be somewhat related to all three criteria. It is pointed out that the work interest measures should be more important in the selection of new policemen than in this study of currently employed persons. The intellectual measures included both specific mental abilities and special aptitudes. Of the abilities, visual perception appears to be most important. Closure speed and perceptual speed showed somewhat conflicting results in prediction. The point is made that the selection process has curtailed the range of abilities in the sample through elimination of candidates with low IQs and with other negative attributes. Again, a predictive study would be required to accurately assess the contribution of mental abilities to selection. Among special aptitudes, the social insight set are most important, with the Test of Social Insight ranking second to the Personal History Index in prediction of the performance measures. The Cree Questionnaire, measuring creative potential, was also usefully related to performance, but is thought to be less desirable for battery inclusion because of time requirements.

Among the behavioral measures, the Temperament Comparator was most useful, and was ranked with the Test of Social Insight in performance

prediction. Some of its elements also predicted tenure fairly well. The Press Test, the Arrow-Dot Test and the Edwards Personal Preference Schedule (EPPS) all contribute somewhat to the prediction of all three criteria. The study suggests that the Arrow-Dot and Press Tests are more efficient than the EPPS because of the greatly shorter time required for administration.

The report next presents a summary of test variable scores that are likely to be most predictive of performance. The profiles of white and Negro subgroups of the sample are compared to generally standardized test results (based in most cases on a general industrial response pattern) or to more specific standards developed from the overall policeman sample. These results are much too lengthy to summarize here, but it may be said that the policemen appear to perform much like first line supervisors in industry on those tests for which such norms are available. Patrolmen, both Negro and white, do not appear to deviate very much from normal on most of these measures. There are also few real differences in mean scores for the two subgroups. Although small (statistically significant) differences were found for several of the variables, these do not appear especially meaningful, nor interpretable, for the total sample. It is easily said that the similarities between the two groups far outweigh the differences.

In terms of the eight performance criteria, the identified eight types of patrolmen were found to differ significantly from the "basic group" on most of the individual variables. Subgroup 2, short-tenure--good performance, differed from the basic group on all eight criteria and the lowest number of criteria on which differences were found was four for the Subgroup 5, average tenure--poor performance. Some additional differences among the subgroups are discussed below.

Subgroup 1 -- Short Tenure--Excellent Performance. These highly rated officers (N = 26) attained very high arrest and award records, showed significantly fewer absences than the average and had about average numbers of complaints and disciplinary actions. While not otherwise different from the basic group, these officers showed significantly higher scores on both drive and vocational satisfaction. They also have higher levels of vocational aspiration and artistic interest and low interest in scientific work. These patrolmen are slightly higher on reasoning ability and language and significantly so on closure speed, perceptual speed and the AC Test of Creative Ability. Socially, these officers show significant tendencies toward cooperative behavior and away from withdrawal in problem situations. They are also inclined to be active rather than passive.

Behaviorally, this group had faster reactivity to stimuli, were significantly more conforming than average, and were found to be significantly more outgoing and excitable and less stable and less sociable than the average group. In terms of their personal needs, as measured by EPPS, they scored significantly lower on needs for autonomy (independence) and intraception (analyzing feelings and motives) and higher on succorance (receiving support from others).



In general, these officers accept authority and are effectively reinforced by supervisory response to their excellent performance records. They are satisfied with their career choice and exhibit drive and enthusiasm for success and advancement. They are highly successful officers.

Subgroup 2 -- Short Tenure-- Good Performance. Although highly rated by supervisors, these officers (N=58) show significantly fewer arrests and awards than average. They also show significantly fewer complaints and disciplinary actions. These facts are true even though the officers are assigned to districts with slightly higher than average index crime rate. Officers in this group score very much like the basic performance group on intellectual measures, special aptitudes, and most of the measures of motivation and behavior, as well. Differences were found in a lower level of financial responsibility, and a higher level of both parental family adjustment and vocational satisfaction.

Behaviorally, these officers were significantly less withdrawn, had a lower level of possible emotional problems, and showed a higher level of acting-out (expressing feelings overtly) than the basic group.

Subgroup 3 -- Short Tenure-- Poor Performance. These officers (N=59) are poorly rated on both performance ratings and have fewer than average arrests and departmental awards, as well. They also have fewer complaints and disciplinary actions, but apparently this may be due to inactivity. A majority of these officers is assigned to districts with higher than average crime rates. Motivationally, these officers are

significantly less involved in family and responsibilities and lower on job stability. They are also significantly higher on vocational satisfaction and show no differences in work interests from the basic group. This group is significantly higher in reasoning ability and in closure speed and organizing a perceptual field. They do not differ from the basic group in verbal comprehension, creative problem solving, or responses to social situations.

Behaviorally, these officers have faster reaction speed, even under pressure, to stimuli than the basic group. They also score higher on ego in the Arrow-Dot Test (a measure of realistic control over impulses).

These officers also show a significantly lower level of creative potential and tend to demonstrate a submissive social orientation as compared with the basic group. These men tend to be more outgoing and expressive and less consistent in their responses than the basic group.

Subgroup 4 -- Average Tenure-- Excellent Performance. Of those officers considered established (i.e., "average" tenure), those with excellent performance records are at the longer-tenure end of the tenure range for the group. They also have a large number of departmental awards and a high number of arrests. Their attendance is good and their complaint and disciplinary record is better than average (fewer of each). This group represents a highly desirable pattern of overall performance. These officers are assigned to the full range of crime rate districts.

These officers scored significantly lower on achievement and adjustment in school situations and also on technical accomplishments. They also scored significantly higher on early family responsibility, occupational stability, and general health. These officers did not show many differences from the basic patterns in work interests, intellectual measures, or social insight measures. They also showed few differences in the behavioral area. Among the few were a significantly lower ability to retain a perceptual figure under distraction, a significantly higher score on realistic impulse control, and a lower one on impulsivity itself. They showed a strong preference for social activities and are significantly less demonstrative and somewhat more talkative than the basic group. They also showed a significantly lower autonomy need and a higher aggression level than the basic group pattern.

These officers are a highly respected, well controlled and productive group of patrolmen and represent a highly desirable element in the departmental organization.

Subgroup 5 --Average Tenure--Poor Performance. This group (N=24) is clearly marginal in performance measures, being rated significantly lower on both performance ratings. They also show high disciplinary action rates, significantly lower arrest rates, slightly more than average complaints and slightly fewer than average awards. Although representing a poor performance pattern generally, they are assigned across the range of districts based on crime rates. This group was found only in Wave I.

On background and experience, this group differs significantly from the basic group only on vocational stability, showing higher concern for establishing security and stability in their work. They also scored slightly lower on drive and slightly higher on parental family adjustment.

Intellectually, these officers did not differ on reasoning ability but scored significantly lower on verbal comprehension and below average on ability to organize a perceptual field. They were not significantly different from the basic pattern in creative problem solving nor on tests of social insight although, on the latter, they were slightly less cooperative and more passive.

There were few real differences in behavioral measures for this group although the group scored significantly higher on the behavior inventory, an instrument validated against the pass/fail criterion for the Department's personal background investigation. This group also exhibits an impulsivity profile identified by the Department's Employee Appraisal Section as possibly associated with poor performance. On personality estimates, this group tended to score in mostly negative directions, but not significantly. These include tendencies toward withdrawal, pathological responses, and higher neuroticism. These officers also tended to be somewhat more outgoing and sociable and somewhat less self-confident than the basic group.

This group shows both verbal and behavioral tendencies which suggest that they might have been "false positives" on the former departmental selection devices: the Civil Service Examination (intelligence) and the

background investigation (behavior).

Subgroup 6 --Average Tenure--Conflicting Ratings and Problems.

The 18 officers of this group were found only in Wave II of testing. They are, on the average, rated as average by superiors but perform either very well or very poorly on most of the other criteria. They have an outstanding record of arrests and departmental awards, but are also significantly higher than average on absenteeism, disciplinary actions, and complaints. The paired comparison ratings for these officers showed a significantly lower rate agreement than for the basic performance group, indicating a range of conflicting beliefs about the competency of these officers.

Motivationally, these officers score much like the basic group except for significantly lower scores on early family responsibility and significantly greater preference for work situations involving authority and prestige. The group scored significantly lower than average on closure speed, representing speed of perceptual organization of a field. They also have a tendency to withdraw in social situations. Behaviorally, these men react significantly faster, and also show an interesting contrast of strong levels of impulsivity and of moralistic control of impulse. This suggests an adjustment conflict between that desired and a recognized ideal thing to do. They also demonstrate a significantly stronger orientation toward systematic activity and report a significantly faster level for their own reaction time. Tempermentally, these officers score lower on self-reliance and are less even-tempered and more talkative than the basic pattern. These

results suggest an inability to deal effectively and realistically with concrete job situations. Their conflicting impulsivity and control, together with the lack of self-confidence and responsibility may lead to a lack of ability to handle the problems confronting the patrolman on the street. Although functioning acceptably part of the time and having a relatively good arrest and award record, these patrolmen should be considered marginal overall.

Subgroup 7 --Long Tenure--Excellent Performance. The 11 officers of this subgroup, identified in Wave I only, have outstanding ratings but are relatively inactive in terms of arrests and awards; they are the longest tenured group of all, and have significantly fewer disciplinary actions and complaints. These are older patrolmen, not highly productive, but thought to be good performers by supervisors.

These officers score significantly higher in higher educational achievement, and in early family responsibility and in financial responsibility. They have established occupational stability but score significantly below the basic group on vocational decisiveness, indicating a late occupational choice. These patrolmen score as well as the younger basic group in intellectual abilities, contrary to normal expectations on several of these tests. There were no differences between this group and the basic group in social insight measures and relatively few differences in behavior measures, either.

These officers scored significantly below the basic group on the behavior inventory--more like the pattern associated with passing the

background investigation. They also scored significantly higher on the trait prompt starter, and lower on the traits socially at ease and sociable, suggesting a work rather than people orientation.

This group represents the successful, mature, officer with consistently good service and ratings. While relatively inactive in street work, these officers are thought to represent a successful pattern of patrolman performance.

Subgroup 8 --Long Tenure--Good Performance. The 13 officers in this group were identified from Wave II testing and were found to have significantly higher ratings than the basic group on both the PC and CPD sets. They are significantly higher on awards but also on disciplinary actions; their arrest record was higher also, but not significantly so. Except for the disciplinary action record, these are highly successful policemen. These officers were found assigned to all types of districts with both high and low crime rates.

In background measures, this group showed significantly lower scores on school activities, leadership and group participation, and selling experience. They showed a higher level of vocational stability and a significantly lower level of vocational satisfaction. The work interest pattern of the group does not differ from that of the basic group except for the socioeconomic aspiration level which is significantly lower. These officers are significantly lower in scores on intellectual ability than the basic group, perhaps due to older age. The patrolmen are also less apt to use an aggressive approach to social problems as measured by the Test of Social Insight.

Behaviorally, this group scored significantly lower on the test of creative potential and were found to be significantly less sociable than the basic group. On the EPPS, this group was significantly higher on the needs for order, affiliation, and nurturance, and significantly lower on the need for autonomy. These suggest dependence on others, a need for precision and organization, for cooperation and for helping others. This subgroup, showing generally good performance in the field with the exception of high rates of disciplinary actions, may represent the stereotype of the old-time beat policeman: told what to do, would carry orders out to the letter with loyalty, but would also give assistance to others in the process.

Conclusions About Patrolman Types. It is believed that the study has successfully identified and described the eight patrolman types and identified the points in which each differs from the basic performance group (represented by the non-clustered patrolman, not identifiable as to belonging to any unique type). The authors believe and hope that these types and their characteristics can be usefully applied to the development of better selection and placement techniques in the CPD, and perhaps elsewhere. The point is made that early identification of good and poor policemen can be helpful in both culling out undesirables and in determining which patrolmen should be watched and trained for higher responsibility. These findings, if further validated, could also be useful for determining the assignments which might best suit the capabilities of the type of patrolmen available.

The tests identified by analysis of variance as being the best discriminators between the eight subgroups were:



<u>Motivational Measures:</u>	<u>Intellectual Ability:</u>	<u>Behavioral Measures:</u>
Personal History Index (Especially Factors 2, 5, 6, 8 and 13)	Closure Speed	<u>Temperment Comparator</u>
	Closure Flexibility	<u>Arrow-Dot Test</u>
	Perceptual Speed	<u>Behavior Inventory</u>
		<u>Edwards Personal Preference Schedule</u>

The authors recommend these tests should be included in further research on the performance subgroups currently identified with respect to both selection and job placement in the CPD.

Recommendations. In addition to the recommendation above about further study of tests in relation to the performance subgroups, the authors recommend continued implementation and research with the selection battery identified through this concurrent validation study. This should include:

(1) Local Validation Studies. For departments other than CPD (and for further use in the CPD) it would be necessary to conduct a prior or concurrent study of the validity of these measures for prediction of successful performance in the local situation. The specific findings of this study should be generalized only with caution. Standards of acceptable test performance for the CPD may be inappropriate elsewhere and should be carefully investigated before use.

(2) Predictive Validation Study. The present concurrent study of predictability must be followed up with a predictive validation of the test battery for purposes of selection and job placement. This should deal with applicants who are not prescreened for intelligence or emotional health prior to testing. The test batteries would then be able to better discriminate among individuals and the traits actually related to subsequent performance could be more readily identified.

(3) Construction of Specialized Instruments for Selection. This study has indicated some areas in which special instruments might be developed which could increase accurate selection of candidates likely to be successful or to differentiate among candidates for placement. An example might be a specialized background inventory, based on the identified importance of personal history in this study. Another example would be to use item analysis to cull out unproductive items from standardized tests, thus shortening them.

(4) Expansion of the Selection Research to Other Police Department Groups. Such studies could be useful in examining the characteristics of successful and unsuccessful policemen in other parts of any Police Department. This study has been limited to patrolmen by intent. This same battery, or with alterations, might prove equally valuable for prediction of performance of other division performance. This would also allow collection of additional data relevant to placement of incoming officers.

(5) The Effects of Organizational Structure on Personal Performance. The identification of subgroups with different degrees of successful performance under varying operational conditions should continue as a longitudinal study to determine the eventual placement, promotion, and success or failure of the members of these subgroups in the organizational structure.

(6) Training for Specialist Functions. The increased knowledge of the CPD and the results of research have suggested three areas of specialized training:

(a) Training of Patrolmen. Training can be instituted with a view toward developing the attributes identified by this study as important to successful performance. One suggested area for training is in human relations especially in solution of interpersonal problems.

(b) Training of Supervisory Personnel. These personnel should be trained in the managerial aspects of their jobs to increase their efficiency in relation to training and development of manpower resources in the CPD.

(c) Training for Administrators of Selection and Placement Programs. Departments should select qualified personnel from within or outside the department to be responsible for implementation and development of a selection and placement program. Such personnel would also benefit from training specifically directed toward use and interpretation of the validated test battery.

## 7. Discussion

Overall this is a highly competent, efficiently developed and conducted study leading toward development of a test battery designed for selection and classification of patrolmen applicants to the Chicago Police Department. In general, the study is very adequate and well reported. There are some shortcomings, however. These relate mainly to the determination and examination of the patrolman types and to the presentation of data. There is a serious question as to the acceptability of the "Basic Performance Group" as being appropriate in any way for use as such a group. These non-clustered patrolmen can in no way represent the average patrolman in performance, since all patrolmen in the sample--all 490 tested--were selected from the top and bottom thirds of the performance index range. This precluded the existence of "average performers" from the sample. By definition these 202 "basic performance group" members were actually performing either in the top or bottom third of the total patrolman sample--based on the paired comparison ratings. This means that any averages drawn from this group--for comparisons as used with the other clusters of patrolmen--should be thought of as representing a group of relatively good or relatively poor performers who happen to have overall patterns of performance somewhat unlike those observed for the eight clustered groups. They should not be thought of as average performers, simply because they were not, as individuals, rated as being average performers.

For some reason, their averaged scores apparently fell midway, or somewhat similar to midway, between those of the other groups.

The basic assumption is based on the following statement from p.188 as: "...the mean scores of this group were compared with those of the original sample and found to be equivalent." The only check possible on this assertion is through comparison of data presented in Chapter VIII. Table 2 therein presents performance measure data for all nine groups which can be appropriately recombined to estimate quite closely the overall group performance measures. When this is done for the paired comparison performance ratings, we obtain an estimated mean of 50.86 and standard deviation of 14.85 for the total group. Comparing these with the data for the non-matched group, as though they were independent samples, which they are not, strictly speaking, we obtain a t value of 2.00, which has a probability less than .05 for these samples. Thus, if these were independent samples of patrolmen, we would conclude that their performance was not equivalent at least on the paired-comparison rating. Since these are not independent samples, this test should not be performed. However, this is an indication that this group should not be considered as an average group even from this point of view, either.

The other major shortcoming of this presentation is that the figures presenting the comparisons among the subgroups within each tenure group, Figures 1, 2, and 3, in Chapter VIII, are somewhat misleading and in cases

in absolute error. Figure 1, p.193, for example, shows a wrong value for absences for Subgroup 3, which in Table 2 is seen to have scored above the basic group and should thusly be shown above the standardized score of 50. Similarly, Figure 3 has reversed the legend for the graph, naming the Subgroup 7 data as that for Subgroup 8 and vice versa.

There are also some apparent problems in the standardization process for these figures, unless the description of standardization on the norm of the basic group does not mean what it says. If that were the norm for all figures, then corresponding values for different subgroups should be corresponding distances from the score of 50 on the scales. This is not always the case. Such poor graphing of data can cause serious confusion to readers and can turn them off on what could otherwise be a very useful study report.

That is the overall conclusion about this study: it is a highly technical and generally well done study, but it has some faults. These faults should have been avoided. And later studies should avoid them. As a concurrent study of the validity of an extensive set of appropriate tests for selection and type classification of patrolmen, this study is a success and should be reviewed and perhaps followed up by police department personnel workers across the country. The identification of the eight (or perhaps nine) performance subgroups from the tested sample could be of significant value in subsequent personnel selection and placement studies, as mentioned by the authors. Comparisons should

have been drawn among the various subgroups, though, instead of only between each one and the basic--nonclustered--group.

Still, with some faults, the study has:

(a) Demonstrated that some tests of the battery applied are useful for selection and potential prediction of performance through concurrent cross-validation techniques,

(b) Demonstrated that performance subgroups can be identified in the Chicago Police Department which appear possibly to have somewhat different background and behavioral characteristics as compared with a (perhaps faulty) reference group,

(c) Identified a subset of tests that are likely to be most useful in further studies of selection and classification of patrolmen in the CPD,

(d) Made valuable recommendations for further follow-up studies and potential implementation of the selection battery either in the CPD or other departments, and

(e) Specifically, laid a good basis for a predictive validation study to investigate the actual utility of these tests in predicting future performance of unscreened applicants for patrolman positions.

POLICY TOPIC: Personnel Selection, Evaluation and Training

TITLE: Minority Recruiting in the New York City Police Department:  
Part I: The Attraction of Candidates,  
Part II: The Retention of Candidates

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#### ABSTRACT:

This is a study of the recruitment practices related to minority hiring in the NYCPD during October 1968 through July 1969. Purposes of the study were: (1) to learn the reasons for present difficulties in recruiting minority personnel, (2) to explore the effectiveness of current strategies and programs for recruiting minorities, and (3) to devise new approaches aimed at improving the representation of minority groups in the NYCPD.

Part I is a study of the factors related to police work which are attractive to minority youths and of which communications media are likely to be most productive with respect to attracting candidates for recruitment. Interviews were used to collect responses of minority youths about what aspects of police work were attractive and about what media had been effective in informing them of NYCPD job opportunities.

Part II studies the extent to which candidates drop out of the recruitment process and to determine and suggest some potential remedies. This included the identification of the primary points of candidate attrition, the attrition probabilities at each phase, and some of the factors that operate to reduce the original number of applications to that number eventually appointed.



## INTERNAL VALIDITY EVALUATION

### Minority Recruiting in the New York City Police Department

#### Part I: The Attraction of Candidates

#### Part II: The Retention of Candidates

Isaac C. Hunt, Jr. and Bernard Cohen  
May 1971

#### 1. Research Goals, Objectives, Policy Issues

The objectives of this study as stated in both the grant proposal and this report were:

- (1) To learn the reasons for present difficulties in recruiting minority personnel;
- (2) To explore the effectiveness of current strategies and programs for recruiting minorities; and
- (3) To devise new approaches aimed at improving the representation of minority groups in the Police Department.

#### 2. Face Validity Check

This study systematically goes about the investigation of matters related to the above three objectives, first by dividing the problem into two areas: (1) the attraction of candidates, and (2) the retention of candidates. Surveys were conducted both by interviews and questionnaires to determine whether potential applicants to take the NYCPD exam learned of openings on the police force and if they knew of the openings, how they

learned of them. Interviews were completed only for minority members between the ages of 19 and 29 with at least a high school education. This insured that of the 200 interviews to be undertaken, with only few exceptions those responding would actually be eligible for appointment to the NYCPD. Such procedures are standard screening to insure that interviewers spend a minimum of time with unqualified candidates.

Nowhere in the report however is a rationale given that 200 interviews constitutes a sufficiently large sampling frame for the magnitude of the problem and population involved. We assume as good researchers they had a rationale for the number interviewed but in the interests of brevity, neglected to include it in the detail of the report. Other than this omission, it appears that this study was well thought out, planned, and executed with good statistical procedures for analysis and reporting.

#### 3. Methodology

To assess the attractiveness of police work, 200 interviews were held with minority persons not known to be interested in police work. They were asked questions about whether they knew of openings or not, and about the advantages and disadvantages of police work. In addition, 2,752 questionnaires were mailed to persons who applied but failed to appear for the Patrolman's Examination on April 5, 1969. The questions on the questionnaires were similar to those asked in the interviews described above. Nine hundred seventy-nine or 36.91% were completed and returned.

The responses from both interviews and questionnaires were analyzed and reported by racial background, boroughs of NYC, surrounding counties, and tabulated by source of knowledge about NYCPD exams, attractive factors of NYCPD, interest in police career, reasons for not taking exam, and recruiting suggestions. Following these tabulations, a discussion and evaluation of each different type of media was presented, with recommendations for utilizing those media reaching the most potential candidates for the least amount of money.

Aside from the question raised earlier about the sampling frame size, the methods appear to be straightforward and standard research methods appropriately applied to the questions pursued.

In Part II--Retention of the Candidates--the attrition of those passing exam #6083 were studied to see where and why attrition took place. The entire 2,939 applicants who passed the written exam were studied and analyzed to determine percentages of both Blacks and Puerto Ricans who attrited at each point. Following the analysis, data are presented in graphic form and recommendations are made for reducing attrition at each point.

#### 4. Data Requirements and Data Utilized

The data used were all properly collected and processed, and were pertinent to the questions raised. The only possible reservations concern the data not collected--i.e., the 100 questionnaires which were returned by the post office as incorrectly addressed. Apparently no attempt was made to have these forwarded or to follow up a sample of

these applicants, e.g., 10 of them, to see what actually was happening to them. Likewise, a sample of those failing the test might shed light on their characteristics and thus, possibly, suggest policies (such as a police academy preparatory night school) to reduce their failure rate.

#### 5. Experimental Design and Controls

Although this study does note a recent increase in minority group applications for the written examination, presumably a positive response to increased efforts to recruit minority candidates, the study itself is not really an evaluation of the effectiveness of recruitment measures in the formal sense. They were not trying to calculate the percentage change in applications effected by their newer recruiting techniques but were trying, instead, to assess which of the modes used appear to be most effective and at what points minority candidates are lost along the way. Thus, perhaps there was really no need to collect baseline data or data on some sort of pre-program situation. Nonetheless, some comparison data might have been useful in evaluating incremental response per unit of program expansion by publicity mode.

The study includes information on both persons selected at random and on applicants having had contact with police recruitment at several levels. The latter group, however, is not analyzed as fully as might have been desirable. That is to say, of the groups having passed the written examination, data is presented to show the proportion dropping

out or failing at each of the successive processing levels, but no information has been collected on the reasons for applicants voluntarily dropping out. Since a larger proportion of Blacks seem to drop out at the earliest stages, information on the reasons for such withdrawal could be as important to the recruitment process as information on how to reach applicants signing for the written examination (the very first step in the process). Even if their failure to include such analysis in their study design were due to time and budgetary constraints, the authors nonetheless should have suggested this area for future research.

Furthermore, the study did not include interviews with persons who were motivated to take the written exam to find out how they learned of openings and what media reached them. Such analysis would indicate which modes of publicity were operationally effective in producing applicants.

#### 6. Results and Recommendations

Specific recommendations were made for the NYCPD to aid in attracting (minority) candidates. Since most of them would not necessarily apply elsewhere, the general method of arriving at each recommendation will be given rather than the specific outcome.

(1) From the interviews with the population eligible to become policemen, but which had taken no steps to do so, the following was learned:

(a) Advertisements - whether by poster, newspaper, handouts, or radio - should "stress the feeling that comes from helping people" and "the opportunity to help maintain law and order within minority communities" as positive outcomes of service with the NYCPD. In addition, the pay (estimated by interviewees as 15% lower than it was), fringe benefits, and security are also considered important.

(b) Radio and Daily News advertisements, though inexpensive, were responsible for informing three times as many persons of careers with the NYCPD as were the mobile recruiting teams.

(2) Based upon responses received from those who signed up for the NYCPD exam but did not take it, the following suggestions were offered to the NYCPD:

(a) Through its posters, handout literature, recruiting and other publicity, the Department should make it clear that a candidate can acquire a high school diploma or equivalency certificate after passing the written Patrolman's Examination.

(b) The Department should cooperate extensively with the Guardians Association and the Department of Personnel in their efforts to establish civil service preparation courses in minority communities. These courses should be similar to, but more extensive than, the one-day course given before the April 1969 examination at locations in the South Bronx, South Brooklyn, and East Harlem. The last was attended by 150 young men. The NYCPD should help in the selection of sites, in the provision of course

material, and in publicizing such courses. The NYCPD should also encourage its commands at locations in minority communities to institute efforts similar to the two-week, Saturday evening preparatory courses given at the Brooklyn North Division headquarters by policemen stationed there prior to an examination.

(3) Question 9 of the Interview Form queried people on their knowledge of what arrest or conviction records automatically disqualified persons from careers with the NYCPD. Of those responding, 73% answered the first part of the question correctly (whether a juvenile offender can be a policeman), 81.6% chose the correct answer for the second part (that a convicted felon cannot join the NYCPD), and 51.7% similarly for the third part (that an adult arrest record does not necessarily bar one from joining the NYCPD). But it should be noted that only 35% of the respondents answered all three sections of this question accurately. The Department should attempt to find discrete ways of letting the public know what are, and are not, automatic disqualifiers for police candidates.

(4) Even with the most sophisticated training, members of the recruiting teams would find it all but impossible to attract a maximum number of candidates with their present equipment. One more patrol car parked on a busy New York corner does not attract undue attention, nor would someone necessarily know its presence was for recruiting purposes. Without megaphones and more striking material, it is all but impossible for the team members, even with the best of intentions, to effectively reach

potential candidates among the passersby. The team's other tools should also be upgraded immediately. As mentioned above, the contacts with the community used by the Department of Personnel have proven rather ineffective for police recruiting. Such contacts that the NYCPD might make for itself would, moreover, benefit both its recruiting and community relations efforts over time. Therefore, the NYCPD should consider taking the following actions through the Commissioner's Office or the Chief of Personnel's Office:

(a) Address letters to a representative number of minority community leaders. These letters should request their help in steering likely candidates to the NYCPD. The letters should be sent in particular to community leaders having rapport and working with such organizations as outdoor summer basketball tournaments and the Harlem Festival. These activities are geared toward a population likely to contain many qualified candidates. The effort would involve the community more in the NYCPD's recruiting problems. It would also help overcome the well-known community antipathy toward the police, by having the recruiting teams make their first visit at the invitation of respected members of the minority communities.

(b) If the NYCPD has professionally trained recruiting specialists available on its force, it obviously should utilize these men to direct its recruiting efforts. On the other hand, if such specialists do not presently exist on the Force, it is likely in the long run to be more cost-effective to hire civilian recruiting specialists rather than to train existing members



of the Force. One source of recruiting expertise for a population similar to that from which the NYCPD draws could be the Armed Forces recruiting specialists. If the desired recruiting specialists are still on active duty with the Armed Forces, perhaps a consulting arrangement could be established. If retired, these people could be hired full or part-time to direct the total effort and to train the police used in recruiting. Whatever the hiring arrangement chosen, the director of this effort should be a minority group member himself.

(5) As mentioned above, there was a 36.9% rate of return on the questionnaire mailed to those young men not appearing for the examination. The racial breakdown of the responses--43.8% Black and Puerto Rican--would suggest that pre-examination attrition among minority group members may be higher than among white potential candidates. The 43.8% figure is substantially larger than the minority percentage present at any patrolmen's examination. Because a simple request for cooperation and assistance evoked such a favorable response from this drop-out population, both in toto and among minority group members, the following was suggested:

(a) In the week or so preceding the examination a better allocation of the time of some of the members of the mobile recruiting teams would be to telephone or to write personal letters to those persons who have filed pre-applications for the examination. Any letters used in

this effort should specifically mention which requirements must be met before the examination and which can be satisfied thereafter. The telephone calls could also be used to clear up such questions.

(b) For future examinations, similar efforts should be made to encourage candidates, particularly minority candidates, to stay in the process during the three critical attrition points after the examination: first, immediately before the medical-physical examination; second, returning the PA-15 forms; and third, during the conduct of the background investigation. It is thought that such efforts would prove more fruitful proportionately for minority group candidates even if applied universally. Many minority respondents took the time to write letters thanking the researchers for interest in their candidacies. Also, 87% of the minority respondents, as compared to 72% of the Whites, indicated an intention to take the next examination. Finally, most writings on other minority recruitment efforts indicate that an "open door" policy is not enough, but rather that some additional effort is often required for successful recruitment of non-Whites.

(6) The results of the April 5, 1969 examination were made known on June 24, 1969 (failures) and June 30, 1969 (passes). Prior to April, examinations were given January 18, 1969, and July 20, 1968. After April, an examination was given June 28, 1969, and one was scheduled for the latter part of October. The length of time between examinations, the time necessary for results to be made known, and the spasmodic

scheduling of examinations all compare unfavorable with what other large police departments have done, particularly those engaged in efforts to increase minority representation.

The entire process--written examinations (and their frequency), medical and physical examinations and background investigations--should be carefully reviewed with a view towards substantially reducing the time required to complete the entire process.

(7) For subsequent examinations, the NYCPD should develop an information system that traces minority candidates from their first contact with the NYCPD through to appointment or non-appointment. This would enable the NYCPD to evaluate those recruitment programs on realistic bases, e. g., the number of minority candidates that any given program, advertisement, or recruiting team attracted to an examination, or the number of successful minority candidates any program has reached. This would give the NYCPD a continually updated body of data on which to make decisions regarding which programs to emphasize, which to strengthen, and which to discontinue.

With regard to Part II and the retention of candidates, the following nine items constitute the major findings:

- (1.) Though Blacks and Puerto Ricans comprise approximately 30% of the city's population, only 18% of all police appointees are of these groups.
- (2.) Fewer than a third of all candidates who passed the competitive exam are finally appointed as probationary patrolmen.

- (3.) More than half of all candidates who passed the competitive written exam (52.5%) drop out of the recruitment process before submitting detailed background information forms required by the Police Department prior to appointment.
- (4.) A slightly higher percentage of black candidates (an estimated 60%) drop out of the recruitment process or are rejected before the Police Department has a chance to undertake character investigations.
- (5.) The attrition patterns of Puerto Rican candidates who pass the police exam do not differ appreciably from those of their white counterparts.
- (6.) Most candidate attrition seems to result from the individual's ostensible lack of motivation to act during the lengthy process of recruitment rather than resulting from outright rejection by either the Department of Personnel or the Police Department.
- (7.) On the average, the recruitment process lasts 17 months from the time a candidate takes the written exam to final appointment as a probationary patrolman.
- (8.) Approximately 60% of those who passed the exam but were not appointed has simply failed to fulfill all the procedural requirements of the application process. The remaining 40% were rejected because they did not pass either the medical-physical or the character investigation.
- (9.) During the personal character investigation by the Police Department, there are no significant differences among Blacks, Whites and Puerto Ricans in the proportions appointed and rejected.

As a result of these findings, the following recommendations were made:

- (a) Personal letters might be sent to all who pass the NYCPD qualifying exam encouraging the candidates to appear for the medical-physical (i. e., letters in addition to the IBM card that is currently mailed to each candidate notifying him of the exam). This might decrease the 22% rate for candidates who pass the exam but fail to appear for the medical-physical.
- (b) The scheduling of the medical-physical should be expedient and swift. Also, applicants might be given an alternate date to appear for the exam.

- (c) Letters and/or phone calls might be employed to encourage no-show candidates to appear on an alternate date.
- (d) All candidates who pass the medical-physical should be encouraged to complete and submit their PA-15 forms. This is particularly important for those who do not know where to obtain certain pieces of information or required documents. Many candidates are also reluctant to file forms because they fear the information requested might either incriminate them or lead to automatic rejection. They may mistakenly think a minor conviction for assault, for instance, automatically disqualifies them. These problems are particularly relevant to minority group applicants because of the socio-economic differences between the races and the fact that minority members are more likely to be arrested than Whites for minor offenses.

In order to deal with these problems, the police department should:

- Attach an instruction sheet to the PA-15 form instructing the candidate how to fill out the form and where to obtain the required documents.
  - Notify the candidate of a location (and telephone number) where help is provided to fill out the PA-15 form.
  - Send letters and/or make phone calls to candidates encouraging them to complete the forms.
  - Enlist the aid of the Guardians Association, the Hispanic Society, and other minority group organizations to contact and encourage the prospective candidates.
- (e) The Police Department should introduce measures to shorten the time between passing the exam and appointment. On the average, a candidate waits 17 months from the day he took the civil service exam to appointment. For instance, the Department should consider methods for increasing the efficiency of the Personnel Investigation Section so that candidates will not have to wait so long for final results.

## 7. Discussion

While all of the recommendations derived from the findings of these

two surveys appear to be sensible and rather easily implemented, there is at least one hard question that needs to be asked. Although one third of the minority population eligible to become officers in the NYCPD had heard of openings by way of radio and newspaper, this does not necessarily prove that more of this relatively inexpensive form of advertising is warranted. This population group after all is the group which did nothing about taking the exam. It seems, therefore, that a more in depth probing would be necessary to determine whether increased public knowledge of the exam is the appropriate objective or whether a more favorable attitude towards becoming a policeman is a more relevant objective. The study should perhaps have spent more time analyzing media effectiveness or productivity in terms of persons motivated to apply for examination per unit of publicity expenditure and less time analyzing media generation of awareness as an apparent end in itself.

POLICY TOPIC: Personnel Selection, Evaluation and Training  
TITLE: Job Attitudes of Police  
AUTHOR: Joel Lefkowitz  
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ABSTRACT:

This study assesses the job attitudes of the 425 sworn policemen and command personnel of the Dayton, Ohio Police Department and relates these attitudes to items of personal history data. Attitudes measured were: job satisfaction, job involvement, supervisory attitudes, cynicism, rigidity, attitudes toward Negroes, etc. The aim is to establish a basis for comparison with other occupational groups.



## INTERNAL VALIDITY EVALUATION

### Job Attitudes of Police

Joel Lefkowitz

August 1971

#### 1. Research Goals, Objectives and Policy Issues

This study is a systematic investigation of the job attitudes of patrolmen and command personnel in the Dayton, Ohio, Police Department, including intra-sample comparisons based on variables such as tenure, age, etc. In truth, this investigation is primarily important as the first step in an eventual program of relating these attitudinal variables to overt performance characteristics. The policy implications of this study, therefore, will be derived for the most part as research is expanded into the area of job behaviors and their correlation with attitudes. Whether attitudes determine behavior propensities, or behavior predisposes toward certain attitudes, is an unresolved psychological issue. There is often a correspondence between the two, however, and ascertaining the extent and degree of that association is the ultimate aim of this effort, although this project is only the beginning step to answering this question.

#### 2. Face Validity Check

The author starts this project with a comprehensive literature

review covering 40 pages in which the sociological, psychological, and police research literature are integrated to determine previous associations or hints of associations between attitudes, beliefs, motives, and job performance. This appears to be a well done review, thorough, and extremely readable. From this review, a group of attitudes is selected for which standardized measures exist, particularly in the industrial psychology field.

The rest of the paper presents the statistical analyses performed on the questionnaire and test data collected. In brief, the results are reported as the degree of association between various sets of variables or the mean scores for subgroups of policemen on such items as job satisfaction categories etc., and stratified by such variables as number of children, age, place in which raised etc. Although described as the first stage of research attempting to link attitudes and behavior, this study is really presented as an end in itself and many of the results discussed do not appear relevant to the long term research goals, e.g., the relationship between tenure and nonattitudinal variables such as number of children, level of education, and rank. The study appears to be statistically well conceived, but at times, rambling. The data showing a profile of police attitudes - "the police type" - and how the attitudes vary with objective background characteristics are, of course interesting. But it is often difficult to see how some of this information can have any real policy applications.

### 3. Methodology

The first step undertaken was to review the literature for indices of job satisfaction which could be administered by paper-and-pencil tests.

Questionnaires were prepared for collecting data on the following eight scales:

(1) Job Description Index (JDI). This consisted of 16 items to be rated from 0 to 3, such as: good opportunities for advancement, etc.

(2) Need Satisfaction Questionnaire. This involved 13 items designed and grouped to measure the following 5 levels of personality needs in the Maslow hierarchy in relation to one's job: (1) security; (2) social needs; (3) esteem; (4) autonomy; (5) self-actualization. Each item has a one to seven rating possible.

(3) Job Involvement Scale. This consisted of 20 items to measure degree of job involvement on a four part discrete scale from "strongly agree" to "strongly disagree."

(4) Leadership Opinion Questionnaire (LOQ). This test had 20 items on each of the following three scales: (1) consideration; (2) structure; (3) goal attainment. Each item was scaled from 0 to 4. The LOQ was administered only to those members of the police department with supervisory responsibilities.

(5) Supervisory Behavior Description (SBD). This measured the same two leadership dimensions, consideration and structure, as measured by the LOQ, and the scoring was the same. This form,

however, was filled out by subordinates in order to describe their supervisor's behavior.

(6) The Dogmatism Scale (D-Scale). This questionnaire, along with no. 7, the anti-Negro scale, was presented as the "Personal Opinion Questionnaire." The advantage of the D-scale over earlier measures of "authoritarianism" is that it presumably measures the extent to which the "total mind" is open or closed. An agree-disagree scale ranging from -3 to +3 with the zero point excluded was used for response to the 40 items. Scores were converted to a 1-7 scale by adding a constant 4 to each response. The theoretical range of scores, then, is 40-280, from low to high dogmatism.

(7) The Anti-Negro Scale. This has a 16 item Likert type scale developed by Steckler. It is one of the few existing scales of prejudicial attitudes toward Negroes which is not extremely transparent and offensive, nor hopelessly "dated" in its terminology. The response format is identical to that of the D-scale.

(8) Cynicism Scale. This consisted of 20 open-end statements concerning significant areas of police work. There were 3 response alternatives to each statement, scored 1, 3, or 5, in increasing cynicism.

These questionnaires were given out to 425 sworn policemen and women of the Dayton Police Force. They were instructed to fill them in and return them sealed to a box where they would be collected.

Every assurance was given that they would be anonymous. Only 337 were returned, and of these, 21 were eliminated because they omitted significant portions. Seventeen others omitted small sections, which were filled in by using the average values for those omitted.

The data were then prepared for computer analysis and processed by means of factor analysis and correlation analysis, yielding correlations, F and t tests. In addition, normative comparisons were made with a sample of 2000 male industrial workers, after removing the 4 police women from the data. The data were then presented in both tabular and graphic form.

#### 4. Data Requirements and Data Utilized

The data collected were appropriate to the task and were well handled. The study could have been better if each lieutenant had collected data from his contingent, in sealed envelopes to insure anonymity, and deposited them in a box, at the same time checking off the officer's names on a check list. As it is, through absence, vacation, illness, and possibly through resistance or procrastination, 88 responses were not turned in and 21 of those turned in had major portions incomplete. This is over 30% missing or incomplete and may indicate a serious self selection out of the data. Had the data been checked in, at least each form would be accounted for, although that does not guarantee that they would be fully completed.

The data presentations and rotated factors with significance are well reported. However, with all factor analysis, there is room for quarreling with the naming of a given factor. Replications of this data may allow for confirmation that such factors are in fact what they appear to be.

#### 5. Experimental Design and Controls

Initially, data was to be collected for the full population of the Dayton police force (sworn officers), thus no sampling design was required. At least part of the nonresponse was deliberate opting out of the sample by persons afraid of identification if they filled out the full questionnaires yet the study design did not include any means to follow-up nonrespondents to check on data biases since returns were anonymous.

This study was not based on an experiment and thus no controls per se were required in the statistical analysis. Police responses were, however, compared with those from other segments of the population who had been administered the same questionnaires and tests. The choice of standardized instruments was deliberate on the part of the researchers to allow this kind of comparison or control, as it were. However, the comparison groups varied among the tests and, in any case, were not usually groups of the population as a whole but industrial personnel. The choice of comparison group is really

irrelevant to inter-policemen comparisons (e.g., effect of education on attitudinal score) but is relevant when characterising policemen as a group as, e.g., "not particularly cynical." One wonders how policemen would compare with some other control group such as laborers or government workers.

#### 6. Results and Recommendations

Before summarizing the results of his study, the author notes that, although the long-range objective of his study is to link attitudes and behavior, there are attenuating factors which may modify the links between any given attitude and overt behavior including all other motivational environmental determinants of that behavior, constraints on expression of attitudes, relevance of other attitudes to behavior, and nature and intensity of the attitude. He recalls that he has not yet attempted to assess any of these attenuating factors nor systematically observed occasions for the overt expression of the attitudes concerned. He accepts the significance of job attitudes, however, and presents his findings with these caveats in mind. Overall, he concludes that his study confirms most of the less-systematic published research available with regard to job satisfaction. Compared to industrial workers, the police in the Dayton department are less satisfied with regard to all five aspects of their work. Among policemen, they are more satisfied with their co-workers, supervision,

and type of work and (relatively) very dissatisfied with pay and opportunities for promotion. They attach importance to gratification of personal needs for security, social contact, esteem, and self-actualization through their jobs although they appear frustrated in these areas, probably accounting for a lack of marked "job involvement."

The author further notes that the paper-and-pencil measures of particular personality traits would indicate that these policemen are not particularly cynical nor dogmatic in their thinking, and only slightly prejudiced against Negroes. This confirms previous findings on such instruments and, in part, counters the more negative evaluations often derived from more informal, casual, and/or subtle measurement techniques and observations of overt behavior. He qualifies his generalizations by noting that there were significant differences among strata defined by various demographic and organizational variables, i.e., there is not a really a tightly defined policeman "type."

The (statistical) factor analysis yielded an important finding in terms of the underlying general groups of factors which appear most significant as determinants of the sample's attitudes, the two groups or factors described as: (1) a motivational factor labelled "psychological growth", and (2) a satisfaction factor concerned with "intrinsic" aspects such as pay, benefits, social relations, security.



In turn, this latter finding would suggest that police administrators ought to pay greater attention to job designs which increase challenge, autonomy, and opportunities for personal accomplishment.

Suggestions for future research emphasize the area of performance measurement and evaluation--first, the construction of fair indices of performance evaluation, and second the relationship between performance and job attitudes.

## 7. Discussion

Some of the variable associations noted in this study seem irrelevant to the long term objective of the study, i. e., the relationship between attitudes and behavior/performance. For example, one wonders if it is really necessary to know that officers characterized by longer tenure also tend to be more satisfied with their pay and co-workers -- will this information contribute to our understanding of the connections between job satisfaction and overt behavior (presumably) uncovered in the next stage of research? In other words this study, which is described in part as the first stage of an attempt to link attitudes to behavior, is really a study of attitudes and background variables complete within itself and explores these relationships without regard to the possible implications for the analysis of behavior to follow. Some of the results are irrelevant, one would think. Many of the associations cannot be used to structure screening devices, since, e. g., tenure is not a variable appropriate for screening new applicants.

In most cases, the degree of association between any single background variable and an attitudinal variable is not sufficiently strong to allow that background variable to be used alone in screening applicants for entrance or promotion, although combinations of variables in some sort of multi-variate prediction might be effective. The primary analytical result, perhaps, is a statistically-based description of policemen's attitudes to determine if there is a "type" and to what degree variations in type are related to variations in background and police experience. Possibly the objective of this exercise is to link background directly to behavior/performance via attitudes, i. e., to predict performance directly from background characteristics, "explained" by the links between background and attitudes. This is not explicitly stated in the report, however.

The author notes that the measures of particular personality traits indicate that these policemen are not particularly cynical nor dogmatic in their thinking and are only slightly prejudiced against Negroes. He concludes that these findings generally confirm previous findings on paper-and-pencil instruments and, in part, do not coincide with the more negative evaluations often yielded by more informal, casual, and/or subtle measurement techniques and observations of overt behavior. He does not consider the possibility that the questionnaire responses were deliberately biased by the respondents.

It seems that one of the reasons for incomplete responses on the biographical portion of the questionnaire was that respondents were afraid that they could be identified personally by their data. Given a fear of identification and the fact that sworn police officers are supposed to show no prejudice if their arrest cases are to stand up in court, it is not unlikely that they tried to disguise their true attitudes in answering these questionnaires.

True, the basic purpose of the questionnaires was theoretically hidden. Nonetheless, many surveys have shown that even where the investigator has gone to great lengths to disguise the true purpose of his research and thus obtain candid responses, interviewees often can out-psyche the psychologist and, in the end, answer the way they think will please the researcher or the way they think their supervisors would prefer if there is the remotest possibility that the supervisors will see the results. Even if these same biases entered when the tests were administered to the "control" groups, and thus policemen were no less candid than their comparison group, the results ought to be phrased not as absolute levels of cynicism, prejudice, etc. but rather as "policemen showed the same/less/greater cynicism than (control) group taking the same test." Such a rephrasing will not change the test scores as presented but is important in terms of interpretation. Thus, the inconsistency of the paper-and-pencil test results reported with other, more informal observations does not necessarily argue for the acceptance of results based on the former methods.

POLICY TOPIC: Personnel Selection, Evaluation and Training

TITLE: A Longitudinal Study of Psychological Test Predictors and Assessments of Patrolman Field Performance

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ABSTRACT:

This study is a follow-up to a previous study (OLEA-046) conducted for a 19 month period in 1966-1968. The previous study investigated the objective and psychological assessment of patrolman job performance. In the current study, predictions made from original measures of job performance and test results (in 1966) were correlated with succeeding assessments of job performance made in 1967, 1968 and 1969. The correlations derived were used to estimate the stability and predictive validity of subjective and objective tests administered in 1966. Also studied were the use of racial group differences for predicting performance and the use of patrolman subgroups for predicting stability of performance.

## INTERNAL VALIDITY EVALUATION

### A Longitudinal Study of Psychological Test Predictors and Assessments of Patrolman Field Performance

J. Furcon, E.C. Froemel, R.G. Francak  
and M.E. Baehr  
October 1971

#### 1. Research Goals, Objectives and Policy Issues

This study is concerned with increasing patrolman effectiveness in the field through improvement of the selection and placement capabilities of police departments. It is the second study<sup>1/</sup> in a series directed toward identification of the patrolman characteristics which are related to high quality field performance with the eventual intent of using pre-hire measures of these characteristics to improve the selection and reduce attrition among patrolmen. This basic issue of adequate and fair selection and hiring techniques has become important both for the desired improvement in overall performance and for the legal requirements for fair hiring practices imposed by the Equal Employment Opportunity Commission.

The four major research goals are as follows:

- (1) Determination of the stability of the supervisory and objective measures used as performance criteria for patrolmen in the 1966-68 study.
- (2) Investigation of the predictive validity of the test battery used in the 1966-68 study.

<sup>1/</sup> See the previous internal validity review--Baehr et al., 1968.

(3) Investigation of nature and stability of the racial group differences found in the original study to assess further the need for separate selection batteries for the ethnic groups.

(4) Conduct of a longitudinal study of the performance levels of the eight patrolman subgroups identified in the earlier study to define their stability, etc.

In addition, this study included provision of technical assistance to the Chicago Police Department (CPD) in implementing the suggested selection procedures and the preparation of articles based on the study to aid in dissemination of the findings of the two projects.

#### 2. Face Validity Check

This is an extensive and thorough report of a follow-up study of psychological assessment of patrolmen characteristics in relation to field performance (see the preceding review). It presents the results of a longitudinal study of both predicted and actual performance of approximately 200+ patrolmen over the years 1966-1969. The results are treated quantitatively and appropriately to serve as both a predictive validation study of the selected psychological tests and a longitudinal study of the stability of nine subgroups of patrolmen identified in the earlier study. The study appears complete and without major flaws, although some wrong data are presented and some conclusions may not be entirely warranted by the data, especially concerning the subgroups' performance. As for the earlier study, it is believed that the overall value of this study is

quite high. The data should be very helpful to both the Chicago Police Department (where the study was performed) and to other departments in developing modern selection and placement techniques. Some of the conclusions from this study should certainly be implemented. These include the requirement for continuing (or initial, for other departments) validation studies prior to final acceptance of the test battery as here defined.

### 3. Methodology

As a follow-up study, the methods applied in this study, including the measures of both psychological characteristics and performance criteria, are essentially identical to those used in the preceding study. Some differences are found because of the differences in research goals of the study.

The basic sample of patrolmen studied here is the 523 patrolmen (including 33 on tactical forces) studied in the prior project. The performance measures used are essentially the same: the paired-comparison (PC) ratings by supervisors; the averaged departmental rankings by supervisors (CPD ratings); the number of awards obtained; the number of Departmental Internal Investigation Division Complaints; disciplinary actions by the CPD; the number of arrests; and the number of absences. In this study, the formerly used tenure criterion has been dropped.

Also, the criterion of complaints was changed conceptually from a similar item used in the former study, so that this criterion is different for 1967-1969 than for 1966. This was dealt with in analysis and results as will be seen later.

In addition to these measures of performance, an attempt was made to have the patrolmen rank their peers using the PC rating techniques. This is discussed below as the peer PC ratings.

Supervisory paired comparison ratings were obtained for 2,440 patrolmen using the same techniques used before. Of the 1966 sample of 523 patrolmen, it was found that only 280 were still on uniformed street patrol in the same twelve districts studied in 1966. Of these, only 258 were found to have been rated both in 1966-67 and 1969-70. Data reported in relation to the various research goals above are based on different numbers of this basic sample of 523 patrolmen, but mainly they are based on differing subsets of the 280 active patrolmen, with the subsets being defined as those patrolmen having complete data for the specific analysis.

Although the prior study treated the patrolmen in two waves based on the time of testing and the districts, this was not done in this analysis since the total number of patrolmen with available data has shrunk so badly. Patrolmen from both waves were treated together. This also forced the predictive validation to utilize only those tests which were common to both waves in the 1966 study.



Each of the research goals mentioned above was addressed by specific analyses which are described in the results section below. In general, the analytic techniques used were simple and multiple correlation and regressions, for the longitudinal analysis and validation, and direct comparisons of standardized scores, to study the stability of the performance subgroups identified earlier.

In addition to the research goals above, the study also included predictive study of Police Academy graduates in Department performance. This part of the study was conducted mainly by the CPD itself, as an internal validation study. This implementation provided for a test of the battery with a group of new applicants rather than the experienced officers studied earlier. The report includes a presentation of the results of this as well.

#### 4. Data Requirements and Data Utilized

Again as in the first study in this series, the Industrial Research Center performed an appropriate development of the standard types of data and analyses thereof to meet the requirements. The set of performance data used included two subjective ratings of patrolmen performance--one developed through a paired-comparison method and the other using the standard rating formats of the CPD. Other performance criteria were those listed above: arrests, awards, complaints, disciplinary actions and absences. Study of these data types over the period of the study--initial

data collection in 1966-67 and subsequent data drawn from 1967, 1968 and 1969--allows the appropriate development of a longitudinal study of variables and of predictive validity of the psychological tests used.

The psychological tests used in the study were those initially commonly administered to both groups of tested policemen in 1966-67 study. These were the Personal History Index, Closure Speed, Closure Flexibility, Perceptual Speed, Test of Social Insight, Temperament Comparator, The Press Test, The Arrow-Dot Test.

It must be remembered that a structured sample of patrolmen was used in the 1966 study. This was drawn by testing and studying the results for only the top and bottom thirds of patrolmen as rated on the paired-comparison ratings. This fact affected the groups studied in the present follow-up also. However, there was no check on the characteristics of the remaining sample in terms of which patrolmen, high vs. low performance persons for example, were still in the group. Since only 210 of the previously studied 490 patrolmen were still employed as patrolmen, these form the follow-up sample, and these individuals should have been compared to the overall characteristics of the total group from the earlier study. This problem was partially avoided in the analysis, where the data were reanalyzed from the 1966 study for only these 210 patrolmen. Thus the comparisons of correlations and their changes in time are at least based on the same group.

## 5. Experimental Design and Controls

The basic design for the validation study is a longitudinal follow-up of data collection, both psychological testing and performance data first, and then performance data collection in subsequent years. The validation process calls for the comparison of actual with predicted performance for each subsequent year. This is a standard design for such validity studies, with the intent being to determine the degree of prediction power over time that can be attributed to the assessment instruments.

The validation study is straightforward and so is the design for comparison of the characteristics of the several subgroups of police performers identified in the initial study. Eight subgroups were identified and the present performance of these groups, as reflected by those still on patrol duty, is compared with their performance in 1966-67. Comparisons are in terms of standardized scores on all performance criteria. A major lack of definition occurs in this comparison, however. The authors neglect to mention whether the 1966 distribution for each subgroup is based on the data of the whole 490 subjects studied in 1966 or on the data for the 210 subjects studied in 1969. Thus, they do not note whether the changes observed result wholly from performance changes or in part at least from sample differences. Proper definition and control of data sets would have avoided this. There is in fact, an indication that the 1966 data are based on the whole 1966 group; in Figure 16, p. 136, reference is to the Basic Performance Group, with:  $N = 202$ . This is the number of group members

found in the 1966 data set, not in the 1969 data set, the total of which is only 210. The numbers of members in each subgroup are not specified anywhere in the report, and the figures imply, incorrectly, that the total 1966 group remains intact through 1969. Appropriate exposition of changes in the sample would have made changes in performance more interpretable--or more open to question.

Appropriately, the validation study retained the use of separately derived prediction equations for black and white patrolmen. The differences in predictability observed in the 1966 data set continued to be true in the present data. The race prediction equations, recomputed for the 210 subjects of the 1969 study, still showed the decided differences found originally.

## 6. Results and Recommendations

Results will be presented separately for the several research areas as defined by the questions posed above. In effect, each area is a separate research study and was analyzed as such.

An initial check was made on the consistency of the performance measures used in the two studies and in the rating process used to establish the Paired-Comparison ratings for the individual patrolmen. These were found to be consistent enough for purposes of the study and the analysis then proceeded to the stability of the performance measures over time.

Stability of performance measures. Intercorrelations were calculated for the seven performance criteria over each year that data were collected. When these data are examined for all 490 (+) patrolmen studied in 1966-67, the stability of the two supervisory ratings and arrest performance and departmental awards are quite acceptable; correlations range from around .40 to around .70. Stability of complaints, disciplinary actions and absences is considerably lower, bordering on the limits of acceptability; correlations ranging from lows of .15 to around .45.

When similar correlations are computed for the 210 patrolmen remaining in the 1969 sample, stability decreases predictably. The two supervisory ratings and arrests and awards still show acceptable levels of stability, with correlations ranging from around .30 to around .60. Complaints, disciplinary actions, and absences were generally lower in stability, with correlations ranging from insignificant to around .40 (in the data actually presented--there is a confusion of data presentation in Table 6 showing these data). These patterns generally hold for both the black and white groups split out separately, with correlations somewhat smaller in most cases but not sufficiently different to change the estimates of stability. Generally the Paired Comparison ratings, CPD ratings, Arrests and Awards were found to be relatively stable as measures of performance over time. The other measures were lacking in desirable levels of stability for purposes of evaluating predictive values of the test battery.

Predictive validation of tests. Multiple regression of the scores of the 210 remaining patrolmen was performed to develop a new prediction based on the reduced sample. These were performed for the total groups, and for the Blacks and Whites, separately, as was done in the original study. Multiple correlations for the Whites (N=151) were about the same as for the total group (of 210) ranking from .37 to .47; while the correlations for the Black group (n=51) were significantly higher, ranging from .73 to .90. These results reaffirm the earlier conclusion that separately developed predictions for Blacks and Whites should greatly enhance the accuracy of performance predictions, particularly for Blacks.

A subsidiary analysis of the differences between Blacks and Whites over the time period of the study showed that there were some consistent differences in the measured criteria, but that many differences were changing with time or fluctuating from year to year. Three consistent differences were: black officers make more arrests than white officers; black officers are the subject of more citizen complaints than are white officers; and black officers are the objects of more disciplinary actions than are white officers. No thorough analysis of probable causes of differences are presented.

Predictive validity results are generally favorable to the process, with generally better results occurring for race-specific predictions than for the total groups. Specifically, both the Paired Comparison and CPD ratings were found to have definitive predictive validity; arrests and IID

complaints were seen to have some predictive value based on the current data; while the values of departmental awards, disciplinary actions, and absences were considered questionable, due to the low correlations of predictions with observations over time. These data generally support the effort to predict performance from test scores. Using prediction equations developed from 1966 performance data, it was possible to obtain significant and meaningful predictions of performance through 1969. These results are considered to confirm the results of the 1966 study and further support the value of the psychological test battery as a tool in selection of police officers for the CPD. The discussion presents details of the parts of the various tests which contributed most to the three criterion variables of ratings and the arrests measure. These are not discussed here since it is believed the entire test and the necessary validation study should be examined in detail by anyone contemplating such selection work. Suffice it to say that portions of the above listed tests were found to predict performance successfully for the CPD patrolmen.

The predictive validity study also examined the separate relationships between predictors and criteria by racial groups. One of the basic research questions was the nature and extent of differences in these and whether they were such as to indicate continued separate predictions and selection processes. It appears on the basis of the data presented that separate predictions are essential to appropriate selection and placement and necessary to comply with the law of the land--the EEOC rulings. Apparently,

selection of Blacks based on white selection processes would be biased with respect to prediction of Blacks' success. Therefore, separate selection and prediction devices are considered necessary.

Longitudinal study of patrolmen subgroups. Eight patrolman performance subgroups were identified in the initial study and one aim of the current study was to examine the degree of stability and consistency of performance of individuals in these subgroups over time. This study is actually one of the weakest parts of the total work because of two major points. The first problem, noted in the review of the original study, relates to the identification of a ninth "non-group" group, consisting of those patrolmen who did not cluster into one of the other groups. This non-group was incorrectly used to represent a basic performance group, mainly because their performance scores did not differ significantly from the average of the overall tested group. The assumption was that a group of persons, originally drawn from either the top or bottom third of the performance ratings (PC ratings), could somehow be construed to be an average performance group and used as a basis for comparison. This was done in the original study and was done here again.

The second point of concern with the comparisons between subgroup performance at several points in time is the attenuation of the groups by the reduction of the total sample from 490 to only 210 which is neither discussed nor dealt with in any way. This problem is not even treated in terms of identifying either who left the groups or whether their leaving



might have been instrumental in causing any changes as are observed. There may be some very systematic processes operating in the selection, over time, of who stays in active patrol duty and who does not. There is not even any indication of the remaining number of personnel within each of these subgroups in 1969. Changes in N's that originally ranged from 11 to only 59 must be significant when the total N has decreased from 490 to 210.

Based on the false assumption that the basic Performance Group somehow reflects a CPD "Average Group," the authors use changes in the Basic Group's performance to indicate some overall changes in the CPD. While this may be true, the combination of the two points above renders it definitely questionable. For example, the authors note that the performance of the Basic Performance Group is quite comparable across the three years except for three points: (1) an increased number of departmental disciplinary actions, (2) an increased number of departmental awards, and (3) a decided improvement in attendance. They then state that: "These changes may be considered to reflect overall changes in the 'culture' of the organization and therefore may be used as a more realistic baseline for gauging change in performance on the part of the performance subgroups." There is not given any comparison between performance levels of the total sample of 210 studied in 1969 and the performance of the total group of 490. It is assumed, implicitly, that the changes in personnel make no difference in the group or groups. This is a very questionable assumption. It raises some direct questions as to the credibility of the data, as well.

Because of the questionable validity of these assumptions, no details of the subgroup performance comparisons will be presented here. Rather, some of the overall summary will be represented. Generally, the authors conclude that there was more stability than change in the characteristics of the eight subgroups, with a predominance of changes in the direction of improvement. (The eight subgroups previously identified were: (1) Low Tenure--Excellent Performance; (2) Low Tenure--Good Performance; (3) Low Tenure--Poor Performance; (4) Average Tenure--Excellent Performance; (5) Average Tenure--Poor Performance; (6) Average Tenure--Mixed Ratings; (7) Long Tenure--Excellent Performance, and (8) Long Tenure--Good Performance.) As indicated by the names, some of the subgroups were represented as less-than-successful in the original classifications. Some changes, particularly in group 3 (low tenure--poor performance), led to increased performance in both ratings and several of the objective criteria as well.

In good part because of the high degree of group stability, the authors conclude generally that the results reconfirm the validity of their premise that stable patterns of police performance can be identified and that these patterns of performance can be differentiated from the average and from each other (the latter of which was never attempted in either of these two studies). They further conclude that the emergent subgroups of patrolmen can be used as "benchmark"

groups for clinical analysis of individual test results. It appears that this conclusion is somewhat premature at this time, given the incompleteness of the analysis and data collection.

Prediction of performance of Police Academy graduates. The last major part of the report is concerned with the CPD's trial implementation of an abbreviated selection battery, based in part on the work reported here. In 1968, 1,234 trainees were given a battery of tests and 538 more were tested in 1969, with 139 tested in 1970, prior to the date of the present report. Two separate batteries were used. Thus, six different prediction equations were developed, based on two test batteries and three racial groups (Blacks alone, Whites alone, and the unspecified total group).

Predictions of CPD ratings were made, using this criterion since it was readily understood and applied by all members of the supervisory staff and would always be available for use as criterion for analysis. Validation of the initial predictions was done against CPD ratings for the first two years of service. Validity of the predictions was not high, thought to be partially due to the considerable instability of the CPD ratings over the time of the study. It was observed that the CPD ratings fluctuated so much that correlations between ratings were as low as .19 initially. These correlations rose to .40 and .50

by the fifth and sixth rating periods, but the predictions were still poor.

It is not entirely clear from the presentation which equations were used in this prediction exercise. It appears possible that the equations developed on the experienced men were used to predict performance of the trainees. If not, it is not clear how appropriate beta weights were derived--with no criterion measure indirectly available for these trainees. This is a serious question of study design and should be looked into at some length. Since the characteristics of older, established, patrolmen are undoubtedly different and probably interact differently with the environment and demands of police work than those of today's youth--with freer attitudes and fewer expectations, it should be clear that a prediction equation developed on experienced policemen would be unlikely to be successful in prediction of younger policemen. What is needed here is a long term study of the new policeman and his characteristics and their relation to successful performance. It is likely that prediction equations can be developed successfully, but they will contain different weights, dependent upon characteristics and values. These will vary among young and experienced patrolmen partially as a function of actual experiences.

The authors conclude this section with several sound recommendations for further research into what remains an open question.

Implications and recommendations. The following specific recommendations stem from the total study:

\* If these results are to be utilized elsewhere, a sound validation study should be conducted to establish the extent to which these results can be generalized to match the situation in other settings. The validity of the test battery must be verified in other settings.

\* Further specific research should be undertaken in the areas of peer-rating of police officers and community assessment of police activities.

\* While the nature and extent of racial differences in performance were explored by these studies, still further research should be initiated to study differences in test responses as a function of race.

\* The application of the selection procedures examined here for patrolmen should be investigated for selection at other police levels such as detectives, supervisors, and top command--one specific question for study is that of whether a selection battery might work systematically to exclude candidates with command potential.

\* There should be further study of the basic concepts of application of concurrent and predictive validity in relation to maintaining current standards of performance rather than raising them--status quo may be an undesirable result.

\* Further analysis must confront the question of whether experience creates the characteristics which have been identified as critical in the selection/prediction process, or whether they are already available for measurement in the new applicant.

\* The advisability of developing specified tests designed for police selection should be analyzed, e.g., should a Police Personal History Index be developed which could relate more closely to the needs of the law enforcement agencies?

## 7. Discussion

This is a significant contribution to the study of selection and performance prediction for policemen. There are some limitations in the presentation of the data and in the completeness of the explanations in some areas. These have mainly been identified in the body of the other sections. However, overall this is an important study in the basic selection areas and highly recommended reading for personnel interested in the basic selection and classification problems in police applications. The predictive validation of the test battery for experienced patrolmen over the four year period of the study is the biggest contribution. The attempt to isolate and identify the characteristics of performance subgroups is of some interest, but the techniques appear to require improvement and additional analysis of the characteristics of the general patrolman population. Similarly, the first try at validation of the test battery for Police Academy graduates should be repeated and the aim should be to develop a true prediction for those characteristics of those new applicants as opposed to using predictions based on the characteristics of older, experienced policemen, who may have been affected by their jobs.

This report is recommended to the personnel department of a large Police Department, but not to a local Sheriff's office. There is considerable value in this series of reports, but the material is too "scientific" to be much use in anywhere but a sophisticated office, concerned appropriately and educated appropriately in systematic processes of personnel selection and placement. These studies should be replicated, with full use of the suggested test battery and with modifications as conceived by the personnel specialist doing the testing and selection development.

In conclusion, these two studies are among the most extensive of efforts in the area of police testing and selection. And, in spite of the critical approach taken to matters of technique and/or presentation, they constitute important steps in the right direction; they should be disseminated and read widely by those personnel who can judge and use the material wisely and correctly.

POLICY TOPIC: Personnel Selection, Evaluation and Training  
TITLE: Changes in Role Concepts of Police Officers  
AUTHOR: James W. Sterling  
PUBLISHER: International Association of Chiefs of Police,  
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ABSTRACT:

This report gives a detailed account of the results of a psychological study of 152 police recruits in four cities: Baltimore, Maryland; Cincinnati, Ohio; Columbus, Ohio; and Indianapolis, Indiana directed at the question of how a police officer views his role and how that view changes as time passes. The individuals in this study were subjected to psychological testing at the outset of their training as recruits, again upon completion of training, and finally after the first eighteen months of duty as patrolmen.

The perceived roles of officers were documented at each of these times. Changes are noted, but how and why these changes took place were not researched, although some anecdotal cases and speculations are offered in explanation of the changes.



INTERNAL VALIDITY EVALUATION  
Changes in Role Concepts of Police Officers

James W. Sterling

February, 1972

1. Research Goals, Objectives, and Policy Issues

This study is addressed to the question, "Why is it that, after exposure to active police duty, so many of our recruits seem to suffer adverse changes in their conceptions of police work?" By measuring the perception of role by police recruits upon entering training, completing training, and after 18 months on the police force, it is possible to show perceived role changes which take place both during police academy and, following formal training, during the first year and a half on the job.

2. Face Validity Check

The problem stated above is certainly a major concern for police. Both trainers and administrators can benefit from an understanding of changes that take place in perceived roles. This research documents the role perception of police with seven different instruments, at three different places in time. However, showing that officers' roles do in fact change during training and during their first 18 months of assignment to a police force does not answer the question posed by Sterling as stated above. This report merely documents what was assumed in the research objective

stated in the report. It remains for a much more intensive, in-depth study to be undertaken to find out how the adverse changes in the conception of their police roles takes place.

In the discussion of the perception of danger (pg. 291-294), the author brings much anecdotal evidence gathered from a literature review into the discussion. The examples given may in fact explain the data, but this study does not do it. The evidence given is good, informed hunches or guesses as to why some of the perceived role changes with regard to the danger of a police job take place. Research literature is full of good, plausible explanations for data, which seem logical but in the end are not found to be so.

The validity of each of the instruments used in this study needs to be examined for the population to which it is applied. To what extent does a change in a rating on the semantic differential from 2 to 3 on a 7 point scale mean anything? Most of the shifts on this scale were at most only 1 place. Further, it may be questioned whether any shift in role perception measured by any of the seven instruments used reflects a basic change in perception or only a change in what is perceived to be the way the officer should respond. In other words, does police training really change an officer's basic perception of Blacks, or does he learn not to use "trigger" words such as "nigger" because they may create personal danger for himself? It seems to this reviewer that many of the changes reported in this study are actually changes in what is reported, which may reflect on the perceived attitudes which are "safe" to reveal or are expected of good officers. Thus there may be no basic attitude, value, or belief change underlying the expressed change in

perception as given by many of the officers. This may be no more than a manifestation of the Solomon Asch effect (perceptual distortion caused by peer pressure).

### 3. Methodology

This study was designed for analysis of four major police departments - Baltimore, Cincinnati, Columbus and Indianapolis, with the hope that findings could be generalized to other police departments. These four cities were selected on the basis of their effective police departments. All four had outstanding leadership, a sound organizational structure, good personnel and training practices and realistic standards of police performance. All four departments were progressive. They were willing to try new approaches to law enforcement. The fact that each department agreed to participate in this research itself indicated a desire for self-examination and an acceptance of the belief that research can serve as a basis for self-improvement.

The literature of role theory reflects a richness of theoretical concepts. At the outset, it was necessary to delimit the areas encompassed within this approach to those aspects which would be measurable, relevant to the experience of the police recruit, and susceptible to fluctuation in the short run. After considerable deliberation, a choice of conceptual areas was made. Preliminary instruments were designed, pretested in a number of locations, reconsidered, and redesigned. Ultimately, a battery of six instruments was decided upon.

### 1. Role Conflict

Since role conflict is central to role theory, an instrument assessing this area was designed. The conflict instrument was adapted from the original form designed by Gross, Mason, and McEachern.

### 2. Perception of Reference Groups

The perception of reference groups as role reciprocals and evaluators is a fundamental concept in role theory. Osgood's semantic differential was employed as a method to measure the connotative meaning held by the subjects for groups who are or will be significant to the police recruit.

### 3. Aggregate Role

Even though the concept of aggregate role is not accorded great importance in the general literature, it was thought to be of major importance at this time within the field of law enforcement. Accordingly, an instrument to gauge the subjects' concept of the aggregate role of the police was devised.

### 4. Role Attributes

Role attributes form an essential area of inquiry. Although Wetteroth's work is founded in traitist psychology rather than social psychology, it was replicated in connection with this part of the research. Here the attempt was to discover the

attributes thought to be essential to the enactment of the police role.

#### 5. Perception of Danger

Danger is intrinsic to the police role. Skolnick reasoned that the performance of the police role is modified considerably whenever a police officer perceives himself to be in a dangerous situation. The instrument utilized was intended to determine the degree of danger perceived by police in typical work assignments.

#### 6. Attitudinal Orientations to Role

The subjects of the research entered their formal training in a condition of role readiness. This state of preparedness included a variety of attitudinal orientations related to the police role. Twenty separate items make up a four-part scale drawn from a factor analysis of the responses of a nationwide sample of police patrolmen.

To the Role Perception Battery, a Life History and a Supplementary Information form were added. The former was designed to obtain essential biographical data from the subjects; the latter was structured to obtain related information which would reflect changes over time. Beyond these instruments, a standardized personality test was completed by the subjects. This instrument, The Edwards Personal Preference Schedule, was designed to measure a number of relatively independent normal personality variables.

This research instrument was chosen because of its congruence to role theory.

At the time of the initial testing at the beginning of recruit training, in the fall of 1968, a total of 152 men from the four cities served as subjects. The recruit class in Baltimore had 43 men in it; Cincinnati had 39, Columbus 31, and Indianapolis 39.

The six role perception instruments making up the role perception battery, the supplementary information form, and The Edwards Personal Preference Schedule, were administered three times: at the beginning of Police Academy training, at the end of the training, and at the end of 18 months of active duty. Several different statistical procedures were used to compare the results of each administration of the tests. Several different methods, both tabular and graphic, were used to present the data analysis to maximize its impact. Discussion of each factor follows the display of the data, explaining the findings presented in the tables or graphs in layman's language and giving plausible explanations for the data and explaining its significance.

#### 4. Data Requirements and Data Utilized

Prior to the presentation of the findings themselves, there is an extensive presentation of descriptive data comparing the cities involved, and the officers of the police forces with national norms where these exist. This is one of the most thoroughly documented studies in all of police research.

The findings presented are carefully analyzed and comparisons are made with Chi square and factor analysis, complete with significance and values. The original instruments, as presented to the police officers, are contained in the Appendix so that the reader may easily find them and review them quickly for applicability to his own use, or for face validity. In some cases, very few factors are found to change significantly; for example, Table 10.2, Analysis of Differences in Personality Need Scores Over Time for High and Low Change Expectation Groups, lists 15 personality needs, of which only one (need for order) is significant for both groups and only three other factors are significant for either of the two groups. It is good to see all the data collected presented, not just those factors found significant. Others may be spared the task of similar research if they find a lack of significance, or they may want to approach the problem with different instruments or procedures if they feel that there should be an effect where none was found.

##### 5. Experimental Design and Controls

This project was well designed, care was given to the selection of comparable cities with good administration so that results could be generalized to other cities. To extend results to other cities, however, one should compare the many descriptive factors given for the cities involved with those of any city to which one might want to apply the results. It is possible that some cities with poor administration and training might not have similar findings, so that the results probably cannot be generalized to cities in general, but rather only to those with descriptors similar to those

cities analyzed here. Without a larger study, covering more variety of police departments, possibly some suburban ones, one cannot say definitively whether these findings are as generalizable as the authors would hope. The control of timing was good. All four departmental recruit classes were treated within a two week period. The factor of similar timing in various sub-population groups is often not considered or, if it is, it is not controlled very carefully.

Careful consideration was also given to role theory in selecting those factors which theoretically could be influenced by formal training and 18 months on-the-job training. While many of these did not prove significant with the instruments used, this does not indicate that they are not valid dimensions for concern. The results, where not found significant may only mean that the instruments are not sufficiently sensitive.

The Solomon Asch and Martin Orne factors, which cause perceptual distortion and distorted reporting may well have had undue effects on a police cohort group who work and study together. Some consistency tests were built into the scales used to see if a person would say the same thing twice in responding to similar items. This is a step in the right direction, but in view of Orne's findings in The Social Psychology of the Psychological Experiment (where he finds subjects tend to perform in ways to help justify an experimenter's hypothesis, without their ever being told what it was), it would be facilitated by the recruits discussing items among themselves following an administration of a test battery, questioning what the investigator is trying to get at, and deciding what would be good answers if not safe answers.



## 6. Results and Recommendations

This research project contains a great deal of useful information about the first 21 months in training and on the force for officers entering training in Sept., 1968. The first 29 pages deal with Role Theory and its application both theoretically and practically to police work. This is followed with a few pages about the research design, sites, instruments, and methods. The remaining 268 pages describe the findings and give recommendations based on the findings. The eleven chapters and appendices contain 102 tables, 79 figures, and one chart, and are referenced to a bibliography of 112 items. To review each table and figure with its findings would take at least a page for each one, more than can be presented here. Thus the discussion here is limited to those instances in which significant results have led to specific recommendations. There are of course many other results and recommendations, though most of them are of lesser significance or considered minor to those reviewed here. The findings and recommendations are as follows:

### A. Findings

Most people appear to accept group solidarity as a characteristic of the police. The many explanations offered for this affiliative tendency range from such practical considerations as the effect of rotating work hours or the operation of a car pool to the view that only a police officer can understand another police officer. Underlying most of these explanations is the concept that expectations influence behavior. In this case, it would

appear that the expectation that police recruits form friendships with other officers is given wide expression within the police environment. Accordingly, the men entering police work respond in varying degrees to this behavioral expectation. However, the development of extensive friendships with other police officers is not an inevitable consequence of occupational socialization. It occurred in Indianapolis and Cincinnati but significantly less so in Baltimore and Columbus.

### Recommendations

The matter of friendship formation is of general interest in the study of occupational socialization. However, the matter takes on far greater meaning when the effects of group cohesiveness are said to have direct implications for the performance of the police role. If one accepts the view that in-group solidarity leads to the adoption of insular viewpoints, secrecy, and isolation from the public, then the formation of friendships may have a negative effect on police role performance. On the contrary, if one accepts the belief that group cohesiveness is a necessary means of coping with the omnipresent threat of danger, then friendship formation with police may have a positive effect on role performance. In either event, it should be clear that associational ties have a significant impact on the enactment of the police role. As a consequence, the development and effect of friendship patterns with other police officers should be given open consideration during and after recruit training as part of a core of subjects dealing with personal and social adjustment to the job. The subject should be considered in a matter-of-fact way as information giving and should be directed toward self-understanding.

## B. Intra-department Aspirations

### Findings

When the subjects were asked during recruit training if they expected to be promoted in rank within the next ten years, all responded that they expected to attain higher rank. After patrol experience, almost all of the subjects again reported that they expected to be promoted in rank within ten years. Clearly, many of the subjects will experience disillusionment as a consequence of their unrealistic aspirations. When the promotional level which the men expected to achieve within ten years is considered, the exaggerated nature of their aspirations becomes even more pronounced. For example, after patrol experience, almost two-thirds of the Indianapolis subjects reported that they expected to attain the rank of lieutenant or above within ten years. However, such unrealistic aspirations were not held by all subjects. After patrol experience, only one-sixth of the Columbus subjects aspired to become a lieutenant or above within their first decade of the job. Such wide differences cannot wholly be explained in term of different opportunity structures. Rather, these differences arise from the varying degree of realism which the subjects incorporated within the formation of their occupational aspirations.

The problem of intra-departmental aspirations was particularly acute for the subjects who had attended college. Although their aspirations were not dissimilar from those of men with only a high school education at  $T_1$  and  $T_2$ , a statistically significant difference between the aspirations of the two groups appeared after patrol experience. At this time, 67.6% of the college

men aspired to become a lieutenant or above within ten years. This compares to a 38.2% for the group with only a high school education. This finding may explain, in part, the problem that many police agencies have in retaining college men in their ranks.

### Recommendations

Preferences are based on knowledge. Thus, it would seem that some attention to occupational mobility would be a valuable supplement to recruit training. A general career orientation to what is both possible and probable in terms of reassignment would contribute toward helping the recruit plan his overall career in law enforcement. Any effort on the part of the training staff to give the men a more realistic view of the actual opportunities in the department and their chances of obtaining a desired position will have a salutary effect on the present and future performance of the men.

## C. Personality

### Findings

As the subjects completed the highly structured classroom situation and later moved to confront the uncertainties of the street environment, one would expect significant changes in the hierarchy of personality needs from what they were at the time of entry into recruit training. After 18 months of enacting the patrolman's role, the subjects' scores indicated higher needs in autonomy, aggression, and heterosexuality. The subjects also obtained lower need scores for deference, affiliation, abasement, and nurturance. The higher scores on autonomy and aggression, when combined with the lower scores on deference and abasement, suggest that the general conformity and

dependency which characterized the subjects at the start of recruit school has diminished. The subjects' personality needs have shifted toward a more active, assertive and self-directing orientation. The decrease in the score for nurturance suggests that the need to help others and greet them with sympathy has also diminished since the start of recruit school. Thus, it can be inferred from the changes in personality need scores that the subjects' general orientation toward people might be more conflict-producing than it was at the time they originally entered law enforcement.

#### Recommendations

Self-knowledge is merely a preliminary. Since there is an inherent conflict between emergent personality needs and role requirements, it should be recognized that occupational adjustment may be difficult for the individual. Hence, the services of a qualified counselor should be made available to experienced officers. Although one of the functions of the police supervisor may be to perform a "first aid" counseling function this does not obviate the need for a professional counseling psychologist.

#### D. The Perception of People

##### Findings

On the basis of this research, it appears that the subjects' perceptions of people generally shifted toward a more unfavorable dimension of semantic space from the time they entered police work. Specifically, this was true on both the cooperative-uncooperative and informed-uninformed scales not for just the outgroups of civil rights leaders, newspapermen and probation officers but also for the in groups of police supervisors, police

trainers, experienced patrolmen and even wives and families. Almost all groups were seen as less informed and as a result, they were less cooperative. The basic problem becomes one of the perception of people in general rather than the misperception of specific outgroups.

#### Recommendations

As is the case with other problems, the solution calls for a greater understanding of human behavior by the police recruit. Attention should be directed to his role as observer. The whole process of people perception including the formation of dispositional judgements, the development of behavioral expectations and the shaping of emotional responses should be incorporated within the recruit curriculum. Once this foundation is learned, then these principles can be applied to the perception of specific outgroups as well as ingroups.

#### E. Aggregate Role Conceptions

##### Findings

The findings of this research suggest that changes have taken place in the judgements of young police officers about the relative importance of positions in accomplishing the overall police mission. The subjects of this research viewed the patrol function as making the greatest contribution to the police mission. They also viewed investigative positions as making relatively less important contributions to the current aggregate role of the police.

#### Recommendations

Until distortions can be righted, role strain will continue to exert a

deleterious effect on the work performance of the patrolman. To alleviate these effects, efforts should be undertaken to clarify the aggregate police role, to give suitable recognition to the patrolman's role and its relative contribution to the overall police mission, and to modify police training programs to reflect more realistically the breadth of services carried out by the patrolman.

F. Attitudinal Orientations to the Police Role

Findings

Four aspects of the attitudinal orientations of the subjects to their role were selected for analysis: valuation of formal education, pragmatic realism, conformity to authority and conservatism. The findings showed predictable changes in attitudes over the time span of this research on three factors. After 18 months experience as patrolmen, the subject's attitudes reflected a significantly greater measure of pragmatic realism, a lesser measure of conformity to authority and a greater degree of conservatism. Overall, it appeared that police experience was a far greater influence for attitude change than recruit training.

Recommendations

At the start of training, information on civilian review boards, lateral entry, crime prevention, and the matter of guilt might be offered to recruits. At the end of training, attention might be given to some of the practical concerns of the patrolman: the effects of court decisions, political support for the police, and patrol demeanor. After initial exposure to patrol experience,

CONTINUED

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information on the relevance of college level academic work to the police job might be presented in special seminars.

G. Essential Role Attributes

Findings

The list of attributes chosen as essential for the enactment of the police role remained relatively unchanged over the time span of the research. The subjects' views of the attributes essential to the police role formed during the period of anticipatory socialization were not greatly affected by the new conceptions of the role gained during recruit training. Nor were these conceptions greatly modified by 18 months of field experience. The complementary qualities of common sense, alertness and job knowledge formed the core of attributes which was seen as essential throughout time and place.

Recommendations

Again, one is left with the impression of the necessity for recruit training to set forth definitions of the police role in explicit terms as well as the relationship of role attributes to the performance of the various components of the role. Implied from the subjects' choices was the necessity for common sense in the exercise of discretion. However, common sense without a grounding in morality and compassion may be inadequate for anything but a superficial performance of the public service components of the police role. In the same way, the necessity for courtesy was a transitory conception because it was not seen within the larger context of human relations. As before, the need for a greater knowledge of human relationships is apparent.

## H. The Perception of Danger

### Findings

There were a number of intriguing findings which arose out of this inquiry into the perception of danger. Overall, the subjects' perception of job-related danger was highest at the completion of recruit training, apparently in anticipation of their entry into the apprentice role. A very high consistency was found in the ranking of assignments according to the degree of danger perceived to be related to their handling. This was true over time and among cities at any one point in time. A positive but lower order of correlation was found in the rank order of subjects across time: those who were high perceivers of danger at the start tended to be high perceivers after training and patrol experience. It is interesting to note that the extent of crime in the area where the subject worked had little apparent relationship to his perception of job related danger. Though these findings do not directly lead to specific training recommendations, they nevertheless suggest the importance for procedures to deal with perceived danger.

### Recommendations

The home remedy for fear is simply to experience the fears as deliberately and as fully as possible. Though simulations exercises and audio visual approaches can be of help during training, real danger and the reaction to it cannot be simulated; they must be experienced. Experience by itself, though, is not enough. Debriefings and discussions can help to extract meaning from these experiences. Again, the necessity for training personnel to have direct

contact with their former trainees is clear. After fear has been experienced, it can be discussed in a group setting. In some instances, individual counseling may be more appropriate.

## 7. Discussion

Perhaps the central dilemma for police is the basic question of the role of a police officer. The older chiefs, captains, lieutenants, and administrators nationwide tend to see fighting crime and maintaining law and order as the dominant role for police; however, when this is stressed, the keeping of the peace and promotion of police/community relations is often strained to the breaking point. This study, like so many others, calls for self-knowledge and learning to manipulate others by psychological means rather than by authority backed with a gun and nightstick.

As an approach to teaching the behavioral sciences to police officers, self knowledge can serve as a base upon which a more general knowledge of others can be built. The development of self knowledge can also serve as a useful technique for creating an interest in and overcoming resistance to the social sciences. However, the acquisition of mere knowledge of the behavioral sciences may be insufficient for the patrolman's role. Science deals with objects and the study of others often tends to become a study of impersonal objects which can be directly influenced, regulated, and controlled. This would seem to be the case with much of the behavioral science material now presented in recruit training programs.

The psychological training of policemen is directed, for the most part toward enhancing their ability to get along with the public, to manipulate people, as it were, and to gain their cooperation with a minimum of abrasiveness. On analysis, this view of training appears to be somewhat superficial and mechanistic. Yet the ability to control and manipulate people has considerable usefulness to the police, particularly in their crime control activities. Though the direct control of behavior may be enough for this part of the police role, it is not enough for the greater part of their work involving community service. Here, a deeper appreciation of human behavior is appropriate. Fundamental to this fuller understanding of others is self understanding and the ability to empathize. The expanded use of social science concepts in recruit training is necessary to attain this goal.

Throughout his report, a large number of theoretical findings have been presented. Some of these findings merely confirm what is already known or suspected. Others cast a new light on the meaning of police experience. As such, they should be regarded as exploratory. In either event, the findings have a use. They may provide additional support for continuing or modifying existing police programs or they may suggest the need for new programs.

The recommendations presented are logically or psychologically related to the findings of this research. Hence, the worth of these recommendations is dependent on the acceptance or rejection of these findings as valid. In the design of this research, a decision was made to use a combined group of recruits from four comparable cities as subjects rather than a group of

recruits from a single city. The intention was to increase the generalizability of the findings. If one accepts this approach as valid, then the recommended programs based on these findings will have general application. If the use of a combined group of subjects is not accepted as a valid approach to increasing the generalizability of the findings, then these recommendations will have a more limited application to the four cities included in this research.

The whole question of the validity of this study is based on the similarity to these four cities of a city wishing to apply the findings to its force. If the mayor of a city is authoritarian and has broad support for a "law and order" approach, these recommendations will not be found very applicable. However, if a community has good citizen-police rapport and seeks to improve its police force, then there is much in this study to be applied.

POLICY TOPIC: Personnel Selection, Evaluation, and Training

TITLE: Development of Psychiatric Standards for Police Selection

AUTHOR: Robert W. Heckman; Dennis M. Groner; Marvin D. Dunnette; and Paul D. Johnson

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ABSTRACT:

This police manpower project was designed to yield information on those factors relevant to on-the-job police performance and to determine nationally applicable tests/standards to aid officials in selection of new police officers. The report published in June 1972 describes progress during the first phase of the project in which researchers worked with police personnel in the development of behavioral rating scales to be used in assessing police performance. The volume also contains a brief review of current practices and other research to date in the area of personnel selection. Subsequent research is intended to identify those nationally applicable tests and screening procedures which adequately predict police performance, validated by correlation with ratings on the behavioral rating scales developed in the first stage of this project. The final product of the research effort is intended to be a Police Career Index (PCI), a set of test and inventory items selected for administration to police applications.



## INTERNAL VALIDITY STUDY

### Development of Psychiatric Standards for Police Selection

R. W. Heckman,  
D. M. Groner,  
M. D. Dunnette, and  
P. D. Johnson  
June 1972

#### 1. Research Goals, Objectives, and Policy Issues

The overall objective of this research program has been to develop a series of devices for selecting police applicants and for assessing policemen being considered for promotion and upgrading. To accomplish the overall project goals, the following research objectives were established:

- 1) To identify job titles and areas of responsibility that are common across different police departments, and to summarize the current state of research knowledge and practice in the area of psychiatric screening of police applicants,
- 2) To learn the major reasons for failure and incompetence in handling police department job responsibility,
- 3) To learn the behavioral dimensions of job effectiveness for job duties, functions, and responsibilities common across different police departments, and
- 4) To develop a set of critical incident-based job behavior scales for job duties, functions, and responsibilities common across different police departments.

Research objectives 5-8, to be accomplished when additional funding is provided, include developing simulated job situations predictive of effectiveness in job duties, validation of inventory responses and personal history information against effectiveness in job duties, development of standardized scoring keys for inventories and personal history blanks and combination of inventories, personal history blanks

and situational job simulations into a system designed to screen and assess police officers. The first phase of the research, reported in this June 1972 report, was primarily intended to develop the incident-based job behavior scales which would be used to objectively rate performance. In the second phase of research, the performance ratings based on these scales will be correlated with performance on predictive instruments such as tests, job simulations, etc. to aid in selection of those screening procedures most accurate in predicting future performance.

#### 2. Face Validity Check

The title of the 1972 volume is quite misleading since this is a report only on the first phase of the overall study which does not really deal with psychiatric standards. The abstract is similarly misleading as it implies that the whole of the research project is completed and described in the attached volume. In truth, the project is far from complete. This volume contains first a brief summary of current practices and research in the field (which, in turn, pays only brief attention to psychiatric factors) and the remainder of the volume is devoted to describing the development of Behavioral Observation Scales (BOS) with which police performance is to be rated. Even if the project were completed, the use of the term "Psychiatric" is misleading since the selection standards to be devised will be composed primarily of psychological, personality and behavioral items rather than psychiatric items per se.

The BOS described in this report were intended for two uses: an objective performance scale to be used in evaluating police performance prior to promotion or job transfer, and as a research tool used in correlating performance with predictive/selection measures such as personality tests, job simulations, etc. administered to a sample of selected officers. Any test/selection measures which show a high

correlation with performance measures (using the BOS) would then be selected for use in applicant screening and evaluation. The report does not indicate what level of correlation between performance and testing scales is expected or required for validation of a particular screening device.

Furthermore, there is some question as to whether or not there is sufficient agreement on the BOS themselves, i. e., their universality as behavior evaluation tools. In most cases, agreement was forthcoming on the behavioral aspect of an item included in the BOS, but there was some disagreement on the relevance of the situation portrayed to the local police department. That is to say, a behavioral situation or anecdote included in the scale might be typical of situations faced by Detroit policemen but not of situations confronted by Dallas policemen. However, it is likely that the Dallas police would agree with the Detroit police on the appropriate response to the situation if it were to occur in Dallas. If these BOS are to be used as intended to validate selection and screening tools, either they must be universally applicable as rating scales or research should be disaggregated by strata, there being a set of BOS for each stratum and thus a set of selection devices appropriate to each stratum (e.g. strata defined by community location.)

### 3. Methodology

The methodology used in this study in pursuit of the four objectives listed in section one above are as follows:

A. Review of police selection practices and research results. The following topics were reviewed for this first phase of the research: current methods of police selection; written and situational tests, including Civil Service tests, aptitude tests, patrol observation tests, and the Dilemma Exercise; medical and physical examinations and standards; background investigations, including both clinical and statistical use

of reference checks and application blanks; personality and other psychological tests; vocational interest measures; and oral board and psychiatric interviews.

The bibliographic list appended to this review of all the above research areas includes only 42 items, a rather sparse review given the number of topics and the importance attached to each.

B. Interviews with officials. Following the review of literature, interviews were conducted with police officials in small, medium, and large communities. The purposes of this part of the research were to collect, enumerate and classify causes of police failure and to learn more about police department organization, chain of command, and promotion paths. Interviews were conducted in five large, six medium and nine small size cities to determine functions common to departments of different size and location as well as the above factors. Nine suburbs of cities were also sampled. The interviews focused on the duties and functions of the following five police positions: 1) patrolmen; 2) investigators; 3) sergeants; 4) lieutenant-captains, and 5) police chiefs. Following the interviews with departmental personnel, discussions were held with three consultants who have had extensive experience with police personnel departments in developing selection criteria.

The literature review, visits with police officials, and discussion with consultants provided the research team with helpful information on screening out potential police failures. The authors themselves state that more has to be learned to better understand police behavior, not only at the patrolman level but also at subsequent levels. They caution that attempts at predicting effectiveness must take into account the situational aspects of police jobs.

C. Development of the Behavioral Observation Scale (BOS). The major part of the first year of this project was spent developing and evaluating behaviorally based job performance rating scales called the Behavioral Observation Scales (BOS), a set of Guttman scales based on police behavior descriptions. These were primarily designed to serve as criterion measures for use in later project phases.

BOS were derived for the positions of patrolman, sergeant, intermediate commanders (lieutenants and captains) and investigators. In theory, the BOS force the rater to focus objectively on job behavior and thereby reduce the incidence of rater bias in performance evaluations. The scales were developed by people directly involved with the job under scrutiny (i. e., either actually fulfilling the position themselves or supervisor for that position) working in conjunction with the study personnel. The final scales were essentially developed by consensus on two points: appropriate category or dimension of behavior, appropriateness of response. The procedure was straightforward. People concerned with a given job group (patrolmen, etc.) hypothesized a number of situations which might confront an officer and, too, a possible response. The responses ranged from those appropriate to the hypothesized incident to those highly inappropriate or "ineffective". Dimensions or incident-categories were suggested by officers and developed by the research staff and some of the participating officers. A collection of "incidents" was made (after some editing) and then distributed to all participants concerned. These participants then noted the behavior/dimension to which the incident seemed to belong (use of force, investigating, dedication, etc.) and rated the appropriateness of the response described in the anecdote.

Responses were first tabulated with respect to consensus on assignment of an incident to behavior categories. Incidents on which there was less than 60 percent agreement on category were eliminated from the collection. Second, mean ratings of response appropriateness were computed as were standard deviations. The appropriateness or "effectiveness" scale ranged from a low of 1 to a high of 9. Incidents for which the standard deviation in effectiveness

rating was greater than 2.5 were also eliminated from the collection. The incidents remaining were then grouped by dimensions and, within dimensions, ranked by mean effectiveness. Thus, at the top of a list of incidents, the anecdote describing superior police behavior or effectiveness is presented. At the bottom of the list, an anecdote describing a highly inappropriate response to a situation is described. From the list compiled for each behavioral dimension, a group of eight incidents spanning the effectiveness range were selected by staff members. Ideally, the final set of incidents would be composed of eight anecdotes in each behavioral category or dimension, evenly distributed along the effectiveness scale, no two incidents being rated at the same level of effectiveness. These screened lists were then subject to review and editing by the full group of participants. An officer would be rated by noting which of the eight anecdotes in each dimension most adequately described his typical behavior or pattern of response to a situation.

#### 4. Data Requirements and Data Utilized

A total of 1800 man hours was spent generating real-life anecdotes depicting good, bad, and in-between varieties of job behavior shown in each category. Out of this, the following numbers of critical incidents were accepted for further review as passing the criteria stated (60% agreement on dimension and a standard deviation of 2.5 or less on effectiveness rating).

<u>Job</u>	<u>No. of dimensions</u>	<u>No. of incidents</u>
patrolman	14	246
sergeant	8	260
investigator	13	305
intermediate commander	9	262

Nowhere in the appendices or the body of the report is it made clear that 60% of the respondents is sufficient for significance.

Why not require 80% or 90%? Or as low as 50%? Likewise the 2.5 standard deviation for the nine point scale is not explained; why not 2? or 4?

Table 4 presents selected data on participants and results from the four job performance workshops, e.g., number of participants at each job level, number of incidents written, etc. Table 5 is a simple tabulation of incidents by dimensions by mean effectiveness rating involving no sophistication. Table 6 presents analysis of variance data by source of variance for a suburban police department (suburb in Twin Cities area) and Table 7 presents analogous data for a metropolitan police department (Detroit), based on a subset of department members. It is not made clear why so few members of the Detroit department (only five) were included nor why the rest of the cities studied were not analyzed in similar fashion, with data pooled to obtain a source of variance and significance and F ratio for all of the data collected. Table 8 presents an Index of Reproducibility for patrolmen's scales based on data gathered in Detroit for 11 behavior scales. Similar displays of the data for sergeant, intermediate commanders and investigators is nowhere to be found.

##### 5. Experimental Design and Controls

The primary methodology used in this study was that of concensus and review to develop the BOS as a tool for objective evaluation. As described, the process was well implemented, although there is some question as to the definition of concensus used (i.e., 60 percent agreement on dimension and standard deviation of less than 2.5 on effectiveness rating). Nonetheless, the thoroughness of the review and selection process cannot correct for the fact that the participants were not scientifically selected to be representative of officers Nationwide. The failure to design a sampling frame for validating the critical incidents and the BOS seems to be the greatest single fault.

The study also included citizen (nonofficer) participation. The difference in perception of patrolman's performance between his police chief and outside citizens is noted, but procedures for dealing with such a judgemental decision in officer evaluation (and hence the use of the BOS) are not spelled out.

It even may be that the selection of citizens to react to the critical incidents (i.e., to comment on which were highly appropriate police behavior and which were not) was haphazard. A group of 44 persons from the Minneapolis-St. Paul area was invited to meet and discuss what they thought appropriate behavior. They ranged in age from 15 to 37 and there were Blacks as well as Whites, and 45% were female. However, nowhere is it revealed how selection was decided. Hopefully, it was not citizen self-selection (e.g. response to an advertisement) since this procedure has been shown to result in atypical, non-representative groups.

##### 6. Results and Recommendations

The first year of this project produced the full list of critical incidents and, based on these, a set of Behavioral Observation Scales composed of hypothetical situations and responses. Plans are underway to use these BOS to rate officers in various communities (750 each of patrolmen and investigators, 400 each of sergeants and middle command officers). At the same time, these same officers will take an experimental set of tests and inventories, requiring about four hours' time. Data will be analyzed to validate and cross-validate special scoring keys to measure potential success (as defined by ratings on the BOS) in each of the four job areas and in each of the many performance dimensions identified. Valid items will then be retained to form a short and easily administered Police Career Index (PCI) for use in screening police applicants. Officers also will be asked to help pre-test situational exercises and job simulations designed to elicit patterns of behavior shown to be important in the effective or ineffective performance of officers.



Thus, the research results reported in this volume (June 1972) are only the first stage in the full project and provide a tool for rating or "grading" officer success on an objective basis with which scores on tests and inventories can be compared in subsequent research.

#### 7. Discussion

This report is the introduction to what appears to be a rather ambitious research effort. The development of some objective measure of success is, of course, a necessary first step in the validation of screening devices intended to predict subsequent performance. However, it is not clear that the BOS developed in this project are themselves universally valid across community factors such as location, size and affluence. The research staff appears to have paid little attention to inter-community differences which may systematically affect the relevance of certain BOS items. There was no real scientific sampling of communities or of police officers evidenced by the report. Future project research is interesting in its basic nature, but appears also to suffer from lack of scientific design. It would seem that the communities selected for future research were chosen by some means other than random sampling of the Nation's police forces and thus cannot be said to be representative of police forces as a whole. If communities do differ in police duties and situations confronted, then a single BOS cannot be universally valid. And, to this degree, the correlation between BOS ratings and scores on selection instruments may be obscured. It might be advisable to disaggregate the study into strata defined by community characteristics such as location, size, affluence, etc. and develop both a BOS and PCI (Police Career Index) separately for each, thus ensuring a higher correlation between these two and hence greater ability of the selected PCI to predict subsequent performance.

A low correlation between behavior ratings, however obtained, and test/inventory scores precludes the use of such screening devices, whether the low correlation is due to lack of a real relationship or to a poor experimental design (e.g., failure to stratify).

A more recent study is Psychiatric Standards for Police Selection\* (73-0018) conducted by the same group, which describes the development of the Police Career Index (PCI) and Police Assessment Center (P.A.C.) The PCI purportedly screens out high risk candidates through an easily administered test. Borderline candidates (moderate risk) then undergo vigorous evaluation in a PAC. The information gained from the tests may be useful for other career decisions such as training, placement, and promotion. The PCI and PAC reportedly are designed to be readily adaptable to a wide variety of police agencies.

\* This report is given from an abstract in the April 1974 LEAA Newsletter Vol. 3 No. 12 Pg. 10. The report itself was not available for review in this study.

POLICY TOPIC: Personnel Selection, Evaluation and Training

TITLE: Police Background Characteristics and Performance

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ABSTRACT:

This is a study of the background characteristics of N.Y.C.P.D. officers directed toward understanding the relationships of these to selection, assignment, promotion and regarded policies. Specifically, the report compares the background measures of these officers with available measures of performance on the job, in an attempt to determine the type of candidate who is likely to display specific patterns of performance. The findings have implications for the development of improved performance measures and selection procedures which are planned for exploration in later studies. The project studied characteristics of 1,915 officers appointed to the N.Y.C.P.D. in 1957, of whom 1,608 were still active members of the Department in 1968 when most of the data were actually collected.

## INTERNAL VALIDITY EVALUATION

### Police Background Characteristics and Performance

Bernard Cohen and Jan M. Chaiken

August, 1972

#### 1. Research Goals, Objectives, and Policy Issues

This study was carried out with the four following objectives:

1. To develop information on how to select men who are likely to perform effectively as police officers and to reject candidates likely to be unsatisfactory.
2. To identify attributes currently thought to be negative or positive indicators which in fact are not related to later good or poor performance.
3. To identify methods for sharpening the estimate of a recruit's future performance by using information from his probationary period on the force, and for determining which probationary patrolmen should be terminated.
4. To determine the kind of men who are likely to perform ineffectively in areas where complaints against the police are common.

#### 2. Face Validity Check

This study proceeds to gather a large body of data on 1915 officers appointed to the New York City Police Department in 1957. With this data, comparisons are then made between members still on the force

with those who have either resigned or otherwise been terminated. It appears that, with such a large number of officers and 150 descriptors for each, truly valid data might emerge. One reservation has to be interjected at this point. It is possible that these officers joining the force in 1957 may not be typical of officers from, say, 1952 or 1962, or any other year, without attempting to examine the consistency of police recruiting and toughness of the entrance exams and qualifications. It is possible that there have been no great changes in these factors prior to or since 1957; however, the reader is not informed one way or the other.

Further, such factors as the economic recession of 1956 may have had a significant influence on the average age or number of prior jobs the applicants had. We have no knowledge of this and a study including at least a significant sampling of 1952 and 1962 officers, or better yet, a sample of each of the years in between 1952-1962, would let us know whether the 1957 group of applicants is typical or average through the years, and if not, in what way it differs.

The authors state in the introduction that they hoped to find factors through this study which could be applied to any other police department in the country. They wisely conclude, however, that without at least a survey similar to this one that such predictions would not be valid, i. e., the predictors for good performance for New York City policemen may not predict good policemen for Peoria, Ill., for instance.

In one place (p. 18 in the summary), it is stated that:

Aspects of background which might be thought to be negative but which were not found to be related to later performance among those who were appointed to the force in spite of these characteristics include:

- (\*) a large number of debts  
a prior history of a psychological disorder  
any history of mental disorder in the applicant's family  
father's occupation  
number of residences or place of residence  
marital status and number of children
- (\*) number of summonses

(\*) asterisk added by reviewer for emphasis, not in original report

This is followed on p. 25 by the following statement:

1. Officers most likely to be a discipline problem for the department, with a large number of departmental charges and times sick, have the following characteristics:  
(Note particular items with asterisk.)

#### Whites

- Young at time of appointment
- Non-college graduate
- (\*) Excessive summonses and debts
- Employment disciplinary record
- Poor background rating
- Low recruit training score
- Poor probationary evaluation

#### Blacks

- High I.Q.
- Few siblings
- Poor background rating
- Low recruit training score
- Poor probationary evaluation
- Born in New York City

These two statements in the summary are not explained as to how they can both be true; however, in the unabridged August 1970 edition,

pgs. 88-89, it is explained that as solitary factors (simple correlation), the number of debts and summonses are not found to be significant. When factor analysis is used and patterns are looked at, then the six factors above, taken together, are significant. This appears, therefore, to be a defect in the study as reported in the summary, not in the study itself, or in the unabridged final report.

One other issue is that, nowhere in either the summary or the complete final report is the rationale given for using officers appointed 11 years earlier rather than, say 10, 12, or 15. What the magic is of 11 we cannot determine, but guess that it probably had to do with availability or completeness of the records for this particular year of 1957. This probably does not invalidate the research, but we can't know whether a similar study in Detroit or elsewhere will give the same predictors. It is possible that there are some personal biases in the personnel department which account for some of the findings; this is particularly likely to be true for those terminated before their 11th year on the force.

#### 3. Methodology

The study was a straightforward survey of existing police records in which two basic bodies of information were collected and then correlated. The first contained the predictor variables such as race, age, I.Q., Civil Service Exam score, family descriptors, occupational history, military history, personal history, incidents with other police and courts, early



performance on the force while a recruit and for probationary performance, a measure of the hazard status of the first precinct to which each officer was assigned, whether a resident of NYC, and the highest level of education.

The above background and early performance figures were then correlated with the following performance measures: career type (special assignments, promotion to or within the detective division, Civil Service promotion to sergeant, lieutenant, or captain), awards received, complaints, departmental charges, criminal misconduct, complaints before the Civilian Complaint Board, absenteeism, injury disapproval, and firearms removal.

All of the above background and performance measures were collected manually from the files of several units within the N.Y.C.P.D. and from the NYC Civil Service Commission. These included: the Chief Clerk's personnel unit; Disciplinary Record Unit; medical unit; Office of the Chief of Detectives; Civilian Complaint Review Board; and the Background Investigation and Screening Unit. The authors state that there were no restrictions on the items of data which they could record and that 150 descriptors were collected for each subject.

Subjects were all police officers appointed to the N.Y.C.P.D. in 1957; a total of 2002 were appointed, but records were available for only 1915, of whom 1608 were still active members of the force in 1968 when this study was conducted. This sample size was large enough

to study subgroups such as: black officers, detectives, and college educated men. It is regrettable that the number of Puerto Ricans was too small to allow for a significant number to be studied as a group.

By studying all officers appointed in a given year, all officers are standardized in terms of tenure. And all experienced a similar sequence of departmental policies in regard to assignment and promotion.

Since no personality tests or performance evaluations were utilized, there was no need to ask for volunteers, but rather the whole cohort of 1957 officers was available for research. There were 69 inactive officers, terminating prior to 1968, whose records could not be located, compared with 307 of the total of 376 officers who terminated whose records could be located. The authors state that they cannot know if the 69 officers with missing records are not in some way different from all the rest, acknowledging their awareness of the possible problem of bias if a group like this is not analyzed. This group represents 18.6% of the officers terminated prior to 1968, and is a significant number. There is no explanation given as to how much effort, if any, was expended in attempting to find these records, nor is there any speculation as to what may have been their status. If, for instance, this represented a group whose records were forwarded to the F.B.I. or a commission such as the Knapp Commission, or, if they all had Spanish surnames or were Blacks, there would be considerable interest in these records.

#### 4. Data Requirements and Data Utilized

The 150 data items to be collected for each officer were selected following a literature search conducted to determine background characteristics predictive of police performance in other studies. The following five factors were considered in developing the list of factors chosen:

1. Many variables which would appear logically related to police performance may not prove to be valid predictors of performance.
2. A few psychological and personality tests may be valuable as predictors of very bad performance (e.g., dismissal for cause), but they may not appear to be as useful for identifying effective long-term performance.
3. Personal history data may show promise as predictors of good and bad performance.
4. The nature of the relationship between predictors and performance may depend on the race of the subjects.
5. Predictors of general utility could probably be developed from a systematic program of validation studies conducted over a period of years with similar research designs in several cities.

The data collected were processed in standard data processing fashion. First the records were located and data coding sheets were made up for each IBM card to be punched for each officer. These included: subject card, force card, medical card, detective card, civilian complaint card, and an alleged complaint disposition card.

The data were hand entered from the N.Y.C.P.D. record sheets onto the coding sheets, from which they were punched and processed by means of the Statistical Package for the Social Sciences (SPSS).

The report gives copies of the coding sheets, and appropriate N.Y.C.P.D. record forms from which data was drawn. There is no report, however, on statistical and clerical procedures used to verify the data collected. In view of the quality of the other procedures used and reported in this study, we assume that proper verifying, coding, and clerical procedures were applied in this study, although the report neglects to say so, nor are they described.

The relations between predictor variables and individual performance measures, as well as the relations among the performance measures taken as a group, were first determined from cross-tabulations and simple correlations. These tabulations were obtained separately for the black officers and the total active cohort, which consists predominantly of white officers. The initial rationale was to avoid summary analyses based on large linear combinations of either predictor or performance measures. The absence of a fully developed theory or model of how individual predictor variables are related to each performance variable required that a large number of such relationships be examined.

Several criteria for assessing the importance and reliability of these relationships were used. These include: the internal consistency

of associations; the conformability of the associations with belief and knowledge of experienced people in this field; and formal statistical tests such as chi-square and F tests.

In the next part of the study, those variables which showed a substantial association with performance measures were identified and factor analyzed for black officers and for the total active cohort. The factor analysis for the active cohort was based on 37 of the background and performance measures, while the analysis for the black sub-cohort was based on 32 of them. Factor analysis was used as a descriptive technique to identify groups of performance variables which would tend to have similar relationships with background. This helped determine which measures of police performance in this study reflected different dimensions of behavior resulting from different sources of variations.

The results of the cross-tabulations, zero-order correlations, and factor analysis led to hypotheses for predicting performance from background variables. These hypotheses were then tested using step-wise multiple regression analysis. This technique of analysis was selected as the primary statistical tool for developing a prediction instrument for the following reasons: unlike other simpler techniques (e.g., the Biographical Inventory Blank), multiple regression analysis does not require a preliminary scoring system, and it is also a widely recognized statistical procedure. Moreover, the relative impact of items may be compared through computation of their standardized

regression coefficients.

After the predictor variables and combinations of these variables which produced the strongest correlations with performance of the black and white officers were identified, the results were compared with the criteria traditionally used for selecting recruits. From the regression analysis, it was possible to identify the combination of individual background factors which provided the most powerful indication of later measures of performance.

#### 5. Experimental Design and Controls

In 1968, when the data for this study were collected, 1626 of the 2002 officers appointed in 1957 remained on the force (81%). For reasons not reported, the records of 18 of this group (1%) could not be found. This is possibly not a significant number, unless they all turned out to be captains, or, say, Puerto Ricans, which could have possibly made a significant number for analysis of this sub-group. It would seem that surnames of those missing could be located from the payroll office and then the chief clerk or other personnel workers might have been able to at least shed some light on the make-up of this group.

Of the 376 officers terminated prior to the 1968 study, researchers could not find or account for records of 69 inactive officers. It would have been advisable to at least pursue the matter until data was obtained on the years in which these officers terminated (by seeing when they left the payroll, etc.).

The authors state that they did not distinguish the men who were

asked to terminate from those who left voluntarily, since it was not always possible to make an unambiguous determination from the department's record. This appears to create a serious problem in the analysis of the data. It appears, therefore, that men dismissed due to disciplinary action or criminal activity, who are admittedly not wanted on the N. Y. C. P. D., are mixed in the analysis with the more ambitious officers who left of their own accord, presumably to advance more quickly or to obtain higher salaries. Attrition is taking place at both ends of the performance scale and it would be useful to separate the characteristics of each group. For example, it was reported that one third of the college-educated recruits left by 1968 in contrast with only 19 percent of noncollege graduates. Other data indicate that college education is positively related to performance. If the college educated ex-members largely left of their own accord, it would indicate that the department should institute policies to reduce the high rate of resignation in this group. If, on the other hand, the college educated group of ex-members were largely dismissed by the department, it would indicate that the college educated group contains both those who perform better than average and, too, those that prove to be quite unsatisfactory.

The mix of the top and bottom of the quality of officers into one pooled data group called "those who left" regardless of reason is bound to lead to the following finding of this study:

The officers who left the Police Department did not possess disproportionate amounts of any characteristics which might be considered negative.

And, of course, there is no way to determine those characteristics which can predict the extremes of undesirable performance, i. e., those that

result in dismissal, if this group is not separated from ex-members as a whole.

## 6. Results and Recommendations

The first part of the conclusions of this study deals with descriptive data of black and white officers, not related to performance. The following 12 variables are then compared with performance and reported:

### 1. Race

The black officers accumulated 65% more departmental disciplinary charges than Whites, but did not differ on numbers of civilian complaints, allegations of harassment or criminal charges. Blacks did not progress as well through Civil Service ranks as did Whites. Blacks did progress into and through the detective division better than Whites; almost 30% of black officers were detectives after 14 years, compared to 15% of the Whites. Blacks had fewer days sick than Whites, but counting each illness as a single time sick, and disregarding how many days they were sick, the number of occurrences was equal for Blacks and Whites.

### 2. Age

The oldest men at time of appointment were least likely to advance beyond patrol assignments, had low absenteeism, and were less likely to have civilian complaints. This suggests that the older officer recruits would be best suited for assignment to sensitive communities.



### 3. I.Q.

As expected, high I.Q. men advanced faster through Civil Service than did low I.Q. men. Low I.Q. officers were much more likely to be assigned to traffic duty which they performed well. Black officers with high I.Q. had a greater incidence of the departmental misconduct pattern than average I.Q. officers, including high absenteeism, but they did not have above average career advancement. This suggests possible race relation problems within the N.Y.C.P.D.

### 4. Civil Service Score (CSS)

The white officers scoring highest on this test were most likely to advance to sergeant, lieutenant, or captain. This was not true for Blacks, and the CSS was not related to any other performance measures.

### 5. Region of Birth

Blacks born outside NYC had better career advancement than those born in NYC. This did not hold for Whites.

### 6. Siblings

Among Blacks, those with few siblings had a history of more misconduct. No such patterns were observed for Whites.

### 7. Occupational History

Occupational mobility was not related to performance. However, a prior history of employment disciplinary incidents or dismissals was found to be a strong predictor of a future pattern as a disciplinary problem for the department.

### 8. Military History

Being a veteran with or without commendations was not related to performance. However, a military disciplinary record was a predictor of future misconduct, including not only violation of the departmental rules and procedures, but also civilian complaints of use of unnecessary force and harassment.

### 9. Arrest History

Men who had been arrested for non-violent crimes prior to joining the force were less likely to be charged with harassment of citizens, such as false arrest, illegal search and seizure, etc.

### 10. Civil Court Appearances

Men who had appeared several times in civil court as a party or witness in litigation proved more likely to engage in harassment later.

### 11. Other Early Background Characteristics

The following which might be thought to be negative but which were not found to be related to performance include: a large number of debts, a prior history of psychological disorder, any history of mental disorder in applicant's family.

### 12. Background Investigator's Rating

The Police Department's background investigators proved to be fairly successful judges of how a man would later perform as a policeman. Low-rated candidates were less likely to be promoted than high-rated, and they were more frequently departmental discipline problems.

None of the early background variables described above were as strong predictors of later performance as the following:

1. Recruit Training Score. This was the strongest predictor of an officer's performance.

2. Probationary Evaluation. This was found to be the second strongest predictor of later performance.

3. Education. The more college attendance an officer had, the better his performance.

Using the results from crosstabulations and regression analysis, the following three Police Performance Profile patterns were established:

1. Men most likely to be discipline problems for the department with a large number of departmental charges and times sick had the following characteristics:

Whites

Young at time of appointment  
Non-college graduate  
Excessive summonses and debts  
Employment disciplinary record  
Poor background rating  
Low recruit training score  
Poor probationary evaluation

Blacks

High I.Q.  
Few siblings  
Poor background rating  
Low recruit training score  
Poor probationary evaluation  
Born in NYC

2. Officers most likely to incur charges of harrassment (false arrest, protested summons, illegal search, illegal detention, etc.) had the following characteristics:

Whites

No history of prior arrest  
History of civil court appearances  
Military disciplinary record

Blacks

No history of prior arrest  
Employment disciplinary record

3. Officers most likely to incur civilian complaints had the following characteristics:

Whites

Young at time of appointment  
Non-college graduate  
Military disciplinary record

Blacks

Low I.Q.  
Many appearances in civil court  
Military disciplinary record

RECOMMENDATIONS

1. Although some differences were found in both background and performance characteristics of Blacks and Whites, a single selection procedure is recommended for all applicants to the N.Y.C.P.D., regardless of race. These are:

a. All candidates who qualify for appointment in regard to statutory and medical requirements be reviewed by N.Y.C.P.D. background investigators.

b. Background investigators provide their overall rating of each applicant's suitability for appointment, taking into account the findings of this study.

c. A sufficient number of black and Hispanic investigators be

assigned to the N. Y. C. P. D. so that in questions of acceptance, an investigator of similar ethnic background can help interpret the characteristics and background of candidates.

d. No candidates should be discouraged because of missing or "negative" information in categories such as: prior arrest for non-violent crime, absence of military commendations or military service, which were found not to predict bad performance.

e. Finally, an extensive program should be developed for evaluating the performance of recruits. Those recruits who perform poorly should be terminated in much larger numbers than has ever been done in the past, based on low grades in the Police Academy and unsatisfactory probationary evaluation. However, the potential effects of an increased rate of dismissing probationary patrolmen on the morale of recruits and on the type of candidate who applies to the Department should also be considered carefully before beginning such a program.

2. The N. Y. C. P. D. should attempt to attract and retain men with college work completed or underway and should attempt to keep them by assisting in completing education where possible.

3. Older officers at the time of appointment and with advanced education should be assigned in greater numbers on a permanent basis to sensitive areas of the city and to mobilized units assigned to trouble spots.

4. The Police Academy training program should be broadened to improve police performance during police-citizen transactions.

5. The N. Y. C. P. D. should improve performance measures, particularly positive ones based upon field activities and taking into account police-community transactions.

6. The department should urge development of a computer-based information system for police performance data, incorporating all of the data found relevant in this study, plus other information which may be developed in the future.

7. The development of new criteria for selection and promotion of detectives should be instituted.

#### 7. Discussion

Because the findings and conclusions of the type described above have been found to vary when conducted in other police departments or at other times, the results should not be applied to other police departments as if they had universal validity, and the authors of the report should be commended for pointing this out themselves. The methods used in this study, however, could be readily adapted to the personnel files of nearly any police department in the country and further research along these lines, including validation studies, would indicate the extent to which the N. Y. C. P. D. 1957 cohort shows typical patterns of relationships between background characteristics and performance.

Perhaps the greatest problem arising in this study, though not

clearly stated in the conclusions, is the question of what criteria are to be used for determining good performance. When N. Y. C. P. D. performance is used, such as promotion, the findings of this study indicate that the community-police performance rating is poor. Thus the old issue - who is to judge police performance, the Chief of Police or a Citizen's Review Board, is raised. Those performing best in terms of positive police-community relations are least likely to be promoted. This seems to call for at least a dual system of evaluation or the addition of some criteria from citizens, if police-community relations are to be improved. Part of this question also relates to ethnic differences. Just as the exams have cultural biases built into them so do the officers themselves in terms of observing and enforcing violations. Thus black officers are better accepted by predominantly black communities, and Puerto Rican officers by Hispanic communities. This cultural-perceptive effect is behind the recommendation that the N. Y. C. P. D. background investigators of officer candidates be of similar ethnic background.

All in all, this study does what it set out to do, and in a well-thought out, efficient manner. Similar studies could be performed by police departments throughout the U. S. and would then give some answers to the question of the universality of the validity of this study for the N. Y. C. P. D. There is no way to tell which, if any, of the factors found predictive in this study would work out in any other police department,

short of actually trying it out. This study should certainly be required reading for police department personnel workers and any citizens or police concerned with improving police-community relations.



POLICY TOPIC: Personnel Selection, Evaluation and Training

TITLE: Policewomen On Patrol: Major Findings: First Report, Volume I; Methodology and Data Tables, Volume II; and Instruments, Volume III

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ABSTRACT:

This is a preliminary report of the evaluation of the patrol performance of 80 new and several reassigned policewomen in comparison to 80 new policemen. It is based on detailed interviews and observations of aspects of performance and the records of that performance over the first four months of patrol assignments. Data obtained cover the areas of equal treatment by new patrolmen, police performance activities and measures of citizen satisfaction with performance, and attitudes toward policewomen among the police and in the community. It is recognized that this is a preliminary report of the findings on the first four months of the study; it is being continued under Police Foundation support for an additional year. Preliminary findings are reported without too much interpretation, to allow the reader to judge for himself the potential for such implementations in other cities. Volumes II and III allow direct assessment of the actual data obtained and the instruments used to collect them.

## INTERNAL VALIDITY EVALUATION

### Policewomen on Patrol: Major Findings, First Report

P. Block, D. Anderson, P. Gervais  
February 1973 (Vol. I) and May 1973 (Vols. II and III)

#### 1. Research Goals, Objectives, Policy Issues

This study concerns police performance on the street and in particular the utilization of policewomen in patrol and beat situations. It is directed toward the question of whether the sex of an officer is a "bona fide occupational qualification" for police patrol and thus whether women can in fact perform patrol functions satisfactorily in the average situation.

#### 2. Face Validity Check

This report summarizes the results of an evaluation of the actual and perceived effectiveness of policewomen patrolling in Washington, D. C. over the first four months of such practice. As a preliminary study it seems quite adequate. The authors state a series of questions of concern and proceed to apply several survey and interview techniques to gain answers.

In general the approach and the analysis of collected data are consonant with the aim and intent of the study. Both objective and subjective data concerning the effectiveness of policewomen on patrol were

obtained through surveys, etc. and these types of data are related through statistical analysis to the questions posed.

The report appears to do what it sets out to do, with the limitation that the time period of performance studied is probably insufficient to answer the questions with any surety. This is recognized by the authors also.

#### 3. Methodology

Eighty newly hired women, assigned to uniform patrol duty during the period from April - October 1972, were studied intensively. Each woman was matched with a male recruit who generally had entered training at the same time ("Comparison Men"). An additional 22 women with prior police experience now assigned to patrol duty were also studied, but less intensively. All but one of the 80 "new women" and 15 of the 22 "reassigned women" were assigned to either Districts 1 or 7 in Washington, D. C. The "Comparison Men" were assigned to Districts 5 or 6, since these districts most closely paralleled the experimental districts.

The major questions studied were: (1) Are the women being treated in a manner similar to the men, i. e., what are the major program problems? (2) How do policewomen compare with men of similar experience in the performance of various patrol functions? (3) How do citizens react to the

service given by male-female police teams as compared to all male teams? (4) What are the attitudes of patrol officers, officials and community residents toward policewomen? (5) What effect have the women on patrolmen and officials?

Data was collected using various instruments and utilized for detailed comparisons of the characteristics of the policewomen and the comparison men with respect to: equality of treatment, including equal assignments and non-discriminatory behavior and attitudes; performance in the patrol situations; effects of patrolwomen on citizen and community attitudes and opinions; attitudes and expectations of policemen, police-women and police officials. Methods of analysis included statistical techniques such as cross tabulations and means analysis among various groups as well as regression analysis to ascertain the strength and direction of various relationships.

Results of the extensive analysis are summarized in Volume I and the detailed tables are presented in Volume II. Volume III contains copies of all instruments and questionnaires used for the study.

#### 4. Data Requirements and Data Utilization

Within the limitations imposed by the shortness of the period of study and of development of the study, this project is generally satisfactory with respect to data types collected and used, although there appear to be questionnaire and response problems which may cause bias. Surveys, structured observations and interviews were the main modes of data collection. The actual instruments used included the following:

(1) Chief Wilson's Survey, directed toward descriptive and performance data about each officer in each group, completed by district officials;

(2) Officials' Survey and Patrol Survey, directed toward attitudes about women and opinions as to effects of their work experience in the district, completed anonymously by patrol sergeants, captains or lieutenants and by the individual patrolmen and women under study-- officials also rated the studied individuals;

(3) Community and Business Survey, to examine citizen attitudes toward policewomen, included telephone interviews with 420 residents and 107 business persons, in three separate waves over the period of study;

(4) Service Survey, 507 telephone and door-to-door interviews with persons having received service from male-female teams and male teams, in which citizens rated performance and attitudes toward policewomen on patrol;

(5) Structured Observations, observers evaluated 93 male-female team tours and 106 tours with comparison male-male teams, completed a uniform report of what happened, how citizens reacted to the teams, and ratings of behavior of patrolmen and women as to attitudes and performance;

(6) Confidential Interviews were conducted with both policewomen, policemen and officials in the experimental and comparison districts concerning problems and attitudes.

Additionally, study personnel checked assignment sheets and personnel records to monitor the comparability and fairness of assignments of the female-male and all male teams as well as other aspects of performance like awards, complaints and absences.

The Community and Business Survey was conducted by telephone from Philadelphia. The study reports (Vol. II) that rather stringent sample specifications made it necessary to dial 1,218 telephone numbers to complete 181 interviews for Wave 1 of the 3 samples taken during the study. In Table I-7, Vol. II (p.26) a total of 184 interviews is reported for this same wave. No report is given on the number of no answer calls as opposed to those where people just plain would not cooperate. Thus it is impossible to judge how representative the final selection is. Survey research has shown that strong self selection factors are often at work in determining both the respondent populations and those who opt out, resulting in a final sample which is not typical of a true cross section of the strata being sampled. Further, experience in ghetto and innercity neighborhoods shows a great reluctance to level or cooperate with any stranger for any purpose. There are so many problems for these residents with bill collectors, welfare workers, etc. that the standard answer to any call other than from a friend is "I donno."

With regard to the other surveys, there appears to be several problems with the instruments which may have resulted in response biases. More time for preparing and pretesting of the instruments would

doubtless have yielded better survey instruments. The following list notes a few of the more serious problems:

(1) Historical data was requested for which there were no records in the hands of the respondents. For example, officers were asked "Approximately how many days in the last month did you spend: (a) in a scout car, (b) on foot beat, and (c) on station duty?" Assuming that officers keep no written records of their assignments, data like this collected between the 10th and 20th of the following month can represent only the roughest approximation.

(2) For some questions there was no place indicated on the form for placement of answers. This can result in the answer being omitted entirely or entered in a place where later coders do not recognize it for the answer to the question they are coding.

(3) There appears a statement that there was evidence that some of the Patrol Survey forms were filled out by other than those to whom they had been given, although they were to have been filled out anonymously. How this was determined, and how many forms were so filled out is not made clear.

In terms of the data base itself, more pretest data should have been collected through preexposure surveys and interviews. But this was apparently not feasible, due to the nature of the "experiment" being a real world implementation of the use of policewomen on patrol. In fact, there was a small amount of pre-post assessment attempted.



The patrol survey was pretested just prior to April 1972, when the first patrolwomen began. This provided for some attitude measurement prior to exposure to patrolling with women as reported by policemen in the experimental districts. Similarly, citizen attitudes were measured in three successive waves, thereby obtaining measures at three points in time over the period of study.

Ideally, the study might have been planned to obtain a full set of opinion and attitude data from the districts, police officials and policemen prior to the first patrolwoman beginning work. This would have allowed for direct prepost contrasts.

#### 5. Experimental Design and Controls

Assignment of the "newly hired" women to Districts 1 and 7 and of the "comparison men" to Districts 5 and 6 was done to concentrate most of the women so as to concentrate the effects and make them more obvious and measureable. However, this assignment also made the comparison less real since the men and women being compared are not working the same streets, meeting the same citizens, nor associating with the same other officers and police officials. Thus, comparisons of data on the performance of the two groups are slightly questionable, at best, because of no opportunity to compare the performance of the two groups directly.

While this lack of direct comparability of either situations or evaluators does not totally invalidate the results of the study, it must render any conclusions less convincing than otherwise might be true.

The already mentioned lack of pretest data is another minor fault of the study. It would have been more desirable to obtain data from officers, officials and citizens about the performance of patrolmen in these areas and their attitudes prior to the introduction of the patrolwomen.

#### 6. Results and Recommendations

With respect to the question of equality of treatment of the patrolwomen, it appeared that the patrolwomen were given approximately the same assignments (scout car and foot beat) as policemen and the vehicles they were assigned to were sent to approximately the same types of calls as those of the comparison men. All patrol persons were initially assigned to patrol with more experienced officers. In the case of the patrolwomen, these senior partners were found to be slightly more experienced than those with the comparison men--it was not determined whether this was by design or accident in assignments.

The results of the pretest of the patrol survey, conducted prior to any experience with patrolwomen, indicated that patrolmen believed that patrolwomen would be considerably less competent than men and would make their (the men's) jobs substantially more difficult as partners. These expectations were operating and may have made the patrolwomen's experience more difficult than for men.

On measures of performance the women compared favorably with men in some cases and less well in others. The "new" patrolwomen made about the same number of felony arrests as did the comparison men, but

fewer misdemeanor arrests at about the same rates but also gave fewer traffic tickets. However, many women compare favorably with the typical (median) comparison male: 37% of the new women made arrests at the same or a greater rate than the typical comparison man. And 20% of the new women gave moving traffic violations at the same or a greater rate than the median comparison men.

Observers found that male-female teams were less likely to initiate incidents than were the two-male-teams. This included both traffic and non-traffic incidents. They also reported that female team members were more likely than comparison men to be given instructions by their partners, and were less likely to take charge of a situation than the comparison men, when the partner is present.

There appears to be no difference in performance of comparison men and women in situations involving violence, but the number of such involvements has been few so far.

New women and comparison men were rated about the same on Chief Wilson's open survey. However, on an anonymous survey of captains, lieutenants and sergeants, women tend to be rated as less competent than on the departmental survey. On both surveys, women received somewhat lower ratings than comparison men on their ability to handle violent situations.

The community surveys indicated that the service provided by patrolwomen is equally acceptable to citizens. Riding observers also

rated the service as equal between patrol women and comparison men.

Citizens also rated all patrol officers, regardless of sex, high with regard to their overall attitudes, respect for citizens, and ability to handle a variety of situations.

Citizens tend to believe that policewomen should be given an equal opportunity as officers and that their hiring will not cause crime to increase nor affect arrest rates. They think women could be an advantage in domestic disputes but a disadvantage in street fights or riots.

Policemen's attitudes have not changed from prior to the policewomen patrolling to now. The attitudes are not attributable to the women's performance and work experience with patrolwomen has had little effect on these attitudes. Both patrolmen and officials feel having a large number of women on the force is likely to make their jobs more difficult. Both patrolmen and women prefer to have a male partner, but the women's preference is less strong than the men's.

Patrolmen, women and officials all agree that fewer women than men can handle violent situations satisfactorily; women think there is less difference here than do men. All types also agree that women are more likely than men to be satisfactory in handling rape victims and that men and women are equal in report writing and arresting a prostitute. Policemen and women also agree that men and women are equally likely to be satisfactory at cruising and observing.

Negative opinions about policewomen on the part of policemen and officials include the beliefs that men are more likely than women to be: calm and cool, courageous, persuasive, strong, decisive, aggressive, observant, and emotionally stable. Women are believed by them more likely to be: understanding and compassionate, and intelligent. Women have more positive opinions, thinking that women are more likely to be: persuasive, decisive, observant, intelligent, emotionally stable, and understanding and compassionate. Women think men are more likely to be strong and aggressive.

Black patrolmen are more favorable toward policewomen than are white patrolmen and younger patrol officers are more favorable toward policewomen than are older officers.

The authors make no recommendations on the basis of this preliminary study. Their conclusions are in terms of what additional study and reporting needs to be done and that which is planned for the subsequent year. These include collection of data about women with more than a year of experience in patrol, about women patrolling alone or with other women or with men with equal or lesser seniority, and about the continuing effects of women in patrol on community and police attitudes. Data are also being collected about arrest and disposition of arrests by policewomen and the comparison men.

The results reported and the interpretations drawn appear entirely consistent with the data as reported in the detailed data tables included with the report.

## 7. Discussion

This is a well conducted and well reported preliminary study of the effects of putting policewomen on patrol in Washington, D.C. The already noted lack of time for the effects to really show up and the lack of data about the attitudes and expectations of the police and citizenry prior to the women patrollers are the only faults evident. Both the design of the instruments and the analysis and reporting of the study were appropriate to the question at hand and well carried out.

The report should be of considerable value to personnel of other police departments in assessing some of the potential obstacles to women in patrol operations. It should also be of considerable help in suggesting an appropriate means of assessing the actualities and effects of making any changes in patrol operations. The basic methods of attitude measurement and examination of performance of officers should be useful in many different situations.

The results of this preliminary study will be of interest to police departments for purposes of examining use of policewomen on patrol. These data, although unconfirmed by either long term operations or follow-up study, seem to suggest that at least some of the policewomen may be about as effective as the typical policeman in the patrol operations. There are some indications of some potential limitations, but these do not appear to be such that women in general should be excluded from patrol jobs. In cases of response to family fights there was evidence that the

policewomen had a calming effect on the situation in general, so that further violence with the arresting officers was less likely than in an all male team. Consideration of the details of this report and of the expected follow-up study (to be completed and published by the Urban Institute in early 1974) could lead to a much wider usage of policewomen on patrol.

POLICY TOPIC: Personnel Selection, Evaluation and Training  
TITLE: Police Civil Service Selection Procedures in  
New York City: Comparison of Ethnic Groups

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#### ABSTRACT:

The Institute was asked to conduct a study of the differential rates of appointment of Blacks, Hispanics and Non-Hispanic Whites applying for the NYCPD. The study is directed toward determining whether these ethnic groups are differentially admitted to the PD based on the written exam and other selection devices.

The study was conducted by first determining the ethnicity of the applicants who took either one of two examinations (one in 1968 and the other in 1970) and then examining the progress of these persons through the appointment process. This included the study of the differential probabilities of acceptance/rejection or dropping out for each group at each point. The results were furnished to the judge involved in a lawsuit against the New York Civil Service Commission, the Department of Personnel and the NYCPD brought by the Guardians Association and the Hispanic Society. These groups claimed the present selection devices and procedures were discriminatory against Blacks and Hispanics. Data were collected from several sources including the Police Department, the Census Bureau, from subjects themselves by mail and by phone calls.



## INTERNAL VALIDITY EVALUATION

### Police Civil Service Selection Procedures in New York City: Comparisons of Ethnic Groups

Jan M. Chaiken and Bernard Cohen  
May, 1973

#### 1. Research Goals, Objectives, and Policy Issues

The New York City Rand Institute was asked to assist the courts in determining whether or not the New York City policemen selection process was equitable with regard to probability of appointments of applicants of various ethnic and racial backgrounds. The Institute was not asked to conclude whether or not the selection process and, in particular, the written civil service examination, discriminated against minority group members but was asked only to provide empirical data indicating the ethnic-racial composition of the applicants taking the examination, racial-ethnic characteristics of groups scoring at each level, and progress through the appointment process of the Hispanic, black and nonHispanic white applicants who passed the written examination. The determination of whether or not these data indicated racial discrimination was to be left to the courts involved, in this instance, in a case in which the Guardians Association and the Hispanic Society charged the New York City Police Department, New York City Civil Service Commission, and the Department of Personnel with discrimination against Blacks and Hispanics in the appointment process.

While ethnic data were generally available for those passing the civil service examination, there were no data on those failing the examination. Thus, the first step in the comparison of ethnic composition of

applicants and appointees, and the bulk of this study, was an attempt to ascertain the ethnic composition of the applicants who took the civil service examination for patrolman in 1968 and in 1970. Ethnic reconstruction was based on several sources used simultaneously.

#### 2. Face Validity Check

This appears to be a soundly developed and conducted study of the ethnic constitution of the sample of applicants to two separate police examinations in New York City. The approach is to estimate the constitution of the original groups through reconstruction estimation of the proportions of each ethnic group by several different techniques: surveys of individual applicants; surveys of PD records; review of Hispanic surnames; examination of the concentration of ethnic groups by Census tract; and telephone survey of previous applicants. The rationales for the data sources used and the estimation techniques applied are clearly spelled out and the process follows the proposed strategy. The reconstruction process followed highly logical lines and the cross comparison of the several possibilities of estimation indicated that the process was successful.

Overall, this appears a valid study with some applicability to decisions that must be made about selection and appointment techniques for use in other police departments. The heart of the matter is the basic question of whether New York City selection and appointment

techniques are discriminatory without benefit of being validly related to job performance. This matter is of general interest and will continue to be until validated selection and placement procedures have been designed and instituted in police departments across the country.

The study involved the 10,321 men who appeared for and took the two civil service examinations for patrolmen (#8046, in 1968 and #0013, in 1970) and the primary objectives of the study were to estimate the composition by race and ethnicity of the groups of examinees. First, the total sample for each examination was divided into deciles based on their raw scores on the written exam. Thus, the first decile was exactly the highest-scoring ten percent of the examinees on each exam, and subsequent deciles were the successively highest scoring ten percents of the group. Tied scores falling at a decile limit were randomly allocated into the upper or lower decile until each ten percent allocation was filled. These decile distributions were then examined to determine the composition by race and ethnicity of (a) each decile, (b) the group of examinees who passed, and (c) the total group of examinees. Secondly, the study also investigated the racial composition of the groups surviving the subsequent steps of the appointment process.

Five data sources were used to identify the racial/ethnic composition of the examinees - those who failed as well as those who passed. For those who passed the written and physical examinations and then submitted the detailed application for a background investigation, race was normally known and could be obtained from the Police Department records. These

records were the source of data on ethnicity for 31.4% of the applicants who took examination #0013 and 28.9% of those who took examination # 8046. A second source of data was a mailed questionnaire sent to nearly all of the subjects of the study. This resulted in data which allowed estimation of differential response rates for the different ethnic groups (based on the response rates of those for whom ethnicity data were available in Police Department records). These response rates were used to estimate directly the proportions of the total group of non-respondents that were of each ethnic background. (This estimation process assumes only that the rate of responding is the same among members of the same ethnic group regardless of whether they have been successful to the same degree in the application process. This assumption might not be valid, since there could possibly be an interaction between relative success in the ethnic appointment process and ethnic background. As pointed out in the study, the response rate for minority group members -- for those whose race/ethnicity was already known--appeared higher than for Whites. This could reflect a higher motivational level resulting from the partial success in the appointment process with success being relatively rarer for these group members; this possibility cannot be verified or disproved from the reported data.) The questionnaire data combined with the Police Department data accounted for the ethnicity of 47% of the subjects for examination # 0013 and 40% of those from examination # 8046.

The third source of ethnicity data was a compilation of approximately 8000 Spanish Surnames prepared by the U. S. Bureau of the Census. Each subject's last name was matched to the list and where in doubt about the Hispanic nature of the surname, subjects were included if their first name was Hispanic. This method identified 753 subjects for examination #0013 and 365 subjects for examination #8046 having Hispanic surnames and the distribution of their scores was examined.

The fourth source of data used to identify ethnicity in the original groups was the 1970 Census--where tracts had been identified as 100% Black, or White, or Puerto Rican, the ethnicity could be assigned with a high probability to any examinee reporting an address in that tract. Similarly, where known proportions of a tract were of each ethnic group, similar proportions of examinees could be estimated as belonging to each of those ethnic groups. The matches between examinees' addresses and the Census tract data was done by the Department of City Planning. This resulted in identification of the 1970 Census Tract for 79% of the subjects. These were available only for the boroughs of Manhattan, Bronx, Brooklyn, and Queens. No 1970 Census data were available for Staten Island nor outside the City of New York.

The final data source was a telephone survey of a stratified (by decile) sample of 630 subjects for examination #0013 and 649 subjects from examination #8046 whose race/ethnicity remained unknown after all the PD and questionnaire data were in hand. An attempt was made to query each

sample subject with the same questions used on the questionnaire. (What race the subject considered himself to be, whether Spanish had been spoken in his home, and whether he had passed the policeman's exam.) This was successful for 43% of the #0013 sample and for 40% of the #8046 sample. Additionally, these sample subjects were checked against the ethnic constitution of their Census tract and assigned a probabilistic ethnicity. Comparisons of data obtained by these two methods (telephone survey and Census tract probabilistic assignment) showed no errors to be made by the assignment technique for examination #0013 subjects and only three errors made for examination #8046 subjects.

Altogether these methods and data sources allowed the identification of the race/ethnicity for 83% of the subjects. Estimates were then made of the proportionate numbers of Whites, Blacks and Hispanics in the remaining unknown portion of each decile (those unknown directly from either Police Department of questionnaire data). These estimates were added to the number of known individuals in each decile. Comparisons of estimates made from each data source and method were found to be closely related, leading to the same conclusions about the composition of the total group.

#### 4. Data Requirements and Data Utilization

The authors have developed a comprehensive and practicable approach to the problem of estimating the proportion of the original group which were White, Black and Hispanic. The requirement to determine the overall

ethnic composition of an unavailable "population" calls for detective skill as well as scientific estimation. The authors have devised a methodology which appears to utilize all of the available resources to develop the estimates required to answer the basic question.

Both the approach and the conduct of the study are entirely consonant with the requirements of the legal question and address the basic issue of the differential selection of different ethnic/racial groups. The development and application of these methods to the available data are appropriate and valid.

#### 5. Experimental Design and Controls

Since this was not an experimental study, design and control questions are somewhat inappropriate. However, it should be pointed out that, with respect to statistical techniques and estimation processes, the authors were careful to generate duplicate estimates through several sources so that they had the capability to examine the consistency of their estimates. This allows one to place considerably more confidence in their overall conclusions and serves as an internal control with respect to data evaluation.

#### 6. Results and Recommendations

Estimates of the total numbers of Whites, Blacks and Hispanics who took the two exams agreed very closely across the three methods used for estimation. These estimates showed approximately 71% of applicants for the two exams were white. The remaining 29% minority members were

divided differently among Blacks and Hispanics for the two exams: Blacks comprised about 19% of the #8046 examinees and Hispanics were about 9.5%; but Blacks were about 15% for the #0013 exam while the proportion of Hispanics rose to about 13%.

Data drawn from the three major methods of estimation of the distributions of scores by racial/ethnic composition of the deciles are presented in detail in the report. To summarize these results, all methods showed that white applicants were much more likely to score in the higher deciles than were either Blacks or Hispanic subjects. Thus, the white examinees were more likely to pass the exam and the proportion of white applicants who did pass was consistently higher than those for the minority groups. The proportion of the total white applicants who scored in each decile was highest for the top decile and decreased monotonically (except one reversal on one test) across deciles. Conversely, the proportions of both Blacks and Hispanics scoring in the top decile were the smallest and got consistently larger in successively lower deciles. That is, Whites consistently were scoring higher than either Blacks or Hispanic subjects, in terms of the proportions of each total ethnic group receiving scores at the various ranks. Statistical confirmation of these differences was provided by a  $\chi^2$  (Chi Square) test of significance of the differences in proportions; the resulting value was significant well beyond the .0001 level.

The authors conclude that the data drawn from the estimation process



based on Census Tract information was most dependable of the methods used (that is, yielded most precise estimates). Therefore, the following results are drawn from that data set. For Exam #0013, approximately 85% of the white applicants passed the exam, whereas only about 46% of both Blacks and Hispanic subjects passed. Similarly, for Exam #8046, about 65% of Whites passed the exam, while only 38% of Blacks and 43% of Hispanics passed it. That is, well over 50% of the Blacks and Hispanics failed both exams, while only about 16% of Whites failed Exam #0013 and about 35% of Whites failed the earlier exam, #8046. The failure rate was over three times as large for minority members on Exam #0013 and very nearly twice as high on Exam #8046.

To summarize these data, substantial and significant differences were found in the distributions of scores for Whites and minority members on both exams. Blacks and Hispanic subjects consistently scored lower than Whites and so were failed at considerably higher rates. Further, no passing grade could have been set to result in equal proportions of Whites and minority groups passing either exam.

The authors also examined the progress of Whites and minority members through the appointment process following the passing of the written exam. There were no important differences by race in the progression through the steps of the appointment process following the written exam through the submission of the PA-15 (Application for Background Investigation). The authors conclude that the differences in proportions

of Whites, Blacks and Hispanic applicants submitting the PA-15 result from the differences in passing the exams.

With respect to outcome of the background investigation, there were no significant differences among the proportions of Whites and minority group members who were appointed to the force (based on data from Exam #8046, only). Although there were slightly fewer Blacks, proportionately, than either Whites or Hispanics who submitted the PA-15 for the investigation, approximately equal proportions of all groups were eventually appointed. Similarly, approximately equal proportions of each ethnic group were still pending completion and/or appointment when data were collected. During the investigation, significantly higher proportions of Blacks and Hispanics were declared "uncooperative" as compared to Whites. Conversely, a significantly higher proportion of white applicants withdrew their applications during this period. These two opposite tendencies counteracted each other so that the outcome was similar for the appointment proportions for all groups. These data were based only on the 1968 exam because data on the investigations and appointments for 1970 examinees were not available when the study data were collected.

The study reports data on applicants by geographical distribution and age at time of taking the exam. These data are peripheral to the point of the study, however.

The authors conclude that the written examinations used to select applicants for policeman training in the City of New York resulted in

significantly different proportions of Whites and minority group members achieving a passing score. Further, these exams consistently rated both Blacks and Hispanic subjects lower than white applicants. Statistical tests show that these distributional differences are highly significant, with less than one chance in a million of occurring by chance of grades had been randomly distributed, independent of race.

These data were turned over to the courts as evidence relevant to the question of the discriminatory nature of the employment examinations for police.

#### 7. Discussion

Although a significantly greater proportion of non-Hispanic Whites passed the civil service examination than minority applicants, the researchers are careful not to draw any firm conclusions about discrimination. Clearly, two interpretations of the data are possible: the written civil service examination is guilty of cultural bias, thus (unfairly) failing a greater proportion of minority applicants, or the examination is not culturally biased but a greater proportion of minority applicants taking the civil service service examination are not qualified to pass. Neither contention can be supported from this study alone; further evidence is needed on the culturally biased items in the test and/or the basic qualifications of the applicants vis-a-vis the jobs to be filled. Nonetheless, this study does raise the question of possible cultural bias in the written examination and forces the issue to be discussed. The evidence on post-examination progress of applicants

would indicate that the rest of the selection process is not discriminatory or, at least, not more so than the examination itself (i.e., continuing the minority-majority proportions established by the examination passing rate).

If subsequent analysis were to show that the examination itself were culturally biased/discriminatory, then future work must focus on the development of culture-free tests and/or differential acceptance criteria to counter the culturally-biased aspects of the examinations used. This study, however, constituted only a first step and such recommendations were beyond its proper scope.

## K. Police/Community Relations

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## EXTERNAL VALIDITY EVALUATION

### Police/Community Relations

The problem of police/community relations is, in many ways, a composite of all problems confronting the police in their various roles. We might identify two basic components: conceptual and communications difficulties, and effective performance of police functions. On the communications side, the basic problem is to increase mutual understanding. Even if the police are adequately performing their basic functions, the public may be unaware of it. Or, police attitudes toward the community may be such as to preclude sympathetic communication and mutual respect. Research must focus on a form of public relations, on increased police sensitivity and even attitudinal changes, and on increased citizen participation in police functions.

On the functional side of the issue, the problem of police-community relations may be the result of police ineffectiveness in fact. This perceived ineffectiveness may apply to all areas of police work or may be due to the fact that the community has different priorities than the department and would like to see a reallocation of police resources. The appropriate research calls for analysis of ways in which various objectives (e.g., reduced street crime) can be achieved as well as increased awareness of citizen priorities.

The research projects concerned with the communications aspect of police-community relations have focused on increased police understanding of and empathy with community environments and special problems, through increased contact with the community, and on the other side of the coin, increased citizen understanding of and empathy with police work. For example, the Washington, D. C. pilot project (see Kelly et al.) brought the community into police work through a citizens board, citizen riders in patrol cars, and other citizen involvement. The project itself was beset with problems and overextended itself in many ways, but was a notable attempt to involve the community in various aspects of police work.

From the police point of view, a study on race attitudes and labeling (Rafky) attempted to note the relationship between terminology and the basic racial beliefs which, logically, affect police empathy and mannerisms toward minority populations. In turn, police mannerisms, including racial labeling, influence police effectiveness and community acceptance in minority areas. Rafky did not structure programs to counter racial prejudice, but he did suggest that less pejorative labels might aid community relations and even soften racial attitudes held by police in the long run. Presumably, this would be effected through the improved community-police relations allowed by the original (possibly superficial) change in labeling.

A third study in this section, by Wilbern and Williams, dealt with citizen perception of police effectiveness through use of an interview



survey. The results are presented for a number of cities in terms of citizen satisfaction with police, attitudes toward increased spending on police protection, feelings of personal safety in their neighborhoods, etc. The survey is useful as an example of the type of data collection which might be instituted in any given community to ascertain the community's felt needs as the first step in bettering community relations.

The remaining three papers reviewed in this section were concerned with police effectiveness in police work per se. Clearly, police-community relations depend not only on each side's perception of the other and police-community communication, but also on police effectiveness in the performance of their various (objective) duties. Poor relations may result from police failure to achieve certain levels of performance, in general, or from police priorities differing from community priorities for police work. Research has been directed at definitions of appropriate police roles. The collection of papers edited by Steadman repeatedly mentions the conflicting roles -- social service and crime fighting -- of the police and note that these conflicts may hamper police effectiveness in a single role. A solution offered by one author is the separation of police staff by function, having specialists in each role and thus avoiding role-conflict. Other research efforts have accepted the existence of role conflict and tried to effect improved police-community relations through increased efficiency in achieving a given objective. For example, the Oak Park experiment (see Adams) approached the problem through an intensive foot and scooter patrol program. The ostensible objective was to reduce

street crime, hence improving relations through improved police effectiveness, but the real effect seems to have been measured in terms of community approval (without hard evidence of crime reduction) stemming from increased police visibility and contact with the community.

An experiment in New York utilizing police specialists in family crisis intervention (Bard) was similarly designed to increase police effectiveness, in this case with a view to the social service role of police. The results were measured more in terms of job-effectiveness than the Oak Park project, e.g., reduced police injury, but clearly there were also public relations side-effects stemming from the improved climate of police-citizen meetings. In fact, the success of the project could not be measured with regard to solution of family crises, since it may have been that the skills of the special unit actually led to an increase in police intervention rather than a decrease.

The projects reviewed in this section constitute only a beginning of the research possible in the area of police-community relations. We suggest that future research include more extensive surveys of citizens in various communities to ascertain the problem areas inhibiting good police-community relations, whether the problems are those of communication and understanding alone or whether there are real differences of opinion on police duties and priorities. More experiments are warranted which seek to bring police and citizens into closer contact both informally

and via formal incorporation of the community in police work. For example, research might be directed into sensitivity sessions involving both police and minority groups, into the greater use of community members in police work (e.g., citizens trained to go with police on family intervention calls), into police-citizen meetings to air complaints and differences that are not formally registered in an antagonistic manner with a complaint board. We also suggest that there are many ways in which police effectiveness can be enhanced, such as the family crisis units, and that research both explore the possibilities and then institute experiments with appropriate controls and data collection to test the hypotheses.

POLICY TOPIC: Police/Community Relations

TITLE: Oak Park Project Evaluation

AUTHOR: Herbert A. Adams

PUBLISHER: City of Flint Michigan, Division of Police

VOL. /NO.:

DATE: October 1, 1970

NO. PAGES:

ABSTRACT:

This is a quarterly progress report of the Oak Park Project, an intensive foot and scooter patrol which was established in a high crime area of Flint, Michigan, in an effort to reduce the incidence of crime and to increase police/minority group communication and cooperation. The report notes a decrease in crime rates during the project, gives details on kinds of contacts by the police with the Oak Park community, and includes numerous letters written by Oak Park residents and businessmen expressing their approval of the project. There are few hard data presented, but the report indicates the project was somewhat successful. According to community letters, it was specially successful from the community relations view point.

## INTERNAL VALIDITY EVALUATION

### Oak Park Project Evaluation

Herbert A. Adams

October 1, 1970

#### 1. Research Goals, Objectives, and Policy Issues

This study examines the effectiveness of the institution of an intensive scooter and foot patrol operation in a heavy crime district in Flint, Michigan. The operation was directed toward reduction of neighborhood crime, especially resident burglary and street crimes. The report summarizes the operation and the results of the six months effort and presents considerable evidence of improved police-community relations and increased community support and appreciation for the police efforts.

#### 2. Face Validity Check

The evaluation efforts are done by the Project Director, Captain Adams, and by Sergeant Williams, the Sergeant in charge of the Oak Park Patrol. This fact may raise some questions about the objectivity of the evaluation. No objective data are presented to support the statement that crime was reduced by as much as 40% during some months of the project. Current crime data are presented, but prior years' data are not. Thus, the reader cannot judge the truth of the statements. Nor does the reader know whether the project was really responsible for the

reduction or whether the reduction was part of a general (unrelated) trend since data are not presented for other areas. On the other hand, there are numerous letters from citizens stating strong support for the project and police efforts. This leaves us believing that the project had favorable effects on the community relations aspects but still questioning its effects in crime reduction.

As an evaluation effort, this report does not meet acceptable standards of either completeness of data or objectivity of reporting. However, as a subjective descriptive report on one attempt at crime reduction and community relations, it may have some limited value for persons in other police departments. Certainly, the citizen response to the intensive patrol and community contact programs was highly favorable, as indicated by letters included with the report.

#### 3. Methodology

The evaluation is simply a descriptive report of what occurred and what was observed on a monthly basis over the six months of the intensive patrol project. Actually, the project consisted of instituting ten scooter patrol districts and five walking beats within the Oak Park area in Flint. This area was reported to be a high crime area within the central ghetto area of the city. Teams assigned to these beats and scooter patrols were mainly temporary Black officers together with some senior patrolmen

working on an overtime basis. The aims were to reduce incidence of street crime and improve the quality of the police - minority community relationships.

The evaluation report consists of a few general descriptive statements and six individual monthly reports by the Patrol Sergeant. Each of the reports include a descriptive statement of the activities of the patrols and a list of the crimes occurring and arrests by the project teams for the month discussed. There is a summary sheet of all criminal activities in the project area for the six months of the activity. There is no presentation of any earlier years' data to allow a direct comparison. There is presented a news release (from Governor Milliken) stating several impressive reductions in criminal activity for the month of July 1970, as compared with the same month for 1969. Again, only the statements are given, not the data.

The evaluation of such a project should have been conducted by an objective outside agency and handled in such a way as to assure the reader of the facts in the case. This was not accomplished in this instance.

#### 4. Data Requirements and Data Utilization

This report consists mainly of the progress reporting by the Flint Police Department on the Oak Park Project and, as such, it should not be viewed as an evaluation report in the usual sense. There is no presentation

of pre-project data in the report, only references to previous years' crime rates and statements of considerable reduction. No data on community views of the police protection in the area prior to the institution of the project are included either. Thus, the report is mostly anecdotal rather than evaluative. Although some data on rates for selected crimes occurring during each month of the project are presented, these are relatively meaningless without a comparison base. Thus, the reader is forced to accept the report's statement of success or to reject the study on lack of evidence.

Ideally, both hard data on crime and on community perceptions and attitudes should have been collected prior to the start of the project for comparison with the current and post project data. Also, there should have been some description of the process of the patrol augmentation, including some indication of the schedule and concentration of patrols throughout the neighborhood. This type of data would be useful to other departments in interpretation of what was done and how effectively the additional patrol personnel were utilized. This ability to more clearly understand the process and application of the patrols would allow better assessment of whether such augmented patrols and emphasis on community relations would be useful elsewhere.



5. Experimental Design and Controls

No experimental design was defined or implemented for this study. A pre-post study of data changes should have been applied to this problem and could have answered the important questions about actual effectiveness of the project. Comparisons between the prior years' data and that measured during the project was discussed, but no specific design or controls were applied.

Control areas might have been studied as well as the project district, but of course this might have been difficult to do since there may have been no truly comparable districts. Such measures as crime rates, population characteristics, economic levels, commercial vs. residential neighborhoods, could have been used to assess the comparability of other districts in the city. Use of comparisons with other areas of even roughly comparable characteristics would have been preferable to no controls at all.

6. Results

The general statement of results of this study is that the authors report results without presenting any comparison data. The summary of crimes occurring by month shows some decrease, but it could be a seasonal decrease or due to some other effect. There is no way to determine from this report how effective the patrols really were with respect to crime control. On the other hand, there is plenty of subjective

evidence that the patrols were effective with the community relations development. Numerous letters from residents and business men reflect the community's reactions to the patrols; all letters included were favorable to the project.

Overall, with no more data than presented, one can say that the additional patrol operations were probably successful with respect to police-community relations and should have had some effect on crime reduction, as is claimed. The innovation should have been carefully examined for real effectiveness, based on comparative data from prior months' crime reports. As it is now, one cannot draw conclusions about the true effects on crime reduction. At the same time, it is clear that the Flint Police Department, to the extent represented by these reports, is impressed and pleased with the effects of the innovation. They would like to keep it operating. This reaction is true of community letter writers also; they too wish to keep the patrols in operation.

7. Discussion

Although probably an effective method, the use of the intensive foot and scooter patrol was not properly evaluated in this report. Thus one is left to speculate, rather than conclude, as to whether this patrol innovation was effective other than in a public relations sense and might be effective in some other setting also. This report would perhaps be of interest to police in other departments, but there is little in the report which would lead to transfer to other situations.

Similarly, there is little new knowledge in the report, besides that the citizens like additional protection and seem to respond positively to attempts to increase the direct contact by policemen on duty. This latter point is not supported, of course, in some of the other studies in this area, where police report citizen rejection of casual talks or drop-in visits. (Reference is to the New York City study of Neighborhood Police in Team Policing: Seven Case Studies, previously reviewed.)

POLICY TOPIC: Police/Community Relations

TITLE: City Taxes and Services: Citizens Speak Out

AUTHOR: Y. Wilbern and L. A. Williams

PUBLISHER: Nation's Cities Reprint Service, Washington, D. C.

VOL. /NO.:

DATE: August 1971

NO. PAGES:

ABSTRACT:

This is a report of the initial findings of responses of 4,300 in-depth interviews conducted under the Urban Observatory Program in ten major United States cities. The adults surveyed, representing a cross-section of each city's population, were asked their views and feelings about city government, city services, and city problems. Of particular interest are the questions included in the survey which concern police protection, namely how safe people feel walking alone in their neighborhoods at night, how they feel about the amount of crime in their neighborhoods, how many crimes they experienced in the past year, whether they feel the police respond promptly when called, and how they feel people in their neighborhoods are treated by the police.

## INTERNAL VALIDITY EVALUATION

### City Taxes and Services: Citizens Speak Out

Y. Wilbern and L. A. Williams  
August 1971

#### 1. Research Goals, Objectives, and Policy Issues

This is a brief report of a survey of ten cities directed toward examining what citizens think about the quality and range of various city services and the certain features of the city government process itself. It covers a range of subjects including police protection and it is that section of the report which is dealt with in this review. The bulk of the data in the report deals with other aspects of city taxation practices and other city services. Although these aspects may be of large general interest, they are not reported in detail in this review.

The survey asked a number of important questions about the characteristics of police protection and the citizen's satisfaction with it. The survey questions seem to be pointed at the definition of the unmet needs and desires of the people with respect to police protection. Therefore, the following appear to be the implicit goals, etc.:

- A. Research Goals: Improved police effectiveness
- B. Objective: Improved police community relations
- C. Policy Issue: Determine community's views as to quality of police protection and define unmet needs--presumably to lead to attempts to meet needs and thus increase satisfaction to practicable extent.

#### 2. Face Validity Check

As a report compiled through the cooperative organization of the Urban Observatory system in ten cities, using standardized instruments (even though not documented in this brief report), this appears to be a fully valid survey of citizen opinions regarding taxation and city services. The brevity of the report does not allow direct assurance on this point, but the overall presentation and the standing of the study group serves to indicate that this would be true. It is suggested that the report would be useful for general information only, not for guidance in specific implementation of change in other cities.

#### 3. Methodology

Ten cities were surveyed with a total of 4,300 interviews collected to represent a cross section of the adult population of each city. The respondents were asked their feelings and views about the city government, city services and city problems. The overall goal was to measure the citizens' feelings and perceptions about basic city services and the local governmental processes. The ten cities were: Albuquerque, Atlanta, Baltimore, Boston, Denver, Kansas City, Kansas, Kansas City, Missouri Milwaukee, Nashville, and San Diego.

The Urban Observatory in each city applied the same interview instruments with standardized procedures between June and October 1970. Analysis was performed by the staffs to the observatories and by the

Survey Research Program, Joint Center for Urban Studies, M.I.T. and Harvard University. Data are summarized for each question and usually presented in terms of the similarities and differences among the responses of the majority of populations of the ten cities. Some analyses of the response tendencies of different subgroups of the population are presented. These include some differences of opinion based on race, religion, age and family income. Most differences mentioned in this overview report are those between races and family income groups. Usually, comparisons are only drawn where there was a meaningful difference between groups.

#### 4. Data Requirements and Data Utilization

The report defines the survey effort as having been developed through the joint cooperation of both city officials and researchers in the ten cities and specifically designed to collect data focused on the local problems and issues. The data described in this report appear appropriate to the intent and stated aims.

This is only an overview summary report of a first analysis of the data. Even without a clear picture of the extent of the data that must have been collected, it seems that much more data are available for more detailed analyses than are here reported. It is stated that detailed analyses are being conducted by each of the ten cities and are to be reported later;

it is hoped that a more detailed analysis is being conducted for the ten cities together, also. This preliminary report is interesting, but generates more questions than it really answers.

The only criticism here is that the report has not yet been detailed and the authors report that this is being done.

#### 5. Experimental Design and Controls

The study is an attempt to describe the opinions held by some citizens in each of ten cities of the nation and to compare these opinions across cities to some extent. The study does not purport to be anything other than a description of these ten cities, although there is an indication that the authors would like to be able to generalize some of their findings to cities throughout the nation. The authors themselves point out the ten cities "are not a cross-section sample of all cities, or even of all cities in the population range of a quarter of a million to a million,..." They then say the cities "...do represent a substantial spread among types of cities. As a result, trends that are common to all or most of these cities are likely to be typical of many cities in the United States." This conclusion is true to some degree. The question that remains is mainly which trends are likely to be typical of which other cities and how likely is such an event? This cannot be answered from these data.



The authors clearly point out many of the differences among the ten cities studied and raise the point that these differences--in population size and constitution, in percent residency of the metropolitan area (SMSA), in population density, in types of housing stock, etc.--may be as important in explaining some of the differences between cities as any characteristics of the city government or the actual city services received. They state appropriately: "Differences among cities in the way government services are viewed cannot be interpreted without reference to the differences between the populations of the cities."

Factors such as the extent and favorableness of the press coverage of police actions, i. e. whether police blotter is reported daily in the press, or whether many reported crimes actually go unrecorded and therefore unreported as has been alleged in many cities, to make the incidence of crime appear to be less or improving due to the excellence of policing. The fearfulness for one's person in the city expressed in Boston could reflect the recent completion and showing of the Boston Strangler, rather than the actual murders committed 6 to 8 years earlier. Such factors can influence the survey data more than the true incidence of crime if it could in fact be measured and known.

It is difficult to imagine how this study could have been better controlled without extending it to a much larger and actually representative (if such were even possible) sample of the nation's cities. Rather than

controls, it is necessary to keep in mind all of the caveats pertinent to the lack of direct generalizability of these data to any other city. The data are interesting and can lead to useful speculation and self-examination, but they are probably necessarily limited to those uses.

#### 6. Results and Recommendations

The following paragraphs summarize only those data reported which are pertinent to the area of police protection and services and to the citizens opinions about the relative priority of needs for these services. Much of the data reported in this preliminary report on the total study are thus excluded from this review.

The first statement of priorities by citizens was in relation to what things needed to be changed, started or stopped in order to make the city a better place to live. Responses to this were widely varied, with fewer than 25% of the people in any city giving the same answers. Police services and courts appeared to be important issues among citizens in many cities--being mentioned in about 7% of responses in San Diego and Milwaukee and in over 20% in Kansas City, Missouri. In most cities, law enforcement and citizen protection comprised about 15% of responses.

When asked what services needed improvement in their own neighborhoods, again over 10% mentioned police services, etc., in most cities, with the range of responses being from about 7% in San Diego to around

21% in Boston. Further, when asked to identify services as to whether expenditures needed increases, were about right, or should be decreased, a majority of citizens in seven of the ten cities indicated a need for increased expenditures for police services and protection. In general, the three services identified most often for increased efforts were helping kids with drug problems, school support, and police services, in that order. By contrast, citizens constantly cited ticketing and towing cars and building freeways as the services which could be cut back. Towing cars was in fact the only service that a majority said should be cut back and that occurred only in Baltimore and Denver.

Increased money for police protection was mentioned by a majority of citizens in seven cities, but when this was examined by family income, this was a concern for a majority of citizens with over \$5000 annual income, but not for a majority of those earning under \$5000. On the other hand, in seven cities with large Black populations, a majority of citizens in all but one city wanted increased spending on police services.

When asked specifically about their satisfaction with police services, citizens responded somewhat differently in different cities. Specifically, when asked how safe they felt on the streets at night, 75% of people in San Diego and Albuquerque felt "very safe" or "pretty safe," while less than half of respondents in Boston and Baltimore felt that way. Also, even in Albuquerque and San Diego, close to 20% reported they felt "pretty

unsafe" or "very unsafe." In general, the less educated, the Blacks, women, and those persons over 65 were reported as being more afraid on the streets. These relationships were found significant in each of the ten cities.

Generally, people felt that their neighborhood area was safer than other areas of the city. Only in Boston did as many as 10% of the respondents report that they thought their neighborhood had more than an average crime rate.

When asked what crimes should be given highest priority by government and police, the most often cited were drug sales, burglary, and robbery in the streets. More than half of respondents in each city cited drug sales for high priority and in some cities the proportion was 75 - 80%. Burglary was cited by about 45% of the citizens in most cities, but in Albuquerque it was mentioned by about 75% of the respondents. Robbery concern was much less consistent across cities. In San Diego and Albuquerque, where people felt safe on the streets, speeding drivers was mentioned twice as much as robbery. But in Baltimore, Boston and Kansas City, Missouri, about 50% or more of the population was concerned about robbery. Prostitution and gambling were almost never cited and car theft was cited by only 10% or less in every city. Speeding or reckless driving was cited by about 20% of the respondents and in Nashville nearly one in three respondents mentioned this.

In response to a question about victimization, a crude index of physical danger (based on frequency of robbery, pursesnatching, pick-pocketing, and assaults) varied from 17 per hundred households in Boston, to 12 per hundred in Atlanta, to 10 per hundred in Milwaukee, Nashville, Baltimore, and Kansas City, Kansas, to a low of 5 per hundred in San Diego and Albuquerque. This index variation appeared to correspond roughly to the reported felt safety among the cities. Rates reported for burglary were relatively constant across the ten cities at around 12 burglaries per hundred households. Nashville and Kansas City, Kansas were somewhat lower and Albuquerque was somewhat higher than this rate.

When asked to rate their police forces, citizens generally rated them as "very good" or "good enough," with about 70% of citizens generally responding with these labels. Most positive were San Diego and Milwaukee with more than 80% responding with one of these two labels. About 75% responded with these labels in Albuquerque, Denver and the two Kansas Citys, and Atlanta, Baltimore, and Nashville were rated thusly by about 60 - 65%. In Boston, 57% used these labels to describe their police services.

Neither income levels nor educational levels affected the perception of police services, but being Black or White did and so did age. In all seven cities with large Black populations, there was a significant difference in the proportion of Blacks and Whites reporting satisfaction with police services. Also in at least five cities, the people over 65 rated police more favorably than adults under 30.

In terms of quality of service, citizens were asked whether police came right away or took a while to arrive when called. In all cities, more people thought police came right away, but the proportions varied widely, with Boston and Atlanta receiving only a little over half responding this way. Within cities, the poor people tend to feel the police are less responsive than do wealthier persons. This was found in perhaps six of the ten cities. Also, Blacks consistently perceived the police as less responsive than did Whites. Differences were large and significant statistically. In Atlanta, 70% of Whites felt police came right away while only 34% of Blacks felt this. In the best situation, Kansas City, Missouri, 79% of Whites viewed police as responsive while only 61% of Blacks did so. Whether true or not, a majority of Blacks in five cities thought police did not respond quickly to their needs while a majority of Whites felt the opposite. Blacks do not perceive the quality of police services to be as high as do the Whites.

In terms of police community relations, citizens rated the way they and their community were treated by the police. The level of satisfaction was generally quite high, only in Baltimore did as many as 20% respond with "not so good" or "not good at all" to the question. Even though Blacks tended to rate police highly on this question (with only Boston receiving less than 60% of Blacks rating their treatment as "good enough" or better), there were, again, significant differences in perception between Blacks and Whites as to police treatment.

7. Discussion

This is a useful report, presenting some facts and figures about the citizen views of needs and services in the area of police protection as well as several other areas of local governmental concern. It may well be helpful to police department officials in terms of stimulating thought and concern as to local perceived needs and real needs for services and public relations. It is probably not going to be helpful in replanning any departmental policies or developing new services. However, it could serve as a springboard for development of a local survey of citizen opinions about needs. And responsive police departments might wish to design and conduct such studies for their own information and future planning.

The overall study and the brief report appear to be valuable contributions to our information about what citizens think about their government and about police services. It is suggested that subsequent, more detailed, reports from the National League of Cities might be even more informative and useful to persons interested in the contents of this report.

Subsequent studies should be broadened to include a more representative sample of cities in the Nation if such descriptive data are to be used for such generalizations as are implied by some of the discussion of the data in this report.

POLICY TOPIC: Police/Community Relations

TITLE: The Pilot Police Project: A Description and Assessment of a Police-Community Relations Experiment in Washington, D.C.

AUTHOR: Rita Mae Kelly, et al.

PUBLISHER: American Institutes for Research  
Kensington, Maryland

VOL./NO.: PB-208 157

DATE: January 1972

NO. PAGES: 467

ABSTRACT:

This is a report of a study to review the literature of police-community relations and to assess the effectiveness of a pilot project in improving police-community relations in the Third Police District of Washington, D.C. The general objectives of the pilot project were to change the attitudes of both police and citizens, change behavior in order to increase crime detection, to involve the community in decision-making, and in general to foster community development. The specific policy issues and means implemented to achieve these objectives were many, beginning after 18 months with the establishment of a community advisory board, and including such diverse activities as a youth center, junior cadet corps program, civilian employees in the police station and an inservice police training program. The first 18 months of their OEO funded project were conducted following the D.C. rioting in the Spring of 1968. No pre-evaluation measures were made, and after 18 months a citizens advisory board was elected, whose chairman was extremely militant. At this point, A.I.R. was called upon to evaluate the project, after the fact by 18 months.



The report therefore is a well-written descriptive narrative of the first 18 months of operation, followed by a quasi-research evaluation design in which similar measures were taken by survey methods in two supposedly comparable police districts and analyzed. The report not only attempts to analyze progress toward improved police-community relations but, in the process of reporting, presents a detailed account of the history and structure of the problem. The problems of the program itself are noted in the report. The problems of the evaluation are fairly self-evident from the description of survey populations (e.g. the exchange of a control group for a program participant group when program area was changed) and the evidence that residents were reluctant to level with interviewers asking questions about police.

Based on the original objectives of the project, the outcome was a disappointment if not a disaster. However, based on the more generalized goal of "improving community relations," there is indication of some successes. This report should be required reading for anyone contemplating improving police-community relations, not that it gives direct answers, but because it describes in detail the pitfalls and difficulties which may be encountered in both implementing such a program and in analyzing it.

# CONTINUED

## 8 OF 10

## INTERNAL VALIDITY EVALUATION

### The Pilot Police Project: A Description and Assessment of a Police-Community Relations Experiment in Washington, D. C.

Rita Mae Kelly, et al.  
January 1972

#### 1. Research Goals, Objectives and Policy Issues

Following the assassination of Martin Luther King in the Spring of 1968 and the ensuing rioting in Washington, D. C., this project was proposed to and funded by The Office of Economic Opportunity (OEO) as a pilot project to improve police-community relations in the District of Columbia. The project was originally funded for 18 months by OEO with the following four general objectives:

(1) To change the attitudes and opinions of the police and citizens, i. e., to make them more aware, receptive and positive and to encourage them to base their attitudes and opinions on fact rather than myths and stereotypes;

(2) To change behavior so that crime detection would increase, emergency social services would improve, methods of settling non-criminal disputes would improve, and behavioral manifestations of hostility between police and citizens would decrease, while explicit acts of cooperation and trust would increase;

(3) To involve the community in the law enforcement problems and activities, including the making of policy, assisting in the training of

policemen, recruiting local youth to careers in the police force, employing civilians in the precinct to perform clerical and other non-law enforcement tasks; and

(4) To inspire and encourage self-initiative and organizational development in the community.

As this study progressed, a further 18 months of the project was funded by OEO, the city of Washington, D. C., and the Law Enforcement Assistance Agency in the Department of Justice.

The following statement from the Pilot Police Project (p. 320) is indicative of the progress in the first 18 months of the project:

"After more than eighteen months and the expenditure of considerable time, effort, and money, the Pilot Police Project had made little headway toward achieving the goals stated in its original proposal and in its contract with its sponsor the Office of Economic Opportunity. During this year and a half, little was accomplished to improve police-Black-community relations or to improve police services through the involvement of the Black community."

As a result, a citizen's board was elected in February 1970, in keeping with the OEO funding objectives of providing poverty area residents the opportunity to gain control over their lives. This board represented almost every spectrum of the political and economic scene. Some considered the board militant and radical, although the following

objectives which they set for the last period of the pilot project do not seem extreme. These were:

(1) To conduct an in-service training program to advance police knowledge in human behavior, law, and police operations and management;

(2) To ensure that police operations and procedures connected with the development of patrol personnel, priorities of enforcement, handling of complaints, methods of police recruiting and promotion, police relations with various citizen groups, and the operation of specialized police units in the experimental area, were applied "to the best interests of justice, efficiency and suitability to community needs;"

(3) To improve emergency, guidance, and other social services to the community poorly provided by the police; and

(4) To involve residents as much as possible in the project's activities.

As a means to these objectives, a number of diverse programs were augmented or instituted as part of the pilot project, in addition to the in-service training programs noted above, e. g., youth center, citizen riders (in patrol cars), junior cadet corps, community opinion and asset survey, 24-hour switchboard, nighttime-weekend emergency service centers, intensive (paid) study for police promotional examinations, civilian employees in police stations, drug abuse program, and a training program for prospective police applicants.

Not all of these programs were sustained, as the report testifies.

## 2. Face Validity Check

This is an extensive and thorough report of a crash pilot police project which attempted to improve police/community relations. The project began in September 1968 with the 13th precinct as the pilot precinct. The area covered by the Spring, 1968 riots was contained within this precinct. The police training in community affairs to be offered to patrolmen was administratively limited to this one precinct while an adjacent precinct to the North was used as a control area. In July 1969, the existing 14 precincts of the city were consolidated into 6 districts. The name of the project was changed at this time to the Pilot Police District Project, and the area of the project now included most of the old 2nd precinct and portions of the 10th and 3rd precincts. In addition, the control area was similarly changed.

The report documents the many problems of the project, including two changes of director and community wariness of the whole project. A number of programs were initiated, but many aborted, thus the project itself was never implemented to the degree originally envisioned. The history of the project and programs are fully described in the text of the report. Given such detailed narrative, many reasons for failures in such a broad project can be found.

The report, however, is concerned not only with historical narrative and thus, by implication, the shortcomings of the project, but also with a more objective evaluation of project success based on interview surveys conducted in the program area and a selected control area. Evaluation at the level of program implementation is descriptive, e.g. so many policemen enrolled in the crash study program and passed the examinations, civilian employees at the station house engaged in such-and-such duties and thus many were involved. Evaluation of changes in community attitudes, the final goal of the project, was based on surveys which are highly questionable, particularly given the redistricting of the program area as well as the suspicions of residents about interviewers' motives and connections. Thus, the conclusions of the evaluation team are highly suspect on two counts: the failure to effectively implement the designed programs, hence poor basis on which to note which types of programs tend to enhance community relations, and the biases in the evaluation surveys used to note attitudinal changes.

## 3. Methodology

The first task undertaken by A.I.R. to evaluate the Pilot Police Project was to review the first 18 months of operation and write an interim report complete with recommendations.



The second task was to review and develop a synthesis of the literature on police/community relations. In this they dealt with the question of definition of police/community relations. Since the objective of the second 18 months of the project was to improve police/community relations, A.I.R. also dealt with the question of what are good and bad relations, and from whose point of view.

The remainder of the report, aside from the evaluation described below, consists of: (1) a description of the Pilot Police Project from February 1970 through July 1971; (2) a description of the in-service police training component of the project; and (3) an evaluation of the in-service training component.

The project methodology itself was diverse and included many aspects ranging from citizen riders in patrol cars to in-service training for policemen. Not all programs proposed were implemented. The Citizens Board was established by the second phase of the project, but the specific measures touching on police attitudes, police-citizen relations, and citizen attitudes were often caught up in project problems. Evaluation methodology, as distinct from project methodology, was essentially based on two types of data comparisons: pre-project post-project comparisons of attitudes of police and citizens, post-project comparisons of attitudes between control and project area persons (both police and citizens).

The design was simple, based on stratified random samples of area citizens and policemen, using interview surveys to collect data. In essence, such an evaluation would indicate the success or lack of success of the program as a whole and not the relative merits of each component (emergency line, citizen riders, in-service training, etc.). Nonetheless, the results of these surveys are presented in the report section on the police in-service training program, the only section dealing systematically with evaluation of the project.

The in-service police training component of the program was developed and evaluated against the following five criteria:

(1) The change in policemen's view towards their roles and functions as policemen, attitude toward the knowledge and opinions of non-law-enforcement experts (particularly those in the social sciences) and community residents, awareness of their ultimate accountability to the community they serve, and perception of and attitude toward the community.

(2) The change in behavior of policemen with respect to the following objectives:

- (a) improved relations with residents in the 3rd district,
- (b) improved police services through crime reduction, and
- (c) reduced mistreatment of citizens by police.

(3) The degree to which 3rd district police programs have been adopted elsewhere.

(4) The extent of favorable evaluation of the project by top city, police, and project officials.

(5) The extent to which the police participants valued the project.

Questionnaire responses were tabulated with respect to each of these criteria, citizen responses being presented separately for project area

residents, ( 3rd district), control area residents (10th precinct), and project area residents who had been apprehended. Police responses are separated both by area and by race (white, Black).

#### 4. Data Requirements and Data Utilized

The evaluation of the project's success and impact was completed by developing indices for the stated goals and measuring differences between the 3rd district experimental group, the 10th precinct group and where possible, the pre-test data from both the 3rd district police (N = 181) and citizen (N = 546) groups. Because a self selection factor was found affecting the participation of policemen in the in-service training, data concerning the police were additionally analyzed, comparing two subgroups from the total 3rd district police sample. These subgroups are: (1) those who had participated in all seven training units completed by the time of the American Institutes for Research survey in December 1970, and (2) those who had participated in none of these units. Chi square analysis was used to test for significance those differences found between groups.

#### 5. Experimental Design and Controls

The research design utilized to evaluate the Pilot Police Project is a modified pre-test, post-test, control group design for two populations: the police and the community residents. As a part of

the evaluation, the following 3 major surveys were conducted: (1) a survey of 509 Washington, D.C. policemen with the samples being stratified by rank and extent of contact with the community; (2) a survey of 973 third district citizens in the experimental target area and of 342 tenth precinct citizens in the control group area, chosen by means of a systematic probability sampling frame; and (3) a survey of 70 third district residents arrested for either a moving traffic violation, a misdemeanor, or a felony. In addition, participants in the project and key community leaders were also interviewed. The pre-test data were collected by the pilot project research staff.

As noted earlier, the change of the D.C. department from precincts to districts confounded the experiment because some of the original target population became controls while some of the control population was now located in the target district. In spite of pre-testing the questionnaires developed for the project, the suspiciousness of area citizens about any strangers, Black or White, especially when asked questions about police, led to a low rate of response to the survey personnel, i.e., response rates for third district residents were 55% and 80% respectively for pre-test and post-test, 61% for tenth precinct citizens, and 39% for third district apprehended citizens. Clearly, the results of these surveys may be biased by citizen self-selection out of the samples; there is no way to determine the extent and direction of the biases. The weakest link in this study is undoubtedly the data given to the surveyors by the citizen-participants; response rates for the surveys of police officers were much higher.

## 6. Results and Recommendations

According to this report, the chief lesson to be learned from this project is that both police and the community have to be involved in setting goals and means so that there can be agreement with both on them. In addition, it is suggested that if the following five general recommendations are kept in mind, the likelihood of efforts to improve police-community relations might be enhanced:

- (1) Recognize that in-service police training is not necessarily the best point to attack the problem of improving police-community relations.
- (2) Concentrate on services currently connected with the police, but not being performed at all or well by them.
- (3) View police-community relations from a long-term point of view; short term training and other experimental programs are likely to be trampled in the political controversy over who will control and operate them.
- (4) Examine what the community people are saying. Stress changing the power relationship by means of influencing policies connected with police recruitment, residence, and promotions, with particular stress on recruitments.
- (5) Concentrate on citizens as well as the police. Educate citizens to assume responsibility in law enforcement.

These recommendations seem like valid platitudes with which it would be difficult to argue. However, this project was not very successful because none of these were emphasized in the beginning.

## 7. Discussion

A well conceived and carefully planned project with the cooperative sponsorship of both the police and citizens of the community could have accomplished a great deal in the pilot project area. The project described in this report, however, was beset with problems from its inception and thus was unable to fulfill its objectives. A number of specific policies were implemented; many were not carried out to their full extent. There was friction among participating groups. The report is straightforward in describing these problems and thus is instructive in spite of the project's shortcomings in describing the kinds of problems which may be encountered, thus helping future project groups to foresee and avoid such problems.

The report ends with a list of recommendations designed to enhance police-community relations in the future. These recommendations are general, and certainly acceptable to most. Nonetheless, the report staff can only suggest that implementation of these recommendations would have resulted in a more successful project; we are not told how they would have been implemented (what specific forms) and to what degree they would have changed the project's success since they are recommendations after-the-fact and were never implemented as part of the project reviewed.

POLICY TOPIC: Police/Community Relations

TITLE: The Police & The Community

AUTHOR: Robert F. Steadman, editor (Bernard I. Garmire,  
Jesse Rubin, and James Q. Wilson)

PUBLISHER: A Supplementary Paper of the Committee for  
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ABSTRACT:

This book contains three background papers on the relationship between urban police forces and the people who reside in the inner core areas of great cities. The three authors represent diverse orientations: that of a police chief, a psychiatrist, and a political scientist. They offer a wide variety of constructive measures designed to meet this challenge. Varied as they are, their recommendations are not mutually inconsistent. All could be pursued concurrently in their main outlines: reorganization and redeployment of urban police forces; greater care in recruitment; professionalization through training and supervision; and enhancement of cultural ties between police and the people. Emerging from their analyses is a sense of need--an imperative need--for closer harmony and mutual support between the great majority of inner-city inhabitants and the local police.

## INTERNAL VALIDITY EVALUATION

### The Police and the Community

Edited by  
Robert F. Steadman  
Johns Hopkins University Press  
Baltimore, Maryland 1972

#### 1. Research Goals, Objectives and Issues

This booklet is a collection of three essays discussing: "The Police Role in an Urban Society," by Bernard L. Garmire; "Police Identity and the Police Role," by Jesse Rubin; and "The Police in the Ghetto," by James Q. Wilson. These papers are brought together to focus on the relationship between the urban police forces and the residents of the inner cores of the great cities. They emphasize the crucial nature of the police - community relations and the major importance of the role of the policeman, as perceived by the policeman himself and by the community.

The first two papers investigate the current conceptions of police roles and the development of behaviors by policemen trying to fill their identified roles. The last paper examines these issues in direct relationship to the special problems of police-community interactions in predominantly black ghettos.

The papers stress a pressing need for understanding of the multiple roles of the policeman and the multiple demands of the community on the police. They also stress the need for close harmony and mutual support between police and community factions. Only through constructive

cooperation can these groups accomplish the mutual goals of decreased crime and lessened police-community conflicts.

#### 2. Face Validity Check

These papers are not experimental or hard research efforts in design or intent. Rather, they are informed discussions of police community problems and potential solutions by three knowledgeable authors. Discussions are directed toward relevant problem areas and are supported by references to pertinent discussions and research activities.

Overall, this is a well developed set of papers dealing with a serious set of problems. These discussions should be of considerable interest to police department personnel concerned about the basic problems relating to police roles in serving the community and preventing crime. The authors treat the basic problems of role identity of policemen and the conflicts between the officers' perceived roles and those demanded by the community. Discussions include approaches toward resolution of these conflicts through redefinition of the police role or roles and educational efforts directed toward both the police and the community.

#### 3. Methodology

The discussions are descriptive in nature and report opinions, beliefs and theories based on personal and professional experience of the authors. There is no research design nor methodology to be discussed, since these are not research reports.



4. Data Requirements and Data Utilization

The reports present knowledgeable discussions of the problems mentioned above, using a broad background of personal experience and knowledge as the basis for these specific papers. All authors reference pertinent literature and statements of other experts when appropriate to support particular points. No special efforts at data collection have been made for these papers, although there are several references to reputable research and data from other studies. For the purposes stated, the level of data utilization seems appropriate, although, as in any discussion paper, there are points at which one might wish more specific data support for some arguments .

5. Experimental Design and Controls

Not applicable, as for Methodology, above.

6. Results and Recommendations

These papers consist mainly of conclusions and recommendations by the authors. They will be presented by author.

Garmire: The Police Role in an Urban Society.

Garmire discusses the multiple roles the policeman is called upon to play and the lack of specific role characteristics and expectations for the officer in modern society. The point is made that the role of the police and his activities must be defined and the responsibilities must be clearly identified both for the policeman himself and for the community.

When roles have been defined and accepted by both the police and the community, realistic selection, training, and evaluation processes can be instituted and the functional performance of the police can be increased, with concurrent increased acceptance by the community.

The two basic roles performed by police are those of community service and law enforcement . While these are basically conflicting roles, police are required to try to master these conflicts and perform adequately in each role. Community service is defined as social service to community members - including the role of social agency of last resort. Law enforcement is defined as the role in which the officer enforces criminal laws - including crime fighting and thief catching. The author believes policemen are not and cannot be selected or trained so as to adequately perform both these roles concurrently.

The author's proposal is to establish two separate agencies to handle the discrete requirements for community service and law enforcement. These would be two separate agencies within a single department, managed by a staff of professional administrators reporting to the municipal governmental head. This would yield a police department split by functional responsibilities, along the lines of the conflicting functional requirements, and governed by a civilian group possessing management and budgeting skills appropriate to the role of modern management. Maintenance of civilian control would be heightened by establishment of a civilian advisory board, to consist of members representing all elements of the community.

Their responsibility would be that of advising the department on problems, means and goals. The board should seek to provide policy input and feedback for the department.

Although fewer personnel should be required in the law enforcement area than in community service, probably the personnel and financial commitments should be increased in both areas - but especially in the community service. Garmire estimates that total resources should be increased by 20 - 25% to implement a workable system, but these increases should not be made without establishing the new organizational structures - they should not be simply invested in the continuance of the present system.

Two other major points made by Garmire are 1) that the traffic control function should be removed from the criminal justice system entirely and put under a transportation function or other social system agency; and, 2) that the police forces of the country should be consolidated to increase the overall efficiency and the cost-benefit relationships. For the latter, Garmire suggests that only the Federal government could potentially bring about the necessary changes to reduce the approximately 40,000 police agencies to a workable number, able to achieve the expected gains in efficiency and effectiveness. Other suggestions for improvement include: the loosening of the present parochialism of police departments; availability of lateral transfer and entry capabilities from department to department; availability of a transferable retirement system;

and a viable national rating system for evaluating the effectiveness of police departments across the country.

Initial steps that could be taken to begin national cooperation and system reorganization are:

- 1) Police seeking assistance and advice for their problems from non-police organizations, such as agencies in the psychiatric, social work and similar fields;
- 2) Experimentation with these concepts by municipalities with stimulation by Federal government and foundation support through cash grants;
- 3) Organizational support of research, educational and training programs designed to prepare police agencies for conversion to the new systems; and
- 4) Private industry assistance, with cash, in the development of the new system, and encouragement through leadership of local governments to modernize and rationalize their police systems.

Rubin: Police Identity and the Police Role

This paper discusses the interaction of the personality of the young policeman with the conflicting demands of the multiple aspects of the police roles, as discussed by Garmire. After a very brief review of two studies of police performance conducted in Miami by Rubin and the Psychiatric Institute, Rubin summarizes some of the specific conflicts observed as that between the peacekeeping, community service and

crime fighting roles of the police; that between the policeman's need to be an individual and to fit into an organization and accept discipline; and those related to the quasi-judicial and establishment-protective roles of the policeman. Rubin concludes that the police-community problems, especially with the black community, are partly due to police-role conflicts.

Rubin also concludes that the answer to these role conflicts is to develop a separate agency for each of the major performance areas that the police must fill. This suggests separate agencies: one would be a peacekeeping and community service agency and the other would be the law enforcement, crime-fighting, agency. Because of the separate role expectations related to each of these functional agencies, young policemen could be selected, trained and employed with only one set of requirements in mind, although some applicants might be suitable for fulfilling both types of jobs. Rubin also emphasizes that the definition of roles would allow more exact and appropriate definition of criteria for this recruitment and training and that this should result in more effective police organizations, fulfilling their individually defined role.

Having discussed the needs for more precise definition of roles, Rubin discusses multiple aspects of police personality and professional development in relation to the conflicts and demands, and in the context of the identify formation of young policemen in relation to their jobs. Having developed somewhat idealized expectations of the policeman's job

through training, and based in part on their commonly observed desire to provide community service, young policemen are frequently frustrated and confused in their role identities by the underlying role conflicts of their actual police experience. Chief among these is the underlying conflict in the basic functions described above. In addition to these main three conflicting roles (peacekeeping, community service, and crime fighting), Rubin discusses also the paramilitary, quasi-judicial, and establishment-protective capacities in which the policeman must function. The underlying and basic conflicts of these roles are examined in terms of pressures bearing on, and the reactions of, the policemen in the streets. Basically, it is concluded that these conflicts cause frustration and realignment of the policeman's expectations and characteristic reactions to the world and the civilians with which he deals. These realignments can grow into fixed response tendencies which may aggravate the situational reality between the policeman and the community. These reactions include: disrespect for citizenry; an emphasis on crime-fighting to the detriment of peacekeeping and community service needs; disregard for discipline and command; and poor use of discretionary powers. Stress and role conflicts also lead to lessening of the potential for continuous growth, making it difficult for the policeman to adapt to the changing demands of an increasingly complex and demanding society.

Rubin's recommendations are directed toward clarifying and simplifying the policeman's role in order to aid him in achieving professional

identity. His suggestions include: separation of the functionally different roles of the police into separate arms of a police department, one a community service arm and the other a crime fighting arm; development of additional programs leading to use of neighborhood police teams and generalist-specialist personnel in community areas; development and refinement of more precise instruments for prediction and selection of police candidates who will be strong performers - that is to develop selection in for the best men instead of selection out of the worst; development and specialization of academy training to prepare candidates to fill the specialized roles in the separated department conceived above - and to develop a strong identification of professionalism and dedication in their jobs; development of strong models of professionalism in the command ranks to serve to influence the acculturation of new policemen - these influences must be directed toward fitting the new man into the newly defined, clearly identified, roles appropriate to the branch or arm in which he is to serve.

Additionally, in the area of community relations, Rubin recommends that the following elements must be built into such programs:

- 1) programs must have complete confidence and backing of the police chief;
- 2) programs must be long enough to allow hostilities to dissipate and productive work to be accomplished;
- 3) program directors must be carefully chosen for experience in task-oriented group conduct;
- 4) staff members must be well trained, highly qualified personnel and include community

organizers, police officers, group leaders, and support staff; 5) programs must be task-oriented, focusing on the accomplishment of specific tasks, which should be self-determined but relate to mutual problems of police and residents; and 6) funding must be sufficient to allow follow-through on specific projects generated by the groups.

Rubin reiterates the development and implementation of the generalist-specialist approach to improved community relations with the policeman-specialist functioning as community organizer. Such specialists would be specially recruited and trained in community liaison. They would attempt to perform original supervisory and peacekeeping functions in the community while also maintaining a cooperative and congenial relationship with all members of the community.

Wilson: The Police in the Ghetto

Wilson's article is concerned with the basic interactions of police with the citizens of ghettos of our large cities. He discusses evidence concerning the perceptions of both citizens and police about the relationships and then discusses some methods and approaches that have been or could be used to attempt to modify some aspects of the relationships. The desire for modifications is based on the perception that the relationships are frequently described as a state of war between police and factions within the ghettos. The evidence does not necessarily support that view.

When citizens were asked about policemen, it is interesting that the expressed attitudes of Blacks and Whites are in general positive rather

than negative. Several recent studies are reported; one showed that a majority of Blacks in three cities thought that police treated Blacks "fairly well" or better; another showed a majority of a national sample of white and black males thought police were "pretty good" or better in terms of respectful behavior toward persons like the respondents. Similarly, in Washington, D. C., 78% of people having contact with police thought the officer had acted properly and 80 % of the black males said the police "deserve a lot more respect and thanks than they get."

Other studies show similar data for large groups of Blacks. When data are examined by other factors, it is seen that age is the major factor in differentiating opinions about police. Young males, both black and white, tend to cause most of the police problems in cities and thus the two groups may be thought of as natural enemies. And in the above studies, the opinions of youths were largely excluded by surveying adults. A study for the Kerner Commission collected attitudes and experiences related to police from 6000 persons. When data were tabulated by race and age, remarkable differences were found. At all ages, Blacks are more than twice as critical of police as Whites (approximately half of Blacks believe police have "used insulting language," "stopped and frisked without reason," or "unnecessarily roughed people up"). While at ages 60-69, Blacks are three or four times as critical of police as are Whites the total percentage involved are much lower (20-24% of Blacks hold these beliefs). As for experiencing such activities oneself, twice as many Blacks as Whites in the youngest age group report personal negative experience with police,

and this seems to hold through about age 40, but for the older age groups, the differences gradually fade out (as the percentages in both groups decline). Blacks are not only more critical of police than Whites, they are generally expressive of more actual negative experiences than Whites.

Blacks also criticize police for lack of services and inadequate police protection. Surveys and journalist reports alike show Blacks being critical of police services as being inadequate to meet the needs of the citizens. In this aspect too, they are more critical of the police than are Whites.

When police views are questioned, data suggest that most big-city officers see citizens at best as uncooperative and at worst hostile. The views of Chicago police sergeants include the feelings that civilians generally did not cooperate with police, that the department was not respected, that civilian friends would criticize them to their faces, and that most people obey laws out of fear of getting caught. This is in contrast to the views of the majority of citizens which were favorable to police. The contradiction is laid to the belief that policemen's opinions are based not upon the general public but upon their interactions with those persons contacted in their routine daily work (i. e., those running afoul of the law for the most part). In a study for the Kerner Commission, over 400 officers were interviewed in eleven major cities. Of these, 54% were dissatisfied with the lack of respect they received from citizens, and 30% believed the average citizen was contemptuous of police. Black officers generally had the same beliefs as Whites, both groups of police found hostility in increasing amounts among "Most Negroes," "Most



Young Adults," and "Most Adolescents." While black officers are more favorably inclined toward the problems of Blacks, generally, than the white officers, they still have similar conceptions of the problems facing them as police officers.

The central finding reported from the review of the evidence on ghetto police-citizen contacts is that the conflicts between police and citizens are largely a result of the effort of the police to perform their job - maintenance of order, prevention of crime, and apprehension of criminals. The citizen reaction to these efforts results largely from the citizen's perception that the police do their job in such a way that innocence offers no protection from police intervention. The chief implication of this is that police community relations are not likely to be improved by programs directed toward non-relevant parts of the relationship in encounters with police. To the extent that the relationship problems stem from the incompatibility of the central police mission and the freedom of all persons to come and go in the community as they please, the problem appears unlikely to improve even with concentrated efforts.

Wilson discusses some of the recent efforts at selection of highly qualified applicants, training in special classes or groups designed to raise sensitivity, and other organizational development approaches in use. These are described, but little current positive output from these approaches is presented. Although higher educational requirements and better selection techniques are championed, there are no real data

discussed. Though some of the above approaches may be useful, it is suggested that the answer to police-community relationships lies eventually in improving management of the police activities and, especially, the patrol function. The department should devise ways to improve the patrol function in curbing crime and maintenance of order.

In an examination of the patrol function and the possibilities for improving its effectiveness, the conclusion is reached that only more and more-informed patrolling with conscientious patrolmen is likely to have the desired effect. And this requires a large increase in available manpower in most departments, currently undermanned and forced to accept marginal applicants. To improve the number and quality of police personnel drastic steps must be taken. Two are suggested: first, to raise the salary level considerably (up to \$15,000) to attract highly qualified men; and, second, using conscription and/or other ways to make police patrol work an alternative to military service for young men. (Since the draft is no longer an optional source of manpower, this may not be a viable alternative.)

Second only to the need for increased manpower is the need to carefully deploy the available manpower. Saturation foot patrols combined with police living in the neighborhood they patrol might be the most desirable option.

Service-oriented community relations units might be applied also to work toward an improved relationship. Such units should not be

isolated from the rest of the department and the personnel should be rotated through the unit on a three or four year tour of duty to avoid permanent hostility between sections of the department. Also, perhaps useful is the development of citizen's organizations and the encouragement of better police community relations through working with such organizations. However, community control of police forces and/or the development of parallel citizens security patrols or "vigilante" groups is discouraged because of the potential problems inherent in these approaches.

The recommendation of this paper is to devise strategies for approaching police-community relations through the self-interest of both parties; getting these interested parties actively involved in efforts to deal with the joint problems of crime and community relations. The patrolman wants support, cooperation and information; the community wants greater safety, quicker and fairer police responses, and less harshness in tone and manner. Community acceptance of police work and community contribution to police policy making will grow out of a collaborative relationship established to attain common goals.

## 7. Discussion

This is a well written and thoughtful group of papers discussing many of the basic aspects of the problem of police-community relations and the

kinds of approaches that can be developed. This collection is worthwhile reading for department personnel concerned with development of police-community programs or with growing needs for such programs.

The common thread among these papers is the lack of knowledge among even professional police departments as to the actual role and job requirements of the working policeman. There is and has been confusion and lack of awareness about the actualities of police work. To quote the editor of this collection:

... we Americans have not known who the police are, or should be, or what we actually want them to do. Lacking knowledge we citizens (and the police) have accepted a mythology of police work. This has isolated the police from reality and has misdirected the help that the people intended to give them. Too often, we have seen the policeman as a crime fighter when actually there is very little that most policemen can do to combat crime. The departments are fragmented and the causes of crime are pervasive - not addressed by current police policies. We have at the same time denied and downgraded a major and legitimate aspect of the police role, that of community service, of peacekeeping. We have assumed the main problem is 'lack of professionalization,' when in fact it may be too much internalization and isolation. We have rightly urged training on police, but refused to define clearly the roles for which they are trained. (From the foreword, by Robert F. Steadman.)

POLICY TOPIC: Police/Community Relations

TITLE: Training Police as Specialists in Family Crisis  
Intervention

AUTHOR: Morton Bard

PUBLISHER: Police Patrol Operations: Purpose, Plans, Programs  
and Technology; ed.: George T. Felkenes and Paul M.  
Whisenand

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ABSTRACT:

This paper gives a detailed account of the Police Family Crisis Training Project which sought to demonstrate the viability of training police in techniques of intervention in family disturbance and to define methods for extending such specialized training in the preparation of police for existing functions. Major emphasis was on psychological methods which may be expected to prevent family disturbances from resulting in assaults or homicides, either upon family members or police officers offering assistance, and upon enhancing the service functions of the police while at the same time preserving their professional identity.

## INTERNAL VALIDITY EVALUATION

### Training Police as Specialists in Family Crisis Intervention

Morton Bard  
1972

#### 1. Research Goals, Objectives and Policy Issues

This study is concerned with training officers in family crisis intervention. It had been observed that 22% of policemen killed in the line of duty died while responding to complaints of "disturbances" and it had also been observed that many calls in the disturbance category were in fact the result of family disputes. Further, it has been noted that intervention in family disturbances is one function in which unskilled police performance may in fact endanger the policeman and may fail to prevent eventual commission of capital crimes or assaults.

"The police project sought to demonstrate the effective utilization of selected police officers in a program of crime prevention and preventive mental health. There is evidence that police are currently engaged in a variety of quasi-mental health roles with little or no training equal to them. There is evidence that their lack of training is often personally dangerous and is wasteful to society as an opportunity lost for preventing certain classes of crime and for relieving manpower shortages in mental health. The area for study involved a common police complaint--the family fight or disturbance. This project sought to demonstrate the viability of training police in

techniques of intervention and to define methods for extending such specialized training in the preparation of police for existing functions."

Based on these observations, a three stage project was designed as follows:

- (1) preparatory phase--for selection and intensive training of personnel to form a Family Crisis Intervention Unit (FCIU),
- (2) operational phase--in which the FCIU would function with consultative support, and
- (3) evaluative phase--for analysis of data collected.

The evaluation was to be restricted to the measurement of the program effectiveness in relation to crime control and police personnel safety in both the demonstration precinct (30th) and a comparison precinct (24th) in New York City.

The evaluation was to be based solely on the following 8 factors:

- (1) Changes in the total number of family disturbance complaints in the demonstration precinct area as compared with the comparison precinct.
- (2) Recurrence of complaints by the same families in the demonstration area as compared with recurrence of complaint rate in the comparison precinct.
- (3) Changes in total number of homicides in the demonstration precinct area as compared with changes in the comparison precinct.

(4) Changes in the number of homicides among relatives in the demonstration precinct and differences in comparison with similar data in the comparison precinct.

(5) Changes in total number of assaults in the demonstration precinct compared with similar data for the comparison precinct.

(6) Changes in the number of assaults among family members in the demonstration precinct area as contrasted with the comparison precinct.

(7) Changes in the number of injuries sustained by patrolmen responding to family disturbance complaints, both within the demonstration precinct and as compared with the comparison precinct.

(8) Follow-up visits to determine outcome in families served by the FCIU as compared with families served by the comparison precinct. (As noted before, follow-up visits were precluded by the New York City Police Department's concern for the civil and individual rights of the families visited by the police.)

## 2. Face Validity Check

This is an extremely well-planned project. It starts with the problem of intervention in family disputes and the often unfortunate results. A thorough review of the literature on the issue together with findings sets the problem as one of great significance in terms of the frequency with which family members and/or police are injured in a

family disturbance when police intervene. It is proposed that with training in understanding the dynamics of family interaction, a police officer may act empathetically in ways which reduce tension and help resolve conflict, rather than possibly fanning the flames of a family feud. Evidence is given that, lacking training in human dynamics, officers often exacerbate a bad situation, leading to their own death or injury.

The project evaluation on the 8 factors listed in the above section turned out not to be at all practicable. The last had been eliminated because it involved invasion of privacy. Only the 7th factor, changes in the number of patrolmen injured while responding to family fights, was both useful and positive. This, it turns out, was vastly decreased in the 30th precinct, compared with the 24th. The other factors, however, did not seem to be significantly different and may reflect differences in the two districts being compared. The report states:

"Ethnic differences in the two precincts (30th largely Negro, 24th largely Puerto Rican) would appear to explain the lower incidence in the 24th precinct. However, differences in the cultures, i. e. Negro being largely matriarchal, and Puerto Rican being largely machismo-patriarchal, may cause differences in patterns of family disturbances."

The careful reader will find much of value in the work reported here and will find it difficult to explain the fact that there were fewer family fights in the control district with no FCIU than in the 30th precinct with the expertly trained FCIU. It may be that the net effect of the



training was to make the officers in the FCIU experts at approaching a family fight without arousing ire from the participants, but that once they left the scene, the situation was free to deteriorate rapidly with the participants adding fuel to the fire by blaming the other for creating such a disturbance that the police had to arrive to calm it. At any rate the incidence of disturbance was much higher in the 30th precinct after the FCIU was in operation than it had been before, perhaps showing acceptance of the FCIU by its usage whenever highly disruptive fights arose. The fact that the homicide rate actually increased after the FCIU was in operation in the 30th precinct while the homicide rate in the 24th precinct, with no such unit, actually decreased, is difficult to explain. It would seem that the effectiveness of the FCIU in referring disputing couples to social agencies or other sources of help was poor. This is especially borne out by the fact that the number of repeat calls in a given family unit was higher in the 30th than the 24th. One can argue that, if there were suitable social/psychological/counselling services available for referral, the incidence of repeat calls should be lower in an area where an effective FCIU is operating. Another possible interpretation, however, is that the families found the police helpful in quelling their disturbances, and when again faced with a fight, lost little time in calling for the FCIU. This does not explain the higher incidence of homicide in the area where the FCIU operates, however. It is unfortunate that the 8th evaluation criteria proposed--that of follow-ups to see how problems had been resolved by

the disputants--was precluded. Much valuable information on family dynamics following a FCIU visit could have been gathered which would have served both to explain findings, and to use as feedback to the FCIU for improving its techniques, i. e. referral to some agencies which the disputants found unhelpful could be eliminated, and more referrals could be made to agencies actually found to be utilized and helpful by disputing parties, with beneficial results.

### 3. Methodology

In essence the plan called for the selection and training of eighteen patrolmen in one Upper West Side Manhattan precinct. This represented approximately 8-10% of the precinct's complement. This community contained a lower to lower-middle class, stable, largely Black, residential community of 85,000 persons. This group of patrolmen was designated the Family Crisis Intervention Unit (FCIU). They were to be trained intensively for one month and then to function operationally for the duration of the two year project period. In this period, weekly consultations were provided by the City College Psychological Center. This group of officers was divided into 3 teams of six men each. Thus it was anticipated that even with several illnesses on the force, there would be at least 2 men to man a family car in each of three shifts around the clock.

The family car was assigned a regular area within the precinct, but was to be summoned to any area in the precinct by other officers if they

arrived at a call involving a family disturbance. The training consisted of both conventional text book training and highly innovative role playing. Following the training period, an operational phase began for the FCIU with the weekly meeting with the CCNY Psychological Center staff support. In addition to guidance provided by the CCNY staff, the officers were backed up by the persons listed in the Community Resource File. The file was a continually updated and cross-indexed family resource file which contained references to community agencies with specific agency staff liason personnel (and their phone numbers) available to provide specific consultative guidance to the men at the time of the actual intervention, if necessary.

An evaluation phase took place following the operational phase. The evaluation methodology was originally planned as an analysis of data pertaining to the eight items listed under (1) above. It turned out, however, that the evaluation was more restricted, political decisions interfering with analysis under some of the eight objectives, i. e., follow-up data. Data on number of interventions, homicides, etc. are presented in the report in good form. And the conclusions are properly qualified, given the inconclusiveness of much of the data, with reasons offered as to why some data would appear to negate the project's felt success.

However, there is some question regarding the interpretation of data and statistics presented by the authors as indications of differentiation between the experimental and control precincts. For example, with regard

to the first objective "changes in the total number of family disturbance complaints in the demonstration precinct as compared with the comparison precinct," the report notes that the 30th Precinct FCIU intervened on 1,338 occasions with 962 families during the project's operational phase as opposed to 492 interventions with 484 families in the 24th Precinct (comparison). First of all, these data present summations over time, not changes or rates of change. There is no comparison with a baseline figure nor a comparison of rates of change between precincts, in spite of the phrasing of the objective. The report does note that a comparison of absolutes is unfair since the 30th Precinct has a larger population. The author concludes, nonetheless, that the number of interventions in the 30th is greater than "that which would be expected," and he also presents some chi-square statistics (presumably) based upon a comparison of actual interventions with "those expected."

We assume that "expected" interventions is somehow based upon data on interventions in the 24th Precinct, yet the author never states how he arrives at the figure, nor does he present data on "expected interventions."<sup>1/</sup>

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<sup>1/</sup> Doing some back of the envelope calculations, it would seem that he used an adjustment factor of the order of 1.2, and a chi-square statistic computed as

$$X^2 = \frac{[(1.2) (\text{interventions in 24th}) - (\text{interventions in 30th})]^2}{(\text{interventions in 30th})}$$

The use of an adjustment factor is not mentioned in the text, nor is the use of "observed" in the denominator, contrary to common practice which uses "expected" in the denominator in computing the chi-square statistic.

This is a flaw in the report, which is not intended to be very technical in its presentation, and does not necessarily imply that the evaluation itself was poorly conceived. However, the derivation of "expected interventions" is critical to the evaluation methodology and therefore to the validity of the conclusions. It is thus necessary to fully justify these derivations.

Similar data and chi-square statistics are provided for six of the remaining seven criteria or project objectives. The same criticisms apply. Overall, the experiment was well planned and the data are presented in full in the report (except for descriptive background data such as population size, etc.). The evaluation methodology can be faulted only for the report's failure to fully explain the statistical methods used, its misleading use of the phrase "Changes in ..." implying baseline data or rate of change based on other data, and the possible failure of the evaluators to consider other types of statistical analyses and data comparisons (e.g., comparison of rates of change from early-project to late-project in both precincts for the various indices, etc.).

#### 4. Data Requirements and Data Utilized

The data was collected by means of 5 forms and files as follows:

(a) Family Disturbance Report to be completed by unit patrolmen.

In addition to the usual demographic and descriptive information, the form was designed to encourage the patrolmen to report impressions and judgments based upon their FCIU training.

(b) Family Car File permanently installed in the family car to enable patrolmen to have readily available to them reports of all interventions conducted by members of the unit. Arranged by street address, the file gave them information on the circumstances of any previous disturbance at each address, whether weapons had been involved, what action had been taken, etc.

(c) Referral Form, to facilitate referrals, a special form was developed. Designed to be similar to a physician's prescription pad, it was also intended to serve as a "flag" for agencies to which referrals were made.

(d) Agency Follow-up Form, intended to facilitate the acquisition of information regarding individuals referred to other agencies. It was designed to be simple and to make minimal demands on overburdened social agencies. The primary goal was to learn whether or not family members were actually making efforts to act upon the officers' suggestions.

(e) Consultation Debriefing Form had a dual purpose: (1) to insure uniform data collection in depth, beyond the limitations imposed by the brief Family Disturbance Report, and (2) to add an element of structure to the individual consultation process. Since there were

educational advantages to the students serving as consultants, the debriefing form served to focus the otherwise free-ranging aspects of the consultation.

In each case the above forms were primarily designed to facilitate the work of the officers rather than to collect "hard" data for statistical analysis. A Keydex information and data retrieval system was planned, but it proved to be more complicated and time consuming than had been anticipated. It required the development of a word dictionary with more than 1,300 characteristics, subsequent key punching, sorting, and tabulation, preparatory to computer analysis, and adaptation of this key word dictionary for use as a coding device, preliminary to the data processing. Therefore, the limited hard data available -- mostly numbers of people, officers, calls, etc. -- was not processed and analyzed at the time of the writing of this report. The author did state in this presentation, however, that the data processing and analysis research aspect of this project will continue and was not a feature of program evaluation. Therefore, the interested reader should contact the author for additional data from this project.

The biggest problems lie in the area of questionable completeness of the data, due to the resistance by patrolmen to completing lengthy forms.

This often resulted in no record being submitted on provocations considered "minor" by the individual officer at the scene. This was particularly the case in the control precinct, so that the figures make it appear that there are fewer family disputes in the control area with no FCIU. Follow-up studies are needed to determine if some of the possible explanations of data variances are in fact correct.

#### 5. Experimental Design and Controls

As a demonstration project, this one was extremely well planned and thought out. That fact that some of it did not work out as hypothesized is due largely to the hypothesis being based on assumptions or myths held widely by police, which do not appear to be true. The classical problem of having a control group which is similar in all aspects but those to be manipulated is the worst problem in this study, and one for which no easy answers are available. Certainly two neighborhoods of the same ethnic and residential characteristics would be a help in further research on this problem.

#### 6. Results and Recommendations

Given Bard's calculation of statistics and analysis of the data, many of the statistics vary in the opposite direction from that predicted. The author presents reasons why this might have occurred and, also, much

discussion devoted to explaining why the project was nonetheless considered successful. Over the life of the project (22 months), the demonstration precinct reported a significantly greater number of interventions: there was an increase in total homicides (significantly) and in total assaults (not significantly); there was an increase in family homicides, but there were no homicides in any of the 962 families previously seen by the FCIU; family assaults decreased; and there were no injuries to any officer in the FCIU. The control precinct, with 1/3 as many intervention calls, suffered one injury to a patrolman and 2 non-FCIU patrolmen of the 30th precinct were injured answering family dispute calls. With the number of police officers in New York who might be involved in family dispute calls at 18,000 men, a similar ratio of injuries to patrolmen reported in the 24th and 30th precincts would predict that approximately 135 patrolmen per year would be injured over the same 22 month period. Thus, city-wide training of FCIU's could be expected to greatly decrease, if not eliminate, injury of patrolmen responding to family crisis calls. This has great implication for reducing the cost of a police force, in that a permanently injured officer may be drawing salary for the rest of his life and his widow after that. This appears to be a study which should be emulated through innovation funding by LEAA or other groups to assist with the cost of the training program. The fact that the FCIU precinct had three times the calls of the control district appears to be a testimony on its effectiveness and the spreading of knowledge of the assistance available throughout the

area so that other families finding themselves in disputes availed themselves of the FCIU. This is a highly probable assumption, but was not tested due to the ban on follow-up. Other projects should provide for a sensitive social worker type of interviewer to at least seek follow-up material so that further improvements may be made in the FCIU by eliminating referral to non-helpful agencies, as at least one possibility.

## 7. Discussion

Of all the studies analyzed in the field of Police-Community Relations, this one seems to be the best in terms of planning, implementing and achieving its objectives. An FCIU will certainly improve the attitudes of persons in the local neighborhoods if carried out along the lines of this study.

The fact that the objective of reducing the incidence of family disputes was not reached probably indicates that there are many more disputes in a given precinct than are ever reported, and that those who do call the FCIU and find it helpful, call on it again, and through word of mouth within the community its helpfulness is advertised so that others avail themselves of the FCIU. It appears from this study that the original objective of reducing the incidence, while laudable, would only apply if the total incidence were known, and after considerable time for referral to agencies who can counsel. This could be as long as 5-10 years,



with new people constantly moving into neighborhoods and crises continually erupting within families. It is obvious that such disputes can never be completely eliminated.

One serious problem with this operation seems to be the tendency of people who have used the FCIU to repeat the process. This may be a result of their respect for the way the unit operated on its first intervention. However, if people become dependent on the unit for assistance everytime they face a crisis rather than resolving their problems through referral agencies, the number of calls is bound to increase, perhaps to the point where the operation becomes too expensive to continue. This possibility again points up the need for follow-up on referrals to make certain they are proper. If adequate services are not available, perhaps the police department should run some family cool-off units the way some departments now run traffic schools for repeating traffic offenders.

POLICY TOPIC: Police/Community Relations

TITLE: Police Race Attitudes and Labeling

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#### ABSTRACT:

The research reported in this paper is intended to shed light on the meaning and use of racial labels among urban police. The study was conducted in 1970, by means of a questionnaire that was directed at 396 sworn members of the police department of a large industrial city in the middle Atlantic region. In particular, attention is focused on the following questions: (1) What labels do police use to refer to Black Americans?; (2) How do police feel about Black Americans, and what is the significance of their racial attitudes?; (3) Do the racial attitudes of police differ from those of Whites in general and Whites in the same economic and social positions?; (4) Are labels valid indicators of racial attitudes--that is, what is the relationship between racial attitudes and labels?; and (5) How does the relationship between attitudes and labels vary among different subgroups of police?

There are some serious methodological and data reporting problems within this report. Also, the report does not present useful conclusions nor recommendations for departmental implementation. There is little action orientation here. Some suggestions for potential recruitment and training are implicit herein.

## INTERNAL VALIDITY EVALUATION

### Police Race Attitudes and Labeling

David M. Rafky  
March 1973

#### 1. Research Goals, Objectives and Policy Issues

Although not clearly stated in the report, this research is directed toward the ultimate goal of improving police effectiveness in black communities through study of police attitudes and labels applied to Blacks. The research does not introduce or study the effect of any specific policy issue; rather, it examines the current situation regarding black-white integration attitudes of policemen in relation to other citizen's attitudes and as these correlate with the labeling behavior of the policemen.

The basic research questions are: (1) What labels do police use to refer to Black Americans? (2) How do police feel about Black Americans, and what is the significance of their racial attitudes? (3) Do the racial attitudes of police differ from those of Whites in general and Whites in the same economic and social positions? (4) Are labels valid indicators of racial attitudes--that is, what is the relationship between racial attitudes and labels? and, (5) How does the relationship between attitudes and labels vary among different subgroups of police?

These research approaches imply the following set of goals, etc.:

A. Goal--Improving police effectiveness in all law enforcement goals.

B. Objective--Improved police community relationships, especially with Black Americans.

C. Policy Issue--If police labeling of Black Americans is assumed to be importantly related to community relations, training or sensitization of policemen to Black Americans' label preferences might be instituted to lead to improved policy-community interactions.

#### 2. Face Validity Check

The basic data on policemen attitudes is drawn from a complete survey of the 396 sworn members of the "Lake City" department. Comparison data are drawn from various survey sources from recent years, both nationwide and local, some of which are inaccurately or insufficiently documented. Comparisons are drawn between policemen and several subgroups of Whites and Blacks with respect to their attitudes about integration and the goals of the Black movement and their usage of and preferences for various labels for Black Americans. Some conclusions or interpretations are based on data referred to but not included in the report((presumably because of the extent of data and the brevity (21 pages) of this report)).

As a shortcoming from the academic view, the statistic used (Sommer's D) apparently does not have a defined probability distribution. Or, if so, there is no use of this to determine the significance of any value. Rather, we are told: "A high Sommer's D (regardless of sign) indicates a strong relationship while a weak association is signified by Sommer's D close to zero." What is high? What is "close to zero?" The author rejected Chi Square, Phi Coefficient, and the Contingency Coefficient to choose this unusual statistic. Apparently, he never considered several other non-parametric statistics which could be applied.

### 3. Methodology

The study reports the findings of a survey of racial attitudes and usage of racial labels among 396 policemen in an industrial city in a middle Atlantic State, called "Lake City." The survey included all sworn members of the police department and was conducted in 1970. The findings from this questionnaire are compared with data from several other opinion polls. These sources are: (1) a National assessment of racial attitudes conducted by the University of Michigan Survey Research Center for the National Advisory Commission on Civil Disorders in 1968-- sampling 2,814 Blacks and 2,582 Whites; (2) a nationwide NORC survey of 1968, sampling 1,251 Whites, of whom 131 were northern male high school graduates and 42 were southern male high school graduates, and

219 Blacks; (3) A second nationwide NORC survey in 1970, sampling 1,247 Whites, of whom 154 were northern male high school graduates and 43 were southern male high school graduates, and 227 Blacks; and (4) Reports of label preferences described (inadequately, per Rafky) by Heinig, for both Blacks and Whites in and just outside Louisville, Kentucky and for Blacks nationwide. The Louisville data were reported in either 1968 or 1970 (Rafky's confusion) so it would probably have been collected at some point between 1966 and 1970. Label preferences were collected from 508 Whites and 506 Blacks. The nationwide data on Black label preferences were probably collected from about 1,500 Blacks and perhaps by a Gallup poll. The description of these sources is extremely badly presented and leads to confusion and potential distrust of the data and comparisons.

Rafky selects data drawn from the various sources to address each of the specific research questions mentioned above. He first examines percentage distributions of racial label usage by policemen, Blacks nationwide, and Blacks and Whites in the Louisville study. He then examines the percentages of each group (police, Whites generally, northern Whites, southern Whites, Blacks, and policemen by racial label preference subgroup) who support the methods and the goals of the Civil Rights movement. Rafky then treats the eight goal statements of the Civil Rights Movement as an eight-item Guttman Scale of Pro-integration sentiments. Individual policemen's scores on this scale are then used to

classify them as being high or low in support of integration goals ("high" being above the mean of 5.2, or scoring 6, 7, or 8 on the eight point scale.) The remainder of the study examines the relationships between this dichotomy and label preferences for different subgroups of policemen. Policemen are grouped by: frequency of contact with Negroes; years on the force; years in present rank, rank; by duties and several other characteristics including education. Sommer's D is used to measure the degree of association between pro-integration sentiments (high or low) and label preference within each group.

There is also included a brief report on the changes in police attitudes toward integration goals and racial label preference after one year in which a Community Service Aide Program was in operation. This program brought young Blacks into community service as police aides working under direct supervision of regular officers. Data were collected and analyzed similarly to the main study.

#### 4. Data Requirements and Data Utilized

The types of data collected are appropriate to the research questions being asked in the study. The only questions which might be raised concern the validity and completeness of the data (due to the incomplete description of some data sources) and the point of the study overall defining relationships between attitudes and labeling rather than other overt behavior).

The question concerning the sources of data and the potential inaccuracy appear to be simply sloppy work on the part of the researcher. There are errors in references and may be in data. There is no specific reason to believe data are in error. However, there are reasons to want to know more precisely than possible here when and from whom and with what instruments the nationwide and Louisville data on racial label preference were collected. Even the two year lag in data collection between the SRC and NORC studies in 1968 and the policeman data collected in 1970 could be highly important for the comparisons which are drawn. A two year lag for collection of the policeman data is two years of changing attitudes and possible change in racial labels. Within the rapidly changing social scene, changes in attitudes and beliefs could easily occur over a two year period--whether resulting from local or national events related to integration. It would be highly desirable to be able to compare data collected on all comparison groups at the same time.

This question of comparability of data for different groups could have been partially answered had the investigators collected some data on the civilian population of "Lake City" at the same time--in 1970. These additional data, even for a relatively small group, could have been compared with both the former nationwide data and those for the policemen. And such a comparison would have added to the acceptability of the study.

They may have pointed out a greater or lesser difference for the policemen when compared simultaneously with the national samples and the local group. Such differences might then be examined as to whether they were group differences, related to being policemen, or actual changes in attitudes over time. In any case, a well-selected local civilian sample would have better answered the questions about police attitudes as compared with those of Whites in general and Whites in similar economic and social positions. Certainly as well as comparison of the police attitudes to those of 131 northern white male high school graduates and of 42 southern white high school graduates, with no other indication of economic or social station.

In fairness, it should be pointed out that some of the comparisons, particularly those related to civil rights movement goal acceptance, are with the NORC--1970 data, where the comparisons appear more valid. Further, comparisons of subgroups of the policemen are all based on the locally collected data and are not influenced by the above questions.

#### 5. Experimental Design and Controls

The basic design of the study is a one shot case study with no direct experimental manipulation of the situation. The exception to this is the one year follow-up reported as an addendum to the main study. Here some pre-post data are available to examine changes in policemen attitudes and labeling after a community service Aide Program.

Being mainly a descriptive and comparative study of attitudes and labeling, the question of controls boils down to whether the correct, or most appropriate, dimensions were selected on which to contrast these attitudes, and whether any should have been used which were not. One dimension which was not controlled satisfactorially is the time dimension, as suggested above, in the discussion of the comparability of data. The inclusion of a current civilian control group for comparison of attitudes would have improved the impact of the findings. Another was also implied above: there is little evidence presented that the policemen are actually being compared with persons of similar social and economic background as was intended in one of the research questions--it appears this comparison is based primarily on high school graduation, which may encompass a broad range of situations and not be truly very similar.

Other than these two control variables, the study examined most of the important variables, especially with respect to the subgroups of policemen. These included attitudes toward integration goals, educational level, age or years on the force, years in rank, rank, and membership in different divisions of the department.

#### 6. Results and Recommendations

The study of the research questions stated above was intended to provide evidence to support or refute some contentions of Jerome Skolnik in Justice Without Trial (New York: Wiley & Sons, 1966). One of these



contentions was that police hold racial attitudes that do not differ greatly from those of other Whites, another was the police tend to use racial labels without direct relation to their underlying attitudes. Rafky addresses these and other questions in his analysis of data.

In comparing the police label preferences in "Lake City" with those of a national sample Rafky finds that they are fairly parallel with respect to percentages using Negro (41% for police vs. 38% of Blacks), Colored (22% vs. 20%), and Black (18% vs. 19%). The remaining percentages are widely disparate as to usage, however, only 1% of police use Afro-American and only 3% use other non-pejorative terms. Conversely, 10% of the Blacks use Afro-American and another 6% use a combination of such terms to refer to Blacks. Ten percent of the police force consistently use either Nigger (8%) or other pejorative terms to refer to Blacks. In a Louisville sample of Whites and Blacks, the percentage usage was: Negro--W-27%, B-51%; Colored--W-16%, B-11%; Black--W-25%, B-8%; Afro-American--W-6%, B-8%; combinations or other non-pejoratives--W-17%, B-20%. None of either the Whites or Blacks in Louisville reported using any pejorative term to refer to Blacks.

Thus, police use of labels for Blacks is generally similar to these black and white groups with exception of the usage of pejorative terms by 10% of the police. About 60% of each group except the Louisville Whites use either Negro or Colored to refer to Blacks. The Louisville Whites

show only 40% using these and another 25% using Black, compared with only 19% of the national Black sample, 18% of police, and 8% of Louisville Blacks.

Skolnik believed that the use of different racial labels had little relation to attitudes and Rafky disagrees. Rafky examines the responses of police, Whites and Blacks to statements about the Civil Rights Movement methods and goals. These attitudes are examined separately for each subgroup of the police who reported using the four label categories: Black, Negro, Colored, and pejoratives. In general, label preference is apparently directly related to attitudes toward the Civil Rights Movement. For the police, users of Black are more supportive of the movement than users of pejoratives, with users of Negro and Colored falling inbetween. In comparison to national attitudes (reported in 1968), police users of pejoratives responded more like southern Whites while users of Negro respond more like Whites in general and northern Whites. Users of Black responded more favorably than either the general white population or the northern Whites.

For the total group of police the responses conform rather closely to those of the general white population. Two exceptions were that many more of the police believe the Civil Rights Movement has been generally violent and that "Communists are behind Negro protest movement." Thus, it appears that for the most part the "Lake City" police are not more

prejudiced toward the Civil Rights Movement than Whites in general. They appear also to be no more prejudiced than white males in similar social situations (based on comparison with northern, white, high school graduates). Some of the data indicate that police attitudes may be slightly more liberal than those of either the national sample or the northern white high school graduates. However, it is felt that this could be a function of the two year lag in data collection rather than a real difference.

To study the relationship between racial attitudes and other characteristics of the police, Rafky constructed a Guttman scale from the responses of the police to the eight goals of the Civil Rights Movement. Police were then assigned the designation of High-Pro (in favor of integration) if they responded positively to 6, 7, or 8 of the items, and the designation of Low-Pro if their positive responses were five or fewer (the mean for the total group was 5.2 on the scale).

Rafky studied the relationship between this dichotomized variable (pro-integration) and label preference and several other variables. Overall, high-pro police tend to use Black more frequently (25%) than low-pro police (15%) and use pejoratives much less frequently (5% vs. 17% of low-pro). High and low-pro police do not differ in their preferences for Negro and Colored. When these two groups are considered in relation to their exposure to Blacks in their daily work, there is not much

difference between the distributions of either label usage or pro-integration sentiments. Similarly, higher education is only slightly related to either variable, although there is some tendency for better educated police to be more tolerant.

In studying these and subsequent relationships, Rafky uses Sommer's D as a measure of the strength of association. This relatively obscure statistic appears to have no underlying distribution for comparison to define the significance of an observed value. Rafky states only that: "A high [absolute value] ... Sommer's D ... indicates a strong relationship while weak association is signified by Sommer's D close to zero." The following reports of degrees of relationship are based entirely on Rafky's conclusions using this statistic. They may be taken with a grain of salt. This reviewer has so far been unable to even find Sommer's D in any of about fifteen statistics and research methods texts.

The relationship between racial label usage and attitudes is found to be affected by exposure to Blacks; police not around Blacks everyday use labels that more strongly reflect their attitudes, while those exposed more often to Blacks are less apt to "speak their mind" in label usage. Conversely, Rafky says that police personally affected by integration (49% of the force) show a much stronger relationship between label and attitudes than do those unaffected personally, although again this involvement does not affect the actual preferences nor attitudes reported.

Attitudes towards Blacks vary with time on the force (directly correlated with age), time in rank, rank, and type of job in the Department. Racial attitudes are more favorable for men with more time on the force than for newly hired police. The data, however, (Table V) indicate that "% High Pro" first declines with length of time on the force and then increases after a trough is reached at ages 25-29 and 30-39. On the other hand, it appears that length of time in rank is negatively correlated with tolerance as measured by Rafky's Guttman scale. The strength of relationship between label preference and attitudes, as measured by Rafky, also changes with both these variables. The relationship is much stronger for both men with short time on the force and with short time in rank, than for men either with longer time in rank or longevity. Rafky concludes that both the new members of the force and the newly promoted personnel are more likely to express their true attitudes in label usage for Blacks. An interesting side note evidenced by the data indicates that the use of pejoratives as well as "Black" is more common among new members than older members, i. e., that the terminology of older members is less polarized and more toward center (the terms "Negro" and "Colored").

Analysis of the attitudes and label preferences by rank shows that 92% of command officers are rated as high-pro and that exactly 92% use labels that are either neutral or Black. For sergeants the high-pro group is 61% and for policemen it is 48%. The relationship between attitudes and label usage is highest for command officers and lowest for sergeants.

The data for different divisions of the department show that the Patrol and Traffic Division has the fewest high-pro policemen (47%) and all others have approximately the same proportion (about mid 60's). Relationships between attitudes and label usage are found to be most strong in police headquarters and in the special sections and weakest in the Patrol and Traffic Division. Rafky presumes that this relates to the degree of contact of the different divisional personnel with Black elite personnel vs. the "Street Niggers."

Rafky concludes that the "Lake City" police are not more prejudiced than Whites in general or Americans in similar social situations. Also, racial attitudes and label usage are related for most policemen. The relationships are fairly strong except for: (1) the older, more experienced police; (2) those with eight or more years in rank; and (3) sergeants.

Rafky states: "The goal of police should be ... to redefine Black Americans as Blacks and Afro-Americans by calling them Blacks and Afro Americans." It is implied that such usage would be more acceptable to the Black community, especially those individuals most active in civil rights and local community development, and might thereby lead to increased integration and police community relations.

Rafky appends to this study a brief report of a follow-up attitude survey of the "Lake City" police department one year after the original

study. During that year a Community Aide Program was in operation which involved black youths as aides in police uniforms, but without arms or arrest power. Attitudes of 265 of the police were obtained in the follow up study and these were examined in relation to the previous reports by the total force of 396 officers. ((It should be pointed out that comparisons between responses of the population of 396 officers and those of a sample of 265 (about two thirds of the population) are subject to question because of the sampling errors in the latter set.))

Rafky reports that in general, attitudes toward Blacks were less favorable after the Aide Program than before and that the usage of Black was generally increased by police with moderate racial attitudes. Usage of pejoratives was essentially unchanged after the year.

Among police who were familiar with the Aide Program and those who had actually worked with the aides the same trends were observed. These police were less favorable toward integration goals but at the same time used Black with increased frequency. Again, it appeared that former users of Negro and Colored had switched to Black. Also, for all subgroups of police, the attitudes were less favorable toward Blacks, but the labeling usage of Black increased.

Apparently, Rafky states, the officers' opinions of Blacks were lowered, partly as a result of inadequate screening of the ten aides, some of whom had criminal records and did not take pride in the Department or in their own work. Police also saw the Aide Program as an attempt

to pacify the black community politicians by adding low class men to the force. Contact with Blacks and perhaps passage of time and the general climate change did result in the increased usage of Black by all police subgroups and all levels of the Department.

Rafky concludes that "private attitudes will not improve simply with addition of Blacks to the department. Other means of attitude change must accompany changes in recruitment, such as staged confrontations, role playing, sensitivity training and didactics."

#### 7. Discussion

This report may be of some interest to police department personnel and may point the way toward some desirable changes in police labeling behavior which may lead to improved police community relations. However, the report is probably of more value for some of the ideas and discussion of attitudes and police characteristics than for the specific data reported. Also, the report will provide very little direction for operational changes for any police department.

## APPENDIX A:

### PURPOSES AND METHODOLOGY-- THE WHY AND THE HOW OF THE STUDY

This study is one of a series sponsored by the National Science Foundation in the area of "Evaluation of Policy-Related Research in the Field of Municipal Systems, Operations, and Services." The general objectives of this series were (1) to make a significant body of policy-related research on municipal systems more accessible and usable by policy makers, and (2) to provide a more rigorous basis for future research projects dealing with policy-related research on municipal systems. The present study focused on accomplishing these objectives for the specific field of police protection. Our aim was to analyze a selected set of police research and present our findings so that the intended audience, consisting of Federal and local government decision makers, police researchers, police administrators and the academic community would be able to understand better the scope and impact of current police research and to have a more informed basis for funding and directing future research efforts.

We considered this study of research in police protection as one that was, in essence, research on research, i. e. we were required to analyze the validity of a given body of research on the effectiveness, efficiency or equity of policies in the police field and to synthesize the evidence to show the extent of new or addition research required. The generic approach taken, one that was required by the NSF sponsor, was to



address each item of research selected to an internal validity analysis, i. e. an attempt to discover whether the researcher actually used proper methods and data for the questions asked, and to then subject appropriate sets of related research to an external validity analysis, i. e. a determination of whether the results of one policy-related research study are credible in the light of accumulated knowledge of other policy-related studies.

The depth and range of internal and external validity studies depends upon many things--the research reports and associated data that are available, the time and funds, and how the results are to be used. Based on our knowledge of the field of police protection, we felt that we should concern ourselves with research documents that are available to the general public and police administrators, as it is these documents and their purported results and conclusions that have the greatest influence on the main body of users. Thus, our initial assumption was to review only those documents in general distribution and not to ask a specific research group for their internal, backup documents. This assumption was consonant with the time and budget constraints, and also forced us to concentrate on the validity of stated results as reported to the users.

As research concepts, internal and external validity reviews appear to have many interpretations, each one depending upon the investigator conducting the review. With respect to internal validity, we felt that it was imperative to define a review process that would cause a high level

of consistency in the approach taken by the many investigators on the project. The agreed upon internal evaluation process and instructions as to how it was to be used in this study are given in Appendix A-I. By reading the internal review items, the reader will certainly note that each investigator contributed both interpretive and stylistic approaches to the internal validity discussions, i. e. consistency in approach was desired, but individualism was not stifled. We believe, however, that by adhering to the proposed internal review format, the total set of reviews do relate, for the policy areas considered, the state of research in police protection in a structured and succinct fashion.

In terms of external validity review, we did not impose any specific format. The investigator of a policy area was told to relate the results and conclusions of each research item vis a vis other items in the same policy area, and to describe any research deficiencies that characterize this area and to provide some statement as to the problem and research needs of the area. Thus, the investigator was asked to coalesce the internal validity discussions into a concise statement of the achievements, deficiencies and directions of research in each policy area.

In terms of the breadth of research included in the study, we concluded that policy issues in police protection can range from those that impinge on the day-to-day operations of a department to the long-range planning issues at all levels of government. Thus, our initial delineation of material tended to be an all inclusive one. We were then required to

establish a process of selection that would enable us to meet the objectives of the study and stay within time and budget constraints.

Central to the review process was the collection and classification of police protection research documents. The first few months of the project emphasized the collection aspects and we solicited many sources and individuals, see Appendix A-II. We collected over 200 documents and organized them by the following 15 policy areas:

- Crime Prevention--Architectural
- Crime Prevention--Crime Statistics
- Crime Prevention--Planning
- Evaluation--Crime Statistics
- Offender Apprehension--Crime Statistics
- Patrol Operations--Emergency Response and Random Patrol
- Patrol Operations--Patrol Beat Design
- Patrol Operations--Simulation Models, Dispatch, Patrol Services
- Patrol Operations--Traffic
- Police Administration and Management
- Police/Community Relations
- Police Effectiveness and Evaluation
- Police Technology and Weapons
- Personnel Selection, Evaluation and Training
- Resource Allocation

In addition, we refined each policy area into policy topics covered by the set of 200 documents, see Appendix A-III. This structure enabled us to determine whether some topic was inadvertently left out, and also to determine the necessary background of the investigator assigned to review a policy area. (Subsequently, these policy area categories were slightly modified and resulted in the final set of policy areas used in Section III.)

An abstract was prepared for each document that indicated title, authors,

date, source, length and a description of the research. When appropriate, the researcher's description was used. The abstracts were then collected and organized by policy area and the total set of abstracts were given to a review committee. The four members <sup>1/</sup> of this committee were asked to rank independently each abstracted item in terms of policy relevance to police protection based on their law enforcement activities, concerns and organizational interests. Each committee member was given a set of ranking instructions as shown in Appendix A-IV. The ranking was kept simple: a 1 meant that the research covered by the item (as indicated by the abstract) was very important and should be included and reviewed, a 2 meant marginally important or indifference to inclusion, and a 3 meant not important and the item should be discarded. The resultant set of scores were then noted on a master copy and reviewed by the project investigators. In order to cull out those research items that did not cover important policy issues, as reviewed by the committee (and also to select a manageable workload), we selected approximately 100 items for indepth internal and external validity reviews. The selection process retained those items which had a majority of 1's, with others of lower rank selected based on agreement of the project staff. In some instances, a selected item turned out to be unsuitable for the final review process (it was not a true research

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<sup>1/</sup>Inspector Herbert F. Miller, Jr., Metropolitan Police Department, Washington, D.C.; Dr. Richard Rau, NILE/CJ, LEAA, Department of Justice (partial review); Mr. John Lewis, Police Foundation; Mr. R. Dean Smith, International Association of Chiefs of Police.

item, was mostly interpretive, was not results oriented, etc.). Thus, the final number of documents subjected to internal validity review in Section IV is 58.

After the selection of the 100 items, each investigator was assigned to by the principal reviewer for a set of policy areas, with the responsibility of conducting the area's internal and external reviews. A secondary reader was assigned to each area to review the outputs and to act as a consultant to the principal reviewer. Any disagreements were resolved by the principal investigator. (This precise secondary review process did not obtain in a few areas due to workload and time constraints placed on the investigators.)

We submit that there are probably other policy areas and research papers that should have been included in this study. But, as it was not our purpose to produce a state-of-the-art document, we selected and deleted (and possibly missed) studies by a process, that in our best judgment, would produce a report of value to a majority of the police protection audience.

Given the total set of internal and external reviews for all policy areas, the results and conclusions were organized and discussed as given in Section II. There we indicate our views of the present condition of police protection research, where the deficiencies are, and some suggestions as to possible remedies.

As noted earlier, we viewed this study as a research task in itself, i. e. the research approach (described above) used to meet the objectives of the study needs to be evaluated in terms of whether it has made a significant body of police policy-related research more accessible and usable by policy makers, and whether it has yielded a vigorous basis for future research projects dealing with police policy-related research. The answer to this evaluative question lies in the future and the study's impact on its readers.

## APPENDIX A-I

### NSF POLICE PROTECTION PROJECT INTERNAL EVALUATION PROCESS

Basic to the research endeavors of this project is a standardization of the process termed internal validity, i. e. whether the researcher used proper methods and data for the questions asked. This note is an attempt to list questions and items of concern which should be addressed to each unit of research included in our project. Each reviewer will follow the internal evaluation steps given below. The writing style should be narrative as against short, telegraphic sentences and the final product, along with the abstract of the unit of research, should be self-contained, i. e. a reader would only want to read the original to get at details. However, the internal evaluation is not meant to be a technical referee's product or a descriptive review. After all the units of research have been internally reviewed, we will attempt to develop a taxonomy of law enforcement goals, objectives and policy issues in order to classify each unit of research and determine which policy issues have been investigated properly. Thus, in the first step below, the reviewer should make sure such items are stated, with emphasis on the objectives and issues. As a guide we offer the following definitions of goal, objective and issue <sup>1/</sup>

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<sup>1/</sup> Adapted from Policy Analysis at the Department of State: A Quantitative Methodology, R. M. Nutwell, Naval Postgraduate School, Monterey, California, September, 1972.

and examples of them taken from the law enforcement field (see Fig. 1 as to how we will relate these concepts).

Goal: An abstract aim or motivating desire which is not itself operationally defined, but from which objectives and policy issues are derived. From a law enforcement point of view we have as goals the following <sup>2/</sup>:

- Crime Prevention: through the maintenance of order, controlling situations which could result in conflict, and discouraging anti-social behavior.
- Crime Repression: through adequate patrol and reducing opportunities for criminal behavior.
- Crime Detection: as soon as possible after its occurrence.
- Offender Apprehension: as quickly as possible in order to discourage would be offenders and enable the punishment and rehabilitation of those convicted.
- Property Recovery: in order to reduce the monetary cost of crime and lessen opportunity for criminals and others to benefit from the gains of crime.
- Noncriminal Conduct Regulation: through activities such as enforcing traffic and sanitary code provisions.
- Miscellaneous Services: peripheral to basic police duties such as search and rescue operations, licensing, operating detention facilities, etc., and including performing public education activities.
- Departmental Operation: by applying organizational, administrative and management procedures to obtain a cost-efficient organization.

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<sup>2/</sup> Adapted from Municipal Police Administration, International City Management Association, Washington, D. C., 1971 and Regional Criminal Justice Planning, National Association of Counties Research Foundation, Washington, D. C., 1971.

Objective: A desired consequence or aim, the achievement of which can be verified by an unambiguous evaluative process. The full range of law enforcement objectives cannot be listed at this time, but we will obtain a range of objectives of interest from the research items of the project. Typical objectives would be to reduce street crime or reduce auto theft.

Policy Issue: A possible course of action, operation, task or program, the implementation of which has broad or significant implications. The full range of law enforcement policy issues cannot be listed at this time, but we will obtain a range of issues of interest from the research items of the project. The utility of these issues will be implied by the selection review committee and the project staff. As our task includes describing high utility policy issues which are not covered properly by existing research, we should be on the alert to highlight such concerns. Examples of police policy issues would be to improve street lighting or to initiate a program for officers to use patrol vehicles while off duty. We will interpret policy in a very general sense so as to not rule out an item of research which treats an issue of limited value, but could at the same time be of universal interest due to its methodological approach, possible extension or adaptation.

The major policy concerns of a police department deal with:

- administration and management
- crime prevention
- crime detection
- offender apprehension
- investigation
- patrol operations
- technology and weapons
- community relations
- personnel selection, evaluation and training
- resource allocation
- effectiveness, efficiency, equity

These areas of concern do overlap in that a new patrol policy can also contribute to police effectiveness. We have grouped the units of research into sets under the above headings. This represents a preliminary taxonomy, but is not meant to be a listing of goals, objectives or policy issues.

We next list the steps of the internal evaluation process to be followed by all reviewers.



### Internal Validity Evaluation Steps

1. Research goals, objectives, policy issues--Determine proper statement of the research in terms of high level law enforcement goals, specific objectives of law enforcement, and specific policy issues to be resolved. An example here is the law enforcement goal of crime prevention with the objective of reducing street crime by the policy issue of improving street lighting (see Fig. 1).
2. Face validity check--Based on an initial reading of the research in light of item 1 above and your experiences as a researcher, does the research appear to be reasonable and credible? This is, in a sense, an intuitive check which should raise issues and concerns to be pursued by the in-depth review. These issues and concerns should be written down so as to ensure your resolving them. They might deal with reasonableness of the assumptions, data sources and availability and the author's apparent biases.

As part of our task is to indicate what policy issues have or have not been explored in depth or properly, we should indicate here other policy issues which could be items for future research under the same goal and objectives, e.g. reduce auto thefts instead of improved lighting. As we review each item of research, we should then attempt to list a full range of appropriate policy issues so as to be able to identify voids in police research.

3. Methodology--Describe the methodological approach used in terms of any formal mathematical/logical model or other formalized description, the hypotheses and assumptions made, and the overall validity of the methodology within the proposed problem setting. This should be a somewhat terse and critical overview of the methodology. It is important to give other researchers a feel for the suitability of the methodology in this new setting of law enforcement and whether such methodology is or is not applicable due to certain assumptions or constraints.
4. Data requirements and data utilized--As we will, in general, be reviewing research which imposes a strong need for appropriate data, this item should be viewed in detail, as a weak or improper set of data is the bane of law enforcement research. Deficiencies in data should be noted in terms of the methodological needs and possible approaches for improving the quality (e.g. research tasks). Thus, we might find that the model/methodology is correct for the problem as stated, but the data are improper.
5. Experimental design and controls--We need to relate our experiences and good practices in the area of design and control of research experimentation and contrast it to what was done in the research under review. We might find that classical design and control techniques cannot be used for most law enforcement problems and there is a need to adapt

such procedures. Where appropriate, we should indicate our thoughts on what could have been done versus what was done in order to improve future research.

6. Results and recommendations--Here we need to assess whether the work as given in the report under evaluation supports the results and recommendations. This section should, of course, include a concise statement of the results and recommendations. In some instances, such results and recommendations will be based on hard data and its unambiguous interpretation; in other instances the author's intuitive and biased inclinations may be the prime rationale. We should discuss these approaches as objectively as possible, recognizing that valid research results can result from "soft" inputs. But we should not be afraid to criticize.

7. Discussion--In this section the reviewer must make a statement as to whether the paper meets the definition of internal validity, i.e. do the statements made in steps 1-6 above offer enough evidence to support a statement that the paper under review is internally valid. A paper selected for review should not be discarded as being internally invalid until the above steps have been taken and analyzed.

It is in this Discussion section that the reviewer should summarize his concerns and offer a free discussion of his general and specific views of the research discussed in the paper and related thoughts and ideas

dealing with policy issues and objectives being studied. Even if the results are valid, the reviewer might have reasons to believe that the implementation of the results will not turn out as expected or might not be a good thing to do. The problem area might be so difficult, e.g. does lighting decrease crime, that the reviewer might feel that future studies and evaluations should not be made and that lighting is a good thing and should be improved wherever possible. Also, concern as to the sensitivity of results to assumptions and data might be discussed, especially as it relates to use of the results by other agencies, i.e., we should give some thought to external validity of the results in this section, as well. The reviewer might also offer his views of how to conduct a new research study directed at the policy issue in question, what the original author should have done in the first place, and other statements on how such research can and should be conducted in the police environment.

It is important that each reviewer follow the above process as best as he can, recognizing that some papers might not lend themselves to all the steps. We should note what the author did or did not do and describe omissions and/or additions which would help or hurt a particular paper. As a guide to the reviewer, we note below a checklist of items to be included when possible. Associated with each item is a procedural step (was it stated by the author) a substantive step (an interpretative statement for an item) and a restatement step (did we include a proper statement of the item in the review and/or abstract). Each reviewer should, at a minimum, note in his review whether the procedural items were done or not, make a substantive statement about each item, and include a proper restatement.

Procedural	Substantive	Restatement
1. Are goals, objectives and issues stated?	1. What is their policy utility for police?	1. What are they?
2. Are assumptions stated?	2. Are they reasonable and what is the impact of assuming the converse?	2. What are they?
3. Is study designed explained?	3. Is it proper in terms of data, control, methodology?	3. What is it?

Procedural	Substantive	Restatement
4. Are results stated?	4. Are they supported by data and methodology?	4. What are they?
5. Are conclusions and recommendations stated?	5. Are they supported by results and are they sensitive to assumptions?	5. What are they?
6. Are caveats and uncertainties recognized and stated?	6. Are they appropriate and should there be others?	6. What are they?

The above process will be followed for each piece of relevant research. A report will be prepared for each of the seven sections above by the staff member responsible for the research area. It will be reviewed by the backup staff member and any disagreements resolved by the principal investigator. Once we assign the work, we will plan to have weekly meetings to review all internal validity reviews accomplished during the preceding week. The final internal validity review will be prefaced by the abstract and followed by the discussion of steps 1-7 above. If necessary, the reviewer should rewrite the initial abstract so that it reflects the substance of the paper under review.

We should note that part of our task is to develop a procedure for assessing internal validity of such research. Thus, all ideas are welcome, especially extensions and modifications of the above.

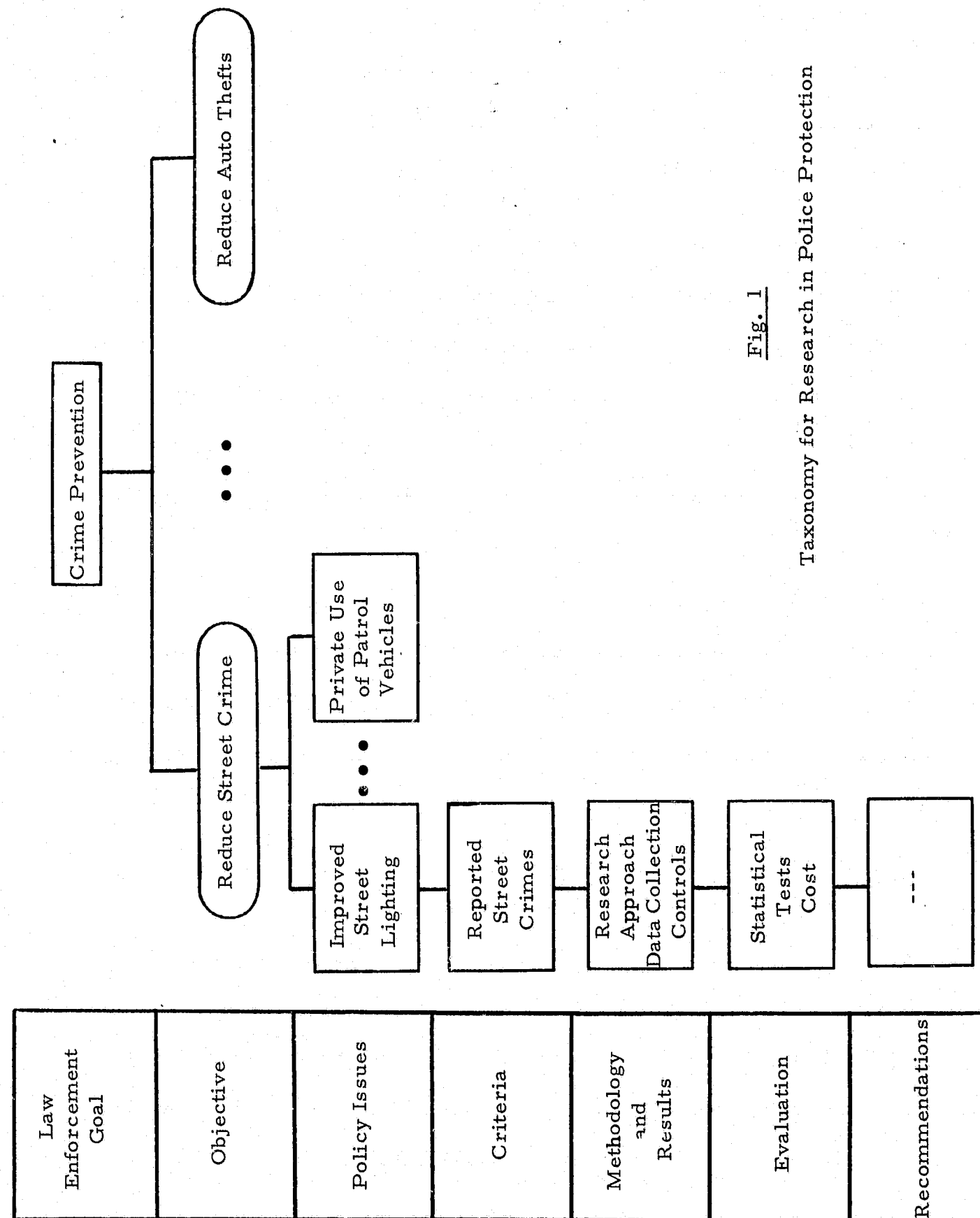


Fig. 1

Taxonomy for Research in Police Protection

## APPENDIX A-II

### SOURCES SEARCHED AND/OR SOLICITED FOR RESEARCH DOCUMENTS

Police Foundation, Washington, D. C.  
 International Association of Chiefs of Police (IACP)  
 The New York City Rand Institute  
 The Urban Institute  
 The Denver Research Institute  
 Criminal Justice Evaluation Project, New York, New York  
 The Center for the Environment and Man, Hartford, Connecticut  
 Division of Observational Research, University of Minnesota  
 Social Action Research Laboratories, Philadelphia, Pennsylvania  
 IIT Research Institute, Annapolis, Maryland  
 Institute for Police Studies, California State University  
 SDC, Santa Monica, California  
 The Rand Corporation, Santa Monica, California  
 California Crime Technological Research Foundation  
 Institute for Social Research, Lansing, Michigan  
 Public Technology Inc.  
 International City Management Association, Washington, D. C.  
 Traffic Institute, Northwestern University, Evanston, Illinois  
 National Institute for Criminal Justice and Law Enforcement, LEAA,  
 Department of Justice, Washington, D. C.  
 The National Criminal Justice Reference Service, Department of Justice,  
 Washington, D. C.  
 The Franklin Institute Research Laboratories, Philadelphia, Pennsylvania  
 Smithsonian Science Information Exchange  
 National Technical Information Service, Springfield, Virginia  
 National Highway Traffic Safety Administration Search, Washington, D. C.

Illinois Institute of Technology - Department of Industrial and Systems  
Engineering

University of Pittsburgh, Graduate School of Business

Police Department, City of Tampa, Florida

Police Department, City of Philadelphia, Pennsylvania

Police Department, St. Louis, Missouri

Police Department, Kansas City

Police Department, Cleveland, Ohio

Police Department, Flint, Michigan

Police Department, Phoenix Arizona

Police Department, Cedar Rapids, Iowa

Sylvania, GTE, Sunnyvale, California

Calspan Corporation, Buffalo, New York

E Systems Inc., Dallas, Texas

Security Planning Corporation, Washington, D.C.

Missouri Law Enforcement Assistance Council

Division of Highways, State of California

Department Highway Patrol, Sacramento, California

Dayton-Montgomery County Pilot Cities Program

Department of Public Works, Kansas City, Missouri

Commission on Peace Officer Standards and Training, Sacramento, California

Highway Research Board, Washington, D.C.

Department of Human Resources, Washington, D.C.

Paul M. Whisenand, Consultant, Costa Mesa, California

A. J. Reiss, University of Michigan

J. F. Reintjes, M.I.T.

W. R. King, University of Pittsburgh

F. J. Landy, Pennsylvania State University

A. B. Bishop, School of Engineering, Ohio State University

L. Berman, University of California, Berkeley, California

A. Blumstein, Carnegie-Mellon University

Lewis Mayo, LEAA, Washington, D.C.

Joseph Lewis, Police Foundation, Washington, D.C.

Richard Rau, LEAA, Washington, D.C.

R. Dean Smith, IACP

C. Bammi, University of Illinois at Chicago Circle, Chicago, Illinois

S. B. Smith, Illinois Institute of Technology, Chicago, Illinois

R. Larson, M.I.T.

N. B. Heller, Missouri Law Enforcement Assistance Council, St. Louis,  
Missouri

R. Laymon, LEAA, Washington, D.C.

S. Hovey, Alameda County 911 Project, Oakland, California

P. Kolesar, City College, CUNY/NYC Rand Institute



## APPENDIX A-III

### POLICE PROTECTION POLICY TOPICS

#### A. Police Administration and Management

- intelligence theory and applications to law enforcement
- neighborhood team policing
- law enforcement MIS and information needs
- dedicated police computer
- automated police information systems and data processing
- criminal justice system information systems
- volume of computer use by police departments
- developing baseline data for project evaluation
- computerized methods of long-range staff planning
- productivity measurement
- 4-day, 40-hour workweek
- survey of salary and administrative data for police departments
- PPBS applied to police department management
- space management and design of courts
- case scheduling and time loss by police as witnesses
- pensions and police mobility
- methods of evaluating detective work
- management of police misconduct
- reduction of injuries and damage to police department property
- state-local relations in the criminal justice system

#### B. Police Effectiveness and Evaluation

- evaluation of Impact Cities projects
- statistical methods of predicting amount of crime absent controls
- evaluating change in crime or clearance rates
- determination of an "acceptable" level of crime
- evaluating apprehension efforts

- effect of increased police manpower on crime rates
- off-duty use of marked police cars
- techniques for evaluating experiments in policing
- effect of increased traffic law enforcement on accidents and violations
- aggregate cost of auto theft to a city and prevention programs

#### C. Crime Protection -- Architectural

- building design
- security devices and procedures
- evaluation of security concepts

#### D. Crime Prevention -- Crime Statistics

- crime incidence
- crime prediction

#### E. Police Technology

- research needs for nonlethal weapons for law enforcement
- police telecommunications
- mobile telecommunications
- radioteleprinters
- digital data transmission over land-mobile radio channels
- concepts of tactical communications applied to police work
- region-wide police emergency communication systems
- the 911 universal emergency telephone number
- STOL versus helicopters in routine patrol
- uses made of helicopters on patrol
- effect of helicopter patrol on crime rates
- costs of aerial patrol
- night vision devices
- voice identification devices
- crime detection and alarm systems

- security systems
- criminal surveillance
- burglar alarms linked to police stations
- protective devices and systems
- fingerprint search systems

#### F. Resource Allocation

- computer applications to police manpower distribution
- computer applications for allocating manpower to calls for service
- descriptions of manpower allocation in police departments
- manpower allocation and distribution procedures in a sheriff's dept.
- allocation of patrol units per probable risks of loss or injury
- incident seriousness index for deploying patrol manpower
- mathematical models for predicting patrol workload
- economic analysis of distribution of police among districts
- development of job-related criteria for performance evaluation
- criteria for police patrol functions
- enhancing police career opportunities
- use of non-sworn personnel

#### G. Patrol Operations -- Patrol Beat Design

- partitioning of police districts into beats
- political districting algorithms
- queueing models for districting emergency services
- mathematical models for distribution of manpower
- control chart theory for allocation of motorcycle officers
- patrol sector design
- minimization of response time
- information flows within police departments
- methods of constructing patrol simulation models
- generation of incident maps

#### H. Patrol Operations -- Emergency Response

- patrol methods
- random patrol and theory thereof
- allocation of emergency units
- dispatch methods and allocation of servers
- coverage by emergency servers
- hot pursuit
- reduction of response time
- modeling of response time
- quantitative decision-making methods
- crime prediction

#### I. Patrol Operations -- Traffic

- real-time surveillance and control systems for freeway operations
- effect of police vehicle presence on traffic flow
- management of highway risks and dysfunctions
- traffic flow information system for allocating police services
- police operations on controlled access highways
- defining police responsibilities in traffic services

#### J. Personnel Selection, Evaluation and Training

- personality traits relevant to police performance
- psychological test batteries for patrolman selection
- standards for promotion of police officers
- attracting and retaining minority candidates for police work
- methods of predicting recruit's future performance
- job attitudes of policemen
- academic programs in law enforcement and criminal justice
- role concepts of policemen and changes therein
- evaluation of training in a police academy

- changes in police attitudes during early career
- performance of women as patrol officers & attitudes toward them
- computer-assisted instruction in police training
- evaluation of subjective & objective predictions of job performance
- stress factors affecting police patrol behavior
- validity of written examinations in recruit selection
- weighting of test scores in promotional examinations
- race/ethnic bias in written examinations & appointment processes
- effects of prior arrest on job performance of police officers

#### K. Police/Community Relations

- community-centered team policing
- police function in urban Black community
- civilian reactions to the police uniform
- problems experienced by Black policemen
- surveying public attitudes toward police & fear of crime
- decentralization and civilian participation in police work
- improvement of police/community relations
- police intervention in family crises
- public attitudes toward crime and treatment of offenders
- racial attitudes of police
- alternatives to confinement of offenders

#### APPENDIX A-IV

##### Guidelines for the Selection of Research To be Reviewed by the NSF Project In the Evaluation of Policy-Related Research In the Field of Municipal Systems, Operations and Services: Police Protection

The MATHEMATICA staff has collected and abstracted approximately 175 documents in the area of police protection. These documents were obtained from a number of sources and by a number of means, including the abstracting services of the National Criminal Justice Reference Service, National Technical Information Service, Psychological Abstracts Information Services, and the Science Information Exchange.

The documents have been organized into the following policy areas:

Crime Prevention--Architectural  
 Crime Prevention--Crime Statistics  
 Crime Prevention--Planning  
 Evaluation--Crime Statistics  
 Offender Apprehension--Crime Statistics  
 Patrol Operations--Emergency Response and Random Patrol  
 Patrol Operations--Patrol Beat Design  
 Patrol Operations--Simulation Models, Dispatch, Patrol Services  
 Patrol Operations--Traffic  
 Police Administration and Management  
 Police/Community Relations  
 Police Effectiveness and Evaluation  
 Police Technology and Weapons  
 Personnel Selection, Evaluation and Training  
 Resource Allocation

It should be recognized that our assignment of a document to one of the above areas may not be exact and changes will probably occur as we get down to detail review. Also, some documents cut across two or more

areas. When this is the case, it was placed in the apparent primary category. However, when a document is reviewed in detail we will indicate at that time those related areas, e. g. a report which deals with effectiveness of offender apprehension was placed in the effectiveness area, but a review would also indicate its impact on the offender apprehension category; also many papers in patrol operations have an objective of offender apprehension, crime detection and crime prevention.

You are being asked to assist the MATHEMATICA project staff in selecting a set of documents for detail review. The basic aim of this selection is to enable us to concentrate on those papers which have a high policy utility to police departments. For example, the review of the experimental program which allowed the Minneapolis police to take police cars home is appropriate as it is a major policy change and other departments would want to have some idea as to whether the process could work in their areas. Thus, a main element to use in the selection process is the possible transferability of the results of a study made for one department to another, or the need to conduct similar research for other departments (which might generate different conclusions). As we are also concerned with research which could aid State planning and law enforcement agencies and Federal policy-makers, appropriate policy research directed towards these groups should also be considered, e. g. a planning and budgeting model for a State law enforcement agency. The basic factors for selecting studies are then:

- Importance of policy issue under investigation,
- Generality of issues in terms of transferability to other municipalities,
- Selection of a set of issues which encompasses most of the major areas of police protection and are representative of the efficiency, effectiveness and equity concerns, and
- Relevance to issues being addressed by State and Federal policy makers.

Each reviewer will have a set of abstracts, organized by the policy areas given above, and will have access to the original documents in MATHEMATICA's library. You are asked to read the abstract and make an initial determination to include or not to include the associated research study. A score of one (1) means include, while a score of three (3) do not include. If you are not sure about a study score it is two (2). The score you give a document (note the score on the top, right-hand corner of the abstract) should be based on the review of the abstract and a detail look at the source document, when necessary.

We are having four separate reviews, and the MATHEMATICA project staff will arrange the abstracts by score, resolve any inconsistencies and select a set of semi-final documents so you can argue for or against the inclusion of certain studies. We will then select a final set.

## APPENDIX B:

### ADDITIONAL REFERENCES

#### Police Administration and Management

"An Information System for Law Enforcement," System Development Corporation, Santa Monica, California, BRT - 18/000/00.

"Law Enforcement Management Information System," Anonymous, IBM Corporation, Data Processing Division, White Plains, New York, 1967.

"Police and Computers: Use, Acceptance and Impact of Automation," Kent W. Colton, Municipal Year Book, 1972.

"Use of Computers: Use, Acceptance and Impact of Automation," Kent W. Colton, Urban Data Service, Vol. 4, No. 4, April 1972.

"The Dedicated Police Computer--Does It Really Make a Difference?" Kent W. Colton, The Bureaucrat, Vol. 1, No. 4, Winter 1972.

"A Computer Oriented Police Planning System," J. L. Worley and C. R. Key, Project SEARCH: International Symposium on Criminal Justice Information and Statistics Systems, 1972.

"Evaluation of the Community Centered Team Policing Program (Dayton Police Department, Dayton, Ohio)," J. B. Cordrey and K. Kotecha, 1971.

"4-10 Plan: Police Explore Potential of 4-Day Workweek," J. Thomas McEwen, No. 1, Selected Topic Digest, April 1972.

"State-Local Relations in the Criminal Justice System," Anonymous, Advisory Commission on Intergovernmental Relations, Washington, D. C., August 1971.

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