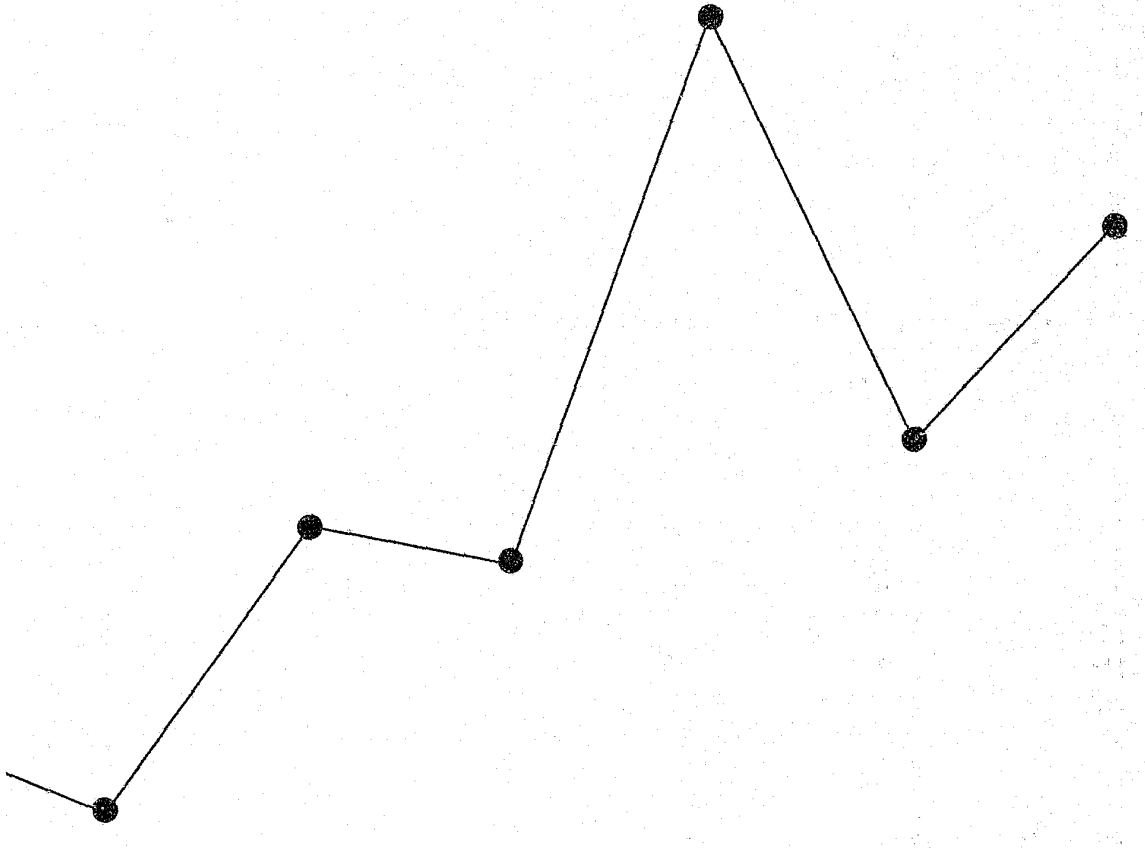
Text
Volume One

Introduction to Analysis of Crime and the Criminal Justice System



Introduction to Analysis of Crime and the Criminal Justice System

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U.S. Department of Justice
Law Enforcement Assistance Administration
Washington, D.C. 20531

1977

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Law Enforcement Assistance Administration
Washington, D.C.
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INTRODUCTION TO ANALYSIS OF CRIME AND THE CRIMINAL JUSTICE SYSTEM

FOREWORD
ACKNOWLEDGEMENTS

This work was performed by Abt Associates Inc., Cambridge, Massachusetts, for the Law Enforcement Assistance Administration under Contract No. J-LEAA-001-77. John Moxley, Training Division, Office of Operations Support, LEAA, served as project monitor. Points of view or opinions stated in this document do not necessarily represent the official position or policies of the U.S. Department of Justice.

Foreword

The Law Enforcement Assistance Administration is actively engaged in providing assistance to state and local governments to support their planning capabilities. Good planning is indispensable to the development and implementation of effective programs for improving criminal justice and reducing crime. Planners know that they must begin with an analysis of the crime and criminal justice problems they face and that the chances for a rational allocation of the system's scarce resources are enhanced when the relevance of the data to the problem at hand is clearly apparent.

A powerful tool at the planner's disposal is the data collected and analyzed during the earliest steps of the planning process. However, it is in these early steps that the greatest difficulties are encountered.

The expertise of analysts, planners, researchers, statisticians, and of greatest importance, people who have had direct personal experience with state and local crime analysis and planning processes have been tapped by LEAA to develop and deliver a training course which is an Introduction to Analysis of Crime and the Criminal Justice System. This training course is being offered to state and local governments to assist and support their capabilities to identify, acquire, and utilize the best available data, analytic techniques, and problem-solving methods.

LEAA has developed a training course in Planning, and has under development a course in Evaluation. The design of these programs of instruction is intended to form a comprehensive and complementary package for the assistance of state and local criminal justice agencies. These three courses, the Planning course, and the Analysis and Evaluation courses--once successfully pilot-tested--are being offered by the LEAA sponsored Criminal Justice Training Center system.

The analysis course materials, including the Text, Instructor Guide, and Administrative Plan, are to be considered

in draft form until the final pilot-testing of the materials is successfully completed by the Criminal Justice Training Center at the University of Southern California. Upon successful pilot-testing in December, 1977, the material and course are to be made available throughout the Training Center system during 1978.

Acknowledgements

The Introduction to Analysis of Crime and the Criminal Justice System curriculum material is the product of over a year's effort on the part of numerous practitioners, academics, and professional organizations. This development process was divided into two phases. During the initial phase, the curriculum development effort was coordinated by Abt Associates. Five pilot offerings of the course were delivered by the State University of New York at Albany and were evaluated by the American Institutes of Research. As a result of these pilot experiences, a revision of the curriculum was undertaken.

Overall supervision of the curriculum development and revision effort was provided by Seth I. Hirshorn with the assistance of Laura R. Studen. Vincent O'Leary supervised the initial pilot offerings of the course given by SUNY-Albany, and Harris Shettel provided evaluation comments during the initial pilot offerings of the course.

Considerable assistance in the early planning stages of this project was provided by the National Conference of State Criminal Justice Planning Administrators, National Association of Criminal Justice Planning Directors, Criminal Justice Statistics Association, the National League of Cities/U.S. Conference of Mayors, and the National Association of Counties.

During the initial phase of course development, overall direction of the curriculum and delivery of the pilot offerings was a cooperative endeavor within LEAA. Primarily involved were the Office of Planning and Management, the National Criminal Justice Information and Statistics Service, and the Training Division of the Office of Operations Support. Leonard Oberlander of the Office of Planning and Management and Marianne Zawitz of the Statistics Division monitored the first phase of the Project. The revision phase of the course's development was directed by the Training Division, Office of Operations Support. John Moxley of the Training Division was project monitor during this revision phase.

The revision of the material was assisted by the formation of an Advisory Group. This group of practitioners, identified on the following page, provided critical judgement in further developing and improving the curriculum.

Finally, recognition must be given to the pilot course instructors and participants who provided both patience and suggestions in recommending revisions to the curriculum--recommendations which are reflected in this material.

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INTRODUCTION TO ANALYSIS OF CRIME AND THE CRIMINAL JUSTICE SYSTEM

INTRODUCTION

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INTRODUCTION

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INTRODUCTION

The approach of this course to the analysis of crime reflects the real-life situations of criminal justice planners and of those who directly or indirectly perform analytic functions within the context of criminal justice agencies. The course is based on the professional roles and responsibilities of individuals who are required to perform analysis of crime and the criminal justice system whatever may be their job titles.

I. COURSE AUDIENCE

As an introductory study in analysis, the course is designed for those individuals who need basic skills in order to have an awareness and understanding of the analytic process and tools used in the analysis of crime. It is designed for individuals who hold criminal justice planning staff positions, budget analysts, community program coordinators, data and policy analysts, program monitors, and others who perform the planning function.

An introductory course of five days can cover only those skills which will enable a planner to know what steps must be taken in crime analysis, what kinds of tools are available to perform them, and how to identify the environmental factors which impinge upon the process. This course does not purport to teach sophisticated statistical/analytic techniques; but has been developed to raise the participant's analytic skill level, and increase awareness and understanding about analytic problems and techniques.

II. COURSE THEMES

In a simplified way, crime analysis may be described as a four-step process: (1) problem identification and formulation; (2) collection of data; (3) extraction of information from the data; and (4) persuasive presentation of the information. It is with this process that the course is concerned. Everything in this course addresses and relates to these four steps.

Using this four-step process for crime analysis, the course has been organized around three integrated themes, although they may be individually identified as a means of explanation for the course rationale. The three themes define and identify analysis as a process, as a set of tools, and as a set of skills.

A. Analysis as a Process

Theme One looks upon analysis as a process which is used to formulate crime and criminal justice system problems, identify the appropriate data collect the data, extract information, and present the information effectively. A critical aspect of analysis is to perceive it as a continuous process within a larger decision-making context and not as a separate function or a few isolated techniques. Putting the process in motion requires specific tools and skills, and these are dealt with in the succeeding themes.

B. Analysis as a Set of Tools

Theme Two concerns analysis as a set of tools that a planner can use to identify crime and/or system performance problems. These qualitative and quantitative tools consist of analytic techniques which are applicable to criminal justice problems.

C. Analysis as a Set of Skills

Theme Three considers analysis as a set of skills used by a planner in meeting agency analysis objectives within an organization's social, political, and economic environment. Skills here involve the development of feasible analysis plans which are timely, within cost constraints, and useful to decision-makers. Identification and an understanding of the factors which may help or hinder the analysis process are a critical intent of this introductory course.

III. COURSE STRUCTURE

A. Overall Framework

The themes have been translated into course goals and objectives and these are organized into teaching units or modules. For each module, there is a goal which serves as a guide for the formulation of behavioral objectives, topics, and teaching/learning techniques. The goals identify the intent of the module. Exhibit 1 relates the themes to the goals of the course.

B. Goals and Objectives

For each goal, there may be one or more behavioral objectives which specify what it is the participant is expected to get out of the module and what he/she will be able to do as a result of the learning experience.

Following the goals and objectives, there is a topical outline in the materials which indicates how each subject area is to be treated; whether by lecture, discussion, individual or small group exercises. The course was designed primarily as a participatory learning experience. Therefore, lecture presentations, where necessary for explication purposes, have been kept to a minimum number, and each is limited to around twenty minutes.

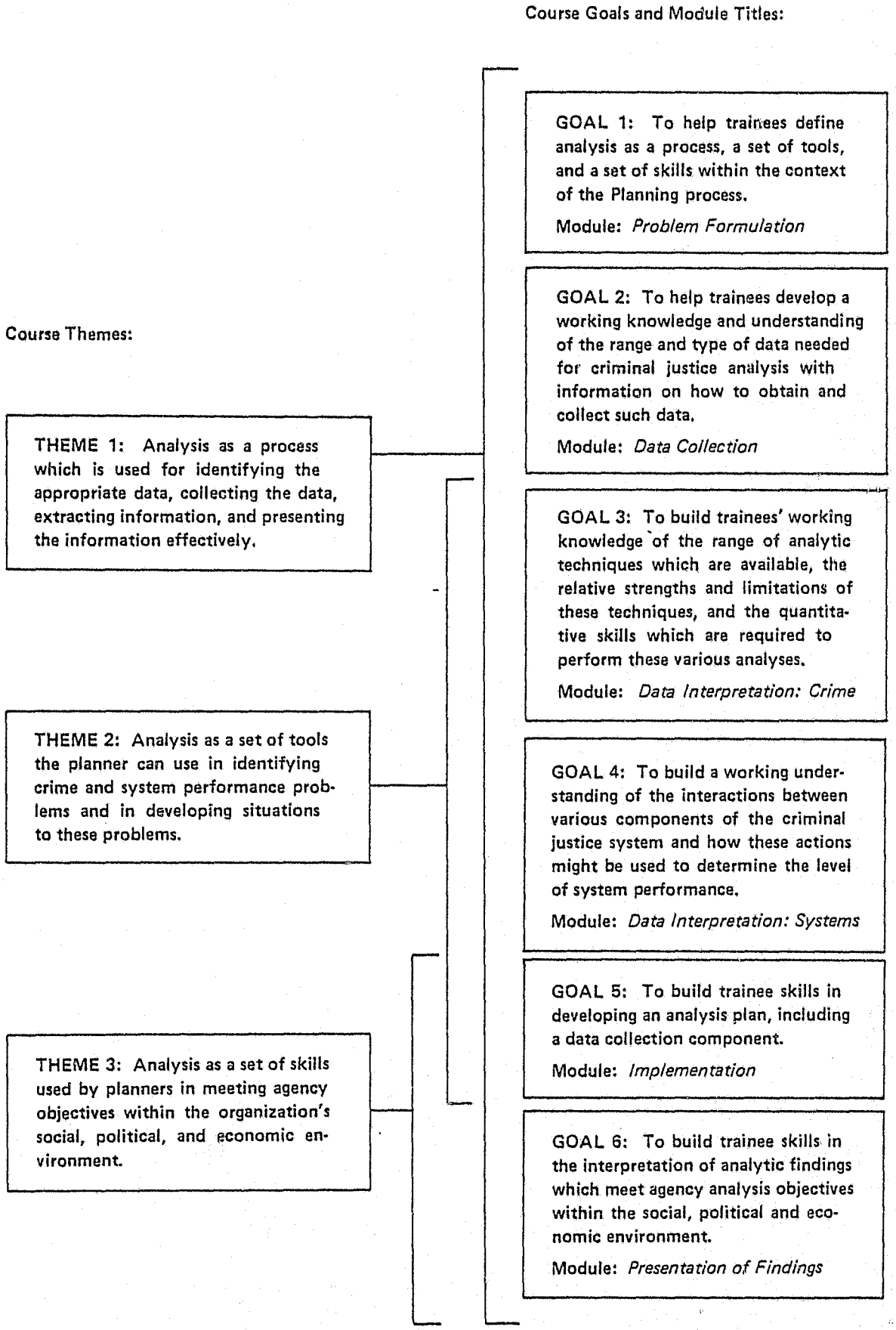
C. Modules

The basic framework for the analysis course is an explication and elaboration of the analysis process.

1. Module 1: Problem Formulation

Module 1: Problem Formulation, in addition to considering the origins of problems faced by criminal justice analysts and the nature of these problems, also examines a problem formulation process which analysts may use. Also considered is the more general question of why use analysis in the criminal justice planning process. The purpose of the first module is to specify what problem formulation is, how it is done, and what the outcomes of this step are in the analysis process.

EXHIBIT 1
RELATION OF COURSE THEMES AND GOALS



2. Module 2: Data Collection

Module 2: Data Collection considers types and sources of data available to the criminal justice analyst. Data sources are divided into two categories: secondary data sources such as the Uniform Crime Reports (UCR) of the Federal Bureau of Investigation and primary data sources such as a public opinion or victimization survey which requires the analyst to collect the original data. The purposes of this module are to identify data sources, relate them to problems and questions addressed by the analyst, and specify the problems associated with their use in analysis.

3. Module 3: Data Interpretation--Crime

In Modules 3 and 4, the emphasis is on the methodology and tools of converting data into useful information. Module 3: Data Interpretation--Crime focuses on the basic quantitative tools used in the interpretation of crime data. In presenting quantitative tools, this module first explains a specific technique, then demonstrates itsuse, and finally provides participants with the opportunity of using the technique on a specific set of problems. Emphasis is given to tools which have practical value and which can be readily acquired by individuals who have a basic understanding of math and statistics.

4. Module 4: Data Interpretation--System

The purposes of Module 4: Data Interpretation--System are to 1) shift the unit of analysis from crime to the relationships between criminal justice system performance and the incidence of crime, and 2) build upon the tools acquired in Module 3. In this module, the tools and skills covered are those useful for separating the criminal justice system into its respective components in order to understand the nature, functions, and interrelationships of the parts within the criminal justice system. By breaking down the criminal justice system into its organization, political, economic, and physical parts, and by considering the dynamic characteristics of the system, it is possible to better determine and understand system problems, and seek solutions to these problems.(1)

5. Module 5: Implementation

The next module, Module 5: Implementation, introduces the basic skills of developing an Analysis Plan. The purpose of the module is to provide trainees with a realistic approach to the preparation of an Analysis Plan involving an elaboration of 1) the crime or system problem to be analyzed; 2) the key variables and data elements required and how they are to be collected (Data Collection Plan); 3) the expected outcomes and products of the analysis; 4) the respective roles and responsibilities of staff; 5) the scheduling of specific analysis tasks; and 6) estimating the budget required for a specific analysis.

6. Module 6: Presentation of Findings

At the conclusion of Module 5 and all of Module 6: Presentation of Findings the concern is with the tools and skills useful in presenting the findings of an analysis plan--such a presentation is the last step in the analysis process. These skills and tools include both effective graphics and preparation of succinct narratives. The purpose of this material is to demonstrate and build participant skills in the effective utilization of the products of analysis, thus becoming a more persuasive influence in the criminal justice decision-making environment.

D. Overall Framework Revisited

Another way of viewing the structure of this training course is in terms of an Analysis Plan. While a complete discussion of preparing an Analysis Plan is presented in Module 5, Exhibit 2 presents its basic components and relates these to each module of the course.

This structure can be used to tie the various information skills and tools of the course into an understandable and useable whole--an Analysis Plan. Throughout the text reference is made back to this exhibit to provide a context for each module and to assist in relating the various modules of the course to its respective stage(s) in the preparation of an Analysis Plan.

IV. AGENDA (See Exhibit 3)

V. ORGANIZATION OF TEXT

The curriculum materials presented in this Text are organized by course module in sequence. Following are the major elements of the Text:

- Module Abstract

  Contains a brief statement of the purpose of the module, identifies the behavioral objectives for each module and presents a topic outline that corresponds to the presentation of material in the Text.

- Narrative

  The narrative for each module contains text on each topic and appropriate graphics. It is important to note that lecture presentations follow the topic outlines for each module, which, in turn provide a framework for the written narratives. Blank space for note taking has been provided throughout the Text.

  Each narrative has, as well, complete descriptions of Exercises associated with each module. These individual and small group exercises provide opportunity for applying the various skills and knowledge of analysis brought to and developed in this program of instruction by each participant.

EXHIBIT 2
ANALYSIS PLAN COMPONENTS WITH MODULE REFERENCES

STAGES IN DEVELOPING AN ANALYSIS PLAN	State *problem* for which analysis is needed	Identify *audience* & *use* for findings	Specify desired products (questions to be answered)	Review available information & formulate *hypotheses* to be tested	Identify *variables* needed & measurement of variables	Identify & select *data sources*	Select *analysis techniques*	Determine target *manpower, equipment* and *time* needed	Estimate *costs*	Select *presentation* format & *dissemination* procedure
ANALYSIS PLAN COMPONENTS	Statement of the Problem	Audience Identification & Use for products	Products	Hypotheses	List of variables & measures	Data Collection Plan	Selected Analysis Technique(s)	Work Plan	Costing	Presentation & dissemination plan
USE (WHAT EACH STAGE TELLS THE PLANNER)	WHY		WHAT			HOW		WHEN & BY WHOM	HOW MUCH	FOR WHOM
MODULE REFERENCE	MODULE 1: PROBLEM FORMULATION				MODULE 2: DATA COLLECTION		MODULE 3: DATA INTERPRETATION — CRIME MODULE 4: DATA INTERPRETATION — SYSTEM	MODULE 5: IMPLEMENTATION		MODULE 6: PRESENTATION OF FINDINGS

EXHIBIT 3
COURSE AGENDA

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
9:00 Introduction 10:00 Module # 1 – Problem Formulation • Criminal Justice Planning • Problem Formulation	9:00 Primary Data 10:30 Module # 3– Data Interpretation – Crime • Descriptive Methods – Measures of Central Tendency – Measures of Variation	9:00 – Comparative Methods – Continued 11:00 • Inferential Methods – Measures of Association	9:00 Module # 4 – Data Interpretation – System • Measuring System Performance	Module # 6 – Presentation of Findings • Analysis Plan Presentations • Presenting Issues and Findings 11:40 Close of Session
LUNCH	LUNCH	LUNCH	LUNCH	LUNCH
• Problem Statements 3:00 Module # 2 – Data Collection • Secondary Data	1:30 – Graphical Methods – Comparative Methods	1:00 – Measures of Association – Continued 1:30 – Methods of Prediction	1:15 • Measuring System Capabilities 2:35 Module # 5 – Implementation • Analysis Plan Components • Analysis Plan Case Study	

Participants should utilize the Text both in tracking each lecture presentation and for instructions to each Exercise activity.

INTRODUCTION--END NOTES

(1) Anthony J. Catanese, Scientific Methods of Urban Analysis (Urbana: University of Illinois Press, 1972), pp. 3-5.

INTRODUCTION--SELECTED BIBLIOGRAPHY

Several sources provide a good discussion of the analysis process and the scientific method. See for instance:

Fred N. Kerlinger, Foundations of Behavioral Research, 2d ed. New York: Holt, Rhinehart and Winston, Inc., 1973, pp. 2-15.

Dickinson McGaw and George Watson, Political and Social Inquiry, New York: John Wiley & Sons, Inc., 1976, pp. 2-30.

More general discussions of social science methodology can be found in the following:

I. Deutcher. What We Say--What We Do, Glenview, Illinois: Scott, Foresman and Company, 1973.

Derek L. Phillips. Knowledge From What, Chicago: Rand McNally, 1972.

Abraham Kaplan. The Conduct of Inquiry, San Francisco: Chandler, 1964.

An interesting historical discussion of the nature of scientific investigation is presented in:

Thomas Kuhn. The Structure of Scientific Revolutions, Chicago: University of Chicago, 1962.

N O T E S

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MODULE 1: PROBLEM FORMULATION

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MODULE ABSTRACT

Title: Module 1: Problem Formulation

Lecturer:

Objectives:

There are two major purposes of the first module: 1) to provide a context for and definition of analysis as used in this course; and 2) to elaborate procedures for developing problem statements and identifying the major characteristics of good problem statements.

After completing this module, participants should be able to:

- Define analysis and identify its significance.
- Reconstruct the general planning process model and identify where and how analysis is used in criminal justice planning.
- Identify two major functions common to most criminal justice planning agencies and explain, in terms of these functions, the uses of analysis.
- Reconstruct the detailed model of the analysis process.
- Identify barriers to and facilitators of analysis in planning.
- Name and explain the criteria for adequate problem formulation.
- Distinguish between inadequate and adequate problem statements.
- Formulate an original problem statement.
- Identify trends in the origins of problems about crime and the criminal justice system.

MODULE 1

Problem Formulation

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MODULE 1

PROBLEM FORMULATION

I. CRIMINAL JUSTICE PLANNING

A. Major Characteristics of Planning

One definition of a "plan" is a detailed formulation of a program of action; planning is the development or devising of such a detailed formulation. As practiced across the U.S., criminal justice planning appears to have at least four major additional defining characteristics in that it is: (1) future-oriented; (2) change-oriented; (3) goal-oriented; and (4) can be characterized as a process.

Many times criminal justice planners receive a call or get a request for an immediate response to a question or problem. Such "crisis" planning often implies responding in an ad hoc manner to a natural or man-made disaster and, in criminal justice administration, usually involves dealing with the operational problems of line agencies.

More typically, however, planning is performed in a one-year time frame corresponding to the agency's or jurisdiction's budget cycle. One-year planning is usually closely tied to the on-going problems and projects of the jurisdiction and over time the process becomes increasingly repetitive and highly structured. In contrast, middle-range planning may involve a five- to ten-year planning horizon, while long-range planning may extend the planner's horizon beyond ten years and as far out in time as a specific problem, issue, or need may require. For instance, one planner focusing on the long-range consequences of the effects of public policies on urban growth utilized a 250-year planning horizon.(1)

A second characteristic of planning is that it is change-oriented. There are two important dimensions of change appropriate to criminal justice: the size or magnitude of the planned change, and the rate of change. Incremental changes, such as a shift in labor resource allocations, require a different type of planning effort than do more massive and fundamental changes, such as the decriminalization of certain statutes. Nonetheless, given an existing situation and a proposed change, large or small, a planner's responsibilities include:

- formulating an accurate statement of the problem(s) facing a community
- identifying preferred alternative remedies, and
- considering what specific impacts such alternatives might have on these problem(s) and the community's environment.

The rate of proposed changes is an equally important consideration. For example, crime reduction objectives are usually qualified by the rate consideration of "by when."

A third major characteristic of planning is that it is goal-oriented. The development and prioritizing of goals and objectives are important planning activities. For example, the Urban High Crime Reduction Program funded by the Illinois Law Enforcement Commission established three major objectives for local projects.

(1) To reduce burglary and stranger-to-stranger crime through rational analysis and systematic goal-oriented planning development and implementation;

(2) To evaluate the various approaches undertaken by the program, for possible replications elsewhere in the state; and

(3) To increase coordination between police, courts, and corrections officials in policy development and decision making at the local level.

A review of local, regional, or state criminal justice planning documents would reveal similar sets of goals and objectives. Establishing priorities among these objectives, however, is an equally important activity.

Finally, as illustrated in Exhibit 1.1, planning may be conceptualized as a process consisting of a sequence of discrete activities and tasks. At the center of this process is a rationalistic view of criminal justice decision-making which involves a planning-action-evaluation sequence. The initial seven steps of the general planning process model--from preparing for planning through identifying alternative courses of action--comprise the "planning" steps of this process. Selecting the preferred alternatives, planning for implementation, and actually implementing the plans comprise the "action" component. Finally, monitoring and evaluating progress is the "evaluation" step in the process.

B. The Relationship of Data Analysis to Criminal Justice Planning

There are two ways of perceiving the relationship between planning and data analysis: either in the context of the specific types of decisions a jurisdiction or agency must make during its planning cycle or, more generally, how analysis may be used for specific steps in the general planning process. Planners must make a series of decisions involving which criminal justice problems merit attention, the best approaches to treating these problems, and the appropriate agents to carry out selected approaches. In addition, there are, at least two basic functions of most planning agencies: 1) the allocation (or the review) of resources by area organizations or activities and 2) the establishment of programmatic initiatives including the assessment of alternative proposals. A premise of this course is that analysis is required if decision-making and the performance of these functions are to be conducted in an effective and efficient manner. The following

Exhibit 1.1

GENERAL PLANNING PROCESS MODEL

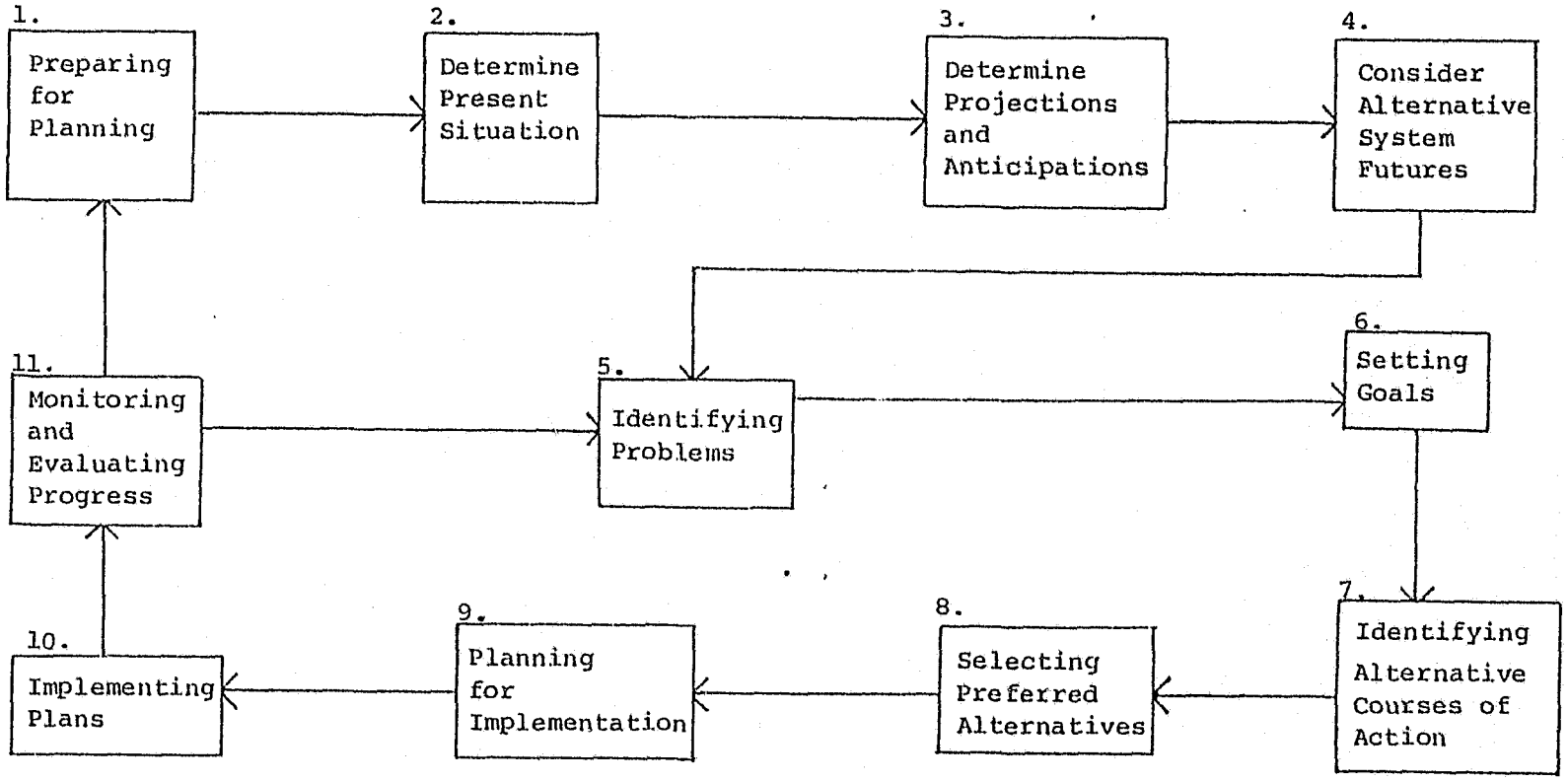


Exhibit 1.2

FORMULA ALLOCATION — AN EXAMPLE

Formula Components:	Percent Total Population, 1976	+	Percent Total Crime Incidence	+	Percent Crime Index Growth, 1971 - 1975
City A	2%		10%		75%
City B	10%		5%		30%
Chaos City	30%		50%		25%
Total State of Paradise	10,000,000		400,000		—

- Total available funds for these three cities is $22,000,000 (42% of $50,000,000).
- Local shares are determined by (1) calculating weighted values for each component for each city, (2) percentaging the weighted components, and (3) calculating each city's share based on total weighted percentage.
- Weights for this example are:
  Population share = 3
  Crime Incidence Share = 1
  Growth Rate = 1/3

STEP ONE

City A = 3(2%) + 10% + 75%/3 = 43.5
City B = 3(10%) + 5% + 30%/3 = 45.0
Chaos City = 3(30%) + 50% + 25%/3 = 148.3

STEP TWO

		% of Total
City A =	43.5	18.37%
City B =	45.0	19.00%
Chaos City =	148.3	62.63%
TOTAL:	236.8	

STEP THREE

City A's Share = $22,000,000 x .1837 = $4,041,400
City B's Share = $22,000,000 x .1900 = $4,180,000
Chaos City's Share = $22,000,000 x .6263 = $13,778,600

Final Allocations

City A	$4,041,400
City B	$4,180,000
Chaos City	$13,778,600
Total Allocated:	$22,000,000

section examines these two primary functions discussing the various approaches to making the decisions associated with each and the role that analysis could play in these decision-making activities.

1. Planning Agency Functions and Analysis

a. Allocation of Resources by Geographic Unit

The allocation of resources by a criminal justice planning agency is probably its most visible and, perhaps, one of its most controversial functions. In fact, the Safe Streets Act (amended by the Crime Control Act) specifically requires that certain portions of block grant funds be "passed through" to units of local government and areas of high crime and high law enforcement activity. Within this framework, analysis--particularly the analysis of the extent and trends of crime--can play a prominent role in the determination of which regions or localities have the most serious crime problems that need to be addressed with block grant or other funds.

Assuming the underlying correctness of the belief that at least some significant proportion of funds should be allocated in direct proportion to the seriousness of crime in jurisdictions, one can examine some concrete analytical procedures for accomplishing this. One approach is to develop a formula which relates the share of funds for a locality to that locality's population share, crime share, and crime growth. The exact nature and parameters of such a formula can be fine-tuned by policy and by the general experience of the planning agency, derived from the evaluation of earlier funded activities in various local jurisdictions in the state. It is a straightforward procedure to try various weights and combinations on a few years of past crime data to see how funds would have been allocated. A hypothetical example of a formula allocation is presented in Exhibit 1.2.

A second approach to allocating resources involves ranking various political sub-divisions of a state along each of several dimensions and then rank the sum of the individual ranks to arrive at a single ranking of all the sub-divisions being considered. In comparison to a formula-based approach, here all variables have equal impact, and the amount of difference between cities is ignored in favor of ordering. An example of this procedure for three cities is depicted in Exhibit 1.3. The three cities in the example have qualified on other grounds as prospective recipients for anti-robbery/anti-burglary program funds. The incidence rate per 100,000 and the average increase over the last five years for robbery, burglary and total crime index are ranked across Cities A, B and Chaos City with rank 1 indicating the highest (worst) and rank 3 indicating the lowest (best). This procedure yields nine indices (ranks) for each city, which are added to obtain the row labeled Rank Sum. The Rank Sums are then ranked from lowest to highest, with the result that Chaos City and City A have first priority for funds, and City B last priority. Note that population level is implicitly considered in the example by use of both crime incidence and the crime rate per 100,000 in constructing the indices.

Exhibit 1.3

RANKING METHOD — AN EXAMPLE

	Chaos City	City A	City B
Robbery Incidence	1	2	3
Robbery Rate per 100,000	1	3	2
Robbery Increase	3	2	1
Burglary Incidence	2	1	3
Burglary Rate per 100,000	2	1	3
Burglary Increase	2	3	1
All Other Index Crimes — Incidence	2	1	3
All Other Index Crimes — Rate per 100,000	1	2	3
All Other Index Crimes — Increase	3	2	1
Rank Sum	17	17	20
Overall Rank	1	2	3

*Assuming that $22,000,000 was available for these three communities, Chaos City and City A would receive first priority for these funds, while City B would be considered last.

It is important to understand that a case is not being made to use procedures such as the ones described as the only methods of deciding which city or cities should receive funds. Clearly, merits of the individual cities in question with regard to potential for designing and implementing an effective program and to capability for overcoming non-technical barriers (such as being able to recruit and hire the right kinds of personnel) might warrant equal consideration.

b. Establishment of Initiatives

An important activity of most planning agencies is to recommend projects, policies and programs which have a jurisdiction-wide impact based on identified problem areas for their community, region or state. These may be crime problems which appear to be exhibiting a sharp upturn in only their community or in virtually all areas of the state, or they may be system performance problems which are common throughout the state. In any case, planners may want to respond to this type of situation with a recommended initiative for the problem in question.

For example, not until some measure of the amount of preparation that correctional officers receive has been assessed, would it be desirable to consider funding a program for regional training centers for correctional personnel. At the same time, while each individual locality may be aware of the shortcomings of its staff in performing their jobs effectively, a planning agency may have the necessary mechanism for recognizing this as a statewide problem, for which regional training centers might be an appropriate response. Thus, it is important for a Planning Agency to take an active role in doing analysis than can unearth problems which would otherwise escape attention.

In another example, crime analysis might reveal that handgun use in the commission of crimes is on the rise and that there has been a sharp increase in the proportions of homicides that are being committed in the course of committing other felonies. Without entering into a discussion of what is "causing" this to happen, a finding that it is occurring statewide has important implications for how the situation might be addressed, such as through mandatory sentencing for use of handguns when committing a crime. This type of solution would be less likely if the problem has been perceived as a strictly local one.

c. Assessment of Competing Proposals

This application of analysis is likely to vary from jurisdiction to jurisdiction depending, somewhat more heavily than the previous two, on the nature of a jurisdiction's planning process. Yet most planning agencies have undoubtedly been in the position of having to make difficult recommendations or decisions among competing grant program or project proposals at different junctures in the planning process. Even in the case where an agency might not do much primary analysis of crime and criminal justice system problems, it nevertheless often finds itself in a position of having

to judge such analyses performed by others in support of proposed activities. Thus planners and analysts, must be able to understand, interpret and critically review analyses provided in support of proposed activities requiring funds.

d. Allocation of Resources Among System Components

The criminal justice system--at any level of government--is generally perceived as consisting of three major components: police, courts, and corrections. Other elements of the system might include juvenile agencies, community service organizations, and the community itself. How funds are allocated among these functional areas has often been the source of criticism and controversy. It is not necessary to enter into this argument directly to recognize that the analysis of the management and adequacy of system resources represents one step toward the resolution of this issue.

Together with the analysis of crime and the major social factors contributing to crime, the analysis of the adequacy and management of the resources of the criminal justice system can yield great insights into how the system affects crime. For example, rather than to speculate about whether lengthy arrest-to-disposition periods with the accused on bail lead to more crimes being committed by the accused it would seem far more productive to draw a sample of defendants for different crimes, and to track their re-involvement with the system while awaiting trial in order to estimate the magnitude of the problem--or to determine whether it is a problem at all. Similar examples could be constructed for probation and parole and for cases in which arrests are made but cases not prosecuted. Would a greater level of resources make it possible for the system to exercise a greater level of influence over crime than it currently does? If resources do impact a specific problem, where can they be used most effectively in the system?

Analysis seems to be weakest in this type of application to a criminal justice planning agency function, probably because the problem being analyszed is the most complex and is relatively new in its formulation for the criminal justice system as a whole. With its overview perspective of the state, region or local community criminal justice planning agencies are in an excellent position to strengthen the understanding of how resources are best allocated among the functional components of the criminal justice system by using this type of analysis.

Based on the four analytic applications just described -- (1) to allocate resources geographically, (2) to establish areawide initiatives, (3) to assess competing proposals and (4) to allocate resources among system components--it would appear reasonable to conclude that an analytical capability is essential, even for state agencies which frequently delegate planning responsibilities to substate units of government or to individual communities. At a minimum, planners need to understand, interpret and critique the analysis products of others. Moreover a planning agency must inevitably make difficult decisions about how limited funds are to be distributed along each of several dimensions. A strong analytical capability is essential as a base from which these agency functions can be performed in a rational and methodologically sound manner.

2. General Planning Process Model and Analysis

Most planning cycles begin with some notion of the major crime problems facing a locality. These are derived from line agency concerns, prior experience in analyzing crime data, public opinion about crime, and relevant research and evaluation findings (see Exhibit 1.1). The problem formulation step in the planning process refines these problem statements and frames them in as precise and specific language as possible. This typically requires some degree of quantification. Data analysis is a key component of this step. It should be emphasized that the "crime problem" includes statements about the ability of the criminal justice system in a particular locality to deal with crime as well as statements about crime levels and rates. Therefore, the scope of the problem definition steps of the planning model (steps 1 through 5 in Exhibit 1.1) ranges over both crime and the criminal justice system as they relate to a given jurisdiction(s).

The formulation of goals and objectives for dealing with the problems identified are established for those problems or parts of problems which analysis suggests can be addressed with some expectation of success. Also emerging from this step are strategy alternatives--phased over time--which in turn lead to program and project design.

In establishing budgeting and programmatic priorities, decision-makers take into account the recommendations of the technical staff. These priorities relate to problem statements, to goals, and to specific actions suggested by analysis. For local planners, the decision-making body is generally the supervisory board. At the one extreme, a supervisory board may take an active role in the planning process, paying little attention to the results of analysis performed by technical staff utilizing other information, personal values and political factors in making decisions about priorities. At the other extreme, a supervisory board may serve a pro forma function, relying heavily or exclusively on staff recommendations for setting priorities.

Once priorities have been set, further analysis is required to develop performance objectives. Expected costs and outcomes associated with proposed projects or programs have to be estimated. These forecasts may be used as benchmarks for subsequent evaluation activities and enable planners to identify with some accuracy why programs and projects succeed (attain their objectives) or fail.

In the general planning model, steps 8 and 9 result in the design of programs and projects that are responsive to identified problems and consistent with strategies that resulted from analysis performed in earlier stages. Program or project components--such as personnel, equipment, materials, facilities, etc.--need to be budgeted within resource constraints. Policies and procedures as well as coordination with other programs or with criminal justice agencies have to be established. Finally, based on program design and expected outcomes, a plan for monitoring and evaluating the program or project should be formulated.

The action component in the planning process is the implementation of programs or projects (step 10). While implementation is straightforward in theory, it is well-recognized that in practice, minor--and sometimes major--alterations may occur in the original program design. There are many reasons necessitating modification, but the most important for present purposes is that of the analysis of data relating to processes and preliminary program or project outcomes. Further analysis may be required to adjust monitoring and evaluation plans.

Step 11 in the model planning process is program or project evaluation. This is equivalent to the implementation of monitoring and evaluation plans, which determine whether there was adherence to design considerations and whether outcomes occurred as expected. By examining both performance (or processes) and outcomes of the program or project, insight can be gained as to why anticipated outcomes were or were not achieved. This insight--to a large extent derived from the analysis of data produced in the course of monitoring and evaluation--serves as input to the Problem Identification step which reinitiates the planning cycle.

This course focuses on analysis which occurs prior to the design of programs or projects. Nevertheless, the basic tools and skills of analysis covered by the course are utilized in implementation and evaluation activities. Analyses play a role in virtually every step of the general planning model described.

Viewed in this context analysis activities are seen to contribute in two major ways to the planning process: 1) identifying and formulating problem statements and 2) developing strategies for dealing with those problems. Implicit in the formulation of strategies are forecasts of accomplishment, i.e. indications of why--based on the analysis of data--a strategy can reasonably be expected to work and its resource implications.

EXERCISE #1

The Relationship of Analysis to Planning

Purpose

The purpose of this exercise is to initiate the process of peer learning and, secondly, to begin to establish a common set of terms and definitions concerning planning and analytic techniques. This exercise is designed to stimulate discussion of the planning process, present the relationship between analysis and planning, and specify the products of analysis as an outcome of this course. As will be shown in other exercises during the course, this link between analysis and planning is a critical one. The first activity in this workshop, therefore, involves trainees in trying to develop a consensus concerning the nature of the planning process. The discussion then moves to the second activity to define the role analysis should play, and actually does play, in planning.

This first exercise provides an opportunity to share, early in the program, concerns about the real world limitations of analysis. These limitations are often expressed in terms of not being able to implement programs, or to make changes, or to "get the ear" of the decision-maker. Hopefully, this course will show that analytic skills result in products which are relevant to decision-makers and which can have an impact on decision-making and planning.

Activities

To begin, the issues of the planning process are opened for discussion by the entire group. Participants are asked to note the major ways in which the planning process established in their own jurisdictions--both in practice and in theory--differ from the planning model presented in Exhibit 1.1. Participants should be divided into five groups to discuss the following issues:

a. What are the assumptions of the general planning model discussed in this module?

b. What are the points of divergence and the common elements between the model and your experiences in the planning process?

c. What does analysis mean?

d. Where does analysis occur in the planning process?

e. How does analysis influence the planning process?

f. What are other influences on the process?

g. What are the expected outcomes or products of analysis?

The activity will be conducted in small group settings. Participants are to consider these questions and come up with specific responses to each question which represent a consensus within the group. Once the small groups have finished their discussions and have put their presentations on a flip chart, each small group is to report back to the large group on the discussions that took place.

II. PROBLEM FORMULATION

A. Defining Problems

Criminal justice planning heavily emphasizes the development of clear and precise statements of crime or system problems before action is taken. The purpose of this section is to demonstrate how to state a meaningful problem correctly. The related issues of getting a good solution quickly with simple methods are considered in subsequent modules of this Text. However, throughout this program the emphasis is on the development of concise statements of problems rather than on problem solutions.

Problem formulation usually involves moving from a broad, general topic to a researchable set of questions related to the topic. This progressive movement involves both the definition of concepts and the narrowing of the topic to a manageable scope. Such a procedure must be consonant with: (1) issues and questions that are of importance to decision-makers; and (2) a reasonable likelihood of obtaining useful results.

It is clearly a difficult task to define the notion of problem formulation or analysis in concrete terms and in a manner with which all planners and analysts will agree. Instead, an operational or working definition of analysis is offered as a reference:

> Analysis involves a sequence of questions and answers--usually revolving around criminal justice data bases--ultimately leading toward decisions for the effective and efficient allocation of resources, through intermediate stages of problem definition and strategy formulation. Questions may be raised from the examination of data or from non-data sources, and answers to these questions are found in the examination of new data or reorganized versions of the same data.

This definition is illustrated in Exhibit 1.4.

The central function of problem definition and strategy formulation, contained in this operational definition of analysis, results in the products of analysis. The "problem definition" product consists of a problem statement and analytical statements explaining the nature of the problem statement. Exhibit 1.5 presents a problem statement example. The "strategies" product consists of one or more statements of how the problem statement is to be dealt with and analytical statements explaining how the strategy is justified.

B. Problem Statements: Four Hypothetical Examples

In the following hypothetical example, it is fairly evident that a detailed analysis of the robbery problem and the manner in which the (juvenile) justice system is handling the accused has been performed in the hypothetical community.

EXHIBIT 1.4
DETAILED SCHEMATIC OF THE ANALYSIS PROCESS

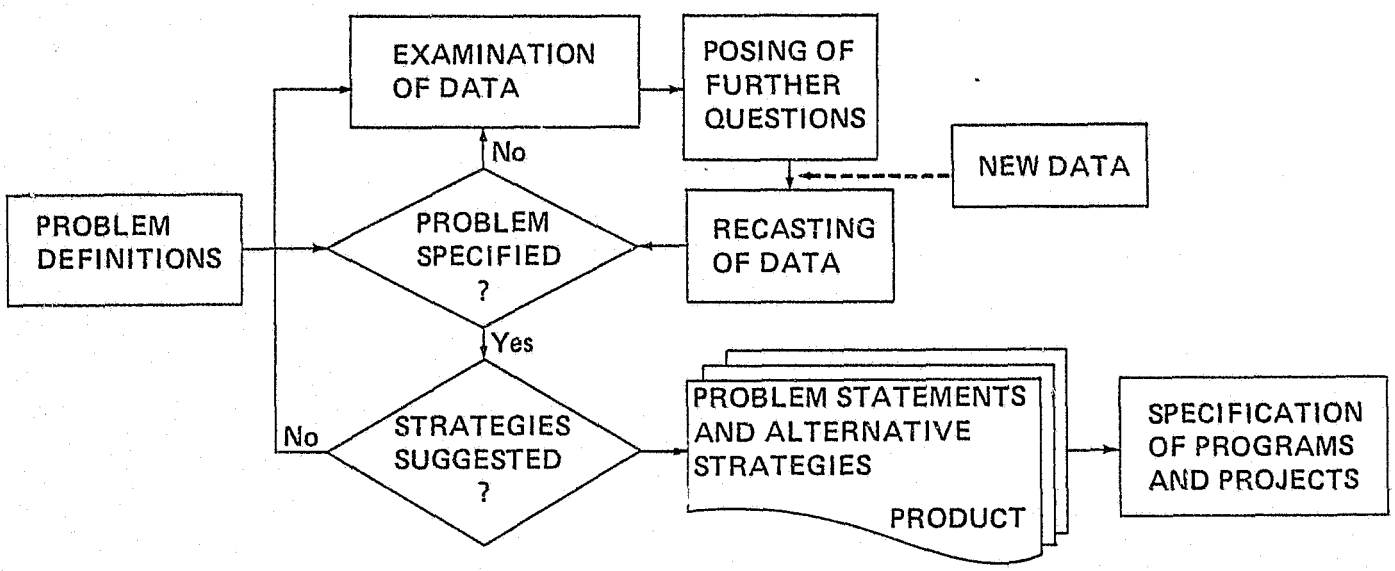


Exhibit 1.5

PROBLEM STATEMENT--AN EXAMPLE

Problem Description

Street crime--both assault and robbery--has increased rapidly in the past year in Chaos City. The personal injuries resulting from assaults have increased in frequency and severity. Reaction from citizen and business groups reflects citywide concern. Many of the apprehended offenders are narcotics addicts. The average age of persons arrested for these crimes was 20.5 years in 1976.

Estimated Extent of Problem

Street crime increased 68%, primarily in low-income core area of the city.

Robberies increased 100% from 2,000 to 4,000 per 100,000 population since 1972.

Assaults increased 124% from 1,700 to 3,800 per 100,000 population since 1972.

Number of disabling injuries increased 50% in 1974.

Problem Statement--One

Street robbery last year increased 23% in incidence, 20% in rate and 35% in seriousness over the previous year. Moreover, this was the fourth year in a row that these three indices rose. Since 1970, robbery has increased 107% in incidence, 121% in rate and 304% in seriousness. The dramatic increase in seriousness has been due to the increased severity of injuries to the victims.

From an examination of a representative sample of reported cases, it is found that the typical perpetrator is black, male and between the ages of 13 and 17 and the typical victim is black, female and over 50 years of age. Demographic projections of these two sub-populations suggest that the population of potential perpetrators will continue to increase relative to the rest of the population and, due to migration patterns of younger white families out of the city and economic and social barriers to similar migrations by older blacks, the population of potential victims will also continue to grow relative to the total population. Thus, we can expect that this type of crime will continue to increase in extent, and possibly severity, unless some positive countermeasures are taken.

By examining the characteristics of reported versus unreported incidents (the latter known from victimization surveys), it is found that unreported incidents are due to the victim's fears of retaliation by the accused. By examining the records of those arrested for street robbery it is found that, since most are juveniles, the accused are quickly released after arrest without meaningful supervision, and those convicted are rarely incarcerated. Thus, the accused are returned to the streets where they can and, it appears, do retaliate against the victims who reported them.

Strategies

Given the above definition of the problem, several alternatives are being considered to combat the situation:

- organization of unarmed civilian patrols to walk the neighborhood generally and be on call specifically to accompany elderly persons on errands or walks, especially on days that social security and welfare checks arrive;

- recommending that juvenile court judges increase the severity of sentences for convicted robbers with more than one prior arrest for robbery;

- recommending that the legislature expand and improve the juvenile detention facility and appropriate additional funds for more juvenile probation officers.

While other strategies have been considered, the three selected were judged the most promising on the basis of estimates of cost and available resources and the feasibility of the criminal justice system to adopt them.

The second example focuses on crime trends. Based on statistical data which are graphically displayed in Exhibit 1.6, the statements represent the result of the analysis process.

Problem Statement--Two

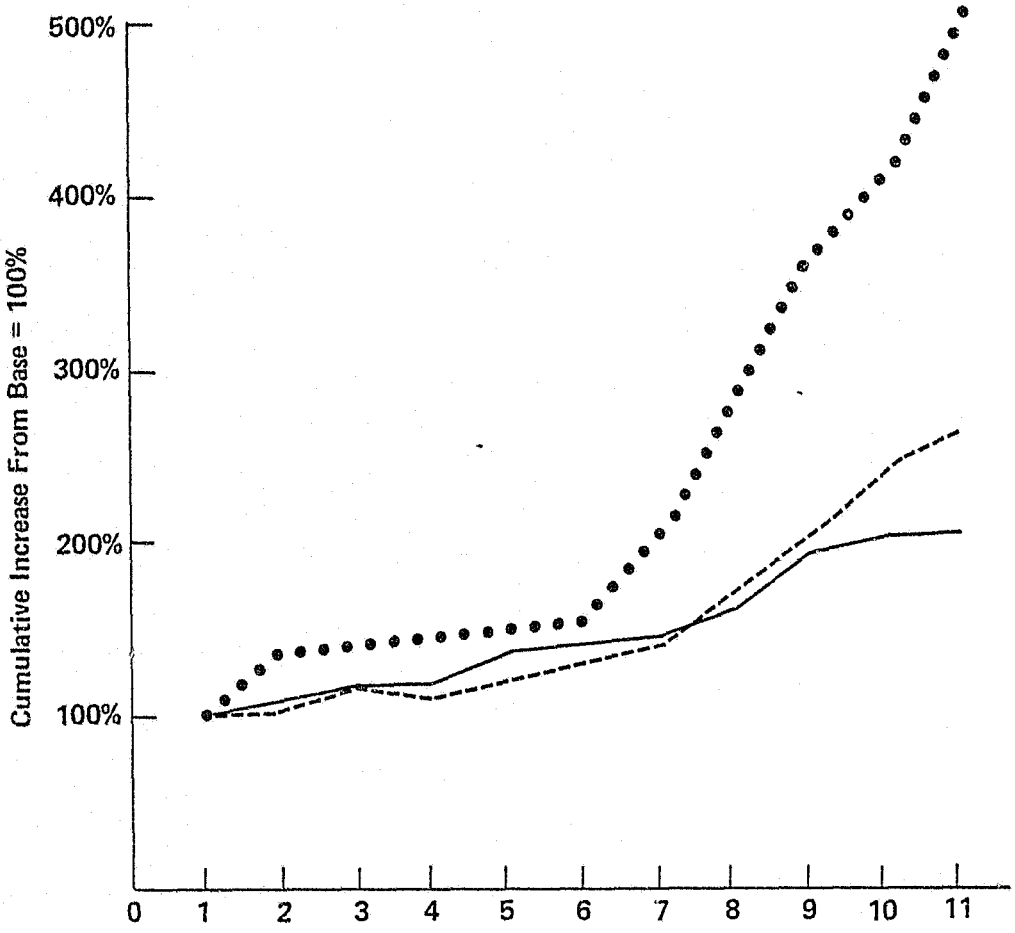
Historically, aggravated assault and homicide rates in this area have been relatively low, and these crimes have not been considered serious problems. By contrast, the rate of robbery has always been quite high; most observers have consistently identified robbery as the jurisidction's most serious crime problem. Analysis of recent trend data, however, indicates that the city's assault rate has shown dramatic increases over the last several years. These increases substantially out-distance the proportional increase in robberies and indicate that unless preventive action is taken assaults may become a significant problem. The significance of this trend is exacerbated by recent signs that the homicide rate is now responding to the increase in assaults. Fortunately, the assault increase has, according to police statistics, come primarily in assaults which invole knives and blunt instruments. Since these are less often fatal than firearm assaults, the homicide rate has not yet risen as rapidly as the assault rate. Should firearm assaults resume their traditional proportional role, however, the city is likely to suffer a very substantial increase in homicides.

The third example contains an analysis of the manner by which a district court disposed of cases of homicide, rape, robbery, and aggravated assault.

Problem Statement--Three

A six-month sample of homicide, rape, robbery and aggravated assault offenses during 1974 was analyzed to determine how serious felony cases were disposed of at the District Court level. A total of 342 such offenses were included in the sample. Twelve percent of the cases were still pending and 10% were deferred prosecution or judgment cases. About half of the remaining cases (43%) of the total were plea bargained to a lesser felony or misdemeanor plea. In addition to this plea bargaining, one-fifth of all

EXHIBIT 1.6
PROPORTIONAL INCREASES IN ASSAULT, HOMICIDE AND ROBBERY IN CITY X,
YEAR 1 = 100%



Aggravated Assault • • • •
Homicide - - - - -
Robbery ———

Source: hypothetical data

cases (one-fourth when pending and deferred cases are excluded) were dismissed. The proportion of those convicted on the original charge varies from case to case. None of the 27 homicides, 4% of the assaults, and 5% of the burglaries resulted in a conviction on the original charge. On the other hand, 28% of the rape cases and 15% of robberies, had a conviction for the original most serious charge.

Strategy

The analysis leading to the problem statement indicates a significant degree of unevenness in the way these four types of cases are handled at the district court level. Believing that this suggests a lack of quality control over cases tried in district court, planners suggest a strategy for improving case screening procedures and developing standards or criteria for case screening. One expectation of this strategy is that repeat serious offenders will be identified in such a screening process, resulting in an opportunity to spend more time developing stronger cases against them.

This final example contains virtually no statistics but nevertheless exhibits statements resulting from the analysis process. Examples like this often arise as a result of citizen initiatives or public outcry.

Problem Statement--Four

Social agencies have always given too little attention--and too little understanding--to the victims of rape. The results have been both that many, perhaps most, rapes are never reported to law enforcement agencies and that victims, scared by the callousness of the system, are unwilling to testify in court, thereby minimizing the possibilities of convicting the offender. The state has determined that improved treatment of rape victims and increased emphasis on prosecuting and convicting rapists are important priorities and has decided to fund a series of pilot projects to achieve these objectives. Our city recently witnessed a series of grotesque and highly publicized rapes. Although the overall rate of reported rapes does not seem high for the city, these specific incidents have galvanized citizen interest and have led to the formation of a citizen-law enforcement task force; already this group has raised sufficient funds within the community to give it some stability and to allow it to formulate series of pilot proposals. We conclude that our city presents an excellent environment for testing innovative concepts about improving the treatment of rape victims and increasing the conviction rate in the prosecution of rape offenders.

EXERCISE #2

Problem Formulation

Purpose

The first order of business for the planner is to formulate a clear and precise statement of his/her jurisdiction's problem(s). The role of the planner as a problem "identifier" is a particularly important one if planners are to be initiators of change in addressing the criminal justice problems in their jurisdiction.

The origins of problem topics and how issues arise may, however, be independent of the perceived role of the planner. To a large degree, external forces may shape the planner's agenda. The origins of problems are frequently found where most planning cycles begin--with an uneasy feeling about the major problems in the jurisdiction. These may arise, for example, because of:

- Line agency concerns over system performance
- Public opinion about crime and fear of specific crimes
- Media coverage of certain problem areas

The purpose of this exercise are 1) to establish a list of problems which participants have recently been involved in, 2) to examine how these problems evolved in their jurisdictions, and 3) to consider which of the indentified problems are amenable to analysis.

Activities

The training session should break into small working groups. Each participant should list five questions/issues/problems which have frequently been the focus of their planning process. The group should then share individual lists and create a group list. Once the group list has been prepared, participants should explicitly identify the origins/sources of these problems. Exhibit 1.7 presents a hypothetical group report on the problem of street robbery.

The final activity for each group is to rank these problem statements in terms of how amenable to analysis each of the problems is. Groups should be prepared to justify their subjective ranking of problems.

Exhibit 1.7

GROUP REPORT FORMAT

Problem: The large and continuing increase in street robbery

Origins

- Newspaper campaign emphasizing the injured elderly victims of street robbery.
- A letter from the mayor to the Chief of Police requesting actions be taken to deal with this problem.
- A university research report documenting the extent of the problem.
- A survey of two high crime neighborhoods identifying street robbery as the most important issue.

The activity will be conducted in small group settings. Each group is to prepare a consensus list of problems, the origins of these problems in its jurisdiction, and a ranking of each problem in terms of its amenability to analysis. Once reconvened, the groups are to report, and a master list of problem areas, origins, and analysis issues is to be prepared by the insturctor. This list will be referred to throughout the remainder of the course.

MODULE 1--END NOTES

(1) Jay W. Forrester, Urban Dynamics (Cambridge: The MIT Press, 1969).

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N O T E S

U.S. Department of Justice
Law Enforcement Assistance Administration
Washington, D.C.
1977

INTRODUCTION TO ANALYSIS OF CRIME AND THE CRIMINAL JUSTICE SYSTEM

MODULE 2: DATA COLLECTION

This work was performed by Abt Associates Inc., Cambridge, Massachusetts, for the Law Enforcement Assistance Administration under Contract No. J-LEAA-001-77. John Moxley, Training Division, Office of Operations Support, LEAA, served as project monitor. Points of view or opinions stated in this document do not necessarily represent the official position or policies of the U.S. Department of Justice.

MODULE ABSTRACT

Title: Module 2: Data Collection

Lecturer:

Objectives:

The purposes of this module are to provide 1) a working knowledge and understanding of the range and types of data needed for criminal justice analysis, and 2) a procedure to be used in identifying and selecting appropriate data given a specific problem area.

After completing this module trainees should be able to:

- Identify and define six types of secondary data;
- Cite at least two local applications of each type of secondary data;
- Specify the major problems or limits of each secondary data type;
- Distinguish between secondary and primary data;
- Identify the principal sources of each secondary data type;
- Describe the major uses of locally conducted surveys;
- Identify the uses of National Crime Panel data for local and state planning;
- Identify and explain four types of random samples;
- Describe two types of survey instruments, their major uses and limitations;
- Identify the major obstacles to the development of computerized criminal justice information systems; and
- Identify and describe at least four national information systems used in criminal justice planning.

MODULE 2

Data Collection

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MODLUE 2: DATA COLLECTION

I. INTRODUCTION

This module covers data available to planners for criminal justice analysis. It is designed to help planners develop a working knowledge and understanding of the range and type of data needed for criminal justice analysis and an awareness of how to obtain and collect such data. Achievement of these objectives is essential for the fulfillment of one of the major course themes: analysis as a process. Data collection is the second step in the analysis process as shown in Exhibit 2.1 and an integral part of an analysis plan (see Exhibit 3, Introduction). This module should help the planner to understand the strengths and weaknesses of the major data sources and to select the appropriate data sources for specific criminal justice analysis problems.

The first half of the module deals with secondary data since these data are more likely to be used, at least initially, by the planner. Primary data are discussed in the second half.

A wealth of data is available in the criminal justice field. The major problem facing the planner is how to select appropriate data from existing sources and identify what new data is needed. A useful way of organizing the mass of data available to criminal justice planners is to think of data needs in six major categories:

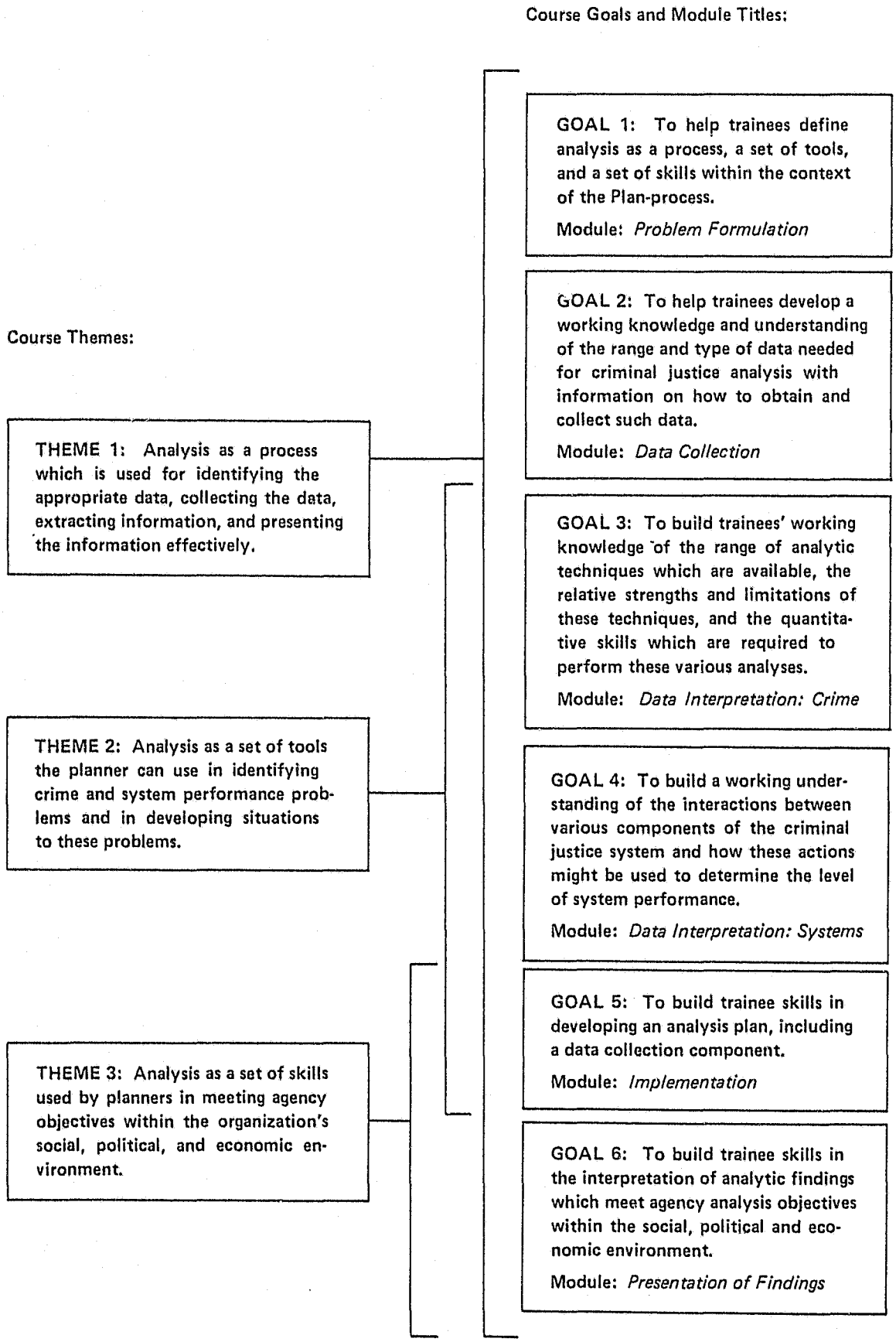
1. Actual Crimes
2. Public Opinion
3. Reported Crimes
4. Demographic Statistics
5. System Data
6. Juvenile Data.

Actual crime data, the first category provides data to answer one of the questions most often asked, "How much crime is there in this community (or state)?" Such data are usually found in Victimization Surveys which ask citizens about recent situations in which they have been victims, although data on some crimes such as homicides (which occur too rarely to be effectively picked up by surveys) must come from official data sources such as the Uniform Crime Reports (UCR).

Public Opinion data are useful in answering questions such as, "What crimes concern residents and businesses most? How well do citizens feel the system is working?"

Data on reported crime data are different from data on actual crimes. Comparisons of data on actual crimes committed and reported crime have shown that many crimes are not reported and that data on reported crime underrepresent the actual amount of crime. Therefore, it is important to distinguish between actual and reported crime.

EXHIBIT 2.1
COURSE GOALS AND THEMES IN RELATION TO MODULE 2



Demographic data help answer the question, "How many people or businesses of various types are victims of crimes and what are the characteristics of these victims?" Use of demographic data permits calculation of crime rates and makes analysis of the correlates of crime possible.

Data on the criminal justice system are needed to answer questions such as, "How does the criminal justice system deal with reported crime?" or "Are system facilities and resources adequate to deal with the current level of offenses?"

Juvenile data are found in all the other data categories, but are treated in this module as a separate category because of laws requiring special handling of such data to ensure confidentiality. In addition, the juvenile justice system is normally separated from adult facilities.

Data from each category can also be used in many different types of combinations to answer a broad range of general and specific questions. When combining different data sources, it is important to ask if the data sources are compatible. For example, do the data cover the same time period? Are the discrepancies between data sources so great as to make any findings extremely questionalbe? The problem of compatibility is always troublesome when using different data sources and particularly in a field such as criminal justice where many different data bases are available.

When reviewing data sources, the distinction between secondary and primary data is important. Secondary data are data which are currently available in easily usable form. For example, published U.S. Census reports containing population data are secondary data. So is a report on an existing victimization survey for a locality, or an annual police department report summarizing crimes committed by category during the past year. Primary data are data which are not currently available in usable form. These data may be obtained through surveys or interviews or by developing a new data base from basic material such as administrative records.

Specific sources of secondary and primary data as well as uses for these sources are discussed in this module. A brief description has been included in the text for some of the major secondary data categories. The descriptions contain information on the major types of data available within a category, and where the data can be obtained.

Sometimes several sources of data will be available which could be used to answer the same question. In such cases, selection of the most appropriate data can be simplified by asking a series of questions including:

- How well will this data permit the question to be answered?
- Are the data reliable?
- Can they be obtained in time?

- What is the most inexpensive data source which will allow the questions posed to be answered adequately?
- How many data are required to clarify a problem?

After the planner has identified the major categories of data needed to answer the questions posed, has identified the secondary data available, has selected the best data source when several alternatives exist, and has identified the primary data needed, the planner is ready to prepare a preliminary data collection plan. The exercises in this module will give the planner some practice in developing such a plan. A final data collection plan can be prepared after analysis techniques have been selected, ensuring that the data chosen are compatible with the analysis methodology. This task will be discussed in greater detail in Module V which covers the preparation of analysis and data collection plans.

II. SECONDARY DATA

A. Actual Crime Data

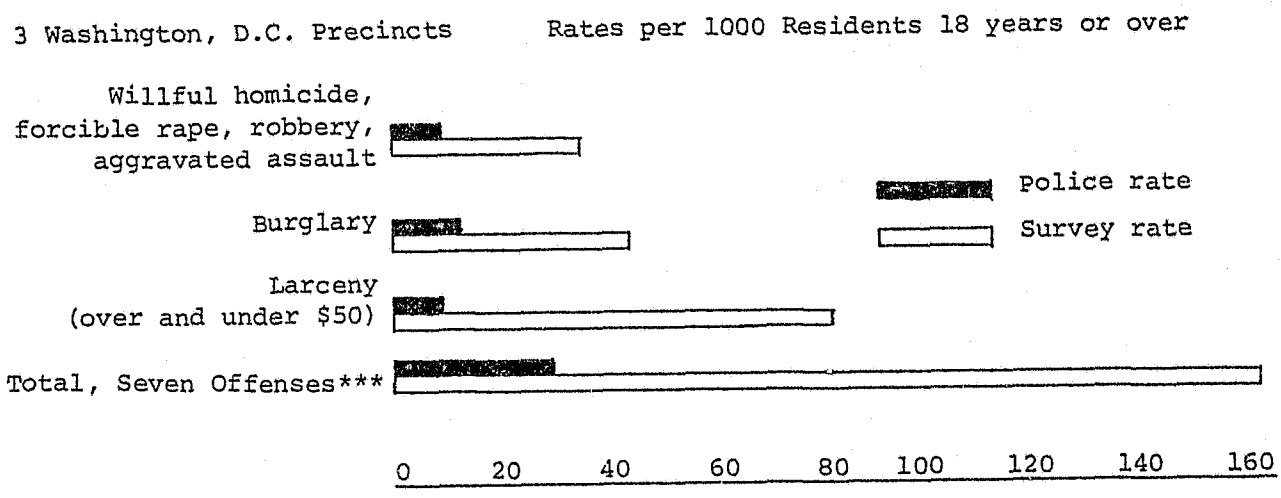
The first major data category to be discussed in this module relates to actual crime in the jurisdiction(s) under study. These data are available through victimization surveys and, for a few types of crime not adequately covered by surveys, through records on reported crimes.

How does victimization data on crime differ from data on reported crime? The 1966 Presidential Commission on Law Enforcement and the Administration of Justice surveys showed that the actual incidents of crime are much more numerous than those reported. Exhibit 2.2 indicates that extent of the differences. Victimization surveys provide data on correlates of crimes as well as simply the "what" and "when." Additional information in existing victimization surveys includes:

- characteristics of victims failing to report crimes to police;
- risk of victimization related to demographic characteristics of victims such as race, sex, age, occupation, geographic location, and income;
- consequences of victimization--injury, medical costs, financial losses due to property loss, extent of property recovery, days lost from work; and
- characteristics of offenders such as age, sex, and race, number of offenders involved in the victimization, and the offender's relationship to the victim.

Exhibit 2.2

Estimated Rates of Offense*
Comparison of Police** and BSSR Survey Data



* Incidents involving more than one victim adjusted to count as only one offense. A victimization rate would count the incidence for each individual.

** Police statistics adjusted to eliminate nonresidents and commerical victims and victims under 18 years of age.

*** Willful homicide, forcible rape, robbery, aggravated assault, burglary, larceny (over and under $50), and motor vehicle theft.

Source: President's Commission on Law Enforcement and Administration of Justice The Challenge of Crime in a Free Society (wash., DC), February 1967, pg. 21.

The sources of secondary data on victimization are still quite limited since the concept is comparatively new and such surveys are relatively expensive. The first national victimization survey was conducted by the President's Commission on Crime and a summary is contained in their report. More recent surveys have been conducted in a number of cities through LEAA's National Crime Survey program. In addition, the U.S. Bureau of the Census in conjunction with LEAA has initiated a National Crime Panel in which a representative sample of Americans age 12 and over have been surveyed every six months since 1972. This sample includes 60,000 households and 15,000 businesses. Finally, some localities have undertaken their own victimization surveys. More detailed information on existing victimization data is contained in the bibliography.

The limitations of actual crime data from victimization surveys include:

- forgetting
- sampling errors
- small area limitations
- no data on certain rare crimes.

One major limitation of victimization data is that victims are asked to recall information. In some cases, people can't recall precisely. One source indicating the possible extent of such non-recall is a study conducted in San Jose, California where reverse record checks were conducted. In reverse record checks, persons who have reported crimes to the police are selected from police files and then are interviewed--without being told they have been selected--to determine whether they mention that they were a victim of the crime identified from the police files. In San Jose over a 12 month period, of the incidents forgotten or for which no data were given by the respondent, 32% were in the first quarter of the year, 24% in the second, 27% in the third, and 17% in the last quarter. Therefore, even victimization data underrepresents the actual amount of crime because of non-recall. (1)

The other three limitations are related to the survey procedure. Sampling errors occur and their magnitude can be calculated. Because only a sample is taken, usually the number of respondents is too small to permit small-area (e.g., neighborhood level) analysis. Finally, crimes which occur rarely such as homicide and arson are not picked up accurately through sample surveys, and official reports must be used for this type of data.

Actual crime data can be used for a wide variety of purposes, including an answer to the common question, "How much crime exists in this jurisdiction?" Other uses may include:

- actual crime rates give a true picture of the magnitude and correlates of the crime problem with subsequent implications for changes needed in the criminal justice system to control or reduce crime;

- place and time of occurrence can suggest police operations strategies. For example, some geographic areas (e.g., downtowns) may have substantially more nighttime crime and need additional police protection or street lighting.
- reasons for not reporting can suggest special efforts to get victims to report, and can suggest areas in which increased system response may be necessary;
- the cost of crime can be more accurately calculated, permitting more accurate studies to be made of the true benefits and costs of existing or proposed programs and system components;
- victimization survey data can suggest additional elements of offenses that should be recorded in police offense reports; and
- victimization survey data can provide an important perspective on changes in rates of crime over time.

B. Public Opinion Data

The second major data category relates to the area of public opinion or attitudes. Secondary sources containing this type of data are usually victimization surveys or public opinion polls which may include data on:

- the importance of crime relative to other problems;
- fear of crime and actions people take to protect themselves;
- ratings of criminal justice services; and
- possible solutions to crime problems.

Existing sources of public opinion data include:

- surveys from the major companies which specialize in public opinion polling;
- local studies financed through the Community Development Block Grant funds from the U.S. Department of Housing and Urban Development, or by other agencies;
- local newspapers which may run surveys as part of an article or series;
- victimization surveys which often contain questions on public opinion;
- local business associations for business-related crime; and
- annual nationwide social surveys from university research centers such as the National Opinion Research Center (University of Chicago) and the Institute for Social Research (University of Michigan).

Public opinion data can be particularly useful if current. Since existing opinion data may not be sufficiently current or contain the appropriate information, how to conduct a public opinion poll is discussed in brief, later in this text.

Some examples of secondary data based on public opinion polls at the national level are included in Exhibits 2.3 to 2.8. A recent example is a national survey conducted in 1973 by the well-known firm of Louis Harris and Associates (shown in Exhibit 2.3). Citizens were asked which two or three should be attacked first. Reducing crime and curbing drug abuse were considered very important, and problems which citizens thought should be attacked early.

In contrast, a sample of local and state officials were asked which two or three problems were the most serious ones facing local or state government. Crime was seventh on their list and drug abuse was twenty-fourth on a list of thirty (see Exhibit 2.4).

Data on such official priorities, when compared with citizen concerns, could be used to revise official priorities so government can be more responsive. Such data on official and citizen concerns could also be used by state and regional planning agencies in conjunction with crime data to determine which areas have the worst actual and which have the worst perceived crime problems. For areas with a severe perceived problem but relatively low crime rates the development of greater public education efforts might be undertaken. Conversely, areas with a relatively low level of perceived crime but higher actual rates might be assisted in the development of programs to reduce crime.

Polls can provide information about the level of fear for various crimes. For example, a survey in 1975 asked people how safe they felt in their neighborhoods during the day and during the night. When the results were tabulated by sex and race, people felt much more fearful at night, and during both the day and night, women and non-whites felt more fearful (see Exhibit 2.5).

Exhibit 2.3

Importance of National Problems, Which Should be Attacked First, and Role of Federal Government in Solving

	Very Important	Two or Three Attacked First	Federal Government Should Take Major Role in Solving (Base: Find problem "very" or "somewhat important")
	%	%	%
Checking inflation	89	57	92
Keeping taxes in line	81	22	91
Reducing crime	80	30	76
Curbing drug abuse	79	39	79
Keeping spending in line	78	12	89
Helping older people	69	12	77
Improving public education	63	22	59
Providing better health care for everyone	63	12	76
Cutting down air and water pollution	62	18	74
Reducing unemployment	59	14	68
More help for poverty stricken people	55	3	70
Improving the welfare system	53	12	70
Easing racial tensions	44	5	55
Providing housing assistance for low income families	44	4	63
Preventing racial discrimination in housing	39	2	58
Improving public transportation	38	6	52
Taking steps to achieve racial balance in housing	27	1	59
Providing housing assistance for moderate income families	21	2	50

Source: Lou Harris and Assoc., Inc., "A Study of Public Attitudes Toward Federal Government Assistance for Housing for Low Income and Moderate Income Families", in Housing in the Seventies, National Housing Policy Review-HUD (Wash., D.C.), 1976, pg. 1448

Exhibit 2.4

Two or Three Most Serious Problems Facing Local/State Government

	Total Local/ State %	Total Local %	Central Cities %	Outside Central Cities %	Counties %	Total State %
Housing	30	29	45	21	25	33
Financial problems; need more money to operate	22	23	30	21	17	21
Taxes	19	13	15	13	10	32
Environmental control, pollution, population growth	18	14	8	11	31	26
Transportation, mass transit	14	15	14	11	25	14
Planning for zoning, land development	14	13	4	19	12	16
Drainage, sewage	14	19	3	27	21	5
Crime	13	15	32	6	13	8
Unemployment	13	11	24	5	10	15
Education, schools	11	4	9	1	4	26
Highways, road	9	10	3	16	6	6
Develop, finance new housing	9	9	15	8	2	9
Help elderly	9	9	3	11	13	10
Election reform government restructure	8	4	5	2	8	15
Increased social services	7	7	11	4	8	9
Traffic congestion	6	9	1	18	--	--
Commercial, business redevelopment	6	7	5	11	--	4
Upgrade, maintain present housing	5	6	5	8	2	3
Abandoned, substandard, dilapidated housing	5	6	5	5	8	4
Inflation	5	1	1	1	--	14
Plan for, control rapid growth	5	6	--	8	10	3
More police, firemen	5	6	8	8	--	2
Recreational facilities, parks	5	6	7	8	2	3
Health care	4	2	5	--	4	3
Drug abuse	3	4	9	2	--	2
Racial issues	2	2	7	1	--	1
Youth Problem	2	3	--	5	2	--
Welfare	2	2	--	3	2	3
Need statewide building code	1	*	--	1	--	1
Any other problems	14	12	5	15	17	18
No problems	1	1	--	2	2	--

*Less than 0.5 percent

Source: Louis Harris and Associates, Inc., "A Survey of the Attitudes and Experience of State and Local Government Officials with Federal Housing Programs" in Housing in the Seventies, National Housing Policy Review (Wash., D.C.), 1976, pg. 1334.

Exhibit 2.5

Public Opinion Data on Personal Safety

PERCEIVED PERSONAL SAFETY IN OWN NEIGHBORHOOD DURING DAY, BY DEMOGRAPHIC CHARACTERISTICS, 13 SELECTED AMERICAN CITIES, 1975

Question: "How safe do you feel or would you feel about being out alone in your neighborhood during the day?"

	(In Percent)					Number of Respondents
	Very Safe	Reason-ably Safe	Somewhat Unsafe	Very Unsafe	No Answer	
Thirteen City Total	44	44	8	3	0	15,386,699
Sex:						
Male	56	38	5	2	0	6,882,142
Female	35	49	11	4	0	8,504,193
Race:						
White	50	41	7	2	0	10,872,109
Black and Other	31	52	12	5	1	4,514,226

Perceived Personal Safety in own Neighborhood at Night, by Demographic Characteristics, 13 Selected American Cities, 1975

Question: "How safe do you feel or would you feel being out alone in your neighborhood at night?"

	(In Percent)					Number of Respondents
	Very Safe	Reason-ably Safe	Somewhat Unsafe	Very Unsafe	No Answer	
Thirteen City Total	13	40	24	22	1	15,386,699
Sex:						
Male	21	49	19	10	0	6,882,142
Female	7	32	29	32	1	8,504,193
Race:						
White	15	41	24	20	1	10,872,109
Black and Other	9	36	26	29	1	4,514,226

Source: Sourcebook, 1976, U.S. Department of Justice, Washington, D.C., p. 304. Table constructed by Sourcebook staff from National Crime Panel data made available by the National Criminal Justice Information and Statistics Service of the Law Enforcement Assistance Administration.

Information on the quality of criminal justice services may also be available through public opinion polls. The same 1975 study cited above asked respondents how they would rate local police. While gender made little difference, whites rated the job police were doing considerably higher than non-whites (see Exhibit 2.6).

Exhibit 2.6

RATINGS OF LOCAL POLICE, BY DEMOGRAPHIC CHARACTERISTICS, 13 SELECTED AMERICAN CITIES, 1975

Question: "Would you say, in general, that your local police are doing a good job, an average job, or a poor job?"

	(In Percent)					
	Good	Average	Poor	Don't Know	No Answer	Number of Respondents
Thirteen City Total	40	41	12	7	0	15,386,699
Sex:						
White	40	41	13	5	0	6,832,142
Female	40	40	11	8	0	8,504,193
Race:						
White	47	37	9	7	0	10,872,109
Black and Other	24	50	19	7	0	4,514,226

Source: Sourcebook, 1976, U.S. Department of Justice, Washington, D.C., p. 322. Table constructed by sourcebook staff from National Crime Panel data made available by the National Criminal Justice Information and Statistics Service of the Law Enforcement Assistance Administration.

Finally, solutions to problems can be suggested in polls. For example, a 1972 survey conducted by the American Institute of Public Opinion asked people what's behind the high crime rate in the United States. The results are shown in Exhibit 2.7. A second poll requested the public's view on specific alternatives. These results are displayed in Exhibit 2.8.

Exhibit 2.7

PERCEIVED CAUSES OF HIGH CRIME RATE, UNITED STATES, 1972

NOTE: The results are based on a sample survey conducted by the Gallup organization's American Institute of Public Opinion. The study was designed to be representative of American adults (21 and older) and includes results from approximately 3,278 interviewers.

Question: "What's behind the high crime rate in the United States?"

	Percent
Laws are too lenient/penalties not stiff enough	25
Drugs/drug addiction	21
Lack of supervision by parents	18
Not enough jobs/poverty	18
Too much permissiveness in society	10
Lack of proper law enforcement	8
Ill feelings between groups/races	7
Lack of responsibility among younger people/ disrespect for law	6
People have too much money/luxury	4
All other responses	23[a]
No opinion	10
Total[b]	140

[a]Includes: lack of religion; television and movies glamorize crime; overpopulation.

[b]Total adds to more than 100 percent since some persons gave more than one reason.

Source: Sourcebook, 1976, U.S. Department of Justice, Washington, D.C., 1977, p. 311.

When a related but somewhat different question was asked in 1975--What are the major contributors to violence in the country today--the results were somewhat different (see Exhibit 2.8).

Exhibit 2.8

BELIEF ABOUT MAJOR CONTRIBUTORS TO VIOLENCE IN THE COUNTRY TODAY, UNITED STATES, 1975

NOTE: The data below refer to the percent of respondents who view each entry as a major contributor to violence.

Question: "What are the major contributors to violence in the the country today?"

	Percent
Organized crime	75
Radical revolutionary groups	65
Urban guerilla groups	61
Black militant groups	61
Left-wing radical groups	54
Communists	54
Extreme right-wing militant groups	52
The easy availability of guns	49
Television crime shows	41
Press coverage of violent acts	36
Congress not passing strict gun control laws	35
Citizen vigilante groups who train people to handle guns	35
President not pushing hard for strict gun control laws	29
Television news	27
National Rifle Association	14
Hunters who hunt animals	9

Source: Sourcebook, 1976, U.S. Department of Justice, Washington, D.C., 1977, p. 311.

Data on relative importance of crime problems can be useful to criminal justice planning officials in assessing possible program changes and public education campaigns and in pointing out to public officials the high priority placed by many citizens on crime control and reduction actions of government.

Data on relative importance of crime problems can be useful to criminal justice planning officials in assessing possible program changes and public education campaigns and in pointing out to public officials the high priority placed by many citizens on crime control and reduction actions of government.

EXERCISE #3

ATTITUDINAL SURVEY DATA

Purpose

The Peoria Crime Reduction Council was established in 1975 in conjunction with two grants (from the Illinois Law Enforcement Commission and LEAA) to develop a plan to reduce a specific crime in Peoria and then to implement that plan.* The specific crime chosen was residential burglary. This crime was chosen because violent crime was already being studied, and the public was concerned about burglaries. A multi-faceted program was initiated, including a baseline and follow-up victimization survey including an attitudinal component.

This exercise is designed to familiarize course participants with the type of secondary attitudinal/public opinion data which might be available to local, regional and state planners from victimization and other surveys.

Activities

Examine the attached Peoria attitudinal survey. Tabulations of the responses are included on Exhibit 2.11. List the data results which you feel would be useful to present to the members of the Peoria Crime Reduction Council. Develop a community profile based on these data, and a statement concerning the residential burglary problem as reflected by the data. Participants are to assume that 1500 residents of Peoria responded to the attitudinal survey.

Source: The Exercise questionnaire and data were obtained with the cooperation of L. Audrey Moore, Director, Peoria Crime Reduction Council, Peoria, Illinois.

Abt Associates Inc.
55 Wheeler Street
Cambridge, Massachusetts 02138

Exhibit 2.9
Attitudinal Survey

Location: Peoria

Results

Day of Week	Month	Day	Time	Interviewer	Complete	Refusal	Business Number	Busy	No Answer	Respondent Not In	Other (Specify)

INTERVIEWER INSTRUCTIONS: IS THE LAST DIGIT OF THE PHONE NUMBER ODD OR EVEN?

Odd ☐ — RESPONDENT SHOULD BE MALE ADULT

Even ☐ — RESPONDENT SHOULD BE FEMALE ADULT

IF PERSON ANSWERING PHONE IS NOT OF THE APPROPRIATE SEX AND AGE, ASK:

"IS THERE A (MALE/FEMALE) ADULT IN THIS HOUSEHOLD?"

NO ☐ — PROCEED WITH INTERVIEW

YES ☐ — SAY: "WE NEED TO GET THE OPINIONS OF EQUAL NUMBERS OF MALES AND FEMALES. SO, I NEED TO TALK TO A (FEMALE/MALE) IN THIS HOUSEHOLD. CAN I SPEAK WITH (HER/HIM) NOW?

YES ☐ — PROCEED WITH INTERVIEW, RE-READ INTRODUCTION.

NO ☐ — RESCHEDULE INTERVIEW.

I'm going to begin by asking you a few questions about your neighborhood.

	GOOD	FAIR	POOR	DON'T KNOW
1. Do you think police protection in your neighborhood is good, fair, or poor?	51%	36%	9%	4%
2. What do you think about the speed with which the fire department comes to your neighborhood when called--is that good, fair or poor?	61%	11%	3%	26%

3. Compared to Peoria as a whole, do you think police protection in your neighborhood is much better, better, about the same, worse, or much worse than in other parts of town?

Much better than in other parts of town?	5%
Better than in other parts of town?	27%
About the same as in other parts of town?	51%
Worse than in other parts of town?	6%
Much worse than in other parts of town?	11%
Don't know	11%

4. In What ways could your local police improve? Any other ways? CHECK ALL THAT APPLY.

No improvement needed	8%
Hire more policemen	10%
Concentrate on more important duties, serious crime, etc.	5%
Be more promt, responsive, alert	9%
Improve training, raise qualifications or pay, recruitment policies	4%
Be more courteous, improve attitude, community relations	8%
Don't discriminate	1%
Need more traffic control	6%
Need more of a particular type of police service (such as patrol cars or foot patrol) in certain areas or at certain times	24%
Don't know	36%
Other (PLEASE SPECIFY _____	15%
_____	

5. I'll read you some things that are problems for some people in their neighborhoods. Please tell me if they are a big problem, somewhat of a problem or not a problem to you in your neighborhood.

	Big Problem	Somewhat of a Problem	Not a Problem	Don't Know
A. Crime in the neighborhood--is this a big problem, somewhat of a problem, or not a problem to you?	7%	20%	54%	1%
B. Abandoned houses or other empty buildings	3%	8%	89%	1%
C. Litter and trash in the streets--is this a big problem, somewhat of a problem, or not a problem to you in your neighborhood?	10%	21%	68%	0%

6. Within the past year or two, do you think crime in your neighborhood has increased, decreased, or remained about the same?

Increased	18%
Decreased	9%
Remained the same	65%
No opinion	2%
Haven't lived in the neighborhood long enough	6%

7. How safe do you feel or would you feel about being out alone in your neighborhood at night? Would you feel very safe, reasonably safe, somewhat unsafe, or very unsafe?

Very Safe	17%
Reasonably safe	48%
Somewhat unsafe	18%
Very unsafe	17%
Don't know	1%

8. How about during the day--how safe do you feel or would you feel about being out alone in your neighborhood? Would you feel very safe, reasonably safe, somewhat unsafe, or very unsafe?

Very safe	66%
Reasonably safe	29%
Somewhat unsafe	3%
Very unsafe	1%
Don't know	0%

9. I'd like you to rate your feelings about the police, judges and other such officials. Please look at your phone dial and imagine that the numbers 1 to 9 represent a range of feelings from "much too lenient"--that number "one" to "much too harsh"--that's number "nine."

A. How lenient or harsh are the local police with someone suspected of a crime? If one is "much too lenient" and nine is "much too harsh," what number would best represent your feelings about the police? (0=DON'T KNOW OR NO OPINION)

1.	11%	2.	3%	3.	8%	4.	13%	5.	36%
6.	7%	7.	67%	8.	2%	9.	29%	0.	0%

B. How about the local judges? How lenient or harsh are they towards offenders? Remember, one is "much too lenient" and nine is "much to harsh." (0=DON'T KNOW OR NO OPINION)

1.	24%	2.	11%	3.	14%	4.	10%	5.	17%
6.	4%	7.	4%	8.	1%	9.	2%	0.	

C. How about the Corrections System? This system includes things like prisons and parole boards. How harsh or lenient are they? (0=DON'T KNOW OR NO OPINION)

1.	22%	2.	12%	3.	15%	4.	10%	5.	16%
6.	4%	7.	4%	8.	2%	9.	2%	0.	14%

D. What number represents your feelings about the treatment people receive from the entire criminal justice system--that is, everything we just mentioned, taken together? (0=DON'T KNOW OR NO OPINION)

1.	14%	2.	6%	3.	14%	4.	17%	5.	24%
6.	7%	7.	4%	8.	1%	9.	2%	0.	9%

C. Reported Crime Data

We have already discussed data categories for actual crime and public opinion. The data which are most readily available, however, are data on reported crime, or "crime statistics" as these data are sometimes called. Crime statistics are the official records of reported offenses and arrests.

Reported crime data initially comes from reports at the local level. The secondary sources for reported crime data include:

- local police department reports;
- reports by Criminal Justice Planning Agencies or Statistical Analysis Centers; and
- national data collected by the FBI available in the Uniform Crime Statistics (UCR) reports.

1. Local Police Department Reports

Reports summarizing local data may be the richest source of data on reported offenses and arrests. Many localities have developed their own reporting system which records crimes of particular interest locally.

2. State/Regional Criminal Justice Planning Agency Data

The majority of states in the United States have one or more of the following state criminal justice-related agencies which collect statewide crime statistics: a state Criminal Justice Planning Agency, a Statistical Analysis Center, or a UCR data collection program. These agencies will have complete crime data on a statewide basis which can be used for comparative purposes by a locality.

UCR state programs provide particularly valuable functions including:

- Assistance in enacting laws requiring local UCR participation.
- Collecting more information than required by the national program.
- Production of annual and some semi-annual publications
- Honoring requests from localities better at the state level because of a more relevant data base and a faster return time.

3. National Uniform Crime Reports (UCR) Data

The only reasonably competitive and consistent national data on crime collected by the FBI is through the Uniform Crime Reports. This system was developed in 1930 under the auspices of the International Association of Chiefs of Police (IACP). The purpose of the UCR system was to develop data on a national basis for comparing the incidence of serious crimes--mainly those involving

physical violence. Prior to the development of the UCR system in 1930, no comprehensive system of crime information on a national scale existed. This was primarily due to the fact that the criminal statutes varied so greatly from state to state in the terminology used to define criminal behavior.

To overcome this problem, a set of definitions for specific criminal acts was devised, following a thorough examination of all the current state criminal statutes. To reduce the potential volume of reporting, only "serious" crimes were included. The crimes which met the FBI definition of "serious" include:

- Criminal Homicide: (a) Murder and nonnegligent manslaughter: All willful felonious homicides as distinguished from deaths caused by negligence. Excludes attempts to kill, assaults to kill, suicides, accidental deaths, or justifiable homicides. Justifiable homicides are limited to: 1) The killing of a person by a law enforcement officer in the line of duty; and 2) The killing of a person in the act of committing a felony by a private citizen. (b) Manslaughter by negligence: Any death which the police investigation established was primarily attributable to gross negligence of some individual other than the victim.
- Forcible Rape: The carnal knowledge of a female, forcibly and against her will in the categories of rape by force, assault to rape, and attempted rape. Excludes statutory offenses (no force used --victim under age of consent).
- Robbery: Stealing or taking anything of value from the care, custody, or control of a person by force or violence or by putting in fear, such as strong-arm robbery, stickups, armed robbery, assaults to rob, and attempts to rob.
- Aggravated Assault: Assault with intent to kill or for the purpose of inflicting severe bodily injury by shooting, cutting, stabbing, maiming, poisoning, scalding, or by the use of acids, explosives, or other means. Excludes simple assaults.
- Burglary--Breaking or Entering: Burglary, housebreaking, safe-cracking, or any other unlawful entry of a structure with the intent to commit a felony or a theft. Includes attempted forcible entry. The UCR definition does not include auto burglaries, burglary of moveables, or a wide variety of such incidents as included in some state statutes.

- Larceny--Theft (Except Motor Vehicle Theft): The unlawful taking, carrying, leading, or riding away of property from the possession or constructive possession of another. Thefts of bicycles, automobile accessories, shoplifting, pocket-picking, or any stealing of property or article which is not taken by force and violence or by fraud. Excludes embezzlement, "con" games, forgery, or worthless checks.
- Motor Vehicle Theft: Unlawful taking or stealing or attempted theft of a motor vehicle. A motor vehicle is a self-propelled vehicle that travels on the surface but not on rails. Specifically excluded from this category are motor boats, construction equipment, airplanes, and farming equipment.

The UCR data have certain limitations which the planner should know about. These include:

- incomplete reporting (not all jurisdictions participate in the reporting system, and not all participating jurisdictions supply all requested data).
- limited number of crimes reported.
- possible bias in individual locality data due to differing interpretations of reporting procedures, or changes in local data collection system.

4. Types of Data Available in Published Form

The major publications summarizing national UCR data are:

- a "quarterly report" giving trend information on the Crime Index offenses (comparison of percent change between current time period and same period of the prior year and a five-year trend).
- an annual report entitled Crime in the United States summarizing crime on a national basis by a number of different breakdowns.

Common uses for official data on reported crime include:

- comparison with victimization data to ascertain the extent to which nonreporting is a serious problem;
- trend analysis; and
- use in criminal justice system analysis to analyze workloads and offender flows through the system.

D. Demographic Data

The fourth major category of secondary data is demographic data. Demographic data refers to data on population statistics, especially with reference to size, density, distribution and vital statistics. Typical demographic measures used in crime analysis include age, sex, race, income, education, place of residence, or business location.

Demographic data are available from a wide variety of sources at the national, state, and local level. Generally, the most consistent source of data--the demographic data equivalent of the UCR statistics for crime--is the U.S. Census. However, Census data are limited because most are collected only every ten years and rapidly become inaccurate, particularly in areas experiencing rapid population change. On the state and local level, demographic data are available from a wide variety of public agencies. Such data are useful in answering specific questions (e.g., school vandalism rates per 1,000 school-aged children where the number of school-aged children is obtained from the local school system).

Demographic data are used for two major purposes in the analysis of crime: in the calculation of crime or population-at-risk rates, and to examine the correlates of crime. Crime rates are normally calculated by dividing the number of reported offenses occuring over a one-year period by the number of people living within the jurisdiction. Thus, if 500 burglaries are reported in a locality of 100,000 population, the commercial burglary rate is 0.5% of 500 per 100,000. Population-at-risk rates are a more refined measure which take into account the population most likely to be affected by a crime. For example, if the locality with 500 commercial robberies had 1,000 commercial enterprises in operation during that year, the population-at-risk rate would be 50% or 50,000 per 100,000.

An example of an analysis product based at least partly on secondary demographic data is contained in the National Advisory Commission on Criminal Justice Standards and Goals report issued in 1973, entitled A National Strategy to Reduce Crime. In the section on National Goals and Priorities, age is used as an analytic variable and the report states:

> Street crime is a young man's game. More than half the persons arrested for violent crime in 1971 were under 24 years of age... (3)

Data on prior involvement with the criminal justice system was used to support the statement that:

> there is strong evidence that the bulk of ordinary crime against person and property is committed by youths and adults who have had previous contact with the criminal justice or juvenile justice system.(4)

Other demographic data are then analyzed in conjunction with the location of crime with a conclusion that:

> there is abundant evidence that crime occurs with greater frequency when there is poverty, illiteracy, and unemployment, and where medical, recreational, and mental health resources are inadequate. When unemployment rates among youths in poverty areas of central cities are almost 40 percent and crime is prevalent, it is impossible not to draw conclusions about the relationship between jobs and crime.(5)

A quotation from the Commission's Report on Community Crime Prevention qualifies such demographic analysis by stating:

> This is not to say that if everyone were better educated or more fully employed the crime would be eliminated or even sharply reduced. What is meant is that unemployment, substandard education, and so on form a complex, and admittedly little understood, amalgam of social conditions that cements, or at least predisposes, many individuals to criminal activity. (Though one of these factors) may not have much effect on an individual's lifestyle, two or three might.(6)

These quotations illustrate the type of data used in demographic analyses and some general conclusions which might be drawn on the correlates of crime.

Demographic data can be very useful at the state or local level in examining the extent to which local conditions mirror or differ from these national correlates of crime. Such data are particularly useful when the interactions are examined so that a composite picture of the demographic characteristics of both offender and victim is developed. Such data then permit the planner to target programs toward the specific group for which they are needed or at least to inform the public of the limitations of the criminal justice system and the need for other types of programs.

E. System Data

Once the actual and reported crime rates and the correlates of crime are known, as well as public opinion about crime and the system, data on the system itself are needed. These system data allow the planner to assess how effectively the criminal justice system is presently controlling and/or reducing crime and what changes could be made to increase system effectiveness. Unfortunately, while an enormous amount of data are available about the system, the data are often fragmented and require substantial effort to organize coherently. In many cases, a new data collection system is needed to produce usable data. In fact, unless the system has been analyzed previously, useful secondary data are rare, and the collection of primary data is almost always necessary.

What is the criminal justice system? In the United States, the criminal justice system is composed of three separate organized parts--the police, the courts, and the corrections systems. A general definition of the Criminal Justice system needs:

> ... an apparatus society uses to enforce the standards of conduct necessary to protect individuals and the community. It operates by apprehending, prosecuting, convicting, and sentencing those members of the community who violate the basic rules of group existence. The action taken against lawbreakers is designed to serve three purposes beyond the immediate punitive one. It removes dangerous people from the community; it deters others from criminal behavior; and it gives society an opportunity to transform lawbreakers into law-abiding citizens. What most significantly distinguishes the system of one country from that of another is the extent and the form of the protections it offers individuals in the process of determining guilt and imposing punishment. Our system of justice deliberately sacrifices much in efficiency and even in effectiveness in order to preserve local autonomy and to protect the individual.(7)

Thus, while the word "system" is used, in actuality the criminal justice system in the United States is composed of relatively independent parts which can be viewed as a system but which do not function as a planned system.

A schematic version of the criminal justice system in the United States is presented in Exhibit 2.10. In evaluating this total system, data are needed from each component of the system for analysis of:

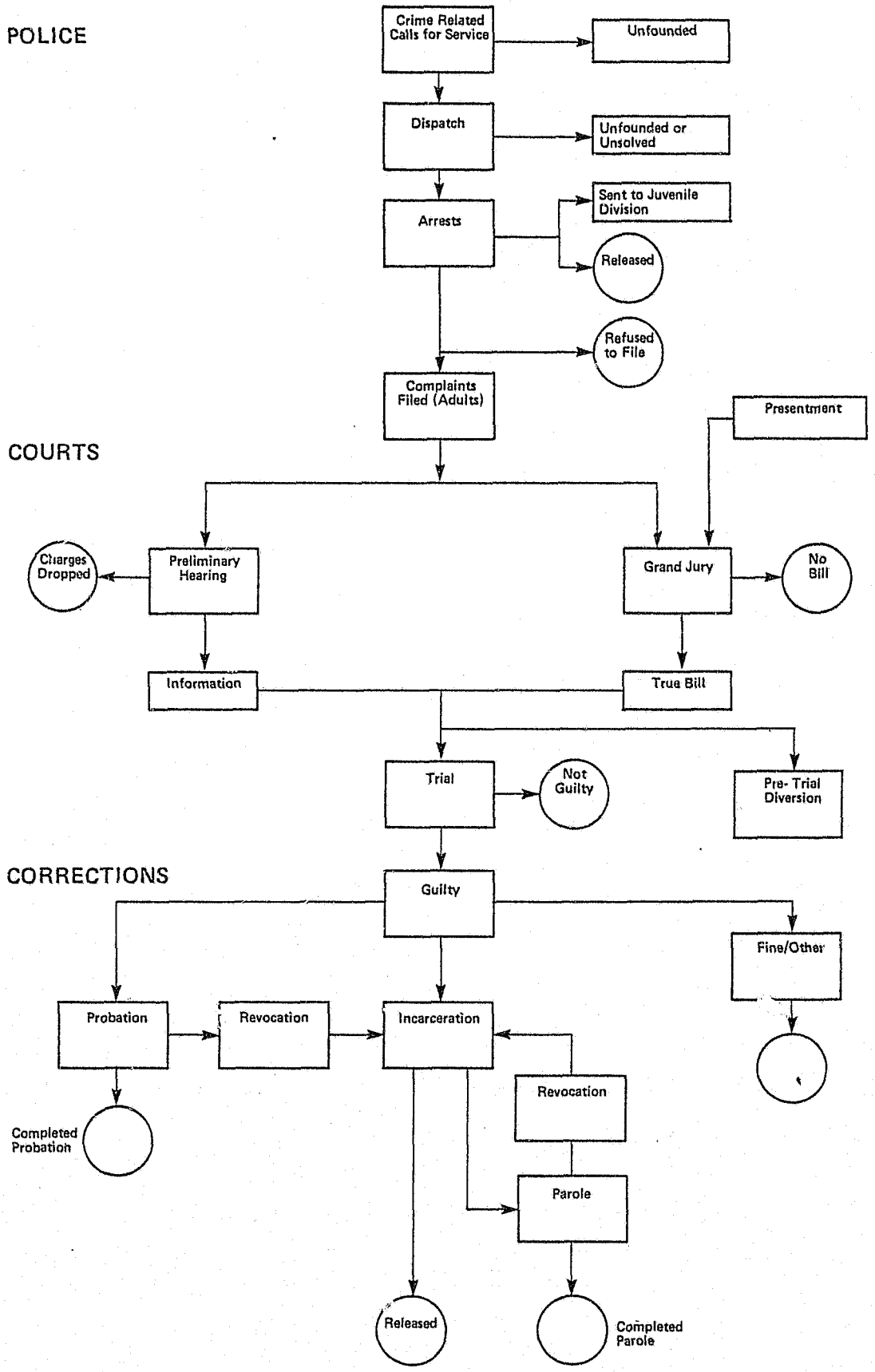
- system performance (offender tracking through Offender Based Transaction Statistics--OBTS)
- system capabilities (system tracking through management and administrative statistics--MAS).

1. Offender Based Transaction Statistics (OBTS)

System performance analysis depends on an overview of the entire system. The system can be said to be effective when it brings the guilty into the correctional system and acquits the innocent in the most expeditious and cost effective manner, while at the same time respecting the offender's human rights. One way of examining the rate and speed with which offenders are handled by the system is to track individual offenders. This method is called offender based transaction analysis (OBTS). The data are "transactional" since the individual offender is the unit of count and thus links the segments of the criminal justice system to each other.

An example of an Offender-Based Transaction data system at the state level is found in California. In the late sixties, the Law Enforcement Assistance Administration sponsored the development of Project SEARCH, a program designed, in part, to implement the collection of transaction statistics. An early prototype of an

EXHIBIT 2.10
CRIMINAL JUSTICE SYSTEM – AN OVERVIEW



operating transactional data system was produced by the California Bureau of Criminal Statistics (BCS). Since BCS has long maintained an active arrest and superior court register containing many of the data that would be required to support a functioning OBTS system it was possible to retabulate a block of data in a transaction format. These data, including twelve counties and covering a three-year time span (1969-1971) track individual offenders from the point of arrest to sentence outcome at both lower and superior court levels.

Exhibit 2.11 is based upon this initial transaction data set and depicts the flow of adult felony offenders through various decision making stages for urban counties. While the decision points depicted in this flowchart are limited due to the lack of correctional data and other pieces of information such as bail determination, they nonetheless give a fairly good approximation of a working OBTS model. It is interesting to note, for example, that approximately one fifth of both urban and rural arrestees have their cases dismissed prior to trial. What may account for these pre-trial case dismissals? Are such a high proportion of initial arrest decisions based upon evidence that cannot later support a conviction?

Of those convicted at the superior court level, approximately one fifth of all urban offenders receive a prison disposition. If one were to consider all convictions (at either the lower or superior court level) the percentage receiving a prison disposition is considerably lower--around 10%. This is especially interesting when one considers that all original arrest offenses provided for a prison term of some kind.

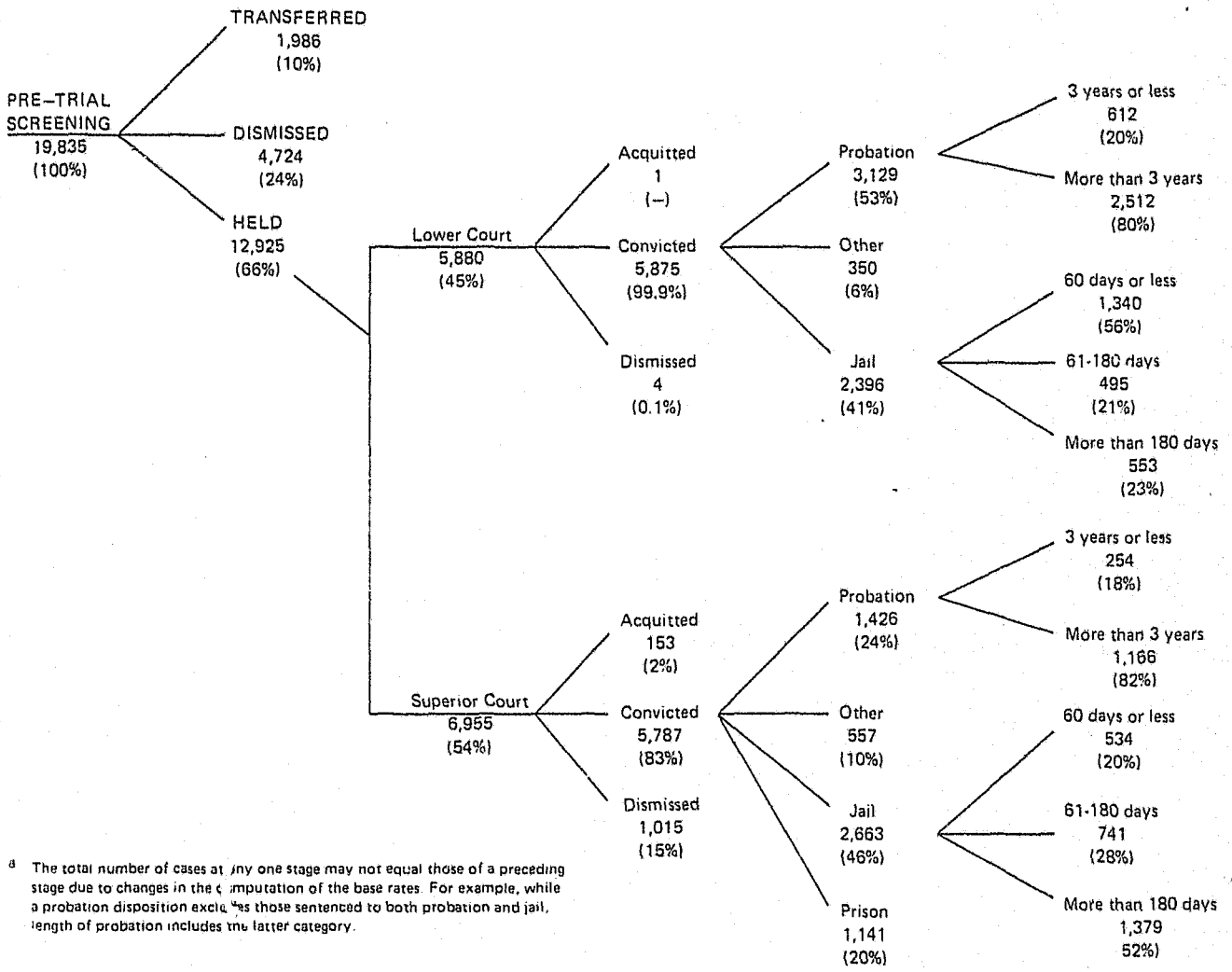
Although the data used in this example are preliminary in that many stages in the processing of offenders are omitted, they nonetheless demonstrated the type of information that can be obtained when criminal justice data are recorded in a transactional format. It is possible to see at a glance the path along which offenders are traveling and the type of dispositions that are occurring. Decisions made at one stage can be related to those occurring at a later stage, a possibility that is precluded in agency-specific summary tables.

2. Management and Administrative Statistics (MAS)

Once the offender-based aspects of the system are understood, the system resources or capabilities can be examined. System resource analysis examines data on workloads and cost utilizing management and administrative statistics (MAS). The findings of this analysis can then be used to try to develop more efficient methods of operating the criminal justice system, or to project the manpower and cost implications of various alternative recommendations for system change.

While some jurisdictions and states already have OBTS data, many more localities have no such data. Existing secondary OBTS data are generally available through the regional or state criminal justice planning agency or SAC. Often, the planner will have to initiate primary data gathering activities before an OBTS analysis can be undertaken. Like OBTS, MAS data are often not available in readily usable secondary form.

EXHIBIT 2.11
FLOW OF CALIFORNIA FELONY OFFENDERS: URBAN AREAS[a]



[a] The total number of cases at any one stage may not equal those of a preceding stage due to changes in the computation of the base rates. For example, while a probation disposition excludes those sentenced to both probation and jail, length of probation includes the latter category.

Much fragmented MAS information is accessible, but usually it comes in varying formats and usually with a significant time lag between the end of the reference period and when data are actually published and released. The sources include:

- budgets of units of state and local government;
- expenditure reports of units of state and local government;
- UCR reports on personnel;
- reports of agencies with licensing responsibilities (such as agencies which license residential facilities);
- personnel data on law enforcement officers (from state training agencies);
- mental health agency client reports by source of referral and type of service provided);
- individual institution statistics, usually maintained in conjunction with whatever agency pays the costs;
- court statistics on arraignments, indictments, trials, dispositions, verdicts, sentending, and referrals (in effect OBTS data);
- agency or institution annual reports;
- Equal Employment Opportunity Commission EEO-4 form (filed by all units of local government)
- information and management systems such as PROMIS;
- applications for funds made by units of state and local government (such as CETA, HUD, Title XX of the Social Security Act, etc.)
- LEAA publication on criminal justice personnel, salaries, and expenditures;
- state Statistical Analysis Centers; and
- state and local certification agencies.

The criminal justice system resources covered by MAS data include:

Police Resources

- police officers
- police equipment
  - communications
  - record-keeping
  - dispatch
  - vehicles
  - weapons
- buildings

Court Resources

- court personnel
  - magistrates
  - judges
  - clerks
  - bailiffs
  - secretaries
- court buildings
- equipment for information and record-keeping

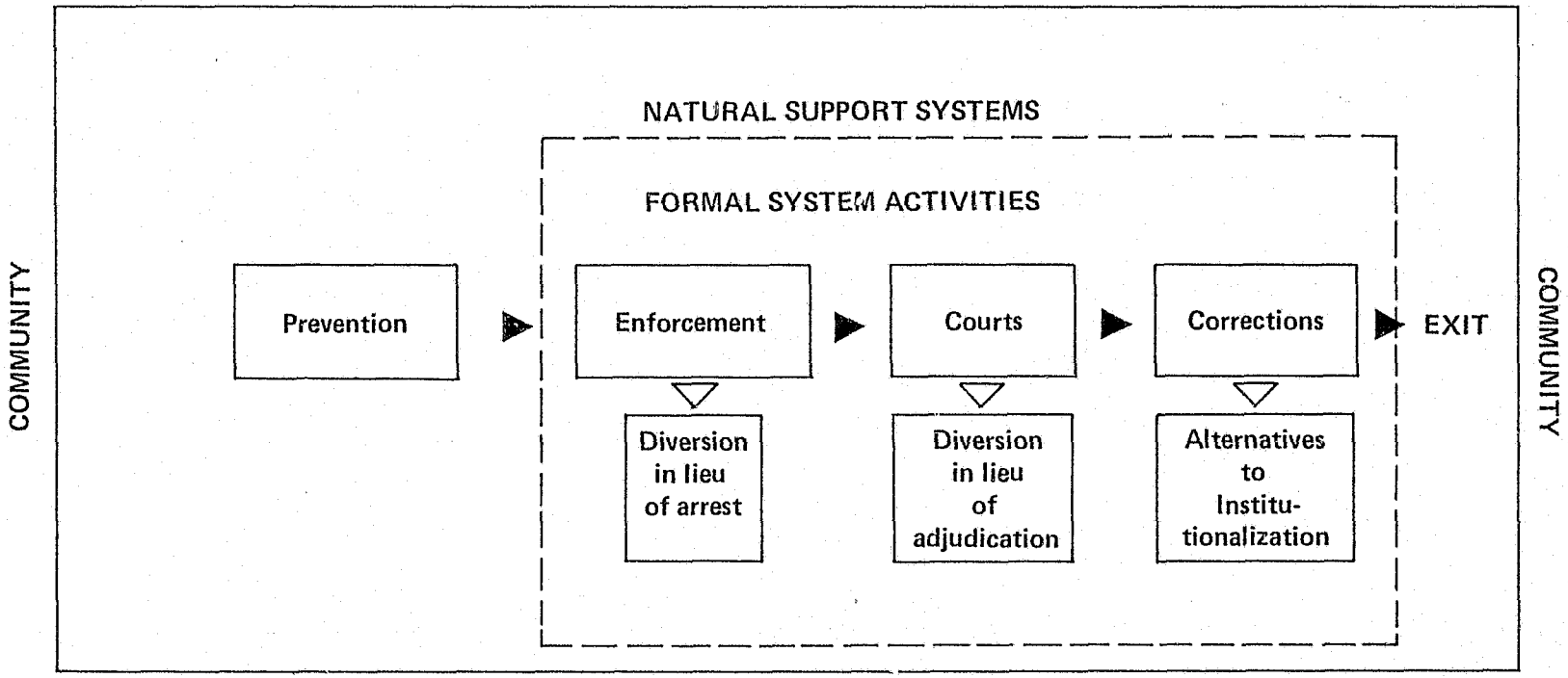
Correctional Resources

- correctional personnel
- buildings
  - prisons
  - community-based residential facilities
  - other institutions
- support equipment

The criminal justice system also has available to it a number of other MAS resources. These range from citizens participating in "citizen watch" programs, taking in runaways, helping adults who need a place to stay during a crisis, to CETA ("Manpower") programs or GED (equivalency) classes. Just as the causes of crime can be found in every aspect of a society, so can the resources of the criminal justice system be construed as every agency and program functioning in a community, a region, or state.

An example of the enormous range of MAS-related data which would be useful and relevant in evaluating system resources is contained in the report issued by the President's Commission on Law Enforcement. This example is related to the juvenile justice system (which, as noted earlier, is somewhat separate from the adult system), but the point regarding the range of available MAS data related to criminal justice system problems is valid for the adult system as well. The President's Commission recommends three major strategies for juvenile delinquency prevention. First was "provision of a real opportunity for everyone to participate in the legitimate activities that in our society lead to or constitute a good life: education, recreation, employment, family life." Second, the report recommended "swift apprehension, thorough investigation, prompt disposition--carried out by persons carefully selected and trained for their functions--should maximize the system's deterrent impact and the respect accorded the law it upholds" since some juveniles are dangerous repeaters and resistant to other rehabilitating attempts. Finally, for some juveniles who need more than a basic opportunity in society but less than formal coercive system treatment, "it is imperative to furnish help that is particularized enough to deal with their individual needs but does not separate them from their peers and label them for life." A recent model of the juvenile justice system is shown in Exhibit 2.12. These recommendations and the model provide a good

EXHIBIT 2.12
JUVENILE JUSTICE SYSTEM—
AN OVERVIEW



Source: Office of Juvenile Justice and Delinquency Prevention, LEAA, 1977.

example of the enormous scope of resources (and data) for criminal justice planning. The first recommendation involves basic changes in U.S. government programs and society itself. The second recommendation is limited strictly to the traditional components of the criminal justice system itself. The third recommendation involves both traditional criminal justice system elements plus other services for education, recreation, job placement and the like.

This broad definition of resource is not inappropriate but it implies a level of data gathering beyond the capacity of most planning agencies, except for special analyses. This text, therefore, mainly limits its concern to the immediate and direct resources of the criminal justice system since change in this system is an immediate task for criminal justice planners. It should be emphasized, however, that a comprehensive planning effort encompasses consideration of all resources and capabilities in a community. Although the analysis of criminal justice system capabilities serves as a primary focus for MAS and OBTS, one should not underestimate the importance of using resources outside the traditional criminal justice system to improve system performance. It is important to consider that changes outside the traditional criminal justice system are doubtless necessary to reduce--rather than control--crime rates substantially. (Module IV presents material on the analysis of both system performance and resource data.)

F. Juvenile Data

Juvenile data are treated separately in this course because the juvenile justice system (and the offense categories it involves) is not simply a junior version of adult crimes and systems. Juvenile and adult records are generally recorded differently and kept separately. Most juvenile record-keeping agencies are much more reluctant than agencies keeping adult criminal records to make juvenile information available to "outsiders," even to criminal justice personnel. (In some jurisdictions, in fact, juvenile records are completely destroyed once a juvenile reaches "adult" status.) Juveniles are generally persons who have not yet reached their 18th birthday. They may come under the jurisdiction of the justice system for a rather wide range of behaviors which do not provide a basis for such jurisdiction in the case of adults. They are generally called "status offenses" (although the term "offense" is often inappropriate) because it is the age status of the individual which permits the claim of jurisdiction. Traditionally, such offenses have fallen into two major categories--"dependency" and "neglect"--although traditional terminology is changing. One recent survey identified 34 different status offense categories used in various states. Most of these categories have to do with the relationships between parents and children, particularly authority relationships. Most common are runaways and "incorrigibles." Truancy is another common status offense. Laws mandate attendance at school up to age 16 in most jurisdictions: a 16 year old can be arrested and subject to legal penalties if repeatedly absent from school; 17 year olds cannot. (Basic legal distinction between "status" offense and "delinquency": a delinquent act would be a crime if committed by

an adult; a status offense would not.) The implications of status offenses for data analysis are that a large number of behavioral forms recorded in juvenile records would not be "criminal" if engaged in by an adult and therefore grossly inflate juvenile offense statistics. The implications for jurisdictional claims are that there is greater discretion by authorities as to whether or not to take legal action than in the case of adult crimes, and a larger percentage of juvenile "caseload" is under jurisdiction for quasi- or non-criminal behavior. (Technically, "juveniles" cannot commit "crimes," they can only be arrested/adjudicated for achieving a state of "delinquency.") A large part of the juvenile system is focused on preventing juveniles from subsequently committing "crimes" as adults. A measure of that concentration of effort is the fact that $41 billion or 98% of all Federal expenditures for youth in 1976 were for prevention programs while only $1 billion or 2% were for Federal enforcement/adjudication/corrections/diversion programs.(7)

UCR juvenile arrest statistics, while valuable for purposes of ascertaining national-level trends, are not broken down by localities (only by groupings of localities). This limits their use for analysis and planning purposes in local communities. Another shortcoming in "official" data is that a very large proportion of juvenile offenses never find their way into official records, due to the reluctance of police to arrest, difficulty in detecting perpetrators, and other factors. In Boston, for example, in over one half of the cases in which juveniles are contacted by the police and a record made, the juvenile is warned by the police and released, and in a far larger proportion of police contacts, no record of any kind is made. Neither "warnings" or unrecorded contacts figure in UCR statistics.

It is therefore useful for local and state-level personnel to have access to other juvenile data which provide a more accurate and comprehensive picture of the actual volume and forms of juvenile crime in their jurisdictions. The following list includes nine "populations" of offenders and/or offenses which can be used:

- offenses recorded through direct field observation in the community;
- complaints to police, including those where no official action is recorded;
- tabulations of total contacts and arrests recorded by police;
- tabulations of all juvenile arrests by crime, by police juvenile division, other police divisions, and as a result of referrals;
- recorded court arraignments (appearances, charges);
- court case records;
- probation caseloads, by offense-types;

- populations of institutions and other placement facilities (by basis of commitment); and
- parole/aftercare caseloads (by offense types).

Not all of these bodies of data will be available in all jurisdictions, but some or most are collected in many. Because each of these bodies of data is based on different selection criteria, each gives a different picture of the "shape" of juvenile offender population and offense patterns for the same jurisdiction. Comparisons among the several bodies of data provide a variety of useful kinds of information, including some notion of the volume and kinds of unacted-on delinquency, and the selection and attrition processes within the "flow" through the juvenile justice system.

There are, however, limitations to these data bases. For instance, court records provide detailed accounting of case processing and are computerized in some jurisdictions making them easily accessible for analysis. In the case of juvenile case statistics, however, access may be severely limited in many jurisdictions due to the desire to protect the identity of a juvenile. Concern with the stigmatizing characteristics of contact with the juvenile justice system has recently reinforced the strong concern for confidentiality in releasing juvenile records. Researchers will require clearance from proper authorities in many jurisdictions to use juvenile justice case data. Comparable concern appears in the use of juvenile correctional system data.

Adequate needs assessment and problem formulation require analysis of a broader range of youth behavior than criminal behavior. What is known about the population of youth who are most at risk of becoming delinquents or status offenders? What are the profiles of these youth at risk? Where are they located in the community or state? Other variables that should be studied include:

- youth unemployment;
- geographic concentrations of population of different social-economic status (SES) levels;
- distribution of learning disabilities in the population; and
- distribution of resources to assist in the solution of youth problems such as mental retardation).

When obtaining these types of data from sources, the planner should bear in mind that:

- the quality varies greatly from state to state and community to community
- the validity and reliability of the data must be assessed before a decision is made to use them; and

CONTINUED

1 OF 5

- the major limitations of the data can be traced to the fact that they were usually collected for purposes different from those of juvenile justice planners.

The following section describes some of these data sources and identifies strategies for utilizing them.

a. Federally Required Reporting Data

Title XX of the Social Security Act
The Title XX state plans can be a useful source of needs and resources assessment data for the juvenile justice area.

Comprehensive Employment and Training Act (CETA)
This locally planned and implemented program is a source of youth employment and training information.

Housing and Urban Development Grant Applications
These grant applications require detailed community and state profile data which can be used to avoid a duplicate effort.

b. Large National Sample Surveys

There are many national sample surveys that are sufficiently large so that the state and large city sub-samples could be analyzed with confidence. However, the sub-samples should contain at least 350 to 400 interviews or subjects. Following is a selection of available and relevant national surveys.

Class of '72 Longitudinal Youth Survey
Sponsored by the Office of Education, DHEW, this study involved 22,000 youth who were interviewed during their senior year and reinterviewed two years later. The study is particularly valuable in analyzing the problems that youth experience in the transition from school to work. The state sub-samples would be usable by all but the smallest states. Any political unit with two or more percent of the U.S. population can use the study.

U.S. Census Current Population Reports
These interdecennial reports based on very large samples of the population contain a number of subject areas of interest to juvenile justice planners --SES, minority populations, employment, and health are illustrated. While some are focused on youth, many contain only very gross data on them. LEAA has made special arrangements with DUALabs to make these data available to state and local planners.

National Alcohol and Drug Abuse Data: This national survey contains a wealth of information on alcohol and drug abuse in the population. It contains profiles of the population most at risk. Strategies for obtaining these data include utilizing the DUALabs service or purchasing the tapes and documentation of these data bases.

c. Specialized Juvenile Data Sources

School Vandalism and Dropout/Pushout Data: Many school districts, state education agencies, and national associations gather these types of data. However, some are reluctant to share data because they might reflect badly on their performance.

How serious is juvenile delinquency and what are the special characteristics of the data? Self-report studies have disclosed that perhaps 90 percent of all juveniles have committed at least one act for which if apprehended they would have been brought to juvenile court. While many of these acts are quite minor in seriousness, many juveniles also commit serious offenses. It has been estimated that one in every nine youths (or one in every six male youths) will appear before a juvenile court before his 18th birthday in connection with a delinquent act (excluding traffic offenses). (8)

The 1974 FBI Statistics indicate juveniles (ages under 18) only account for 27% of the population but account for 45% of all index crime. In addition 22.6% of the arrestees for violent crime were juveniles, and 50.7% of the arrestees for property crime were juveniles. Of the total arrests for index crimes, persons under age 18 accounted for 49% of the arrestees for larceny, 55% for motor vehicle theft, 53% for burglary, 33% for robbery, 19% for rape, 17% for aggravated assault, and 10% for murder and non-negligent manslaughter.

Crimes peak at different ages for juveniles. Using 1974 statistics, the median age for auto theft arrestees falls between 16 and 17, for larceny between 17 and 18, for burglary between 16 and 17, for aggravated assault between 25 and 29, for robbery between 19 and 20, for rape between 21 and 22, and for homicide between 25 and 29.

Thus the volume of offenses, the number of serious offenses, and the special confidential characteristics of juvenile data qualify these data for special and separate treatment by the planner.

Other special characteristics of juvenile data include:

- the collective (gang) nature of many crimes which cannot easily be detected from official data;
- the peaking of crime rates for different crimes at different ages indicates preventive programs can be aimed at specific "high-risk" age groups; and
- the special and complex nature of the juvenile criminal justice system with many "passes," "diversions," and "failures to impose sanctions" results in a high attrition rate within the system, and may also make offender-based tracking and the collection of useful MAS more difficult.

EXERCISE 4

SECONDARY DATA SOURCES

Purpose

This exercise is designed to give participants some practice in assembling a wide range of existing data sources in a secondary Data Collection Plan oriented towards problems of juvenile delinquency.

Activities

Using the juvenile crime questions identified earlier in Module 1, Exercise #2, make up a Data Collection Plan which includes the following information:

1) All agencies in your jurisdiction which have data related to juvenile offenders (include agencies with state and national data which could be used for comparative purposes)

2) All data which you would expect these agencies to have which is pertinent to the questions posed

3) How this data could be used to answer the questions posed in Module 1 on juvenile offenses

4) What problems you would have in accessing this data

The product should be a chart with the information in the following format:

AGENCY WITH DATA	TYPE OF DATA	USE OF DATA	ACCESS PROBLEMS

III. PRIMARY DATA

Planners in the criminal justice field have access to enormous amounts of data. However, in many cases these data are not suitable or adequate for analysis of a specific topic or problem. In such cases, the planner will have to initiate a primary data collection effort. Primary data gathering is expensive, time consuming, and designing the data collection and analysis plans requires specialized skills. Therefore, secondary data should always be used first if they provide sufficient information to respond to the analysis questions adequately.

If primary data collection is selected, the data will generally be of two kinds--a survey or poll, or a collection of basic criminal justice system records. While the concepts behind victimization surveys, public opinion polls, and information system methodology are fairly straightforward, in practice the use of these methods often involves technical issues relating to sampling procedures and system design that are complex. Therefore, if possible, expert assistance should be obtained.

There are several possible sources for such assistance. First, technical assistance may be available from someone in the local jurisdiction who has experience with one or more of the methods proposed. If not, some state agencies offer technical assistance through their state criminal justice planning agency, statistical analysis center, or comprehensive data systems program. The LEAA staff may be able to provide a reference to one or more jurisdictions which have completed similar data collection efforts. Finally, there are many consultants who can provide technical assistance to complete the survey, poll, or system analysis.

In assessing alternative primary data collection efforts, it is important to be familiar with the variety of methods available. Even if the jurisdiction uses a consultant to do all the data collection work, a decision must still be made by the jurisdiction or jointly with the contractor of what data to collect, how large and what type of sample is required, and how the data should be collected.

In answering these basic questions it is important to have the problems clearly stated. Selection of data collection and analysis methods is heavily dependent on such problem statements and analytic efficiency is directly related to an effective data collection plan. Once the questions and uses to which the findings will be put are known, a review of methods should be undertaken.

The following discussion of primary data is divided into three parts. First a brief review of survey and sampling methods is provided. This review is an orientation about local surveys and not detailed presentation. The second part presents a detailed overview of criminal justice information systems (CJIS) developments which is oriented toward the user of such systems. The development of CJIS in the past several years has provided a new and powerful tool for criminal justice planners who can access and utilize the various data stored in these systems.

A. Primary Data Collection Methods

Following is a three part discussion of, first, certain aspects of locally conducted surveys; second, an overview of sampling techniques appropriate to survey activities; and third, a review of survey instruments. These discussions are presented strictly as a summary of the basic procedures of primary data collection in criminal justice. References are provided in the bibliography which provide a thorough introduction to survey methodology.

Despite the availability of National Crime Panel data, a number of local (e.g., city, state) criminal justice agencies have conducted, or are planning to conduct, sample surveys of their own. These locally initiated efforts are scattered, and they vary tremendously in focus and quality. Although most of the local surveys have been concerned with the study of victimization, other information--particularly in the realm of public attitudes--is being generated.

There are a number of reasons why local agencies have chosen to devote resources to conducting local sample surveys. First, some local agencies find it desirable to develop sources of information that are independent of official processing. Even among local personnel who wish to use the NCP data, there is concern with the amount of "lag time" that occurs between data collection and dissemination in the NCP program. The results of locally sponsored surveys can be put to use as soon as the data are collected and analyzed. Secondly, many practitioners believe that it is easier to gain acceptance for programs developed on the basis of locally collected data rather than on the basis of results generalized from surveys that were conducted elsewhere. Finally, when trying to address issues with information generated by a survey that was not explicitly designed to address those issues, one often finds that questions were not asked in exactly the way one would have wished. This problem can be overcome when local personnel design their own surveys in terms of problems and issues that are relevant to them.

Regardless of whether a sample survey is being conducted on a national or local level, it is imperative that the people planning the survey explicitly consider what information they wish to generate and how they intend to use the survey results. Survey methods are less applicable to some information needs than to others. For example, it would be wasteful to use a survey to gather data on which to base decisions about the allocation of police manpower within a city; actual calls to the police for service and reported crimes already provide good indicators of the need for police personnel in various areas of the city. On the other hand, if police officials are concerned with potential public response to a planned change in police practices (e.g., the abandonment of some existing service functions), then a sample survey could prove useful in estimating public attitudes.

Even when it is decided that a sample survey will be helpful in generating needed information, the particular goals set for the survey will determine what specific methods must be used and how much

the effort will cost. Suppose, for example, that a goal is to estimate, from a sample, the number of robberies occurring in a city. Such a task requires a very large sample because robberies are relatively rare events. In addition, the goal requires that the sample used be representative of the population of the city.

Surveys of known victims can provide valuable information about citizen contacts and satisfaction with the criminal justice system, pointing to ways for system improvement. Because the target population can be defined to include only people who have been in contact with the criminal justice system, it is easier to construct a sampling frame, that is, identify respondents. Official records can be used for this purpose. Since all of the people in the sampling frame are known to have had contact with the system, the sample drawn for interviewing would not have to be anywhere near as large as in the usual victimization survey which tries to uncover victimizations in the general population.

There are several ways in which the NCP victimization survey experiences can be useful to local agencies planning to conduct their own surveys. If the local agency wants to locate and interview victims in the general population, the NCP findings can provide a rough idea of how many victims of various types of crime will be located in a sample of a given size in a certain type of area (e.g., urban, suburban, rural). With this estimate, the agency can decide on the approximate sample size it will need. Secondly, the interview schedules used in the NCP have been extensively pretested and refined. They can be quite useful as guidance for the agency in constructing its own instruments. Thirdly, the NCP pretests have also generated some very important findings about effective interviewing procedures in victimization surveys. Familiarity with these findings can help avoid needless errors and improve data collection quality. The Census Bureau has produced interviewer training and instruction manuals for the NCP program. These documents cover a variety of procedural points. For example, one section describes how each question in the interview schedule should be asked and when and how the interviewer should probe for answers. Finally, the Census Bureau's NCP survey documentation contains technical information on sampling, weighting factors, and estimation procedures useful for those involved in a local effort.

1. Sampling Procedures

It is generally not practical to collect data from an entire population because of time and cost considerations. In the usual case, it is more efficient to collect and study data from a sample of the population being considered. An analysis of the sample data should provide useful information about the population being studied. In order for the results obtained from the analysis of sample data to be applicable to the population from which they were drawn, it is necessary that the sample be representative. A representative sample is one which reflects the characteristics of the population being sampled in its true proportions. In actual practice, a representative sample can never be attained unless there is perfectly accurate and complete knowledge about the population being studied. A representative

sample is most likely to be obtained if the sample is drawn using a random selection procedure. Such a sample is called a random sample. A random sample is extremely important: methods of statistical inference used to generalize from the sample to the population of interest depend upon representativeness of the sample. A random sample can be drawn only from a population if every item or person in the population has an equal chance of being drawn on each successive draw. Procedures for obtaining random samples are described in basic statistics textbooks, a number of which are referenced in the bibliography following this section.

There are a variety of types of random samples that can be drawn from populations. Four types of random samples will be briefly discussed here: 1) simple random sampling, 2) systematic sampling, 3) stratified sampling, and 4) cluster sampling.

- A simple random sample can be drawn from a list of all members of the population using any of a variety of simple devices (for example, drawing numbers from a hat or using a table of random numbers). In most practical research problems, a total list of all items or people in a population is rarely available. For example, there are no lists of all people living in New York City. Using a telephone book would include only those members of the population who had a telephone, for many purposes excluding important elements, i.e., low income groups, from the population of interest. The more the list from which the sample is drawn is not representative of the total population, the more the results of inferences to the total population will be biased.

- Systematic sampling is similar to random sampling. For systematic sampling, beginning with a randomly chosen person on the list, one can simply choose every kth person.

- In a stratified random sample design, the total population is divided into relatively homogenous subpopulations. Random samples are drawn from within each of these subpopulations. One reason it is often useful to stratify a sample is that different sources or lists may have to be used for each sub population. Another reason for stratifying a sample is that a smaller number of cases can be drawn to achieve the same level of accuracy. Selecting and sampling from strata reduces variability in the population. This reduced variability allows a smaller sample size to be used. This is an important consideration because the reduced sample size required by stratifying can result in substantially reduced costs.

Examples of strata are: sex (male or female); age (20-29, 30-39, etc.); marital status (married, widowed, divorced, separated, never married).

- Cluster sampling is another method frequently used in survey analysis and can reduce the costs of collecting and analyzing data. In stratified sampling the population is divided into groups, and then a random sample is drawn from each group. In cluster sampling, the population is divided into a large number of groups, and then samples are drawn from among the groups. For example, if all the census tracts in a city were considered to be organized in clusters, a certain number of census tracts would be selected for study. The objective of such a cluster analysis is to select clusters which exhibit great variation, but which at the same time are small in size, or located in such a manner as to minimize data collection costs, such as those involved in interviewers' traveling time.

2. Survey Instruments

There are two basic types of instruments used in survey research: interview schedules and self-administered questionnaires. Interview schedules are forms from which interviewers read questions to respondents and on which replies are recorded. The major advantage of this kind of data collection procedure is that skilled interviewers can probe the respondents by asking a series of questions in order to clarify issues. In situations where a skilled interviewer can create a non-threatening situation for the respondent, increased cooperation on the part of the respondent may lead to more valuable results. Conversely, in a situation where interviewers are poorly matched with respondents, tension between the interviewer and respondent can seriously affect the quality of the data collected. An additional advantage of the interview method is that observational data or other kinds of data, e.g., environmental conditions, can be collected during the same session. In some instances, interviewers may also produce a higher response rate than would be attained using self-administered questionnaires.

The major disadvantage associated with interview schedules is the sharply increased costs as compared with using self-administered questionnaires. A second disadvantage is that the presence of an interviewer may result in potential response bias in some situations. For example, in situations where interviewers are not highly skilled, where respondents are suspicious; where there is a poor demographic match between interviewer and respondent, or where the material covered in the interview is personal or fraught with socially desirable answers--responses recorded by the interviewers may be biased.

Self-administered questionnaires are designed so that respondents can provide answers to the questions without any assistance. Clarity and appearance of the questionnaire are particularly important in designing self-administered survey questionnaires. A major advantage in using a self-administered questionnaire is cost. Self-administered questionnaires are much less expensive to administer than are interviews. They can be administered to people assembled in groups, can be distributed to people on location to be returned upon completion, or can be administered through the mails. For some topics, particularly when questionnaire responses are anonymous, respondents may be willing to answer questions concerning socially undesirable or illegal behavior. Measures can be included in questionnaires to account for socially desirable response bias as well as for random checking of responses, consequently reducing these two common sources of error.

The major problem with self-administered questionnaires is response rate. Although response rates can usually be increased substantially with follow-up reminders to respondents, the number of respondents not completing the questionnaire may be higher for self-administered questionnaires than the refusal rates in an interview situation. A lower response rate can have a serious limiting effect on conclusions drawn from a particular study because of the sampling bias introduced by non-respondents.

B. Criminal Justice Information Systems (CJIS)

In broadly assessing the long-range data needs for criminal justice analysis, comprehensive data systems will probably provide the best source of data. Many states already have portions of such a system in operation. This section of Module 2 reviews large-scale criminal justice information systems so that the planner will be familiar with the data capabilities of such systems - whether they are currently operating systems which could be used immediately by the planner or systems in use or being developed elsewhere which could be proposed for use in the planner's jurisdiction.

Since 1931 when the National Commission on Law Observance and Enforcement[9] (the Wickersham Commission) found that "a proper system of gathering, compiling, and reporting of statistics of crime, criminals, of criminal justice, and penal treatment is one of the first steps in the direction of improvement," successive study groups and commissions have lamented the lack of progress in creating national systems that describe the functioning of the justice system. In recent years the President's Commission on Law Enforcement and the Administration of Justice[10] and the National Advisory Commission on Criminal Justice Standards and Goals[11] have come out strongly in support of the development of systems that would provide data to support a diversity of planning and analysis needs. Researchers and planners have continued to press for accumulations of basic data that could be analyzed to depict the nature of crime and the response

of society's institutions.

In 1969, Project SEARCH, a cooperative effort among several states to test the feasibility of computer-to-computer exchange of criminal history records,(12) included in its project plan the following objective:

- Computerize annual statistical reports in existing statistical series to permit retrieval of data by LEAA and by selected police, court, and correctional agencies for uses to be specified by the Project Coordinating Group.

Project SEARCH soon came to believe that the existing material was not accurate or useful enough for even limited demonstration purposes. Project SEARCH recast the statistical objective:

- Design and demonstrate a computerized statistics system based on the accounting of individual offenders proceeding through the criminal justice system.

The new objective was accomplished through a series of projects that spanned the years 1969 through 1972. These projects conceptualized the Offender-Based Transaction Statistics (OBTS) approach to criminal justice statistics and documented the development of these data collections in five participating states.(13) The reports of this effort concluded that separate criminal justice statistics systems could be developed utilizing collection mechanisms and data base configurations established during the implementation of operational criminal justice information systems.

The idea was to build operational information systems and statistical systems that were separate but compatible. Each would be used to satisfy a different criminal justice need. Unfortunately, developments in these areas have not kept pace.

1. Obstacles to Development

Throughout the 1960s and early 1970s, automation was an innovation in criminal justice. Although industry was using the computer for an increasingly diverse set of applications, computer usage in the public sector, particularly among justice agencies, was primitive. It took the Safe Streets Act of 1968 and the creation of the Law Enforcement Assistance Administration (LEAA) to focus attention on the problems of crime and the lack of information with which to respond. LEAA was the means for funding new programs to capture necessary data about individuals and their contact with the justice process.

Consequently, early systems were designed to meet specific needs of user agencies and jurisdictions. Not surprisingly, operational considerations and reporting requirements took precedence while statistical data were given lower priority. Several factors contributed to this posture:

- Administrators lacked an understanding of the benefits of automated systems.

- Users generally mistrusted computer reports.
- Many CJIS designers were competent either as technical or subject matter experts, but few were proficient in both.
- Most jurisdictions did not employ trained planners and statisticians.
- Multijurisdictional information system design was plagued with political problems, reflected in a general lack of cooperation and coordination.

Throughout this period, a number of external factors combined to retard the development of information system capabilities. Some of these factors were technical, involving hardware, reliability and cost; others related to public issues and increased the uncertainty that automation could be employed effectively. Thus, many criminal justice agencies adopted a wait-and-see attitude because their staff had little interest in pioneering developments in such a risky area. Fortunately, in recent years many of these difficulties have been mitigated to the point that progress has accelerated:

- Computer technology has undergone dramatic changes. Computer systems used to sprawl over an entire floor, required special cooling, and were very expensive. Today a general-purpose microcomputer system complete with memory and input/output interface costs as little as $1,500.(14)
- Software was batch oriented. Today on-line systems predominate. New and faster software makes possible high speed telecommunications, with terminal networks interfaced to a central processor. Moreover, applications software has improved. An assortment of ad hoc report generators has facilitated data base manipulation and analysis. Statistical routines are now available in standard software packages that run on a wide variety of machines.
- On the debit side, intergovernmental relations have impeded the sharing of data among the branches of government. Most troublesome has been the constitutional requirement for separation between the executive and judicial branches and its effect on reporting court disposition data to a state law enforcement system. As criminal history systems have developed, however, some cooperative arrangements between these agencies have emerged.
- Security and privacy issues have also slowed the implementation of new systems because of the uncertainty surrounding such points as individual access to records, audit requirements, and the

> dissemination of arrest and conviction records. The Congress of the United States has failed to pass comprehensive legislation; national leadership has taken the form of regulations issued by the Department of Justice. These regulations provide structure but leave to the states the responsibility of implementing security and privacy provisions. (15)

As most of these problems have moved toward resolution, more and more criminal justice information systems have been developed. Still the focus has been on operations, ignoring for the most part the special problems of planners and analysts.

In some cases, separate data systems have been developed for use by planners. Experience has shown that it requires time and resources in amounts larger than originally anticipated to design and implement such criminal justice information systems. If traditional manual data collection methods and strategies must give way to newly automated procedures, the problems of setting up new systems are compounded. Therefore, the notion of separate data systems for use in planning versus criminal justice operations no longer seems reasonable for the following reasons:

- Additional clerical effort to compile data.
- Increased volume of data to enter into systems.
- Higher potential for error based on multiple data sources.
- Requirement for increased computer capacity.
- Additional development costs.
- Data processing conflicts.

Justifying new system development solely on the basis of planning or statistical needs is becoming increasingly difficult. However, today's computer systems contain a wealth of information suitable for analytic purposes. Most of these data have not been used because planners and researchers are not in the mainstream of information reporting and processing. The challenge of the future is to creatively employ operational systems to support deliberations on policy matters.

Since the typical data base maintains data about persons, cases or events, summary information is easily generated. If data necessary for a particular ongoing analysis are not available, it is usually easier to modify reporting procedures to capture and store needed data than to develop a second system. Thoughtful aggregation of basic data could satisfy a host of statistical requirements, including those for policy planning as well as for operations and management.

2. Status of CJIS

Since 1968, LEAA sources report that over $450 million has been awarded in some 4,000 grants to federal, state and local governmental

agencies for the development of criminal justice information systems. State and local matching funds and independent development monies significantly increase this total investment in systems which range from local want/warrant systems to statewide computerized criminal history systems.

A recent survey(16) of 549 state and local law enforcement, court corrections and prosecution agencies resulted in only 167 responses which reported no "automated information systems." Operational systems range from a single application on a shared computer to a combination of up to 85 specific functions running on a totally dedicated computer. (A dedicated computer means the computer time is completely available to one user such as an agency or locality. A shared computer is available to more than one user.) Several systems are multi-jurisdictional.

In 1972, LEAA instituted a national program to promote the enhancement of information capabilities in the states. This Comprehensive Data System (CDS) program concentrates on state-level systems, but involves data distributions from local sources. As of 1976, 43 states had been approved for participation in CDS and more than $53 million of grant funds had been awarded to support CDS components. Exhibit 2.13 details the 1976 status of the CDS program, but does not reflect additional state developments that are compatible with CDS.

In fact, system development in criminal justice has reached the point where transfer of proven systems now takes precedence over new designs. A multi-year grant to SEARCH Group, Inc. to establish the National Clearinghouse of Criminal Justice Information Systems calls for the creation of a national index of systems and the provision of technical assistance to agencies interested in installing systems.

Exhibit 2.13

STATE PARTICIPATION IN THE COMPREHENSIVE DATA SYSTEMS PROGRAM (CDS) AS OF 1976

CDS COMPONENT	STAGE OF SYSTEM DEVELOPMENT		
	OPERATIONAL	UNDER DEVELOPMENT	PLANNED
Statistical Analysis Center/ Management and Administrative Statistics (SAC/MAS)	13	4	6
Offender Based Transaction Statistics/Computerized Criminal Histories (OBTS/CCH)	15	13	15
Uniform Crime Reports (UCR)	24	6	13

Many systems are performing in the field, both in large cities and in rural communities. While particular local criminal justice information systems might be difficult to tap for planning data, a series of national systems programs are encouraging implementation of comparable capabilities throughout the United States.

3. Emergence of National Systems

National systems are not federal systems. As used here, "national" refers to the states cooperatively promulgating new systems for their own uses. Data from national systems should be most useful in studying the criminal justice process and understanding the operations of justice agencies.

National systems have emerged successively, one giving birth to another. They have had two concerns: information about individuals and their contact with the justice process, and information about the incidence and nature of crime. Both concerns are discussed below.

In 1969, six states came together to study the feasibility of computer-to-computer exchange of criminal history records across state lines. This project to develop a System for Electronic Analysis and Retrieval of Criminal Histories (SEARCH) produced so successful a prototype that in 1970 the Attorney General decided to authorize the FBI to manage the inter-state exchange portion of the system, and all states were invited to join the system. The Computerized Criminal History (CCH) system at the state level was designed to incorporate data from all segments of the justice process. It was expected that law enforcement, prosecution, courts, and corrections would supply requested data.

It soon became apparent, however, that the state system could not mandate the submission of data from individual agencies because of constitutional prohibitions and lack of resources at the local level. To secure court data and corrections data especially, satellite reporting systems would have to be developed.

Requiring data without providing services to the agency which must comply results in faulty submission plagued by error. Since court and corrections data would be supplied by systems controlled by representatives of these criminal justice processes, it was natural to design them to include information necessary for the management of these functions. The results were national programs to design and implement State Judicial Information Systems (SJIS) in the courts and Offender-Based State Corrections Information Systems (OBSCIS) in corrections. Once developed, these systems would be required to submit specified data to the state center responsible for the CCH system.

As SJIS are being implemented in states across the country, court administration has realized that it in turn requires basic data from operating trial courts. This need will be satisfied by a new national trial courts project, GAVEL, which will be designed to support the day-to-day functioning of the trial court, while providing necessary data to the SJIS. Similarly, data concerned with prosecution are being developed through the national program to implement

Prosecutive Management Information Systems, PROMIS; and it is only a matter of time until systems emerge for probation and local corrections.

In the area of crime reporting, progress is also being made. State and local law enforcement have been inundated with requests to provide crime data tabulated in different ways. Duplicative coding to satisfy the UCR and other requirements is becoming intrusive to the operations of the agencies. Furthermore, data coded in these ways are usually not sufficient for adequate crime analysis and resource allocation. In response a new system called ABCR is being tested. ABCR, Attribute Based Crime Reporting, is a method of recording the detailed characteristics (attributes) of a criminal event without regard to generic label, and translating these records into specified crime classifications through a set of transformation equations.

To be successful, ABCR requires the capture of raw data at the time the crime has occurred. Such data are recorded on crime incidence reports by patrolmen responding to calls for service. To be sure that appropriate information is obtained in these situations, a Standardized Crime Reporting System (SCRS) is being developed and tested in participating agencies throughout the country.

A summary chart showing the relationship of these data systems to each other is contained in Exhibit 2.14. Development of these systems is progressing and more data are becoming available daily. The problem and challenge to planners, however, is in applying this data to crime and system issues.

4. Examples of National Systems

The previous section focused upon the evolution of national criminal justice systems and upon the nature and extent of current system development activity. This section presents a variety of such national systems to provide a clearer sense of their importance as a data resource. Each system discussed here has actually been implemented or is about to be implemented, generally in more than one jurisdiction. Adequate documentation of each is available.

These national systems are used as examples because most have been subject to the intensive analysis necessary for multi-jurisdictional implementation. The Offender-Based State Corrections Information System (OBSCIS), for instance, which is presently operational or under development in more than 20 states, is one of the most popular information systems in criminal justice history. Hundreds of person-years of analysis have gone into the development of OBSCIS. The result is a data resource, a multi-state data base, that can be a unique source of information for analysts.

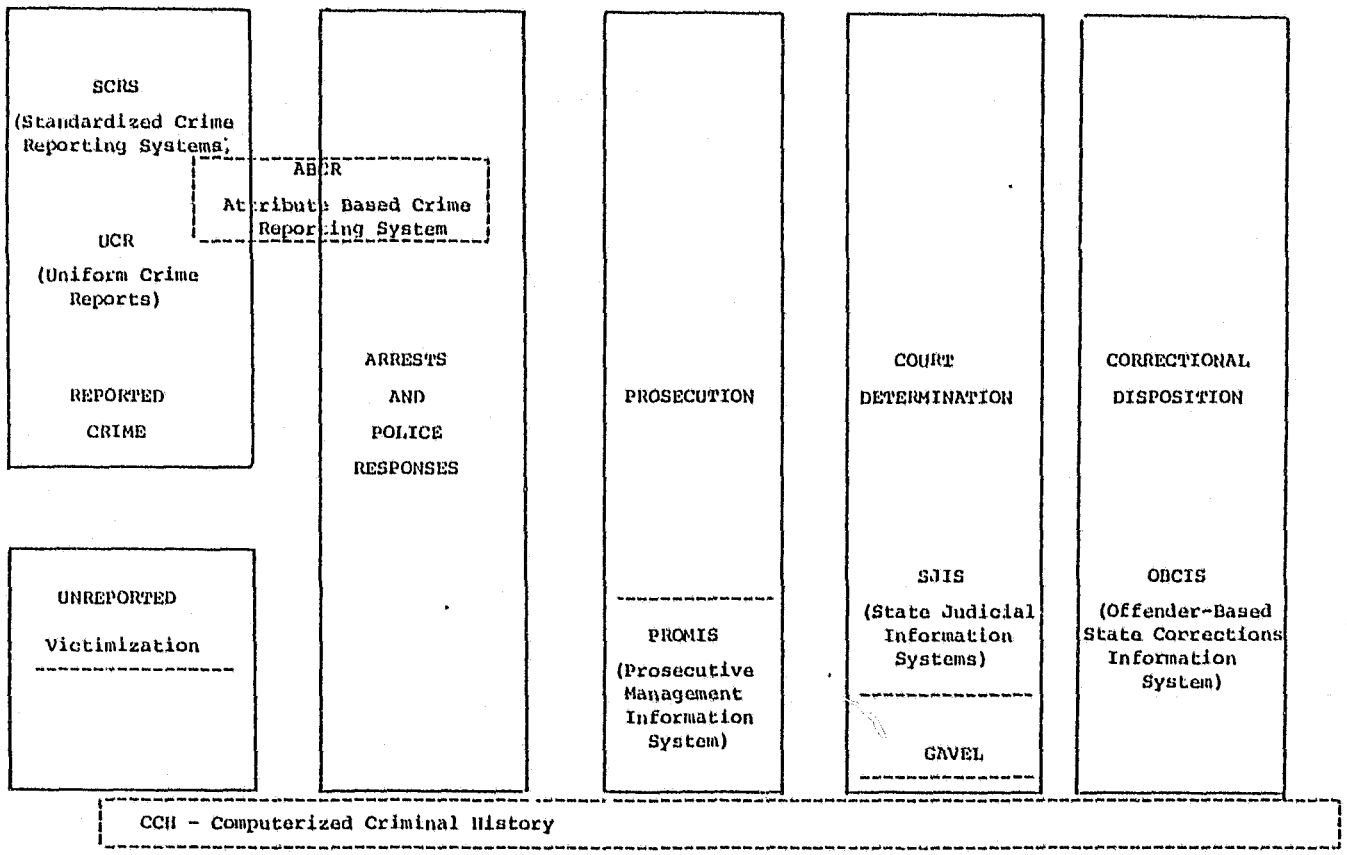
There are, of course, a multitude of other systems, manual as well as automated, in existence in criminal justice today. Each of you should develop a clear understanding of the operational systems within your interest area and of the data bases available to you.

The national systems we will discuss are:

- Standardized Crime Reporting System (SCRS)

EXHIBIT 2.14

RELATIONSHIPS OF CRIMINAL JUSTICE INFORMATION SYSTEMS



- Attribute-Based Crime Reporting (ABCR)
- Computerized Criminal Histories (CCH)
- National Trial Court Information System (GAVEL)
- Prosecutive Management Information System (PROMIS)
- State Judicial Information System (SJIS)
- Offender-Based State Corrections Information System (OBSCIS)

Most of these systems are designed primarily to satisfy the needs of management. However, with the application of a modest amount of imagination, skill, and common sense, these systems can be made to provide valid, useful information for planning.

- Standardized Crime Reporting System (SCRS)

Crime reporting systems were initially developed by police agencies simply as investigative and prosecutorial aids. However, uses of police records and statistics quickly expanded. Such data was used, for example, for management decisions concerning the distribution of law enforcement resources. On the other hand, utilization of crime/event report information by planners and researchers has been minimal. Their under-utilization of police reporting systems is largely the consequence of their unfamiliarity with the range of data available and a failure to conceptualize or hypothesize the relationships between crime/event report data and important contemporary issues. The lack of planning and research interest was also partly due, in the past, to concerns over the validity of data produced by these systems. The dimension of the data integrity problem, however, has been substantially reduced with the advent of a Standardized Crime Reporting System (SCRS).

SCRS is still in an early stage of development as a national system. Its potential for establishing basic data on criminal occurrences, particularly when it is coupled with the concept of Attribute-Based Crime Reporting discussed below, is vast. The SCRS model is undergoing testing in five jurisdictions, four local police departments, and one state agency.

The SCRS model includes these features:

- Geocoding;
- Alphanumeric identifiers for events and recording officers;
- Easy-to-use forms;
- Simplified paper flow;
- Trained collectors, processors, and users of data;
- Clearly-defined responsibilities for report review, approval, and audit;
- Uniform criteria for report taking, property valuation, and offense classification;

- Thoroughly tested standardized data elements; and
- Case or event-oriented recordkeeping.

SCRS establishes four basic report forms:

- Complaint/dispatch report;
- Crime/event report;
- Follow-up investigation report;
- Arrest report.

Each form contains data elements that allow it to be linked to other forms associated with the same crime or event. Such linkage is a critical component of SCRS, in that it allows ready access to all related records. Furthermore, it supports the development of statistical information describing agency processing of cases.

A variety of output reports can be created from SCRS data. Most are intended to provide direct support to department management, but they can also be an important source of information for planners. Included are offense, arrest, court disposition, property loss, and activity summaries.

As more jurisdictions adopt SCRS, the possibility of comparative studies increases. Analysis of crime patterns and law enforcement responses at regional, state, and multi-state levels becomes possible.

Crime event reports have unique value to the researcher because they are retained for extremely long periods of time. Although files are periodically stripped of old cases, each document is generally microfilmed for the archives before being destroyed. The great volume of archival records permits very accurate statistical analysis for research and planning purposes. Another valuable source of case incident information is available from those departments which retain in computer usable form the massive amounts of data they periodically extract from SCRS for beat studies. This information is useful to the researcher and planner who is conversant with both the data elements and data processing methods and can modify or design output reports for special studies. For example, archival records can be used to examine the relations and attributes of offenders with victims, as well as the geographic distribution of crime and its relationship to demographic factors. Geocoding, an integral SCRS process, has reached very precise detailed levels in some of the larger law enforcement agencies which code individual addresses on the crime incident reports. Very sophisticated, correlative studies are possible with the address matching programs currently available.

Studies concerning the influence of such factors as police deployment, service policies, staffing levels and enforcement strategies upon offense, apprehension and clearance rates are additional examples of issues and relationships which can be researched through examination and analysis of SCRS data.

Finally, other correlative studies utilizing SCRS, ABCR, Bureau of Census and a host of collateral information systems may explain or offer insight into the impact of a wide range of environmental and

criminal justice factors on the phenomenon of crime, e.g., housing, lighting, travel barriers, sentencing practices, correctional programs.

- Attribute-Based Crime Reporting (ABCR)

ABCR can be seen as a companion system to SCRS. In terms of development, it is at the same point, with field testing of the ABCR model about to be undertaken in local and state agencies. Together, SCRS and ABCR constitute the optimum structure for gathering and supporting the analysis of crime incident data.

ABCR is a methodology for categorizing crime based upon the unique characteristics of the criminal event. Using this methodology, the specific attributes of each event are recorded and become the basis for producing the crime classification required not only by the individual agency but also by others in the criminal justice community. Originally, ABCR was seen as a means to use a computer to assign events to the variety of crime classifications in use today (e.g., Uniform Crime Reporting, the uniform offense classification used for NCIC/CCH, and the appropriate state statutes). ABCR would allow for automatic translation from basic attributes to any of these crime classifications.

The analytical power of ABCR has proven to be far greater than was originally anticipated. Combining the complete incident data included in ABCR with complaint, investigation, and arrest reports from SCRS results in a data base that can be manipulated to satisfy the needs of administrators and analysts alike.

At the operational level, law enforcement operations and management personnel can perform many types of crime analyses, not only for investigative purposes but also for better decision-making (e.g., in resource allocation, patrol dispatch, level of service).

At the planning level, ABCR data can provide the data needed for comparisons on either an agency-to-agency basis or program-to-program basis. These comparisons are needed to better allocate funding, determine program emphasis and measure program impact.

At the legislative level, criminal incident data that are easily retrievable and accurate can be used to discover legislative issues and to measure the impact of passed and proposed legislation.

At the research level, the ABCR data base provides a universe of crime data never before in existence. Not only are the data unique and unambiguous, they are also comparable from agency to agency, especially within the same state. Data can be analyzed using any combination of attribute descriptors. For example, victim/offender relationships can be analyzed by crime type. Crime locations can be used to predict future crime types at repeat locations. Correlations between crime types can be determined such as in rapes and robberies.

Combining criminal event data with other data bases can produce surprising correlations, such as in using unemployment, welfare, and education data along with the criminal event data to analyze causal effects or correlations with crime.

Computerized Criminal Histories (CCH)

The criminal history record chronicles each major contact that an individual has with the criminal justice process by documenting such events as arrests, dispositions, sentences, and correctional commitments. This record is the informational thread that weaves together the functions performed by law enforcement, prosecutors, defense, courts, corrections, probation and parole. What is significant about a criminal history record is that it is relied upon by a wide variety of users, all performing different functions at different points in the overall criminal justice process. Among these are prearrest investigations by law enforcement officers and prosecutors; arrest and bail release decisions; plea bargaining, court case preparation, and witness verification; juror qualification, witness verification, and sentencing; and post-trial corrections and probation/parole activities such as estimating the likelihood of escape and violence.

Hence, computerized criminal history systems are, today, the most collective source of data about the criminal justice process itself. Each of the major components of the system (law enforcement, courts, and corrections) relies upon specific reporting systems which collect data and provide information on the particular operations of that component. The UCR supports law enforcement; SJIS and OBSCIS application are designed to meet the respective informational needs of state judiciaries and corrections. A computerized criminal history system coordinates them all.

Since criminal history records collectively can be manipulated in numerous ways, managerial uses of the data become spinoffs from normal operating systems. New state-level systems to collect, manipulate and report this type of information are not necessary. Managerial needs can be met by manipulating existing data, available from operational computerized criminal history systems.

As of 1975, 28 states maintained a computerized criminal history capability; 17 states' systems contained complete criminal history records; others included summary records or are limited to name indices. More than 4,000,000 complete records were contained in the state systems.

Criminal history records contain:

- Personal descriptors (fingerprint classification, date of birth, sex, height/weight, aliases/nicknames, and residence locations and dates)
- Arrest data (arrest charges, places, and dates)
- Court/prosecution/probation data (charges: Pleaded to, reduced and/or sentenced; dispositions: charges, outcomes, probation terms)
- Corrections (where and how long incarcerated, parole/release, local/state/federal).

National Trial Court Information System (GAVEL)

GAVEL is still in its formative stage, with the project to define the system model just underway. This project is intended to:

- Determine the information required to operate and manage a trial court;
- Develop functional specifications for the GAVEL model; and
- Identify existing automated trial court information systems, which may contain elements appropriate for inclusion in the model.

Determination of the information requirements of any system is normally based upon an analysis of the information needs of those who are expected to receive system outputs. In the case of GAVEL, trial court operational personnel and administrators are the most obvious users of system information, and they will be consulted during the system development process.

There is also an opportunity in GAVEL, as in any criminal justice information system that is in the early stages of development, for planners to insure that their information needs are given consideration. Obviously, it is easier to design a function into a new system than it is to modify an operational system. Valuable information for planning can certainly be derived from existing data bases; nevertheless, planners have an opportunity (and a responsibility) as new systems such as GAVEL are created to participate in the design process.

Prosecutive Management Information System (PROMIS)

PROMIS was originally developed by the Office of the U.S. Attorney for the District of Columbia. Subsequently, PROMIS was declared an Exemplary Project by LEAA, and it is currently being adopted by prosecutors throughout the country.

PROMIS was developed with four major goals:

- To allow expenditure of resources on the preparation of cases in a manner proportionate to their relative importance;
- To monitor and insure consistency in the exercise of prosecutorial discretion;
- To alleviate scheduling and logistical impediments to the adjudication of cases on their merits; and
- To analyze problems in the prosecution of criminal cases.

A complete overview of PROMIS is included in the references listed in the bibliography. Exhibit 2.15 lists systems functions in relation to the above goals. For this discussion, we focus upon one particularly interesting feature of the model, that of providing a basis for ranking cases by "importance."

The fragmentation of case control and responsibility, which is a characteristic of the assembly-line processing methods of large,

EXHIBIT 2.15

PROMIS GOALS AND CAPABILITIES

1. Allocate Resources Based on Importance of Cases	. Uniform rating of crime gravity . Uniform rating of defendant prior record gravity . Calendar listings of pending cases in descending order of gravity
2. Monitor Even-Handedness	. Automation of reasons for discretionary decisions . Tracking of relationship between police charges and prosecution charges . Ability to conduct special studies relating disposition patterns not only to legal charges but also to gravity ratings
3. Control Scheduling and Logistical Problems	. Automated subpoena generation . Display of reasons for prior postponements in each case . Automated alert when defendant has more than one case pending . Listings of fugitives from pending cases . Case aging lists . Case listings by assistant prosecutor
4. Research and Analysis Capability	. Periodic statistical reports on: - intake and screening - preliminary hearings and grand jury cases - misdemeanor and felony trials - disposition types - delay problems - abscondency problems . Ability to perform special studies, e.g., - geo-based studies of crimes and arrests - patterns of criminality - plea bargaining

urban prosecution agencies, tends to shroud the volume of pending cases in a blanket of anonymity. The prosecutor's perception of the value and merits of individual cases becomes blurred by the high speed, repetitious handling of masses of cases, all of which begin to look alike.

Although the ideal of carefully and thoroughly preparing each case is generally unattainable in such an environment, it is possible to devote what scarce resources do exist to the intensive preparation of the most important of the pending cases. However, it is first necessary to strip away the anonymity from the massive pending caseload so that differences in relative importance will be clearly evident.

A common set of criteria is needed for comparing one case to another so that the prosecution management does not have to memorize the contents of hundreds of case jackets in order to identify an order of importance. A hierarchy of legal charges is not sufficient for this purpose because important differences in defendants' prior records and in degree of harm to society are masked under the same legal charges. For example, there may be dozens of pending assault cases, some involving defendants with lengthy prior criminal records and inflictions of serious injury and some involving first offenders with relatively less infliction of injury.

PROMIS provides comparability among cases by rating each case according to two standard sets of criteria. One set measures the amount of harm done to society by the alleged offense, and the other set measures the gravity of the prior criminal record of the accused. Since these ratings are numerical, it is possible to compare one defendant to another, irrespective of the current charges against each, and to compare one crime to another whether or not both involve the same statutory offense. Based on these ratings, prosecution management can intelligently apportion its limited attorney time to the intensive preparation of those cases on the day's calendar which involve relatively more important crimes and offenders. PROMIS prints out a copy of the court calendar for each date, but instead of listing the cases in the order the court will call them, e.g., oldest case first, alphabetically, or in ascending order by docket number, it lists them in descending order of importance according to the gravity of the crime and the gravity of the prior record of the accused.

Crime gravity or "seriousness" is measured by a set of criteria developed by criminologists Marvin Wolfgang and Thorsten Sellin of the University of Pennsylvania (see Module 3). These criteria, which are applied to the case by the assistant prosecutor and the arresting police officer during intake and screening, assess the amount of harm done to society through a measurement of the amount of personal injury, property damage or loss, and intimidation.

The defendant gravity is measured by a variation on a set of criteria developed originally for the California Department of Corrections to predict recidivism among parole candidates. These criteria pertain to the density of prior arrests and convictions, particularly for crimes against persons, and the use of aliases.

PROMIS provides extensive data on the prosecutorial function. Almost 170 different data items are included for each case: biographical data, data about the crime and arrest, about the relationships among the principles in the case and about each prosecution and court action affecting the case.

- State Judicial Information System (SJIS)

The SJIS program is the first multi-state effort to bring management information systems to state-level judicial administration. Versions of the SJIS model are presently being implemented in 18 states. The model supports eight functions seen as being common to state court administration throughout the country:

- Monitoring and supervision;
- Resource allocation;
- Planning;
- Research and development;
- Budgeting;
- Legislative liaison;
- Training and education; and
- State and local government liaison.

You will note that planning has been specifically included and that in fact several of the listed functions are closely related to analytical planning activities. It turns out that a major responsibility of state-level court administration is planning.

The SJIS data base is structured to allow flexibility in adapting the model to individual state needs while still supporting comparative studies. Each state has built its own system, yet there is in fact a high degree of commonality.

If one were to compare the SJIS data base with the data bases associated with the other six national systems we are discussing today, one would be struck by the number of data elements they have in common. Expanding the comparison to include data to support planning at regional, state, and national levels again reveals a high degree of commonality. The reality is that the information required to effectively manage criminal justice operations does not differ significantly from that which is required to plan for those same operations. Planners massage the data in different ways, but the data are essentially the same.

Offender-Based State Corrections Information System (OBSCIS)

In 1974, SEARCH Group, Inc. launched the Offender-Based State Corrections Information System (OBSCIS) project. The goal of this project has been to identify practical guidelines and uniform standards for the development of correctional information and statistical systems for use as a research and planning tool. Now in its third year of development, OBSCIS involvement has grown from 10 states initially to 23 states today.

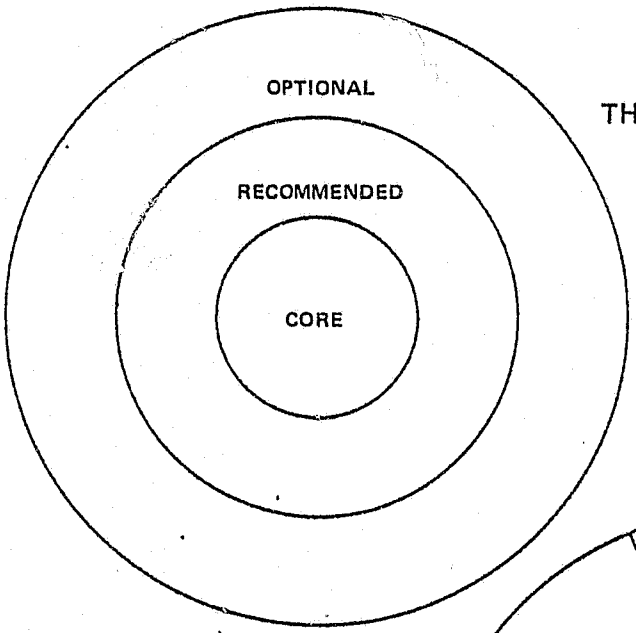
During phase I, the project produced a model (Exhibit 2.16) that attempted to satisfy the basic informational needs of correctional administrators while supporting the requirements of other criminal justice system designs such as Offender-Based Transaction Statistics/Computerized Criminal Histories (OBTS/CCH) and National Prisoner Statistics (NPS).

The OBSCIS data base is structured into three strata of data elements. A minimum necessary to support all national corrections information programs is known as the Core level. Elements found in the Core level include basic items such as sex, birthdate, offenses, sentence, etc. Where applicable, a uniform coding structure has been developed to standardize the data among all states. The Core Data Base elements are structured to meet the national reporting requirements of OBSCIS and OBTS/CCH.

Extending beyond the Core is a recommended group of data elements which form the basis for correctional information systems at the state level. Some Core level elements are expanded at this level and other elements not found at the Core level are added at the recommended level. Examples of added Core level elements include birthplace, alias, and parole board decisions.

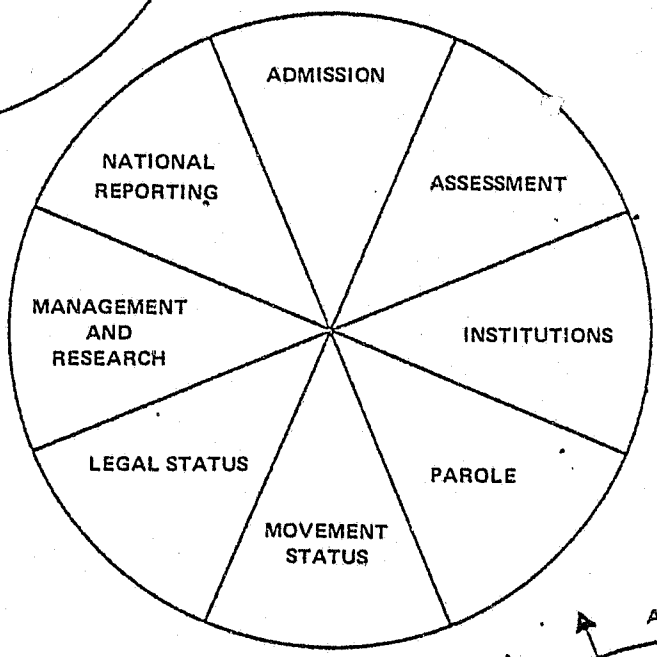
At the outer perimeter of the data base are optional data elements for those states developing additional capabilities and features. This level encompasses those data elements found at the Core and Recommended levels but may include expanded definitions or more detailed coding. For example, in the standard list an offender's alias is specified with a yes/no indicator while in the Optional category, a list of all known aliases can be developed and collected. Thus, the OBSCIS data base can be expanded to meet the needs of a particular corrections environment. The information in an offender-based system, however, is just that. It is offender information and does not fully respond to the information needs of correctional management. The Management and Research application, one of eight OBSCIS applications, has a potential for unlimited expansion as an application area. It is necessary to recognize that wide variations exist and to focus upon key areas which are of potential value to administrators.

EXHIBIT 2.16
THE OBSCIS DATA BASE, APPLICATION AREAS AND MODEL

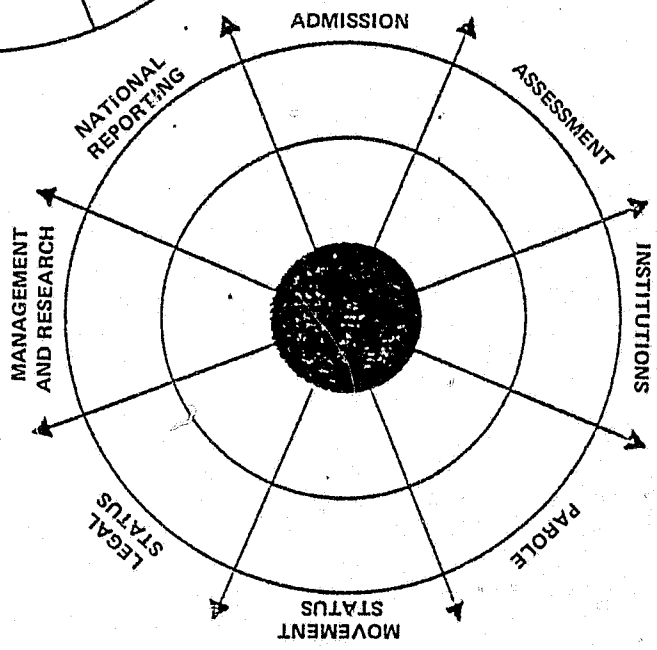


THE OBSCIS DATA BASE

The OBSCIS Application Areas



The OBSCIS Model



EXERCISE #5

DATA COLLECTION AND ANALYSIS: AN EXAMPLE

Purpose

This exercise is intended to immediately involve participants in the analytic process by considering the relationship of data to problem statements and the identification of additional data to elaborate a problem statement. It also serves to relate data collection and data analysis which is developed in Module 3, thus providing a transition in the training course.

Activities

The instructor begins the exercise by dividing the group into six small groups, and then gives the following instructions:

The Metropolis Crime Planning Board has decided that in 1977 and 1978 it wants to concentrate its attention on one of the four most common offenses (Burglary, Robbery, Assault, and Larceny) reported to the police in Metropolis according to the FBI's Uniform Crime Reports.

A study conducted by the State's Crime Analysis Bureau reveals the rates per 100,000 population shown in Exhibit 2.17 for these four offenses for 1975 and 1976 in Metropolis. The study also presents comparisons with Homewood, another city in the state of comparable size.

- Develop a clear statement of the Metropolis' crime problem based on this data;
- Illustrate the kinds of data and analyses which would be necessary in order to aid the Planning Board in choosing the offense on which to concentrate and in choosing an appropriate strategy for dealing with the selected offense;
- Examine the data in Exhibit 2.17 and answer the following questions:
  --What kinds of analyses can be performed with the data provided?
  --What other kinds of data would you need for further analysis?
  --How would these data be obtained?

EXHIBIT 2.17

STATE OF ALEXANDRIA, FOUR CRIMES REPORTED TO POLICE MOST FREQUENTLY IN METROPOLIS AND HOMEWOOD, 1975 AND 1976.
(Per 100,000 population)

	1975		1976	
	Metropolis	Homewood	Metropolis	Homewood
Burglary	1908	1201	2263	1363
Theft	872	1014	896	1052
Robbery	912	898	991	1054
Assault	761	521	807	533

Source: State of Alexandria, Crime Analysis Bureau, 1976. Hypothetical data.

MODULE 2--END NOTES

(1) American Justice Institute, Burglary in San Jose (Springfield, Va.: NTIS) #PB 211 789.

(2) As reported in Housing in the Seventies, National Housing Policy Review. U.S. Department of Housing and Urban Development, 1976.

(3) LEAA, National Advisory Commission on Criminal Justice Standards and Goals, A National Strategy to Reduce Crime (Washington, D.C., 1973), p. 23.

(4) Ibid.

(5) Ibid., p. 25.

(6) Ibid.

(7) Office of Juvenile Justice and Delinquency Prevention, LEAA, Second Analysis and Evaluation: Federal Juvenile Delinquency Program, Vol. I, p. 59.

(8) President's Commission on Law Enforcement and the Administration of Justice, The Challenge of Crime in a Free Society (Washington, D.C., U.S. Government Printing Office), p. 55.

(9) See the Commission's Report on Criminal Statistics.

(10) See the Task Force Report, Crime and Its Impact--An Assessment.

(11) See the Summary Volume, A National Strategy to Reduce Crime, and the volume entitled, The Criminal Justice System.

(12) Project SEARCH later became SEARCH Group, Inc.*

(13) See Project SEARCH Technical Reports Nos. 3, 4, and 5.

(14) See SGI Advisory Bulleton No. 2.

(15) See SGI Advisory Bulleton No. 3.

(16) Survey conducted by Brandon Associates, Inc. for LEAA's 1976 Directory of Automated Criminal Justice Information Systems.

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* SEARCH Group Inc., 1620 35th Avenue, Suite 200, Sacramento, California.

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The references included in this bibliography were selected because they are either representative of a broader range of literature, are a standard reference in the field, or are useful for a particular purpose.

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GENERAL

U.S. Department of Justice, LEAA. Sourcebook of Criminal Justice Statistics--1976, Washington, D.C.: U.S. Government Printing Office, 1977.

The Sourcebook contains an extensive compilation of criminal justice and related statistics which are nationwide in scope. The material includes data on characteristics of the criminal justice system, public attitudes toward crime and criminal-justice related topics, the nature and distribution of known offenses, characteristics and distribution of persons arrested, judicial processing of defendents, and persons under correctional supervision.

President's Commission on Law Enforcement and Administration of Justice. The Challenge of Crime in a Free Society, Washington, D.C.: U.S. Government Printing Office, February 1967.

One of the standard reference works on crime and system problems at a national level, illustrating the use of a number of different data sources to determine the problems and some possible solutions.

ACTUAL CRIME VICTIMIZATION DATA

Wesley G. Skogan, ed. Sample Surveys of the Victims of Crime, Cambridge, Mass.: Ballinger Publishers, December 1976.

An edited textbook of readings on victimization surveys.

James A. Inciardi and Duane C. McBride, "Victim Survey Research: Implications for Criminal Justice Planning," Journal of Criminal Justice, vol. 4, 1976, pp. 147-151.

Discusses various uses of victimization surveys.

Clifford W. Marshall, Alfred I. Schwartz, and Sumner N. Clarren. Obtaining Reported Crime Data for Analysis: A Case Study (Cincinnati), Washington, D.C.: The Urban Institute, 1977.

This is a good example of a local data collection and management effort.

The following are victimization survey analyses:

U.S. Department of Justice, Law Enforcement Assistance Administration. Crime in Eight American Cities: National Crime Panel Surveys in Atlanta, Baltimore, Cleveland, Dallas, Denver, Newark, Portland, and St. Louis. Advance Report. Washington, D.C.: U.S. Government Printing Office, July 1974.

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PUBLIC OPINION DATA

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U.S. Senate, Subcommittee on Intergovernmental Relations, Conference and Concern. Citizens' View, American Government--A Survey of Public Attitudes, Washington, D.C.: U.S. Government Printing Office, December 1973.

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U.S. Department of Justice, Law Enforcement Assistance Administration. Public Opinion Regarding Crime, Criminal Justice, and Related Topics, by Michael J. Hindelang. Analytic Report 1. Washington, D.C.: U.S. Government Printing Office, January 1975.

Dae H. Cleary and Charles H. Zastrow, "Police Evaluative Perceptions of Themselves, the General Public and Selected Occupational Groups," Journal of Criminal Justice, vol. 4, no. 1, (Spring 1976), pp. 17-28.

An opinion survey on how police perceive themselves, the public and some occupational groups. Findings include high self-esteem among police, low ranking of prison inmates, politicians, college students and lawyers from a list of thirteen occupations.

REPORTED CRIME DATA

U.S. Department of Justice, Federal Bureau of Investigation, Uniform Crime Reports for the United States, Washington, D.C.: U.S. Government Printing Office, yearly.

Yearly reports available from 1930, when the program began, to the present.

Michael J. Hindelang. "The Uniform Crime Reports Revisited," Journal of Criminal Justice, vol. 2 (1974), pp. 1-17.

Assesses accuracy of Uniform Crime Reports through comparisons with homocide statistics collected by the Center for Health Statistics and the 1967 National Opinion Research Center victimization survey.

Michael D. Maltz. "Secondary Analysis of the UCR," Journal of Criminal Justice, vol. 4, no. 2 (Summer 1976).

Proposes an index of the Risk of Death due to Robbery based on the FBI's partial disaggregation of the murder statistics.

DEMOGRAPHIC STATISTICS

Two good introductory pieces on demographic data are:

Henry S. Shryock, Jacob S. Siegel and Associates. The Methods and Materials of Demography, vol. II, Washington, D.C.: U.S. Government Printing Office, 1971, pp. 757-58.

Leonard Oberlander, ed. "Data Use Tools and Techniques Available to Criminal Justice Professionals,"(chapter 14) in Quantitative Tools for Criminal Justice Planning, Washington, D.C.: Law Enforcement Assistance Agency, 1976.

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Samuel Korper, et al. "Composite Social Indicators for Small Areas--Census Use Study--Recent Developments in Methodology and Uses," Census Tract Papers, Series GE-40, No. 9, Area Statistics, American Statistical Association, Montreal, Canada, Washington, D.C.: U.S. Government Printing Office, 1973, pp. 18-23.

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U.S. Department of Justice, Law Enforcement Assistance Administration. Offender-Based Transaction Statistics: New Directions in Data Collection and Reporting, by Carl E. Pope. Analytic Report 5. Washington, D.C.: U.S. Government Printing Office, 1975.

Other system-related publications include:

U.S. Department of Justice, Law Enforcement Assistance Administration. The Judicial Processing of Assault and Burglary Offenders in Selected California Counties, by Carl E. Pope. Analytic Report 7. Washington, D.C.: U.S. Government Printing Office, 1975.

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Sheldon Gleuck and Eleanor Gleuck. Delinquents and Nondelinquents in Perspective, Cambridge, Mass.: Harvard University Press, 1968.

This book is a continuation of a study of 500 white delinquents and 500 white nondelinquents from slum neighborhoods. It summarizes findings over a 15-year period. Many variables are analyzed including family background, mental and physical health, school experiences, and environmental conditions. The follow-up study found the differences between the delinquent and nondelinquent groups continued to a marked degree, although crimes in the delinquent sample dropped off beyond the 17-25 age span suggesting delayed maturation. The book discusses other differences between the two groups and ways the findings can be used.

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One of the standard texts on sampling is:

L. Kish, Survey Sampling, New York: John Wiley & Sons, Inc., 1965.

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J. Davis, Elementary Survey Analysis, Englewood Cliffs: Prentice-Hall, Inc., 1971.

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Project SEARCH has developed extensive documentation on large-scale information systems as indicated in the End Notes. However, good sources for small systems information are:

Donald G. Hanna and John R. Kleborg. A Police Records System for the Small Department, Springfield, Ill.: C. Thomas, 1977.

Ernest Cresswell (ed.). The Proceedings of the Second International Symposium on Criminal Justice Information and Statistics Systems, San Francisco: April 1974.

Edward F.R. Hearle and Raymond Mason. A Data Processing System for State and Local Government, Englewood Cliffs, N.J.: Prentice-Hall, 1963.

A good conceptual foundation is presented although the technical information is dated.

System Development Corporation. Urban and Regional Information Systems, Washington, D.C.: D.H.U.D., 1968.

An overview of cases, theory and practical issues of system design and development.

N O T E S

U.S. Department of Justice
Law Enforcement Assistance Administration
Washington, D.C.
1977

INTRODUCTION TO ANALYSIS OF CRIME AND THE CRIMINAL JUSTICE SYSTEM

MODULE 3: DATA INTERPRETATION – CRIME

This work was performed by Abt Associates Inc., Cambridge, Massachusetts, for the Law Enforcement Assistance Administration under Contract No. J-LEAA-001-77. John Moxley, Training Division, Office of Operations Support, LEAA, served as project monitor. Points of view or opinions stated in this document do not necessarily represent the official position or policies of the U.S. Department of Justice.

MODULE ABSTRACT

Title: Module 3: Data Interpretation - Crime

Lecturer:

Objectives:

A major theme of this training program is to develop tools and skills essential for criminal justice analysis. Descriptive and inferential statistics are a traditional starting point for the interpretation of crime data, and, thus, are the focus of this module.

The emphasis throughout is on practical, useful and readily understood methods. Mathematical theory is not dealt with; instead, demonstrating problem-solving using the statistics is the primary goal. In going over the following material, the reader should focus on: (1) how the results of the various calculations are used to interpret crime data; and (2) when the use of a specific analytic tool is appropriate.

In the second portion of the module inferential tools are presented which have wide application to two generic problems encountered by analysts of crime. The first involves inherent problems of explaining crime. Two methods which have application to crime data and that aid in examining the relationships between crime and other variables are presented. The second problem generic to crime analysis and planning is prediction. In this module the emphasis is on easy to use and interpret prediction methods deemphasizing theory but covering the limits and strengths of the prediction methods.

After completing this module, participants should be able to.

1. Identify and distinguish between:
   - measures of central tendency and measures of variation
   - mode, mean, and median
   - index of qualitative variation, range and average deviation
   - pie charts, bar graphs, time charts, and frequency histograms
   - descriptive and inferential statistics
2. Calculate and interpret the following:
   - rates, percentages , percent change
   - mode, median and median
   - range, index of qualitative variation, and average deviation
   - a percentaged cross classification table
   - scatter diagrams

3. Define, calculate and interpret the following:
   - chi square statistic
   - correlation coefficient
   - regression coefficients
4. Be able to explain and utilize the following concepts:
   - central tendency
   - variation
   - distributions
   - association
   - independence/dependence
   - prediction
   - time series model
   - causal model
5. Be able to explain the purpose and outline the general process of statistical tests.

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Data Interpretation--Crime

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MODULE 3: DATA INTERPRETATION--CRIME

I. INTRODUCTION

What is "data interpretation" as used in this course? Essentially it is the application of a set of tools used for converting data about crime and system performance into information valuable for decision-making. These tools include both quantitative techniques as well as qualitative methods. In this module the emphasis is on the quantitative techniques used to interpret crime data, while the interpretation of system performance data is presented in Module 4.

The types of quantitative methods that are used to interpret crime data range from the application of graphs, charts and maps to multi-variate modeling methods useful for understanding and predicting trends in crime. This module concentrates on building skills involving more basic quantitative tools--descriptive and inferential statistics.

There are two reasons for so defining the module. First, this course is an Introduction to the Analysis of Crime and the Criminal Justice System, and descriptive and inferential statistics are a traditional starting point for conducting data analyses. Secondly, there seems to be an inverse relationship between the complexity of the methodology used by planners and their impact on decision-making. A premise of this module is that the proper use of basic quantitative tools by planners will result in a significant impact on the decision-making process.

What are/is statistics? The question implies the answer for statistics is a collection of numerical facts about ourselves and our environment as well as a set of tools used to deal with such numerical facts. It is this latter definition which is used as one of this course's themes, emphasizing the view that statistics is concerned with the collection, organization and interpretation of numerical facts or observations about crime and system performance.(1)

In the first section of this module, the use of various statistical techniques for describing crime data is presented and demonstrated. Descriptive statistics are used for two purposes. They are used to characterize what is "typical" about a crime, i.e., how it is performed, where and when in the community it most frequently occurs, and who the average offender is. For instance, of the 975,630 estimated robberies in 1974, less than half involved the use of a weapon (47%). Of the robberies involving a weapon, the knife was the most frequently used weapon (43%). Sixty percent of all robberies took place on the streets or in parks; forty-six percent took place between the hours of 6:00 a.m. and 6:00 p.m. Finally, the "typical" suburban robber in 1974 was a white, male between 25 and 29 years of age. It is assumed that the planner has data on each crime and each offender and wants to describe the principal characteristics of the crime, criminal activity in

the jurisdiction, or the types of offenders involved in specific crimes. The statistical measures used for such descriptions are the mean, mode and median, known collectively as measures of central tendency.

A second purpose of descriptive statistics is to measure the variation in crime data. Variation refers to the differences among the various measured observations. Measures of variability are used to indicate how widely individual measurements vary from the central tendency in the data. Using the example of robbery again, the state with the lowest robbery rate per 100,000 inhabitants in 1974 was Iowa (10.1) while the state with the highest rate was New York (476.3). The minimum and maximum values of a distribution as well as the range for a distribution (466.2 in the example above) are three statistical measures of variation. Other such statistical measures of variation are the average deviation and the related coefficient of variation.

In addition to these descriptive statistics, this module presents and illustrates various graphical techniques for describing data for a single variable. Sets of statistical measures by themselves don't convey the complete description of a crime trend. They are enhanced and supported by carefully conceptualized graphics. In this module two categories of graphics are presented using crime data examples: those used to describe quantitative data--time charts, frequency histograms and polygons; and those appropriate for describing qualitative variables--charts, graphs and maps.

With consideration of how to construct and interpret crime rates and the construction of cross classification tables the module shifts attention to tools used to describe the relationship between two or more variables. For example, consider the question of whether or not regional variations occur in terms of the types of weapons used in robberies. Exhibit 3.1 presents a cross classification table of armed robberies classified by type of weapon used and region in 1974. Note both the central tendencies of the data, as well as significant variations.

Exhibit 3.1

Robberies Known to Police,
By Type of Weapon Used and Region, 1974

	Type of Weapon			
Region	Firearms	Knife	Other	Strong Armed
Northeast	34.0	20.5	11.0	34.5
North Central	51.4	7.4	7.6	33.6
Southern	55.0	8.0	5.0	31.5
Western	42.5	12.9	7.4	37.2
All U.S.	44.7	13.1	8.1	34.1

Source: Sourcebook, 1976, p. 505.

The use of crime rates by comparison of rates across jurisdictions and over time can lead to the identification of differences. If different rates do exist these facts may indicate potential contributory factors to the crime rate. Calculating such crime rates with respect to other variables such as demographic characteristics of the jurisdiction may lead to a better understanding of the causes of crime.

The final part of the Descriptive Statistics section covers how to measure crime seriousness using the Wolfgang-Sellin scale. Measures of crime seriousness are used to indicate the amount of harm inflicted on a community over time and the relative seriousness of crime among jurisdictions or smaller areas of a jurisdiction. Such information can be used as an aid in assessing manpower requirements, and budget allocations or in identifying the need for special programs and projects.

In the second section of this module two elementary concepts of inferential statistics are covered. The purpose of inferential statistics is to make an estimate or prediction about a population such as offenders, or a phenomenon--such as crime--based on a small amount of data contained in a sample. In this course two basic analytic problems faced by planners are treated by the tools of inferential statistics. The first problem involves measuring the relatedness of two variables, while the second involves measuring the predictability of a relationship, or expressed another way, the idea of finding the value of one variable from a knowledge of the values on another variable. A typical prediction problem faced by planners is to predict the value of a specific variable such as the amount of robbery in a jurisdiction next year, given values for that variable over the past five years.

Measuring the relatedness between two variables, such as unemployment rate and persons under correctional supervision, involves two concepts: first, determining the nature or direction of the relationship between these two variables, and second, estimating the strength of their relationship. Commonly used measures of association which are presented in this module are the chi square statistic used as a tool for interpreting cross classification tables and the Pearson product-moment correlation used to interpret the relationship between continuous variables (continuous here refers to variables measured on an interval or ratio scale).

The last topic covered is regression. This technique requires the planner to distinguish between the variable about which predictions are to be made and the variable from which we make the prediction. Thus the planner must designate one variable as the independent or "causal" variable and the other (s) as the dependent or "effect" variable. Special consideration is given to the problems of time series predictions using the "least squares" method. Included are presentations of scatter diagrams, free hand regression lines and the method of least squares.

The emphasis throughout this module is on 1) the proper application of basic quantitative tools to problems of interpreting crime data; and 2) relating these tools to the analysis process both in terms of the problem formulation and data collection steps as well as the presentation step.

II. DESCRIPTIVE TOOLS

A. Measures of Central Tendency

A number of easily calculated measures are available to summarize numerical data for a single variable, facilitate comparisons and interpretation of crime data, and, hence, increase its utility to the planner. Central tendency is here used to describe the representativeness, typicality or centrality of a distribution. The idea is that data for a single variable, such as the age of offenders, tend to cluster around a central value which is between the two extreme values of the variable being studied.

Locating a central value can be very useful in reducing a mass of data to easily understood quantitative values which in turn can be readily communicated to decision-makers, particularly when coupled with a description of the distribution of the data about the central point--a subject covered in the following material. In addition, to reducing masses of data, measures of central tendency simplify the task of drawing conclusions and making generalizations about the crime problem in the community. Following are the definition and examples of three common measures of central tendency: the mean, the median and the mode.

1. Mean

Imagine that the small state of Paradise has a total of ten cities. The City of Chaos had, in 1976, 91 murders. Each of the other nine cities had one murder, for a total of 100 murders in Paradise. Since the state allocates resources to each city evenly based on the average state-wide incidence of homicide, the Mayor of Chaos feels, rightfully, that there is a problem. Using the mean number of homocides per city of ten to determine allocations ignores the actual crime situation.

If a distribution, such as the number of murders in 1976 in the ten cities of Paradise, is sharply skewed, or asymetrical, use of the mean is often deceptive. Extreme scores, such as the value loss of the bank robbery in Exercise 6, can significantly effect the value of the mean. In such cases it would be more informative to use the median, or, especially in such an extreme example as Paradise, the mode of one murder to describe what is typical about Paradise.

MEAN

$$\bar{X} = \frac{X_1 + X_2 + X_3 + \ldots\ldots X_n}{N} = \frac{\Sigma X}{n}$$

$\bar{X}$ = Mean, N = number of values

Example

Murder Rate Per 100,000 Population, 1974.		
Northeastern	7.6	
North Central	7.6	
Southern	12.9	N = 4
Western	7.8	
$\Sigma X =$	35.9	

mean murder rate per 100,000 population in 1974 $= \bar{X} = 8.98$

2. Median

The median is a special case of percentile ranks. That is, by definition, the median is the score at the 50th percentile, thus requiring that the categories of a measure be ordered. The median is determined so that half the observations are equal to or greater than the middle observation and half of the observations are equal to or less than the middle observation.

Since the median requires ordered data, some information is lost in using it. A second limitation of the median is that it is time-consuming, requiring the ranking of possibly hundreds of scores. Two other limits are that few people understand it, and that it is subject to fluctuation given small differences in observed values of a variable in contrast to the mean.

MEDIAN

The median of a set of numbers arranged in order of magnitude is the middle value or the arithmetic mean of the two middle values.

Example

Murder Rates for Five Selected Cities, 1974.

Monroe, LA	14.7
Roanoke, VA	10.5
Stockton, CA	9.0
Waco, TX	7.4
Wichita, KA	5.4
Syracuse, NY	3.5

$$9.0 + 7.4 = \frac{16.4}{2}$$

8.2 median

3. Mode

The last measure of central tendency considered here is the mode. It is the easiest of the measures to calculate, yet its use is rare in criminal justice planning.

There are two explanations for the mode's lack of use:

a. it is not stable; adding a few additional observations can significantly change the modal value, and

b. a distribution may possess more than one mode, thus making it an ambiguous measure (i.e., a bimodal or multi modal distribution)

Nevertheless, the mode is almost always found by simply inspecting a distribution for the value(s) which most frequently occur.

MODE

The mode for a set of measurements is the value(s) that occurs with the greatest frequency.

Example

Weapons Used in Homicides - 1974

Gun	12,474
Cutting or Stabbing	3,228
Blunt Object	976
Personal Weapons	993
Poison	9
Explosives	9
Arson	153
Narcotics	36
Strangulation	424
Asphyxiation	71
Unknown Weapon	259
	18,632

The Gun is the modal choice.

B. Measures of Variation

The purpose of numerical description is to obtain a set of measures (one or more) that is useful in communicating a simple mental impression of a complex data distribution. Measures of central tendency only portray part of this impression; equally important is the relative distribution of the measurements.

Measures of variation are companions to central tendency measures; that is, while measures of central tendency describe what is "typical," measures of variation can be used to describe its adequacy or representativeness. Specifically, measures of variation have two primary purposes: 1) to describe how well the central tendency measure represents the central tendency in the data distribution, and 2) to summarize the dispersion of observations throughout categories in a distribution. The lower the value of the measure of variation the more adequate or representative the central tendency measure.

In this section two types of variation measures are presented. First considered are measures used to describe variation in categorical or qualitative data. These measures are the Variation Ratio and the Index of Qualitative Variation. Secondly, the Range and Average Deviation are described as measures of variation for continuous data distributions.

1. Variation Ratio

In Exercise 6, Exhibit 3.7 there are nine qualitative or categorical variables--Sex, Race, Employment Status, Prior Record, Type of Weapon, Place of Arrest, Type of Robbery, Place of Occurrence, and Sex of Victim. Consider how much variation there is, for instance, in the type of robbery experienced in the community. Data for type of robbery are displayed in Exhibit 3.2.

Exhibit 3.2

Incidence of Robbery, By Type of Robbery, Chaos City, 1974

Type of Robbery	Frequency
Robbery and Attempted Robbery with Injury	5
Robbery without Injury	8
Attempted Robbery without Injury	2
	15

Source: Exercise #6

The mode is robbery without injury. One way of measuring the variation in this categorical variable is to observe the proportion of observations in the nonmodal categories. This is the procedure used to calculate the Variation Ratio (V).

VARIATION RATIO (V)

$$V = \frac{1 - f_{mode}}{N}$$

V = Variation Ratio

f_{mode} = Frequency of the Mode

N = Number of Observations

Example

Using the data in Exhibit 3.2

$$V = \frac{1 - f_{mode}}{N}$$

N = 15

$f_{mode} = 8$

$$V = \frac{1 - 8}{15}$$

$$V = .47$$

2. Index of Qualitative Variation

A second tool for measuring variation in qualitative data is the Index of Qualitative Variation (IQV). This index is another tool used for interpreting qualitative differences of observations in a distribution. Consider the qualitative variation illustrated in Exhibits 3.3 and 3.4. Which distribution has greater variability?

Exhibit 3.3

Offenders, By Sex of Offenders
Chaos City

Sex of Offenders	Frequency
Male	13
Female	2

Source: Exercise #5

Exhibit 3.4

Victims, By Sex of Victims,
Chaos City

Sex of Victims	Frequency
Male	9
Female	6

Source: Exercise #5

INDEX OF QUALITATIVE VARIATION

$$IQV = \frac{\text{total number of observed differences}}{\text{maximum number of possible differences}} \times 100$$

$$\text{maximum number of possible differences} = \frac{n^2(L - 1)}{2L}$$

where n = total number of observations

and L = number of classification levels

Example

Using the data in Exhibit 3.3

$$\text{maximum number of possible differences} = \frac{15^2\ (2 - 1)}{2\ (2)}$$

$$= 56.25$$

$$\text{total number of observed differences} = 13 \times 2$$

$$= 26$$

$$IQV = \frac{36}{56.25} \times 100\%$$

$$IQV = 64\%$$

Using the data in Exhibit 3.4

$$\text{maximum number of possible differences} = \frac{15^2\ (2 - 1)}{2\ (2)}$$

$$= 56.25$$

$$\text{total number of observed differences} = 9 \times 6$$

$$= 54$$

$$IQV = \frac{54}{56.25} \times 100\%$$

$$IQV = 96\%$$

If the IQV is equal to 0 then there is no qualitative difference in the distribution. Such would be the case if all victims or all offenders were male. If the IQV is equal or close to 100% then there is great variability in the distribution with respect to the qualitative factor. In the preceding example the obvious conclusion of greater variation in the sex of victims data is confirmed by comparing the two calculated IQVs.

3. Range

In describing the variation in the distribution of a continuous variable such as crime rates, different measures of association must be used than those just presented. The Range, for instance, is the difference between the largest and smallest values in a distribution. It is a measure of the span of possible values within which observed values for a variable actually occur. Because only the maximum and minimum values are considered, the range provides no indication of the form of the distribution--whether they are all clustered or evenly spread out across the distribution

RANGE

Range = Maximum - Minimum

Example

Exhibit 3.5 presents murder rates for selected metropolitan areas across the United States classified by region for 1971 and 1974. Following are calculations of the Range for selected groups and subgroups:

$$\text{Range}_{1971} = 25 - 1 = 24$$

$$\text{Range}_{1974} = 21 - 1 = 20$$

$$\text{Range}_{\text{North-74}} = 20 - 1 = 19$$

$$\text{Range}_{\text{South-74}} = 21 - 13 = 8$$

$$\text{Range}_{\text{West-74}} = 14 - 4 = 10$$

The range is most frequently used in summaries of data made available to the public, in highlighting crime data by emphasizing extremes, and for describing the variation in small samples. Like the mode, the range is an unstable statistic; changes in either the maximum or minimum result in changes in the range. The range's dependence on extreme values in a distribution also makes it susceptible to data problems.

Exhibit 3.5

Murder Rates for Thirty Cities from the North, South and West, 1971 and 1974

South	1971	1974
Atlanta, Ga.	20	21
Augusta, Ga.	22	17
Birmingham, Ala.	14	18
Charlotte, N.C.	25	18
Corpus Christi, Tex.	13	14
Dallas, Tex.	18	15
Houston, Tex.	17	19
Richmond, Va.	15	15
Washington, D.C.	11	13
Wichita Falls, Tex.	6	14
North		
Albany, N.Y.	3	3
Atlantic City, N.J.	5	15
Chicago, Ill.	13	16
Detroit, Mich.	15	20
Grand Rapids, Mich.	3	4
Lancaster, Pa.	2	1
Madison, Wis.	2	2
Pittsfield, Mass.	1	1
South Bend, Ind.	6	8
Syracuse, N.Y.	4	4
West		
Boise, Idaho	5	4
Denver, Colo.	8	7
Fresno, Calif	8	13
Honolulu, Hawaii	4	9
Kansas City, Mo.	13	12
Sacramento, Calif.	6	7
St. Louis, Mo.	15	14
San Francisco, Calif.	8	12
Seattle, Wash.	4	6
Vallejo, Calif.	4	9

*Rates represent the number of murders per 100,000 population rounded to nearest whole number.

Source: Sourcebook, 1976, and Mendenhall, Ott and Larson. Statistics for the Social Sciences, 1975.

4. Average Deviation

The Range is based on only two values in a distribution. In contrast, the average deviation utilizes all values in a continuous distribution to determine the amount of variation. Deviation in a distribution refers to the distances of each value from either the mean or median. Since these distances will be either positive or negative, and their sum necessarily equals zero, the average deviation utilizes the absolute values of these distances for computing the variation of a distribution.

AVERAGE DEVIATION

1. $$AD_{\bar{X}} = \frac{\Sigma|X - \bar{X}|}{n}$$

   $AD_{\bar{X}}$ = Average Deviation from the mean

   X = observed values

   $\bar{X}$ = mean

   n = number of observations

2. $$AD_{median} = \frac{\Sigma|X - median|}{n}$$

   AD_{median} = Average Deviation from the median

Examples

Following is a comparison of the variability in the murder rates presented in Exhibit 3.5 between the north and the west in 1974 using the two measures of average deviation.

NORTH

$AD_{\bar{X}}$

1. $\bar{X} = \frac{\Sigma X}{n} = 7.4$ mean

2.

X	$\lvert X - \bar{X} \rvert$
3	4.4
15	7.6
16	8.6
20	12.6
4	3.4
1	6.4
2	5.4
1	6.4
8	.6
4	3.4
	58.8

3. $\Sigma\lvert X - \bar{X} \rvert = 58.8$

4. $AD_{\bar{X}} = \frac{58.8}{10} = 5.88$

AD_{median}

1. 20, 16, 15, 8, 4, 4, 3, 2, 1, 1

median $\frac{4 + 4}{2} = 4$

2.

X	$\lvert X - median \rvert$
3	1
15	11
16	12
20	16
4	0
1	3
2	2
1	3
8	4
4	0
	53

3. $\Sigma\lvert X - median \rvert = 53$

4. $AD_{median} = \frac{53}{10} = 5.3$

WEST

$AD_{\bar{X}}$

1. $\bar{X} = \frac{93}{10} = 9.3$

2.

X	$\lvert X - \bar{X} \rvert$
4	5.3
7	2.3
13	3.7
9	.3
12	2.7
17	7.7
14	4.7
12	2.7
6	3.3
9	.3
	37.7

3. $\Sigma\lvert X - \bar{X} \rvert = 37.7$

4. $AD_{\bar{X}} = \frac{37.7}{10} = 3.7$

AD_{median}

1. 14, 13, 12, 12, 9, 7, 7, 6, 4

$\frac{9 + 9}{2} = 9$ = median

2.

X	$\lvert X - median \rvert$
4	5
7	2
13	4
9	0
12	3
7	2
14	5
12	3
6	3
9	0
	27

3. $\Sigma\lvert X - median \rvert = 27$

4. $AD_{median} = \frac{27}{10} = 2.7$

Thus, according to this information, the murder rates in the north are more variable than those in western metropolitan areas.

These Average Deviations can be expressed as percentages of the measure of central tendency to more easily interpret the information. In this example if we divide the $AD_{\bar{x}}$ and AD_{median} by the $\bar{X}$ and median respectively and multiply these results by 100, coefficients of variation are obtained.

Example

COEFFICIENTS OF VARIATION

North

1) $AD_{\bar{X}} = 5.88$, $\bar{X} = 7.4$

$$\frac{5.88}{7.4} \times 100 = 79\%$$

2) $AD_{median} = 5.3$, median $= 4$

$$\frac{5.3}{4} \times 100 = 135\%$$

West

3) $AD_{\bar{X}} = 3.7$, $\bar{X} = 9.3$

$$\frac{3.7}{9.3} \times 100 = 39\%$$

4) $AD_{median} = 2.7$, median $= 9$

$$\frac{2.7}{9} \times 100 = 30\%$$

EXERCISE #6

DESCRIPTIVE METHODS

Purpose

The purpose of this exercise is to present crime data from a hypothetical community, along with relevant U.S. data, and using descriptive tools, to interpret and summarize these crime data. The exercise focuses on the crime of robbery and requires the development of a succinct memorandum to the Mayor and Chief of Police in the community outlining the nature of the robbery problem. This memorandum should incorporate, as appropriate, the descriptive measures and statistical findings made during the exercise.

Activities

In this exercise participants should form groups with five members. Once these analysis teams have been formed, each team should carefully inspect the data base (Exhibits 3.6-16) highlighting significant, interesting or questionable aspects of the data.

Once the data have been inspected each team should review the following two questions the Mayor and Chief of Police have requested answers to:

1. Define the robbery problem in the community. Include in your problem statement answers to the following:
   - to what extent is robbery a major community problem?
   - what are the important characteristics of the crime? the offenders? the victims of robbery?
2. Make recommendations, based on your problem statement, about an effective robbery reduction strategy.

Teams are limited in their response to the Mayor's request, to a two page statement of the problem and one additional page to present alternative crime reduction strategies. Teams will be asked to make a presentation of their interpretation of the data before the entire group.

Exhibit 3.6

Community Crime Study-Robbery Data*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Selected Characteristics of Offenders															
Age	25	26	32	41	24	16	21	19	31	27	27	30	17	19	20
Sex	M	M	F	M	M	M	M	M	M	M	M	F	M	M	M
Race	W	W	W	W	N	N	N	N	I	W	W	W	N	N	W
Education	8	10	12	12	6	10	7	6	6	8	12	12	10	12	12
Employment Status	U	U	E	E	U	E	E	U	U	E	E	E	U	U	E
Prior Record	Y	Y	N	N	Y	N	Y	N	N	N	Y	Y	Y	N	N
Selected Characteristics of the Crime															
Type of Weapon	K	G	N	G	K	K	G	G	N	G	G	No	G	K	K
Time of Day	7p	8p	5p	5p	1a	10p	2a	2a	1a	3a	3p	1a	2p	1a	12a
Place of Arrest	S	S	S	C	C	C	C	C	C	C	C	S	C	C	S
Type of Robbery	2	2	3	1	1	1	1	2	2	2	2	2	2	1	3
Place of Occur	3	2	3	4	4	3	2	3	6	2	3	5	2	1	1
Selected Characteristics of the Victim															
Age	30	41	45	22	61	72	49	81	25	35	62	65	35	72	60
Sex	M	F	F	M	M	M	F	F	M	M	M	F	M	M	F
Value of Stolen Property	100	350	0	100	na	0	75	25	4000	150	75	600	1500	65	0

* For explanation of variables and values see Exhibit 3.7

Source: Hypothetical Data.

Exhibit 3.7

Community Crime Study Code Book

Variable	Variable Description and Codes
Age	Age of Offender at arrest
Sex	Sex of Offender M. Male F. Female
Race	Race of Offender W. White N. Negro I. Indian
Education	Last year of school completed by Offender
Employment Status	Employment status of offender U. Unemployed at time of arrest E. Employed at time of arrest
Prior Record	Offender has prior criminal record Y. Yes N. No
Type of Weapon	Type of Weapon Used (if any) K. Knife G. Gun N. None
Time of Day	Time of day robbery occurred (A=A.M., P=P.M.)
Place of Arrest	Part of metropolitan area Offender was arrested S. Suburban area C. Central city
Type of Robbery	Type of Robbery 1. Robbery and attempted robbery with injury 2. Robbery without injury 3. Attempted robbery without injury
Place of Occurance	Type of place where robbery occurred 1. Highway 2. Commercial house 3. Gas or service station 4. Chain store 5. Residence 6. Bank 7. Miscellaneous
Age V	Age of Victim
Sex V	Sex of Victim M. Male F. Female
Value of Stolen Property	Value of stolen property (in dollars)

Exhibit 3.8

Persons Arrested, By Offense,
United States, 1974

Criminal Homicide	13,818	.2%
Forcible Rape	17,804	.3
Robbery	108,481	1.8
Aggravated Assault	154,514	2.5
Burglary	340,697	5.5
Larceny-Theft	729,661	11.8
Motor Vehicle Theft	107,226	1.7
	6,179,406	100.0%

Source: Sourcebook, 1976.

Exhibit 3.9

Persons Arrested, By Offense,
Local Community, United States,
1974

Criminal Homicide	17	.2%
Forcible Rapes	10	.1
Robbery	302	4.1
Aggravated Assault	105	.1
Burglary	250	3.5
Larceny-Theft	820	11.3
Motor Vehicle Theft	134	1.8
	7,250	100.0%

Source: See Exhibit 3.8.

Exhibit 3.10

Robberies Known to Police
By Place of Occurrence and Average Loss (dollars)

Place	1974 U.S.	Average Loss
Highway	49.9%	$321
Commercial House	17.1	191
Gas or Service Station	3.1	510
Chain Store	6.4	258
Residence	11.5	324
Bank	.8	3598
Miscellaneous	11.2	305

Source: See Exhibit 3.8.

Exhibit 3.11

Persons Arrested for Robbery by Age,
United States, 1974

Age	Number
10	571
11-12	2019
13-14	7394
15	6999
16	8894
17	9468
18	9875
19	8585
20	7241
21	6471
22	5882
23	5349
24	4671
25-29	13447
30-34	5631
35-39	2695
40-44	1520
45-49	851
50-54	426
55-59	173
60-64	74
65+	185

Source: See Exhibit 3.8.

Exhibit 3.12

Persons Arrested for Robbery, By Sex,
United States, 1974

Male	101,098	(93.2%)
Female	7,383	(6.8%)
	108,481	

Source: See Exhibit 3.8.

Exhibit 3.13

Persons Arrested for Robbery, By Race,
United States, 1974

White	31,477	(35.2%)
Negro	55,728	(62.3%)
Indian	634	(.7%)
	89,415	

Source: See Exhibit 3.8.

Exhibit 3.14

Estimated Number of Personal Incidents and Business Robberies,
By Type of Weapon Used,
United States, 1974

Gun	150,170	(15%)
Knife	199,560	(20%)
Incidents with weapons	462,110	(47%)
Total incidents (Robbery) (Robbery)	975,630	

Source: See Exhibit 3.8.

Exhibit 3.15

Estimated Personal Incidents, By Time of Occurrence,
United States, 1974

6:00 a.m. - 6:00 p.m.	46%
6:00 p.m. - 12 midnight	39%
Midnight - 6:00 a.m.	14%
Total Incidents (Robbery)	975,630

Source: See Exhibit 3.8.

Exhibit 3.16

Estimated Number of Personal Victimizations, Robbery
By Age of Victim,
United States, 1974

12 - 19	387,460 (32.9%)
20 - 34	394,140 (33.5%)
35 - 49	184,790 (15.7%)
50 - 64	126,910 (10.8%)
65+	80,690 (6.8%)
	1,173,980

Source: See Exhibit 3.8.

C. Graphical Methods

Crime and criminal justice system problems may be described using the statistical methods presented in the previous sections as well as by applying graphical techniques to data. In this section various graphical tools, including graphs, charts and statistical maps, are presented.

Graphical methods complement statistical treatment of crime data. They are used to facilitate description of crime problems by 1) clarifying the informational content of the data; 2) highlighting certain aspects of the information; and 3) making contrasts and comparisons more vivid. Graphics also help to focus questions about the causes of crime problems and the consequences of planned actions.

Graphs are snapshots of reality, framed by the picture-taker. Varying interpretations of the data will depend, in part, on how the data are portrayed. Exhibit 3.17 illustrates two different graphical presentations of the same data. Clearly, the application of graphical tools involves not just a knowledge of the tools, but also the associated skills necessary for developing a presentation style that minimizes distortions, deceptions or misrepresentations.

The following material is divided into two parts. First considered are the graphical methods used to describe qualitative categorical variables, including pie charts, bar graphs, and statistical maps. Then graphical methods for treating quantitative variables, including frequency histograms and time charts, are presented. The section concludes with an exercise emphasizing the application of these graphical techniques to enhance the description of the robbery crime problem described in Exercise #6.

1. Graphical Methods for Qualitative/Categorical Variables

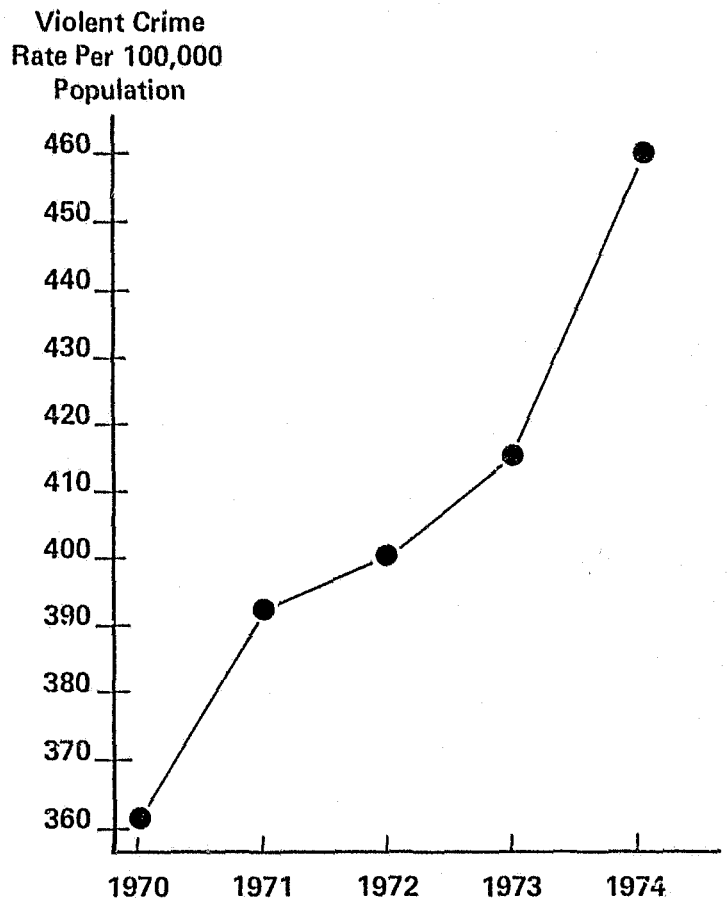
- Pie Charts

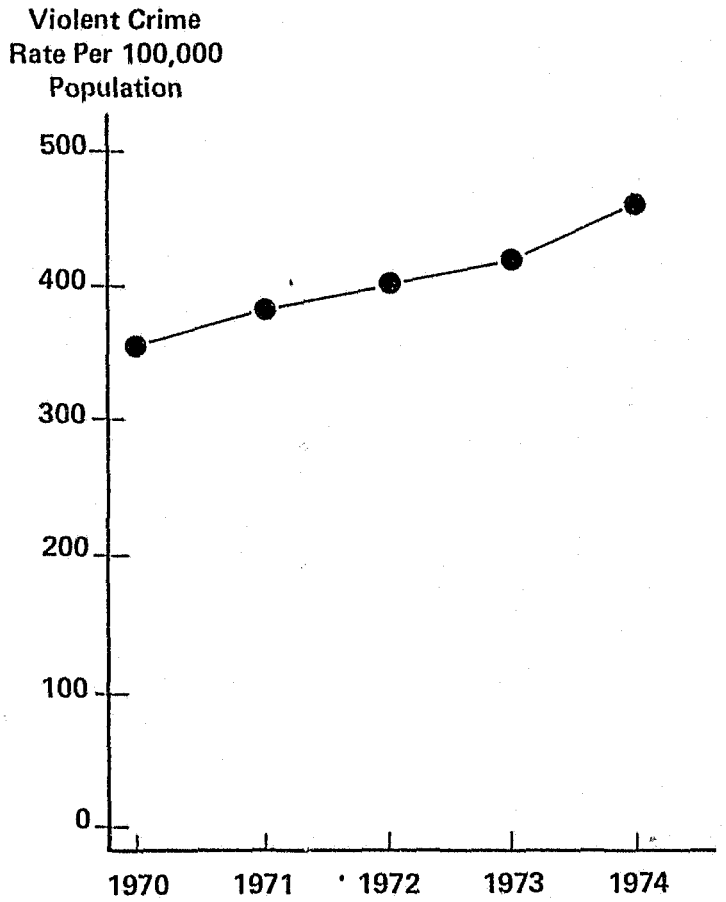
A Pie Chart is illustrated in Exhibit 3.18 in which each circle represents the total of some characteristic such as the total number of, in this case, persons arrested. These three charts depict three demographic characteristics of persons arrested in the United States during 1974: sex, age and race. Note the problem in fully interpreting these images: for instance, how proportionate are these percentages with the characteristics of the total U.S. population?

Note how in Exhibit 3.18 each "pie" is divided into "slices" with each slice representing a portion of the whole. Each slice is determined by calculating the number of degrees in the circle (360°) proportionate to the size of each slice. Thus, in 1974, 83.3% of all offenders were male and its "slice of the pie" is represented by 299.8° (1% = 3.6°).

In Exhibit 3.19, all property crime in the United States for 1965 and 1975 is represented by the areas of the two pie charts, with the 1975 chart more than twice the size of the 1965 chart. Both the change in property crime and the shifting distribution among

EXHIBIT 3.17
USE OF THE "OH, BOY" CHART TO EXAGGERATE DIFFERENCES

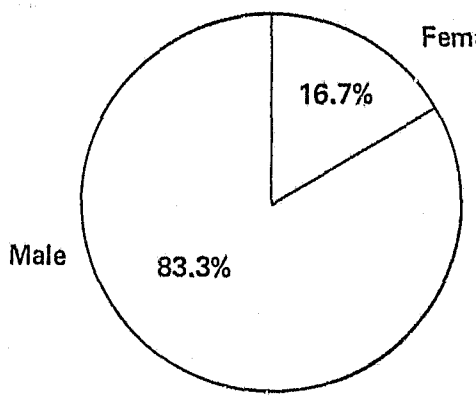




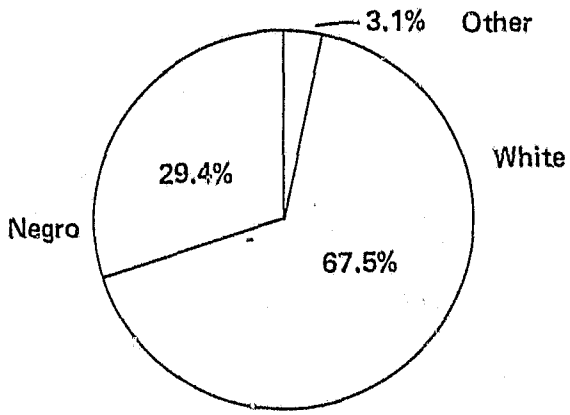
Source: Sourcebook, 1976, p. 443.

EXHIBIT 3.18
CHARACTERISTICS OF OFFENDERS, UNITED STATES, 1974 –
PIE CHART EXAMPLE

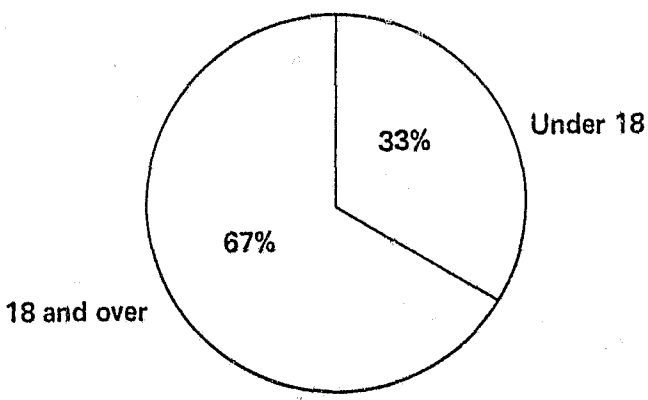
SEX



RACE



AGE

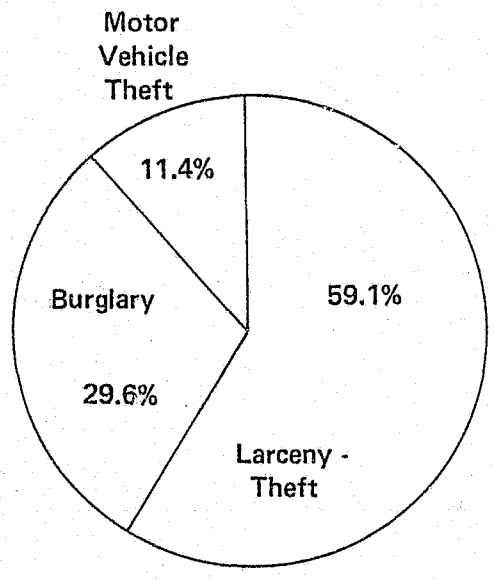


Source: Sourcebook, 1976.

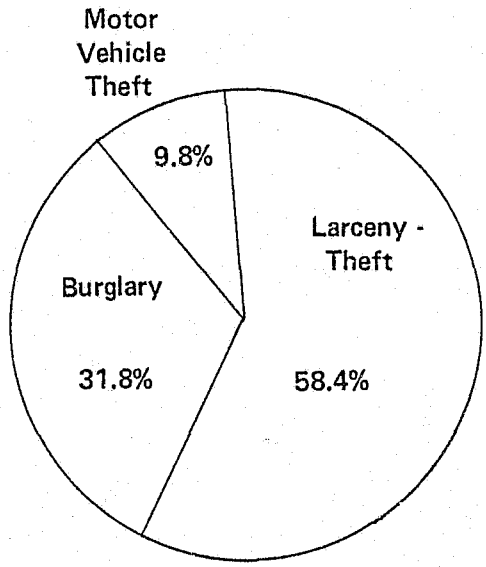
EXHIBIT 3.19
PROPERTY CRIME, UNITED STATES, 1965 AND 1975, PIE CHART EXAMPLE

Year	Burglary	Larceny - Theft	Motor Vehicle Theft	Total
1965	1,282,500	2,572,600	496,900	4,352,000
1975	3,252,100	5,977,700	1,005,000	10,234,800

Source: FBI, Crime in the United States: 1975, Table 2, p.49.



1965



1975

types of property crimes is illustrated by the chart. Note the doubling of property crimes and the relative decline in motor vehicle thefts and the rise of burglaries.

An interesting variation of the pie chart is the coin chart which is frequently used to graphically present distributions of money. Exhibit 3.20 presents fiscal year 1974 expenditures by jurisdiction--federal, state and local--for the three components of the criminal justice system--police, courts and corrections using the coin chart method.

Some studies have indicated that of the many different graphical techniques available, the pie chart is read more accurately and as rapidly as the other representations.(2) In addition, the use of pie charts is not restricted to qualitative variables as indicated in Exhibit 3.20. Following are three recommendations for constructing pie charts:

- Minimize the number of categories (slices). Too many categories make the chart difficult to interpret.
- When possible display the categories (slices) in ascending/descending order.
- Avoid displaying the data or number in each category: use instead percentage figures whenever possible since these are easier to interpret.(3)
- Bar Graphs

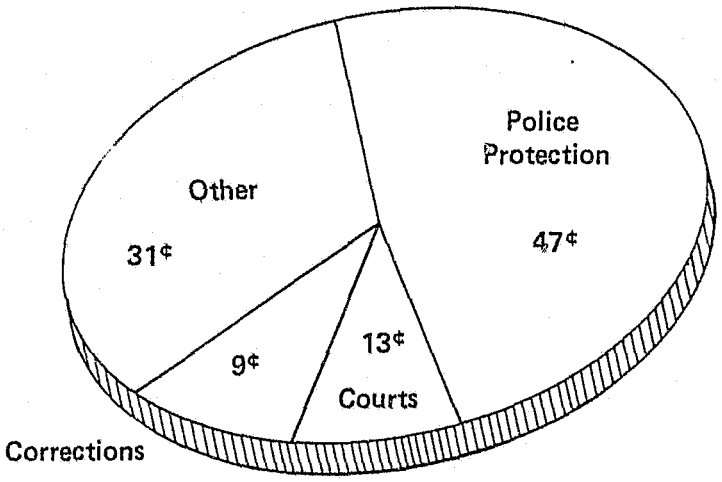
A bar graph, illustrated in Exhibit 3.21, is also typically employed to display qualitative data. A vertical or horizontal bar is used to represent the number of observations or values in a particular category. The bar graph emphasizes the categories of a variable; as in Exhibit 3.21 the emphasis is on year. Data from the UCR are shown in the graph. In this application each bar represents the total crime index nationwide. Note the steady increase in the index over this eight-year interval illustrated by the graph.

A second application of the bar graph is presented in Exhibit 3.22. In this bar graph, each bar is the same length, representing 100% of the cases in each crime category. The unshaded portion of the bar indicates the percentage of a specific crime that had been cleared, the shaded portion indicating those crimes for which no arrest had been made. It is obvious from this graph that violent crimes are much more likely to be cleared than are property crimes.(4) Following are some rules of thumb to follow in constructing bar graphs:

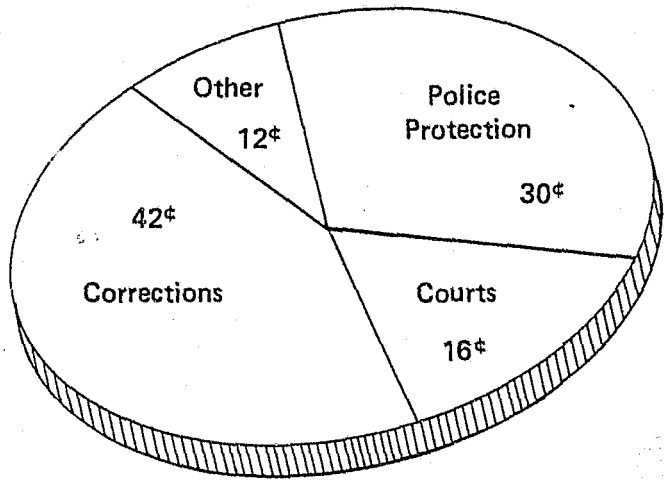
- Place categories along the horizontal axis; frequencies on the vertical axis.
- For clarity of presentation, leave a space between each category bar.
- Keep bars a uniform width and avoid an excessive number of categories.(5)

EXHIBIT 3.20
CRIMINAL JUSTICE EXPENDITURES, BY JURISDICTION AND FUNCTION,
FY 1974 – COIN CHART EXAMPLE

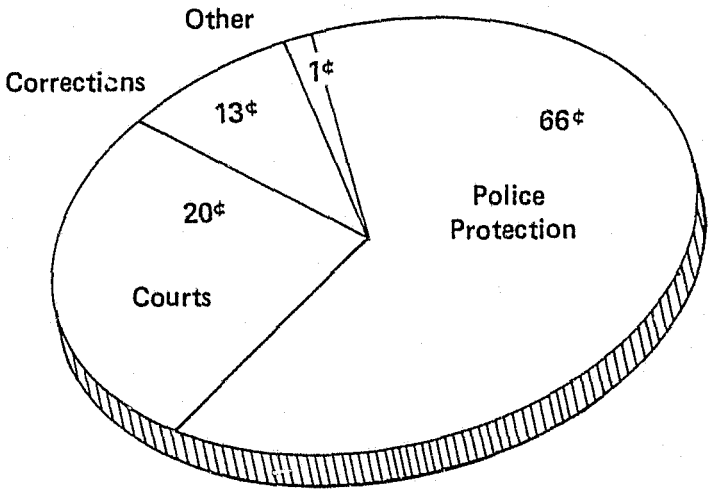
FEDERAL



STATE

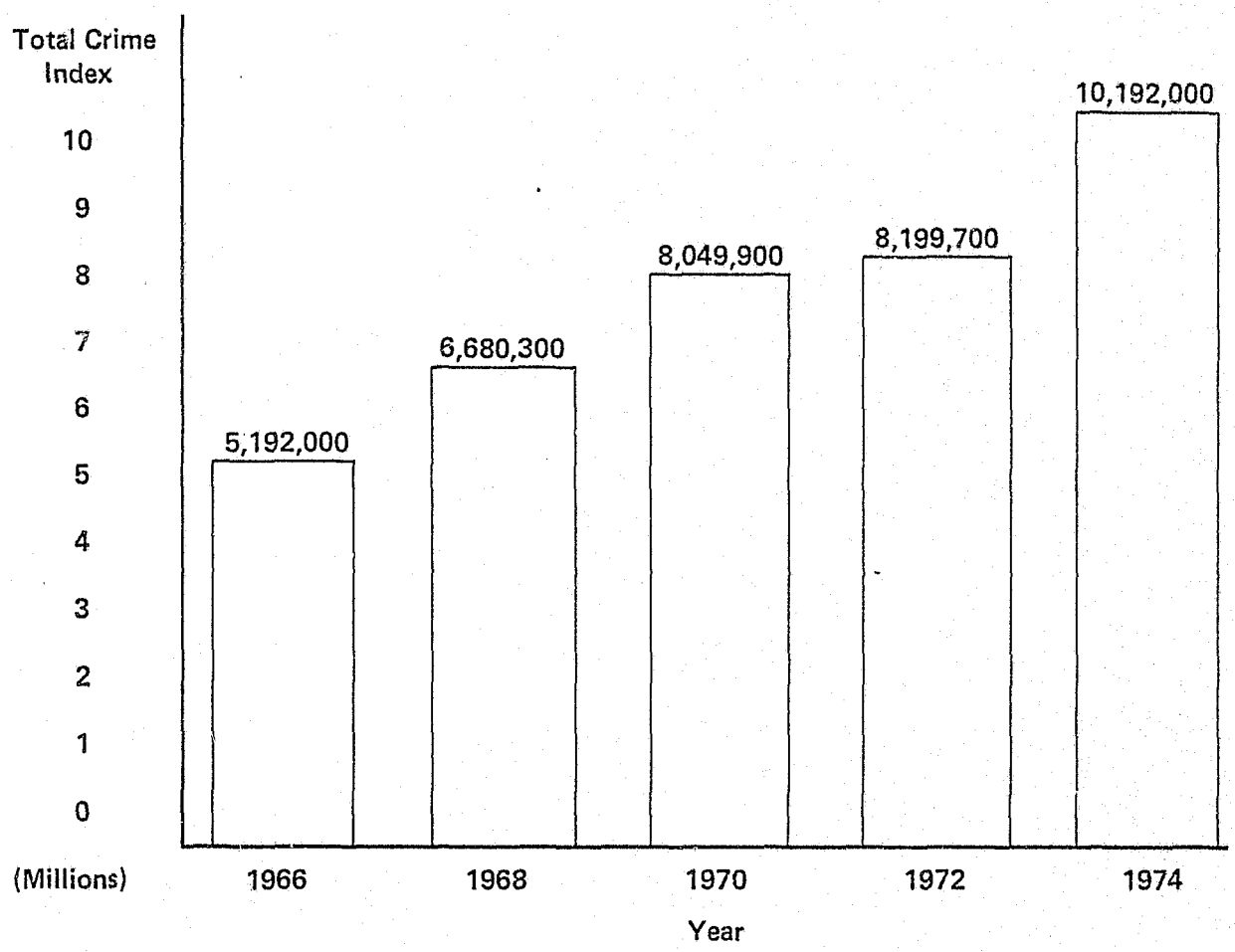


LOCAL



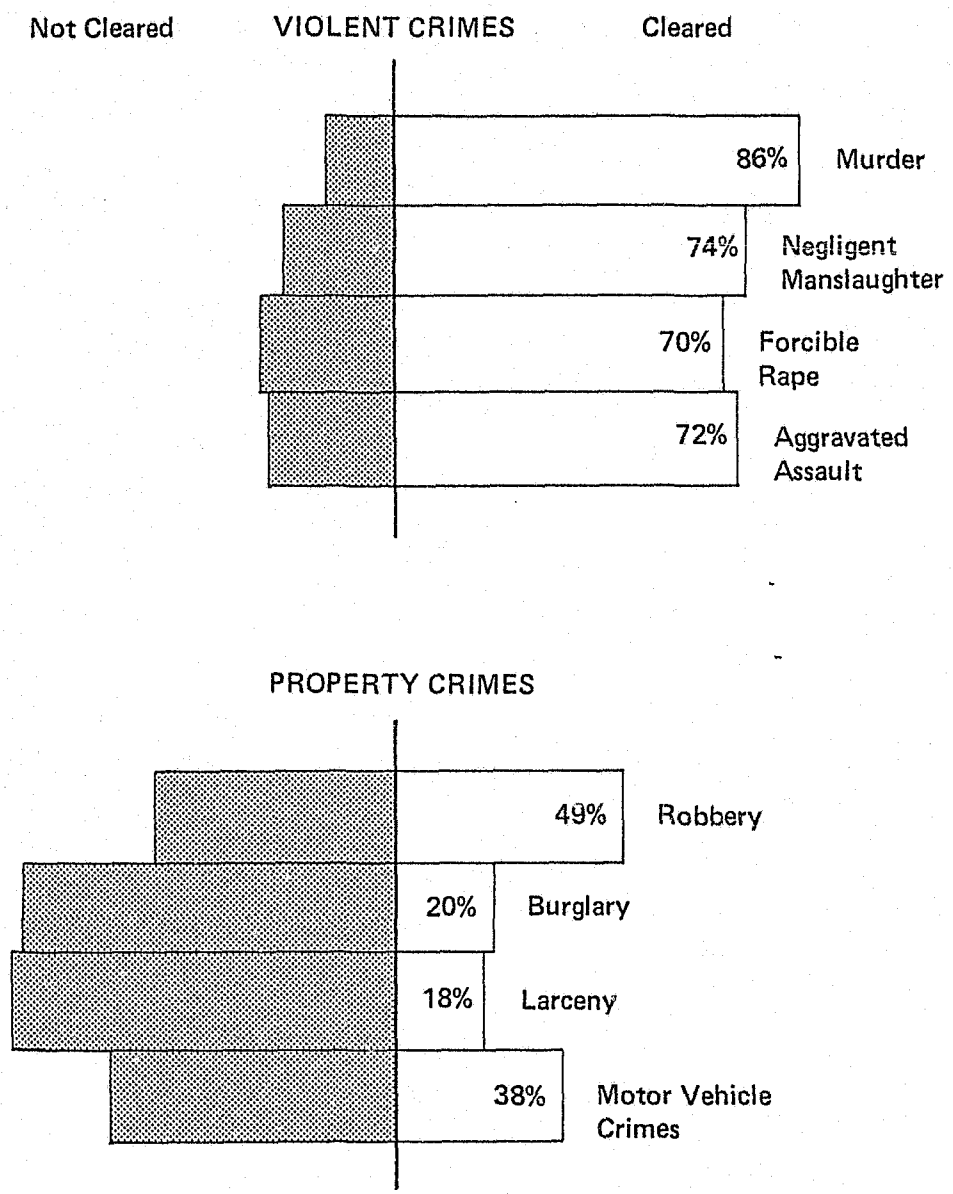
Source: Sourcebook, 1976.

EXHIBIT 3.21
TOTAL CRIME INDEX, 1966-1974 – BAR GRAPH EXAMPLE



Source: Uniform Crime Report for the United States, 1974.

EXHIBIT 3.22
CRIMES CLEARED BY ARREST, UNITED STATES, 1974 – BAR GRAPH EXAMPLE



Source: Sourcebook, 1976, p. 555 and adapted from Loether and McTavish, Descriptive and Inferential Statistics, Boston, Allyn & Bacon, 1977.

2. Graphical Methods for Quantitative Variables

• Statistical Maps

Spatial analysis is important in criminal justice planning because it fits many of the operational problems, such as deployment of police, jury selection in courts, and isolation of crime and/or victimization and related social problems. Furthermore, program funding is rarely applied to individuals. Rather, funds are applied to problem areas, such as neighborhoods and communities. Therefore, it is important to be able to utilize tools that provide ways of aggregating individual cases or transaction statistics into spatial summaries that can be used to display and interpret data.

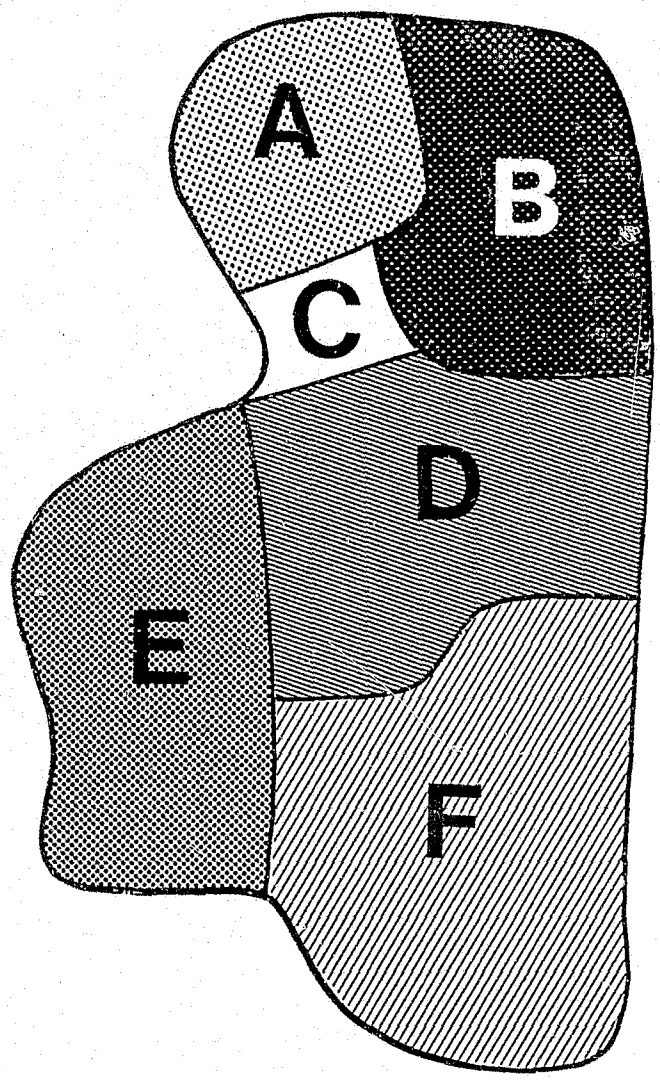
Two different approaches to development of statistical maps are presented in this section. Exhibit 3.23 illustrates the product of a hand-crafted statistical map while Exhibit 3.24 is one type of computer-made statistical map. Regardless of the a-proach taken there are two basic rules of thumb to use in preparing such maps:

- Minimize the number of categories and shades to facilitate reading of the map.
- Select appropriate geographical units to present.

In general statistical maps are prepared by selecting appropriate shading for different classifications of a variable and the proper unit to analyze. In Exhibit 3.23 the unit of analysis is the census tract, and the darker shading indicates a higher burglary rate. Exhibit 3.24 presents a computer-made map in which the unit of analysis is Los Angeles county, and the darker shading indicates a higher incidence of juvenile delinquency for areas within the county.

Statistical maps are more readily understood by decision-makers than are long gray columns of numbers or abstract and complex statistics. When variables are presented in the spatial form of maps, the scaling and shading selected are important to the interpretation of results. For example, one type of scaling is what might be called a mathematical or standardized scale. A mathematical scale represents any increment from zero to infinity. For mapping purposes the increments might be divided into discrete levels. It is this type of scale that is applied in Exhibit 3.24 on juvenile data.

EXHIBIT 3.23
HAND DRAFTED STATISTICAL MAP, BURGLARY RATE EXAMPLE

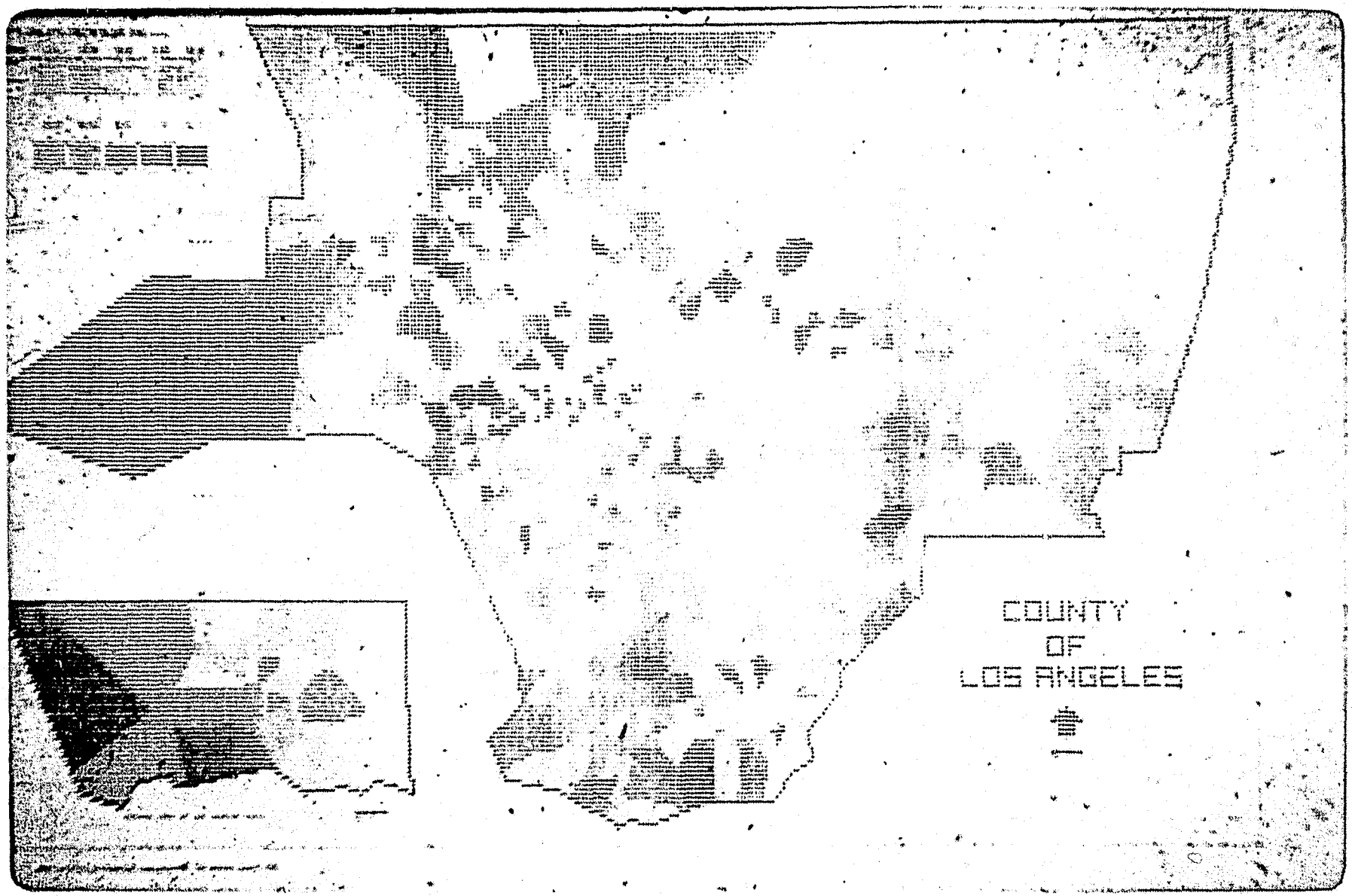


TRACT	RANK*	HOUSEHOLD*
A	6	51
B	4	86
C	1	146
D	2	138
E	5	70
F	3	93

*Burglary Rate per 1000

Exhibit 3.24

SyMap Example of Juvenile Delinquency Distribution,
Los Angeles County



In the exhibit the levels for the various categories have been determined by using percentiles. For example, the number of cases that are the top ten in a total of 100 cases would be placed into the first category. Clearly, statistical maps can be "flavored" by this type of scaling procedure. In Exhibit 3.23 the categories are discrete, but are not of equal size thus, while the map implies an equal gradation in the burglary rate, the data do not support such an interpretation.

This is a major shortcoming of statistical maps. A second problem in their use is that the shading is difficult to retain in reproduced copies thus losing the high contrast critical to their interpretation.

The computer map was prepared by linking two disparate administrative files into a common data base. For example, reported crimes and probation data are collected by two different agencies. In order to combine these two different files, linkages must be obtained through a common geographic base such as the census tract. The census tract is often used in planning because it contains approximately 5000 persons and, in designing tract boundaries, each metropolitan area has a locally designated panel that fixes boundaries so that the tracts contain a more or less homogeneous population.

Allocating data to geographical areas is called geocoding. Once various pieces of data have been geocoded they can be readily aggregated, combined into new measures and indices and displayed geographically. Essentially, this was the technique used to produce Exhibit 3.24.

For some time there have been efforts to develop computerized information files that would provide a way of storing urban data and linking it to a geographical location in much the same way that we do in referencing maps to relate to our physical environment. A computerized information file designed to relate geographic location is called the Geographic Base File (GBF). Thus, in essence, a GBF is a computerized map.

Geographic Base Files have evolved from various approaches. There is the grid system, based on latitude and longtitude; there is the partial block inventory that is typically found in planning agencies which assign a unique identification to a piece of land defined by some existing boundary lines. These are typical land parcel files found in Assessors' offices. There are also Address Coding Guides (ACG), made up of address ranges in the form of block segment records, which were developed for metropolitan areas and used during the 1970 Census. This last GBF focuses on descriptive information about block faces. Similar to an ACG is the Zip Code technique which is also a Geographic Base File.

Finally, there is another approach to the GBF which has the acronym DIME, (Dual Independent Map Encoding). This particular system contains all the information for GBF files, in that DIME contains coordinates, existing boundaries, block faces combining most of the features of address, range and block founding. All of the physically abstracted features are organized into a single comprehensive computerized Geographic Base File. The DIME approach combines the

address information of the ADG file in that the usual segment is a portion of a street length, with terminating modes defined by either natural or man-made intersecting boundaries, such as streets, railroads, or lake frontages.

The basic feature of the DIME file is that each mode formed by intersecting boundaries is uniquely identified. With each node block number uniquely numbered, computers can be programmed to provide two independent approaches of bounding an area. When these two techniques are matched, it insures that the existing network is representative of an entire geographical area. Spatial information can be added to the DIME file by assigning geographic coordinates. The coordinates can be latitude, longitude, or some arbitrary X-Y grid coordinates.

What is particularly useful about DIME files is that each metropolitan area in the country is at this time either developing or has developed this sort of GBF file. With the computerized GBF a special computer file and/or hard copy street index can be easily constructed. From either medium, records geographically identified by street address can be matched to the file, thereby associating geographic identifiers with addresses on some input administrative record. Thus, either by hand or through computer programs already developed that provide address matching capability, one can, for example, add police districts, census tracts, the various types of juvenile delinquency crime rates assigned by spatial location, or local tallies of other records. Once geocoded, raw data can be aggragated and displayed by arbitrary areas such as the census tract, police district, or planning area, thus providing a powerful analytical and communication tool for criminal justice planners.

Most of the foregoing discussion describes types of computer files useful for statistical mapping. It should be stressed that there is nothing that precludes the same general approaches to the use of data from being accomplished through manual techniques. For many urban and rural settings, in fact, it might be more expedient and less costly to proceed with non-computer based geocoding techniques.

For example, let us assume that we are dealing with a file that has approximately 3,000 records and there are addresses attached to the records and it is desired to geocode these files to a town with a population of 25,000. Let us further assume that we are on a one-time research study and we wish to look at various social, economic events as they relate to different types of crime reported at police precinct levels. The crime reports might very well be already coded to the precinct level. However, other information, such as poverty, population components, and housing may not be so coded. Therefore, it may require the use of other administrative records geocoded to the precinct level.

If there is a street index, either in the form of a list of address ranges within each precinct, or, perhaps, a typical city map with address ranges and boundaries of the respective precincts, it can then be readily transformed into precinct unit aggregates which, when summarized, can be used to describe different kinds of crime, and also different kinds of social, economic and land use conditions.

CONTINUED

2 OF 5

Once geocoded, aggregated, and transformed into appropriate rates or indices, the results could either be displayed through the typical tabular approach or by mapping the data (as presented earlier).

The uses of such maps in criminal justice planning are varied. For instance, these maps, in addition to describing the crime trends in a region, may also be used to suggest the explanations underlying the crime pattern. Preparation of similar maps at five-year or yearly intervals can provide a valuable tool for describing and interpreting prevailing crime trends. In short, like most of the graphical tools described in this section, a statistical map serves as a visual aid to describe and highlight certain aspects of a crime problem as well as means of developing additional questions.

- Frequency Distributions

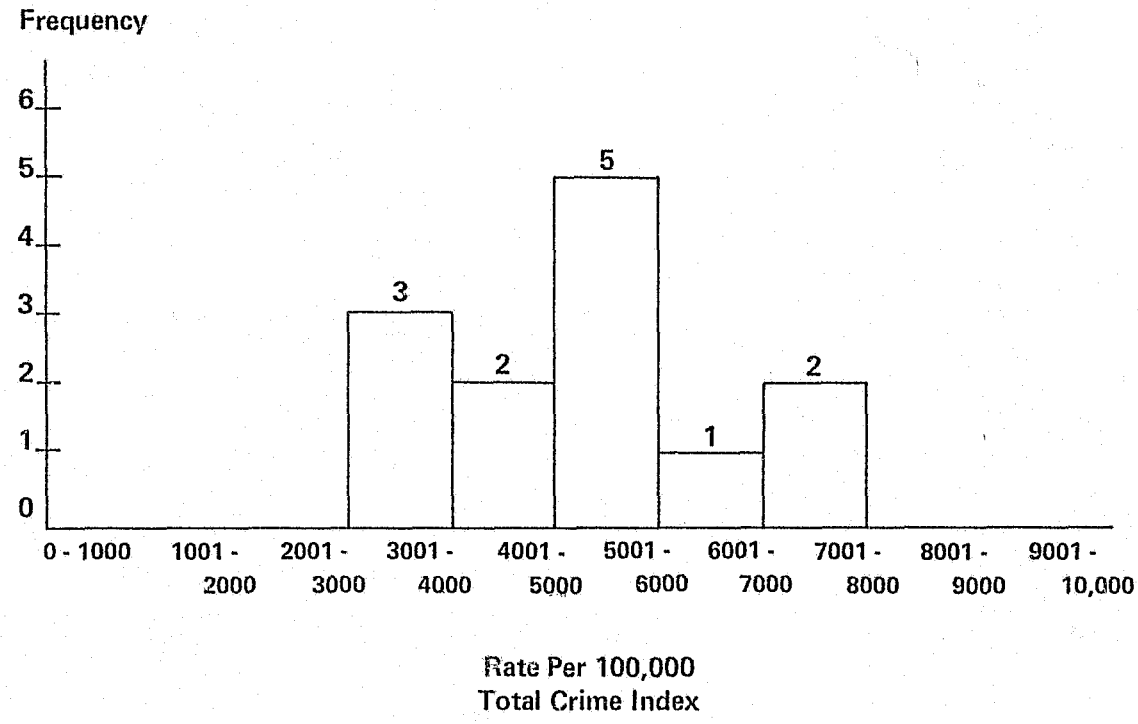
Perhaps the most useful graphical techniques are employed to interpret the frequency distribution. Two tools are used to visualize frequency distributions: histograms and polygons. A frequency histogram is the quantitative variable counterpart to the bar graph previously described. Exhibit 3.25 illustrates the use of the histogram on the Total Crime Rate for Western States. A second technique used to visualize frequency distributions is the frequency polygon. These are constructed by simply connecting with straight lines the mid-points of the histogram bars. A frequency polygon using the same data as in Exhibit 3.25 is presented in Exhibit 3.26.

Both techniques are particularly effective in reducing a large number of data points into easily understood and communicated information. The examples in Exhibits 3.25 and 3.26 utilize only 13 data points (one data point for each state) yet still are useful in describing the central tendency and dispersion of the total crime index in Western states.

The characteristics of such frequency distributions are of particular importance in interpreting crime data. Explanation of the factors that influence the shape of the distributions (where they are high or low) is a major purpose of statistical inference. A number of statistical measures have been developed to describe the shape of frequency distributions. Readers interested in such measures should consult the selected bibliography at the end of this module for additional information on this subject.

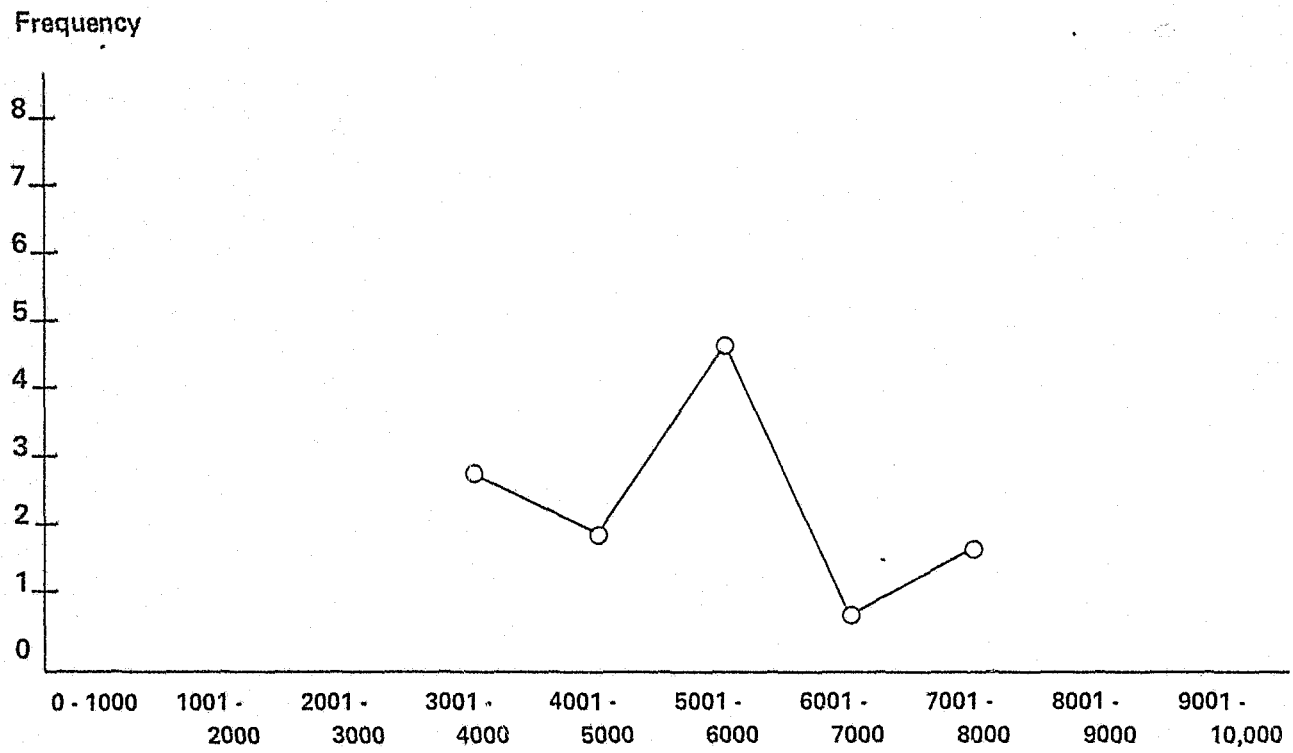
EXHIBIT 3.25
ILLUSTRATION OF FREQUENCY HISTOGRAM, TOTAL CRIME INDEX,
RATE PER 100,000 POPULATION, WESTERN STATES, 1975

State	Total Crime Index (Rate Per 100,000)
Arizona	8,342
Colorado	6,676
Idaho	4,141
Montana	4,189
Nevada	8,153
New Mexico	5,839
Utah	5,113
Wyoming	4,156
Alaska	6,197
California	7,205
Hawaii	6,027
Oregon	6,752
Washington	6,141



Source: FBI, Crime in the U.S., 1975, pp. 54 - 55.

EXHIBIT 3.26
ILLUSTRATION OF FREQUENCY POLYGON, TOTAL CRIME INDEX,
RATE PER 100,000 POPULATION, WESTERN STATES, 1975



Source: Uniform Crime Report for the United States, 1975.

- Time Charts

Time series analysis provides an historical context for judging crime statistics which reflect a single time interval. If trend lines of at least five years or measurement intervals can be constructed from available data, this variety of analysis becomes more important. Trend data can be exhibited graphically to facilitate the visual interpretation of crime levels and rates, as depicted in Exhibits 3.27 and 3.28. Exhibit 3.27 shows a comparison of six-year burglary trends in the State of Paradise against averages for various jurisdictional groupings, while Exhibit 3.28 compares that state with the nation for the crimes of burglary, robbery and auto theft. Displays such as these are particularly useful for identifying unexpected contrasts in state or regional trends which merit detailed examination.

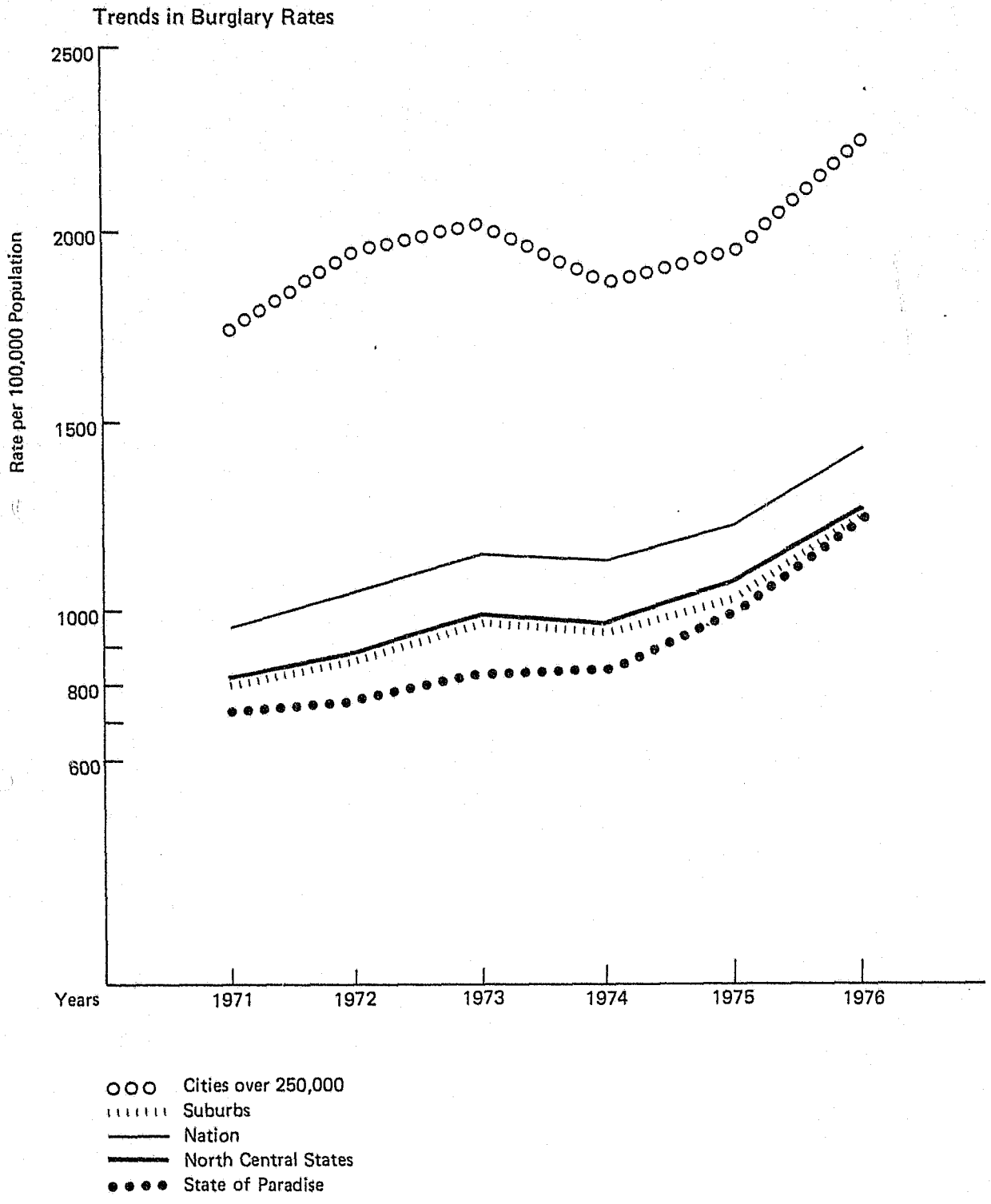
Time charts focus attention on the patterns of increase or decrease in crime over a period of years, months or days. The more time involved, the better, since longer trend lines give the planner a stronger basis for assessing the significance of recent shifts. Such analysis can also be profitably applied to the characteristics of offenses, such as the proportion of homicides involving firearms and the proportion of rapes in which the offender was totally unknown to the victim, assuming that estimates of these proportions exist or can be made--possibly by sampling historical records.

Time charts are more powerful where adjusted for changes in socio-economic and demographic characteristics of the population or where more specialized populations at risk are introduced, such as the number of automobiles rather than size of population as a measure of the auto theft rate. Time series analysis is most powerful when trends for a group of jurisdictions are compared.

Nonetheless there is much that can be learned utilizing time series analysis from crime incidence data for even a single jurisdiction, and this knowledge can lead to the formulation of useful statements about current and potential crime problems.

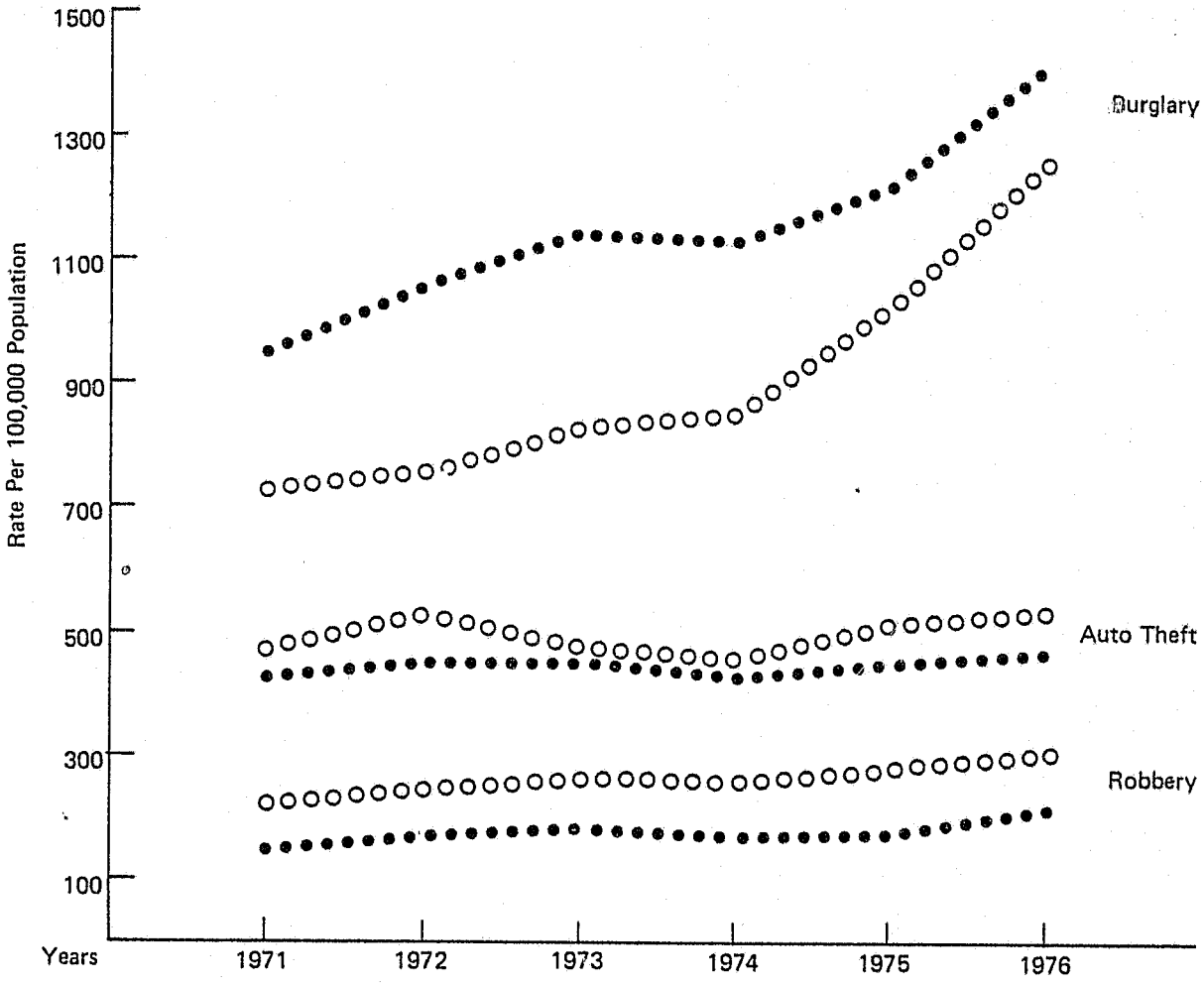
In Exhibit 3.29 the latest annual change in homicide is shown to be highly positive. From this alone, it would appear that homicide is on the increase and thus is a pressing problem. However, when placed in the perspective of the five-year time series, it seems that the latest increase is but a random fluctuation. Consequently, homicide is not something about which to get overly alarmed. This reinforces the importance of developing a significant historical data base before interpreting time series data.

EXHIBIT 3.27
TRENDS IN BURGLARY RATES, BY URBAN SIZE, UNITED STATES AND STATE OF PARADISE, 1971-1976



Source: hypothetical data

EXHIBIT 3.28
TRENDS IN BURGLARY, AUTO THEFT AND ROBBERY, UNITED STATES AND STATE OF PARADISE, 1971-1976



Source: hypothetical data

EXHIBIT 3.29
HOMICIDE: FIVE YEAR TREND FOR THE CHAOS METROPOLITAN AREA, 1971-1976

Source: hypothetical data

With trend data describing weapons use in homicides, the frequency with which homicide results in the course of other crimes, and the age, sex, and race of victims and offenders (all of which are reported to the FBI each month by law enforcement agencies), a more detailed analysis might find within a steadily growing crime trend several subsidiary trends of significance. Findings might lead to a statement such as the following:

> While all of the 15% increase in non-gun homicides over this period could have been predicted from basic demographic shifts, firearm homicide increased much more drastically than might have been predicted, increasing 300% rather than the statistically expected 40%. Other important characteristics of the homicide increase with a substantial drop in the number of homicides in which victim and offender were acquainted, and a tripling of the number of homicides occurring in the course of robberies. The increase in robbery homicide victims was clearly concentrated in older Black males; the increase in offenders was concentrated among younger Blacks. Thus homicide continued to be concentrated among the Black male community. While the increase is partially related to the increase in robbery homicide, it is overwhelmingly the product of firearm use.

The strengths of time charts are their ability to put statistics in historical perspective, the opportunity to spot important changes in the nature of crime which have critical relevance both for future trends and for preventive strategies, and the possibility of detecting emerging problems which have not developed intensity sufficient to provide public controversy. The technique's weaknesses include 1) the inability to suggest--in the absence of additional adjustments--which trend movements may be linked to broad social trends and which may have more local roots and, perhaps, be more susceptible to particularized remedies, and 2) at least over the short term, the possibility that trend movements reflect changes in citizen decisions to report crime, rather than in crime incidence.

Population size has a shortcoming when using crime incidence in time charts. There is substantial empirical evidence attesting to the importance of population size as a "predictor" of crime. Areas with large populations tend to have high crime rates, and vice versa. Thus, changes in crime incidence over time may be partially accounted for by changes, in the same directions, in population size. Controlling for the influence of changes in population size in crime analysis may provide a picture of movements of crime that is more meaningful for planning purposes.

The concept of crime rate, which is considered in greater detail in the following section, is defined as the number of Index Crimes (total or individual) occurring per 100,000 people over the period of one year. Comparing trends in incidence and rate for a given crime category illustrates the value, for planning purposes, of analyzing

the latter (i.e., removing the population component of crime). Following is the method for calculating the crime rate: divide the reported crime incidence by the population and then multiply by 100,000. This is known as the crime rate per 100,000 in population. Use percent change to compare magnitudes of crime in two periods, i.e. $\frac{\text{Crime in Later Period}}{\text{Crime in Earlier Period}} \times 100$

Exhibit 3.30 shows that between 1970 and 1974 there was a 30 percent increase in the incidence of assaults. Suppose that none of the other Index Crimes rose more than 16 percent during that period: what might this suggest? When one controls for changes in population size (i.e., examine the rate) it appears that assaults increase relatively little (7%) during that period. (See Exhibit 3.31)

It is particularly useful to remove population size from the analysis of crime trends because changes in population size are generally thought to be part of broader social trends and not susceptible to local control. Crime rate allows the planner to characterize crime in ways that may be more suggestive of local remedial action.

Frequently a planner wants an annual crime rate per 100,000 population but has crime incidence data for only part of the year. An annualized figure can be estimated using this formula:

$$\frac{\text{\# of incidents reported to date}}{\text{population of jurisdiction}} \times 100{,}000 \times \frac{12}{\text{\# of months for which data are reported}}$$

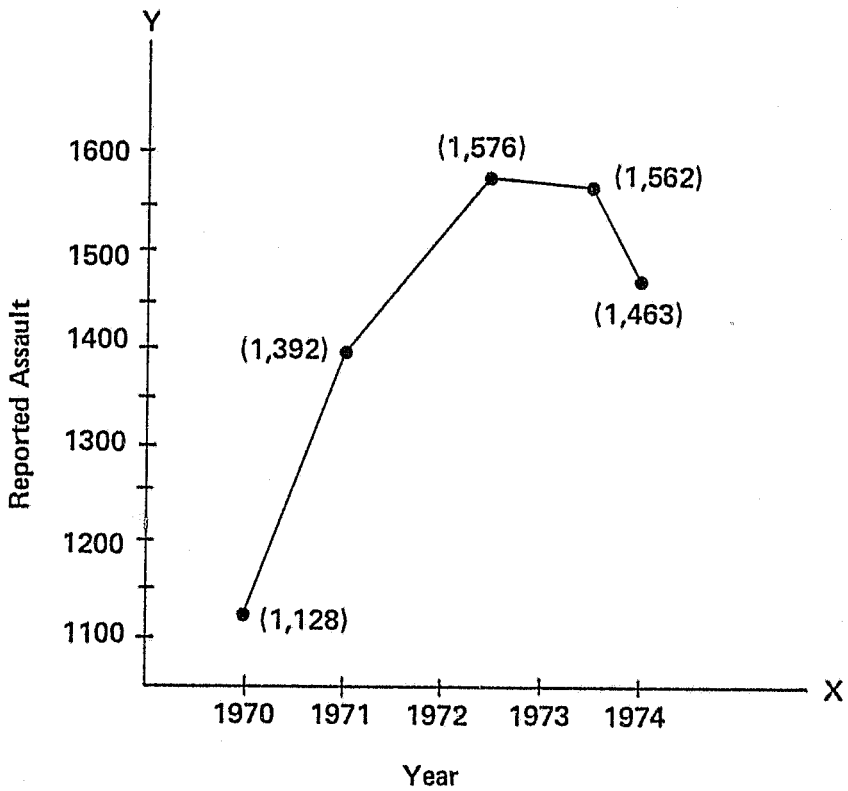
Such a formula does not, of course, account for possible seasonal variations or for trends in crime which might alter or change the crime level within a given year. Multiplying the part-year crime rate by the reciprocal of the proportion of months studied will provide an annualized figure which can more readily be used in comparisons across jurisdictions.

Following are two qualifications to be aware of in using crime rates to analyze time trends:

a. Certain data, e.g., population size, are normally collected only every ten years by the Bureau of the Census. Estimation methods are used to determine population size between decenials.

b. Population size is not the best "predictor" for all crime categories. There are more meaningful rates for certain crimes. For example, the incidence of auto thefts may be more a function of the number of automobiles than the size of the population; forcible rape may be a function of the number of females over 12. These rates, based on "population at risk", have previously been discussed.

EXHIBIT 3.30
GRAPH OF REPORTED ASSAULTS OVER TIME AND CALCULATION OF PERCENT CHANGE, 1970-1974

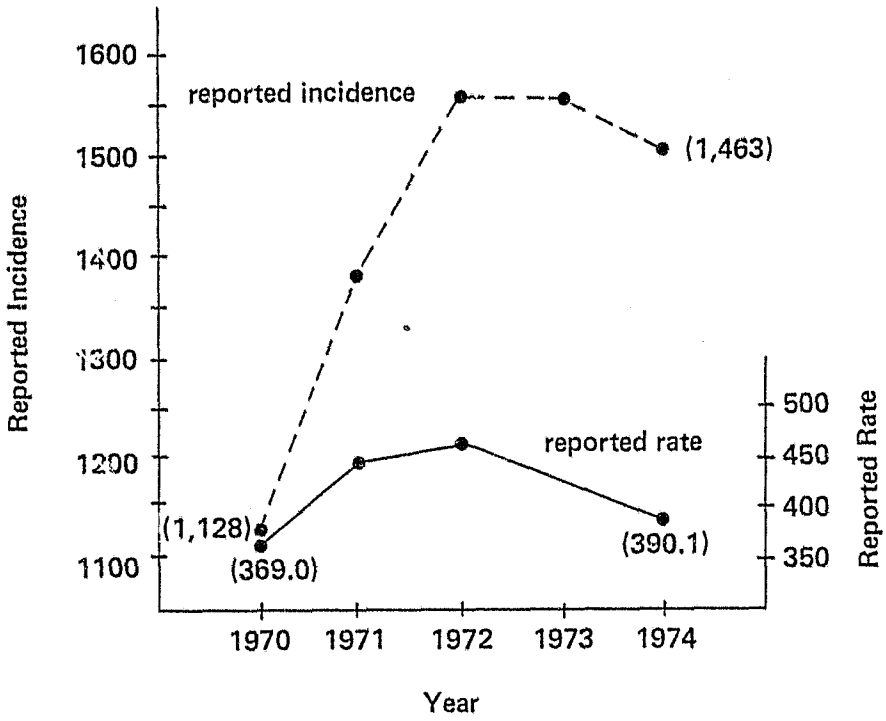


Percent Change 1970-1974

$$\left(\begin{matrix}1463\\1128\end{matrix} \quad 100\right) - \quad 100 = 29.7 \text{ or } 30\%$$

Source: hypothetical data

EXHIBIT 3.31
COMPARISON OF TRENDS IN REPORTED INCIDENCE AND REPORTED RATE OF ASSAULT, 1971-1974



Percent Change in *Incidence* 1970-1974
30%

Percent Change in *Rate* 1970-1974
7%

Source: hypothetical data

EXERCISE #7

GRAPHICAL METHODS

Purpose

The purpose of this exercise is to apply the various descriptive tools for interpreting crime data; however, the emphasis is on the identification of appropriate graphical methods, construction of graphs, charts and maps, and preparation of a brief written narrative to accompany each visual aid.

Activities

In this exercise participants should work in small groups of no more than three. Using the hypothetical data in Exhibit 3.6, each student is required to prepare at least three different visual aids along with an accompanying narrative, to describe the robbery problem evidenced by the data. Be sure not to ignore the following three basics in preparing these visual aids:

1) Proper titling of the graph, chart or map,

2) Proper attribution of the source of data, and

3) Complete labelling of the principle components of the visual aid.

The narrative that accompanies the graph, chart or map should specify the informational content of the visual as well as to highlight a significant finding illustrated by the visual or state questions suggested by it.

Once the smaller groups have completed their work, teams should be merged into larger groups and the products of the exercise compared noting the various approaches taken to the data.

D. Comparative Methods

A number of statistical tools are available to describe the relationships between two or more variables. In this section four such methods are presented: the use of rates and index numbers, seriousness weighting systems, cross tabulation tables, and scatter plots.

Comparative analysis is particularly powerful for three reasons. First, comparison of a crime profile to other crime profiles for "similar" jurisdictions can give the planner a clearer idea of the significance of particular crime data and trends and a better balance in interpreting shifts in those measures. Second, attention should be given to the ways in which roughly similar jurisdictions differ from each other in terms of their demographic characteristics and their respective systems of justice. Relating these differences to differences in the levels and intensity of crime may result in clearer causal insights into the sources both of crime and of crime prevention; insights which should be at the heart of program design. Third, comparisons of jurisdictions, census tracts or other units of analysis, may give criminal justice decision-makers moderately objective standards for allocating limited resources. While the severity of a crime problem may be an "absolute measure" in the eyes of a local resident, decision-makers with limited resources must compare different crime problems and assess different levels of severity in determining the allocation of resources.

1. Rate/Index Development and Application

The concept of rates is familiar to most criminal justice practitioners and has been discussed briefly in this text: crime rate, arrest rate, clearance rate, conviction rate, recidivism rate, and so forth. In fact, most of these notions are so familiar that planners and analysts often fail to question the way that a particular rate is constructed, or to examine carefully what a rate or index really measures and how they are applied.

Take crime rate as an example. Crime rate is commonly distinguished from crime incidence in that the former represents a standardized version of the latter. That is, crime counts within a geographic unit are divided by the population of the unit (thus arriving at a rate per capita), and the result is multiplied by 100,000 or some other scaling factor to make the interpretation of the result somewhat easier to interpret. In this way, geographic units of different populations are made more comparable through a standardizing process.

Deriving crime rates as described above represents one way of achieving comparability. When this method is used for specific crimes, however, the meaning of rate varies. If a rate is to be interpreted as a "risk" of victimization, then greater care must be taken in choosing the denominator which is used to calculate the rate. For example, in calculating the rate of forcible rape as a risk of being the victim of such a crime, the number of rapes reported should be divided by the number of females (in the age group where the event would be legally defined as rape) residing in the geographic unit of interest, rather than by the total population. Similarly, the risk of auto theft should be estimated by dividing the number of autos stolen by the number of autos that could be stolen (e.g., the number of registered autos). Thus, while there is nothing inherently "wrong" in dividing the in-

cidence of different types of crime by population (or area) to arrive at a rate, analysts should always be cognizant of what the result really means and how it is to be interpreted.

The following material discusses various kinds of measurement indicators. Measurement in crime research can be grouped into four commonly-used index types: concentration indices; distribution indices; density indices; indices of unit share.

- Concentration Indices

Concentration indices are most appropriately described as the ratio of two measures relating to the same phenomenon, where a particular attribute of the phenomenon is captured in the numerator or denominator, but not in both. It is perhaps, the easiest type of rate to construct because all the elements come from the same data source. For example, one might need to know about the residence of male juveniles in developing a special diversion program for male delinquents in a metropolitan area. Using Probation Department files, the index for each census tract can be computed by dividing the number of male juveniles against whom delinquency petitions have been filed and whose residence is within that tract, by the total number of juveniles residing in that tract against whom such action has been taken.

- Distribution Indices

A second measure, a "distribution index", is useful for assessing the degree of crime problem within the context of a larger population that could be involved with the problem. Here, then, the numerator would be some aspect of interest to criminal justice as compared to a "population at risk". The risk population can be persons (e.g., juveniles), places (e.g., liquor stores), or things (e.g., autos). This kind of measure is often useful for resource allocation and/or long-range planning. Consider another example concerning male juveniles. If one were to develop a distribution measure one would not compare male delinquents to all delinquents. Rather, the denominator of the index would be the total number of male juveniles, and the numerator would be the number of delinquent male juveniles. Note that two data sources may have to be consulted to construct this index, one from which male juvenile delinquency data can be drawn, and one from which male juvenile population counts can be drawn

- Density Indices

Density indices reflect population counts per unit area. For example, the visualizing of cities versus rural areas represents an intuitive perception of density. Density is particularly important for aggregate statistics, because it standardizes for size of area. Thus, political or administrative areas (e.g., states, counties, cities, police districts, and census tracts), which rarely exhibit uniformity of size, can be converted to comparable units by means of a density index.

The analysis of the problems related to criminal justice require spatial "standardization". For example, in a sample of juvenile delinquent males, a different action might be taken if the number of juveniles involved, say 200, reside in an area of one square mile, than if they resided in a hundred square miles. It is also possible that the nature of police operations would depend on the density of target groups (e.g., juveniles or male juveniles).

- Indices of Unit Share

This index refers to the proportion of a phenomenon which occurs in a large area. These indices are commonly used by criminal justice planners in contrasting the share of crime in an area to that area's share of the population. For example, in the previous discussion the number of male juveniles on probation has been used as the numerator of an index. Suppose that one wants to know which census tract has the greatest share of male juvenile delinquency, within the total metropolitan area. This can be calculated by dividing the count of male juveniles who have committed delinquent acts residing in the census tract of interest to the total number for the county. Maps displaying the values of each of these index types through various degrees of shading provide an excellent visual comparative framework and clearly demonstrate the differences in the meanings of the sample indices regarding juvenile probation statistics. This mode of presentation is excellent for managers and decision-makers whose time constraints preclude their examining extensive statistical tables.

- Comparative Analysis Using Index Numbers

The comparative analysis approach emphasizes the simultaneous assessment of crime data for many different jurisdictions. It can be done for jurisdictions within a state or within a local jurisdiction. It can be extended by comparisons with crime figures for regional groupings of states or with the nationally aggregated portrait of similar-sized jurisdictions, such as cities 250,000-500,000 in population or suburban counties. Data of this sort are provided each year in Crime in the United States. These publications can also be used to obtain data on other jurisdictions and SMSAs which planners feel are similar to their own. By special request to the FBI one can often obtain additional crime-specific data (e.g., proportion of crimes involving firearm use) for these jurisdictions.

Comparative analysis is often extended in two directions. First, victimization data may be introduced. These data allow the planner to factor in a rough city-to-city adjustment for levels of crime reporting. Detailed work with victimization data will also allow the planner to get a richer sense of the typical and not-so-typical characteristics of crime incidents in the local jurisdiction.

Second, comparative measures can be combined with time series data, a very powerful combination which remedies several of the weaknesses of each individual technique.

These additions to straight comparative analysis are extremely important; still, much can be gained from comparative work which lacks time trend or reporting rate perspectives.

Exhibit 3.32 contains selected crime data for all major cities within a state and gives them explicit ranks on several crime incidence and crime rate dimensions. This sort of explicit ranking process might be used to determine eligibility for certain "anti-crime offensive" programs, or it might be incorporated into a formula for determining the contours of block grant fund distributions. Statistics like these are particularly provoking because significant differences in ranks may be observed over time and these may, in turn, give the planner important hints about the nature of crime within the state or a local jurisdiction which may lead to successful crime prevention techniques.

Exhibit 3.33 presents a relatively simple comparison which uses comparative national, regional, and large city data on crime rates. Despite the simplicity of the comparison, it allows important crime statements to be made. For instance:

> Compared to the nation as a whole as well as to our region, the State has an enormous problem with auto theft. While the problem--and the disparity when compared to national figures--is even worse in the State's largest city (and in the several cities contiguous to it), it is a problem experienced throughout the State. For this reason we are prepared to consider innovative proposals for combatting auto theft from any jurisdiction within the State. On the other hand, the comparative data demonstrate that while the largest city has a further problem with robbery (showing a 1974 robbery rate that is 73% above the figure for comparable cities), this problem is not shared to any comparable extent with the rest of the State. Because the robbery problem is so severe within the City, we are considering support of special anti-crime street patrols and of a special prosecution unit for robbery cases within the local prosecutor's office which would refuse to consider plea bargains leading to non-prison dispositions and attempt to reduce drastically the time from arrest to final trial (now roughly 270 days) for those accused of armed robbery.

Exhibit 3.34 presents a relatively sophisticated and versatile version of within-state comparisons, and Exhibit 3.35 offers an example of the insight which comparative analysis can bring to profile analyses which would otherwise rest on one year's percentage change. For example, the data in Exhibit 3.32 suggest that City 5's 20% increase in auto thefts reported may be far more disturbing than the same proportional increase in reports of forcible rape. Similarly, City 11's distressing change in total index crime takes on a very different aspect once further comparison reveals this is due to changes in non-violent property crime and that the 8 percent increase in violent crime was clearly below the rate of increase for other comparable cities.

Exhibit 3.32

SELECTED CRIME DATA FOR CITIES - 25,000 POPULATION AND LARGER

City#	Population	Index Crime Total	R	Rate	R	Robbery Total	R	Rate	R	Burglary Total	R	Rate	R	Total Ranking	Combined Rank
1.	148,000	3,525		2,381.8	17	149	4	100.7	19	1,353	3	914.2	15	61	10
2.	127,100	5,556		4,371.4	4	396	2	311.6	2	1,965	2	1,546.0	5	16	2
3.	92,000	2,303	6	2,503.3	15	111	7	[illegible]	13	1,024	6	1,113.0	11	58	8
4.	90,400	2,272	8	2,513.3	14	103	8	113.9	16	1,034	5	1,143.8	9	60	9
5.	80,591	2,647	5	3,284.5	9	191	3	237.0	3	910	7	1,129.2	10	37	5
6.	74,200	2.165	9	2,917.8	10	92	9	124.0	11	594	10	800.5	19	63	11
7.	70,100	4,330	2	6,490.7	1	431	1	613.4	1	2,008	1	2,864.5	1	7	1
8.	65,615	2,914	4	4,441.1	2	148	5	225.6	4	827	8	1,260.4	6	29	4
9.	56,700	1,567	7	4,088.2	5	121	6	213.4	5	1,099	4	1,933.3	2	29	3
10.	55,700	1,567	11	2,813.3	11	67	11	120.3	14	426	16	764.8	21	84	16
11.	50,200	1,833	10	3,651.4	7	91	10	181.3	7	577	11	1,149.4	8	53	6
12.	49,248	977	18	1,983.8	21	11	26	22.3	27	330	18	669.6	23	133	22
13.	47,400	634	24	1,337.6	29	51	15	107.6	18	161	28	339.7	32	146	24
14.	45,260	1,147	14	2,477.3	16	32	21	69.1	21	488	13	1,054.0	13	93	18
15.	45,300	850	20	1,898.5	22	20	23	44.2	24	306	21	675.5	22	132	21
16.	42,600	1,072	17	2,516.4	13	58	14	136.2	10	355	17	833.3	17	83	17
17.	41,800	755	21	1,801.4	23	7	29	16.7	30	321	20	767.9	20	143	23
18.	40,985	1,539	12	3,755.0	6	35	20	85.4	20	705	9	1,720.1	4	71	12
19.	40,100	1,095	16	2,700.7	12	49	16	122.2	12	445	15	1,109.7	12	83	15
20.	39,800	928	19	2,331.7	18	64	13	160.8	8	464	1	1,165.8	7	79	14
21.	37,052	632	25	1,705.7	26	11	25	29.7	25	165	27	445.3	29	157	27
22.	36,300	563	27	1,551.0	28	21	22	57.9	22	211	24	561.3	24	147	25
23.	33,200	338	30	1,013.1	31	6	30	18.1	29	107	32	322.3	33	185	32
24.	33,983	717	22	2,109.6	19	40	17	117.7	15	324	19	963.3	14	106	19
25.	33,835	588	26	1,737.8	24	7	28	20.7	23	194	25	573.4	25	156	26
26.	32,300	657	23	2,034.1	20	3	33	9.3	33	114	31	352.9	31	171	29
27.	31,400	537	28	1,710.2	25	35	19	111.5	17	260	23	828.0	18	130	20
28.	31,200	295	31	945.5	32	3	32	9.6	32	176	26	564.1	25	179	30
29.	31,000	1,112	15	3,587.1	8	65	12	209.7	6	266	22	858.1	16	79	13
30.	27,800	400	29	1,582.7	27	13	24	46.8	23	148	29	532.4	26	159	23
31.	27,055	1,201	13	4,439.1	3	39	18	144.2	9	531	12	1,962.7	2	58	7
32.	26,500	175	34	662.8	34	2	34	7.5	34	99	33	373.5	30	199	34
33.	26,000	265	32	1,019.2	30	4	31	15.4	31	134	30	515.4	28	182	31
34.	25,600	201	33	785.2	33	7	27	27.3	26	74	34	289.1	34	187	33

Notes: Rate equals crime incidence divided by population expressed in 100,000
R denotes the relative rank of the city.

EXHIBIT 3.33
PART I CRIME PROFILE, 1974

Crime Profile*

	Homicide	Rape	Robbery	Assault	Burglary	Larceny	Auto Theft
City X	21	55	1123	403	2563	2607	3480
Cities over 250,000	22	55	648	383	2237	3171	983
Percentage of Difference	(3%)	(1%)	73%	(5%)	(14%)	(18%)	(204%)
State	4	16	212	156	1550	2079	1366
Region	7	21	278	189	1305	1976	601
Percent of Difference	(41%)	(25%)	(24%)	(17%)	(19%)	(5%)	(127%)
Nation	10	26	209	214	1429	2473	461
Percent of Difference	(55%)	(41%)	(2%)	(27%)	(8%)	(16%)	(196%)

Source: hypothetical data

* All crimes as defined in the Uniform Crime Reports. "Percent of Difference" refers to the percent by which local statistics are greater (or less) than comparison figures.

Exhibit 3.34

COMPARISON OF INDEX CRIME
PERCENT CHANGE 1974 OVER 1973

City #	Approximate 1970 Census Population	Crime Index Total	Violent Index Crime	Property Index Crime	Murder Non-Negligent Man-Slaughter	Forcible Rape	Robbery	Aggravated Assault	Burglary	Larceny	Auto Theft	Composite Rank
1	393,000	+17	+15	+17	+18	+80	+19	- 3	+28	+12	+ 7	7
2	384,000	+24	+24	+25	+22	+24	+27	+18	+15	+31	+ 6	2
3	383,000	+15	+34	+13	+31	+39	+29	+40	+11	+15	+11	5
4	382,000	+ 5	- 2	+ 7	-20	-12	+ 4	- 9	+ 8	+24	-13	14
5	366,000	+19	+13	+19	+23	+21	+35	-13	+24	+14	+20	7
6	362,000	- 3	+ 7	- 4	-22	+12	0	+17	- 4	- 2	-10	15
7	361,000	+20	+ 4	+22	+ 1	+29	- 1	+13	+25	+37	-13	9
8	359,000	+ 9	+ 8	+ 9	-29	+ 9	+ 4	+18	+ 4	+14	+ 4	13
9	347,000	+13	+18	+13	- 3	+21	+51	+ 1	+22	+13	-18	10
10	335,000	+26	+16	+28	-10	+78	+39	- 2	+26	+35	+ 7	3
11	332,000	+29	+ 8	+31	+12	+23	+11	+ 5	+40	+26	+20	4
12	325,000	+24	+21	+24	+72	+26	+48	+14	+21	+24	+33	1
13	322,000	+20	+21	+20	+ 6	+22	+40	+ 5	+22	+24	+ 2	6
14	310,000	+ 7	+13	+ 7	+29	- 1	+24	+ 1	+ 2	+11	+ 5	12
15	308,000	+14	+ 1	+15	+18	+ 9	+ 3	- 1	+24	+13	+ 6	11
Average	351,000	+16	+13	+16	+10	+25	+22	+ 7	+18	+20	+ 4	

Exhibit 3.35

RANKED BY PERCENT CHANGE IN INDEX CRIME
1974 OVER 1973

Ranking											
First	CITY 11	City 3	CITY 11	City 12	City 1	City 9	City 3	CITY 11	City 7	City 12	City 12
Second	City 10	City 2	City 10	City 3	City 10	City 12	City 2	City 1	City 10	CITY 5	City 2
Third	City 2	City 12	City 2	City 14	City 3	City 13	City 8	City 10	City 2	CITY 11	City 10
Fourth	City 12	City 13	City 12	CITY 5	City 7	City 10	City 6	City 7	CITY 11	City 3	CITY 11
Fifth	City 7	City 9	City 7	City 2	City 12	CITY 5	City 12	CITY 5	City 4	City 1	City 3
Sixth	City 13	City 10	City 13	City 1	City 2	City 3	City 7	City 15	City 12	City 10	City 13
Seventh	CITY 5	City 1	CITY 5	City 15	CITY 11	City 2	CITY 11	City 9	City 13	City 2	City 1
Eighth	City 1	CITY 5	City 1	CITY 11	City 13	City 14	City 13	City 13	City 9	City 15	CITY 5
Ninth	City 3	City 14	City 15	City 13	CITY 5	City 1	City 9	City 12	City 3	City 14	City 7
Tenth	City 15	City 8	City 3	City 7	City 9	CITY 11	City 14	City 2	CITY 5	City 8	City 9
Eleventh	City 9	CITY 11	City 9	City 9	City 6	City 4	City 15	City 3	City 8	City 13	City 15
Twelfth	City 8	City 6	City 8	City 10	City 8	City 8	City 10	City 4	City 15	City 6	City 14
Thirteenth	City 14	City 7	City 4	City 4	City 15	City 15	City 1	City 8	City 1	City 4	City 8
Fourteenth	City 4	City 15	City 14	City 6	City 14	City 6	City 4	City 14	City 14	City 7	City 4
Fifteenth	City 6	City 4	City 6	City 8	City 4	City 7	CITY 5	City 6	City 6	City 9	City 6

The strengths of comparative analysis are its ability to evaluate rates and changes in terms of similar processes elsewhere and the availability of one or more objective measures which may be used to establish the distribution of resources among jurisdictions. The weaknesses of the technique, at least in its simple forms, include 1) a failure to account for differences in crime-reporting behavior among jurisdictions which might influence the validity of comparisons, 2) a lack of historical perspective which may encourage misleading interpretations of relative rankings and other comparisons, and 3) an initial disparity between the sentiments of local citizens and the analysts definition of which crimes are a problem, and why.

EXERCISE #8

COMPARATIVE ANALYSIS

Purpose

Module 3 is intended to expose the participants to the techniques and uses of comparative analysis, particularly as it applies to crime data. This section has focused on a comparison of trends in crime incidence using various rates and indices. In the next section the discussion turns to the concept of crime seriousness. However, in this exercise seriousness is introduced to help elaborate the crime problem. The presentation of these three descriptors of crime--time trends, rates and seriousness--are used to indicate that the nature of the crime problem can vary depending on how it is defined and interpreted. Thus, the need exists for a broadly-defined crime profile in programmatic planning. This exercise should force the participants to reach the same conclusion as a result of calculating and comparing trends in crime incidence, rate, and seriousness.

Activities

The participants are to work with assault data to compare trends in incidence, rate per 100,000 population, and seriousness:

Assault	1970	1971	1972	1973	1974	% ch. 1970-74
Incidence	1128.0	1392.0	1576.0	1562.0	1462.0	30%
Rate	363.9	446.2	469.0	427.9	390.3	7%

Participants should assume that, according to a modified seriousness index, assault is broken down into the following categories and assigned the following weights:

unsuccessful attempts	- multiply by 0
receiving minor injuries	- multiply by 1
treated and discharged	- multiply by 4
hospitalized	- multiply by 7

The assault data are distributed among these four categories as follows:

	1970	1971	1972	1973	1974
Unsuccessful Attempts	113	141	152	152	131
Victim received minor injuries	338	376	236	109	146
Victim treated and discharged	508	612	756	797	730
Victim hospitalized	169	263	432	504	455

Following are the specific tasks for each team in performing this exercise:

1. Calculate the raw seriousness of assaults for each year.
2. Transform that figure into "seriousness per incident" so that the annual indexes are then comparable.
3. Calculate the percent change in seriousness/incident for the years 1970-1974.
4. Compare it to percent change in incident and rate.
5. What can you say about trends in assault between 1970 and 1974 using these three descriptors?
6. What are the planning implications of the differences in the rates of change, i.e., problem formulations, alternative strategies?

2. Seriousness Scales

Thorsten Sellin and Marvin E. Wolfgang created a weighting system for crime that can be used to measure changes in the seriousness of crime over time or among jurisdictions. The system has relevance for planning decisions.(7) This measure can be used to determine where in a city the rates of serious crime are increasing and where they are decreasing. This information can be used as an aid in determining budget allocations, assessing manpower requirements, and identifying the need for special programs such as block patrols or security programs.

The Sellin-Wolfgang index has three important characteristics:

a. It can be disaggregated down to the smallest geographical and temporal unit.

b. It is based on data normally collected by local police departments; thus costs in establishing the system are minimized; also, there is likely to exist a sufficiently long series for trend analysis.

c. It is a measure of the amount of harm inflicted on the community.

One application of the Index was in the Watts Model City Area, using Los Angeles Police Department data from the MO files. The project demonstrated that seriousness per 100,000 population and the crime rate do necessarily vary in the same direction over time and may even be negatively correlated.(8)

Heller and McEwen in reporting on the application of the Sellin-Wolfgang Index to crime data provided by the St. Louis Metropolitan Police Department concluded:

- The average seriousness of a crime against the person was four times as great as the average seriousness for a crime against poverty.
- Crimes against the person in St. Louis accounted for 12.5% of the incidents but 37.5% of the seriousness.
- Two thirds of the harm from crime may be attributed to property loss, and one-sixth each to physical injury and mutilation.
- The injury and property loss occurring in the average traffic accident is over fifty percent more serious than that occurring in the average Part I offense.(9)

Exhibit 3.36 presents the index scores developed by Sellin and Wolfgang. These are applied by weighting each specific incidence of crime by the score and using the mean seriousness for each type of crime.

In Exhibit 3.37 these seriousness scores have been applied to hypothetical data resulting in the table presented. Notice how there is significant variation in the seriousness score compared to the incidence of crime in two of the census tracts: in census tract B

Exhibit 3.36

Sellin-Wolfgang Seriousness Components and Scores

	Score
Injury Component	
Victim Assaulted	
Minor injury	1
Treated and discharged	4
Hospitalized	7
Killed	26
Intimidation Component	
For Each Forcible Sex Offense	
The sex offense	10
Intimidation by weapon	2
For Non-Sex-Offense	
Physical or verbal intimidation	2
Weapon intimidation	4
Property Component	
Premises Forcibly Entered	1
Stolen Vehicle	2
Value of Property Stolen	
Under $10	
$10-$250	2
$251-$2,000	3
$2,0001-$9,000	4
$9,001-$30,000	5
$30,001-$80,000	6
Over $80,000	7

Source: Hellerand J.T. McEwen. "Applications of Crime Seriousness Information in Police Departments," Journal of Research in Crime and Delinquency (January 1975, Vol. 12, No. 1), p. 45.

Exhibit 3.37

Illustrative Application of Seriousness Scale to Crime Data

Census Tract	Number of Incidents[1]	Percent of Incidents	Total Seriousness[2]	Percent of Seriousness
A	30	5%	60	6%
B	42	7%	142	13%
C	125	22%	250	23%
D	240	41%	300	28%
E	52	9%	152	14%
F	90	16%	180	16%
Total	579	100%	1084	100%

[1] In a one year period

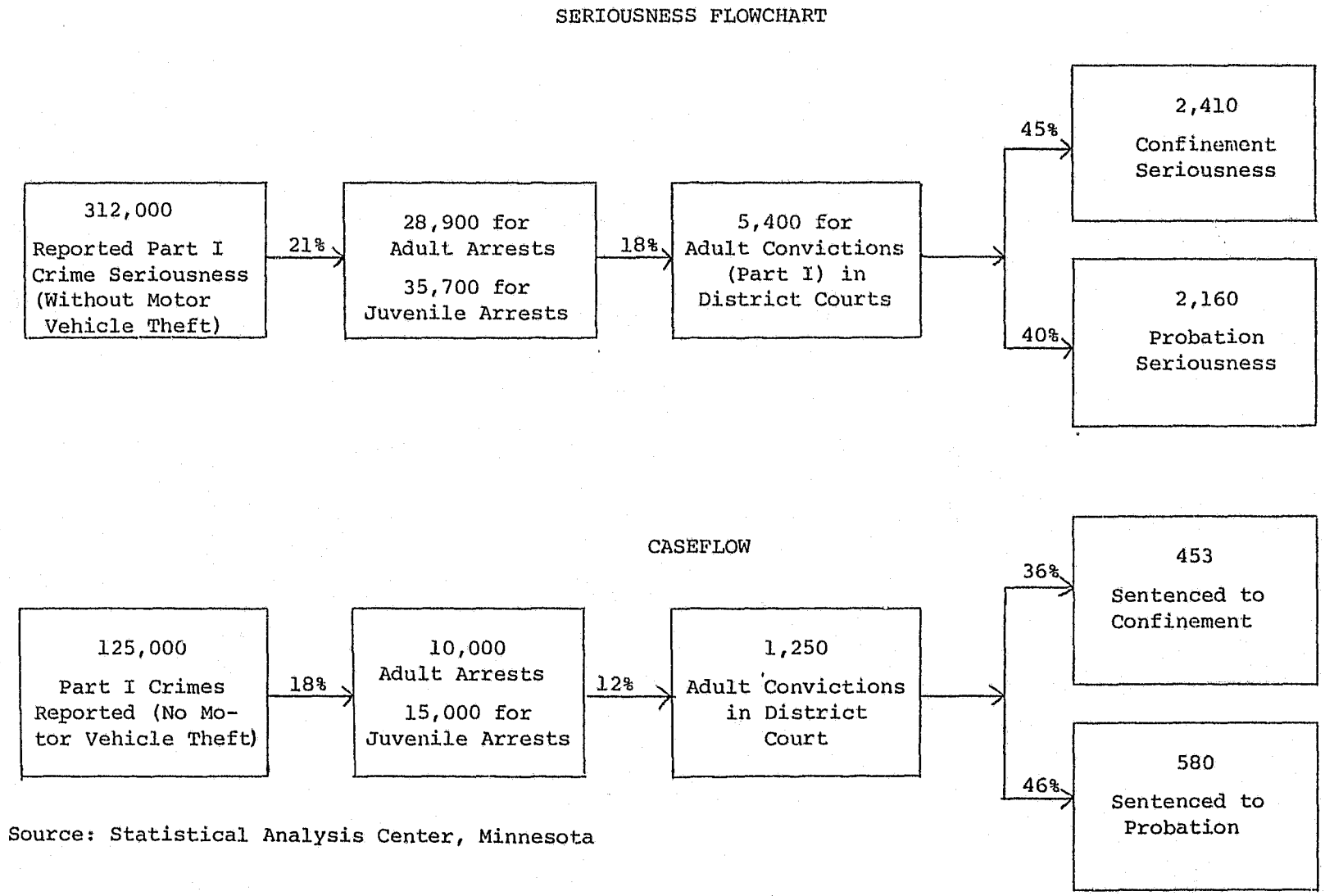
[2] (Number of Incidents x Score)

Source: Hypothetical Data

crime is more serious than reflected by the frequency of incidence while in D it is less serious than the volume of crime would indicate.

A second application of the seriousness concept is illustrated in the following quotation from a recent report prepared by the Minnesota Statistical Analysis Center and Research Unit. This application involves using the scores to describe and assess criminal justice system operations. Module Four covers this general topic in greater detail.

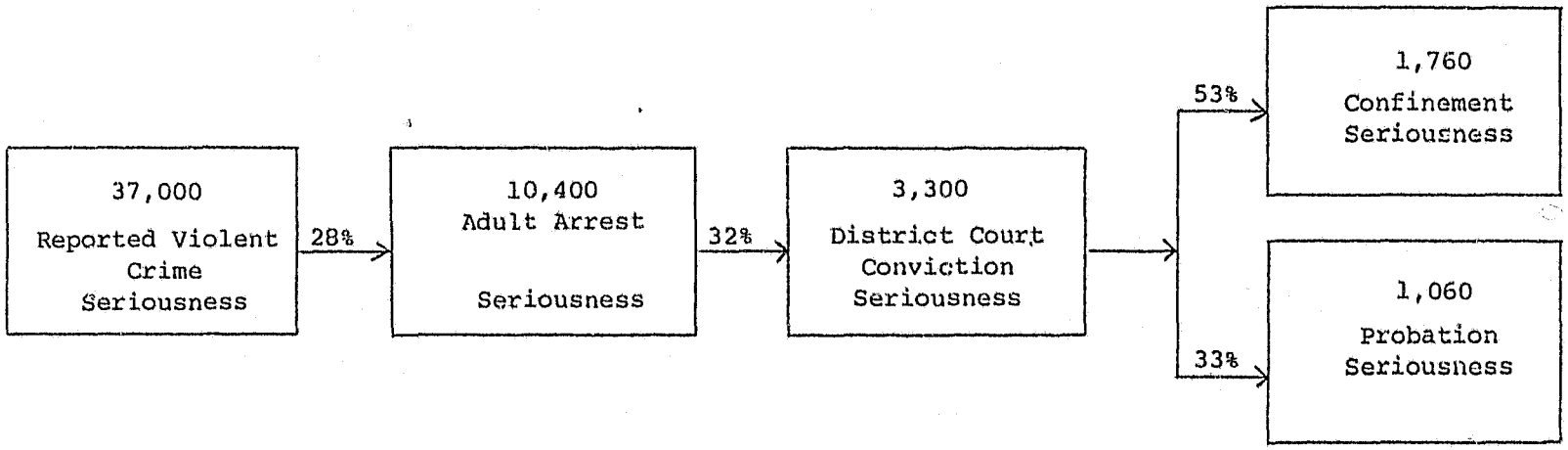
> One problem in analyzing or evaluating the criminal justice system is that knowing the number of crimes, the crime rate, or the number of people arrested does not give us much information about the seriousness of crimes. If the criminal justice system had sufficient resources to give equal attention to all types of crime, the seriousness of crime would not be a particular issue. But we know that the system exercises great discretion in who will be arrested, prosecuted, and sentenced to prison; this is shown by the funneling down of the numbers of people at successive stages of the system. We might expect that if the system must choose between prosecuting crimes of varying seriousness, those most serious will get the most attention. On the other hand, we do not expect less serious crimes to be totally disregarded, so that they might be committed with impunity. Thus, how the system handles crimes, as measured by their seriousness, can be one measure of how the system is working. We can, specifically, compare the funneling by quantitative numbers of people to the funneling by seriousness of the associated crimes.
>
> To measure seriousness of crime we need a scale that compares one crime to another. Such a scale or index has been developed by Wolfgang and Sellin, based upon their studies of how people in general rank crimes by seriousness. Following this scale, in part, we assign the following weights to crimes: homicide-26, rape-11, robbery-5, aggravated assault-4, burglary-3, and theft-2. From this scale we can find the total seriousness for any set of committed crimes. We can also find the amount of seriousness processed by the system at any stage. For example, we can assign to each court conviction the seriousness weight of the crime of conviction, or to each prison confinement the scale weight of the offense of conviction. Then multiplying the number of crimes or defendants by their respective seriousness index at each stage of the system and adding them together, we can find the total amount of crime seriousness processed throughout the system. The result of this analysis is shown in Exhibits 3.38 and 3.39 for Part I crimes (excluding motor vehicle theft) and violent crimes in Minnesota in 1973. Along with total seriousness at each stage is shown the percentage that amount is of the seriousness at the prior stage.
>
> Comparing the seriousness flowchart with the strictly numerical flowchart, we make these observations. The two flowcharts are most alike when arrests are compared as fractions of reported Part I crime. Adult arrests account for 7 percent of reported Part I crimes (excluding motor vehicle theft); the percentage is 18 percent if juvenile arrests are included. For seriousness the comparable percentages are 9 percent and 21 percent. So we find only a slight predisposition in the system toward the arrest of the more serious offenders. At the district court level the margin of seriousness increases over the numerical: 12 percent of the adults arrested are convicted, and this accounts for 18 percent of the seriousness of the crimes of arrest. For district courts 46 percent of those convicted are placed on probation and 36 percent confined. In terms of seriousness of convictions those percentages are 40 percent and 45 percent. Thus, seriousness becomes a more decisive factor as one moves through the system, although the margin is not especially great. Note also that one effect of plea negotiation is to reduce the observed level of crime seriousness processed by the court subsystem.



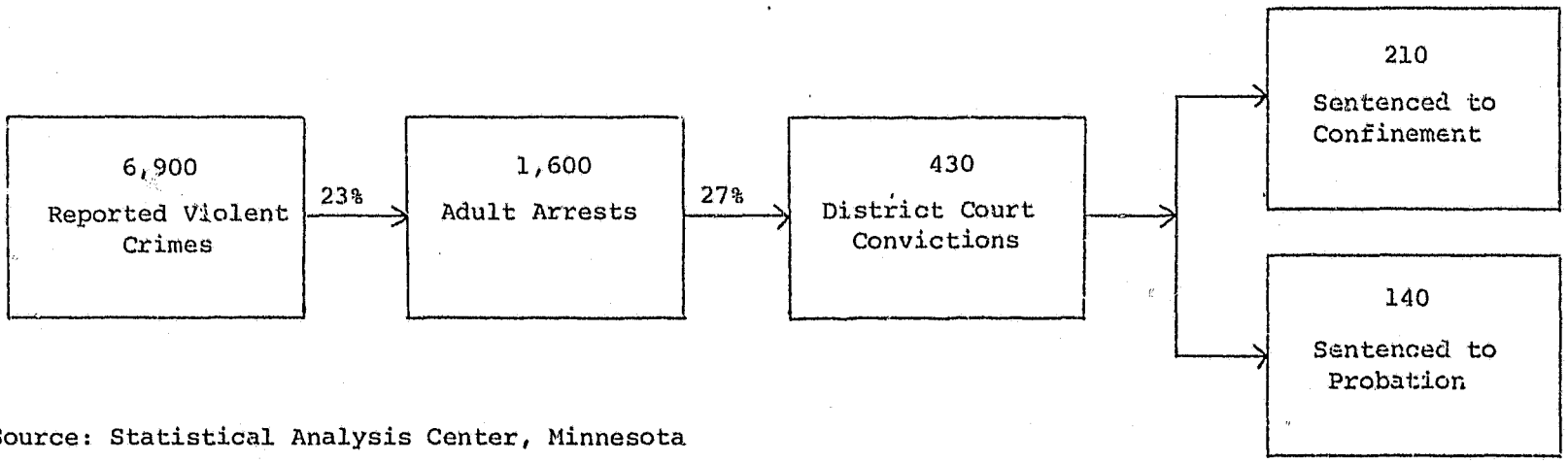
Source: Statistical Analysis Center, Minnesota

EXHIBIT 3.38. COMPARISON OF SERIOUSNESS AND CASEFLOW IN 1973 FOR PART I CRIMES (EXCLUDING MOTOR VEHICLE THEFT)

SERIOUSNESS FLOWCHART



CASEFLOW FOR VIOLENT CRIMES (ADULTS ONLY)



Source: Statistical Analysis Center, Minnesota

EXHIBIT 3.39. COMPARISON OF SERIOUSNESS AND CASEFLOW IN 1973 FOR VIOLENT CRIMES (ADULTS ONLY)

EXERCISE #9

CRIME SERIOUSNESS

Purpose

This exercise is intended to illustrate how comparative analysis and the use of seriousness scales can help the planner in defining the crime problem.

Activities

Exhibit 3.40 illustrates the crime rates for eight cities within a state for a recent year. Population size is also given. Even a single table of this sort can produce many insights and provide direction for the formulation of statements about crime.

Members of the state legislature's Committee on Criminal Code Revision have recently taken part in a survey on the relative seriousness of various crimes. The values they attached to the various crimes are as follows:

Murder	(30);
Forcible Rape	(20);
Robbery	(5);
Aggravated Assault	(5);
Breaking and Entering Burglary	(2);
Larceny	(1);
Motor Vehicle Theft	(3).

New funds have been allocated for crime reduction efforts in cities over 100,000 in population. Final guidelines have not been written as to whether only a selected number of cities (at least two but no more than half) can receive funds, or whether the state will have total discretion in allocating these funds.

- On the basis of your analysis of these data, what appear to be the greatest problem areas? To what extent does this suggest where and for what funds should be spent?
- Suppose you had five days to assemble an initial proposal. What additional data are needed to make a more accurate assessment? How might such data be analyzed?

Exhibit 3.40

Crime Rates* of 8 Selected Cities and the State 1974

	City 1	City 2	City 3	City 4	City 5	City 6	City 7	City 8	State
Population	153,911	350,499	117,435	241,577	292,109	543,730	121,138	122,201	8,248,650
OFFENSE									
Murder	18.2	26.8	20.4	14.1	21.2	23.4	6.6	3.3	14.4
For. Rape	39.6	43.7	29.8	33.5	57.2	65.1	28.1	11.5	35.0
Robbery	510.0	944.9	300.6	349.4	470.7	360.5	397.9	218.5	269.6
Agg. Asslt.	154.0	840.5	537.3	400.7	404.8	484.8	327.7	391.2	344.5
B&E/Burg.	3613.8	3438.0	3013.6	2928.3	3580.5	2528.1	2739.9	1401.0	2239.6
Larceny	6579.1	4799.4	5710.4	4584.9	5098.8	3699.1	6656.9	3549.9	3817.5
MV Theft	949.9	844.5	519.4	324.1	686.4	506.7	926.2	718.5	472.5
TOTAL	11,864.6	10,937.8	10,131.6	8634.9	10,399.5	7537.9	11,083.2	6293.7	7192.8

*Rate per 100,000.

3. Cross Classification

The sorting of data into various categories is a simple method of generating questions, clarifying factors underlying a problem, and, in general, identifying and elaborating community crime problems. An example of a one-way table is presented in Exhibit 3.41. It is a one-way table because even though seven categories are used, only one variable--crime--is involved. A two-way table is presented in Exhibit 3.42 which is the result of cross-classifying the data of two variables.

The analysis of such cross-classification tables involves both the description of the individual variables involved, i.e., in Exhibit 3.42, crime and area, as well as making a determination concerning the relationship between the variables, i.e., does the incidence of crime vary significantly across geographical areas of the nation.

Exhibits 3.42 to 3.46 illustrate a five-step procedure that can be used in interpreting data using cross-classification tables.[10] In the first step the planner must determine which variable is the dependent ("effect") and which is the independent ("cause"). In Exhibit 3.43 the type of crime has been identified as the cause of the dependent variable "value of stolen property." Exhibit 3.44 then distributes the marginal raw percentages of the dependent variable. As expected, the more frequent value loss is in the $1 - $49 category.

The third step presented in Exhibit 3.45 involves calculating the percent distribution of the dependent variable for one category of the independent variable--burglary. Note how there is a significant variation in the Burglary distribution from the marginals toward increased value loss. The fourth step repeats calculating the percent distribution of the dependent variable for the remaining categories of the independent variable. Exhibit 3.46 presents all of the calculated percentages.

The final step utilizes comparisons to interpret the percentaged cross-classification table. Following is a partial list of observations made from Exhibit 3.46.

Exhibit 3.41

One-Way Table Illustration

	Category						
	1	2	3	4	5	6	7
	Total U.S. Crime Index	Murder and Non-Negligent Manslaughter	Forcible Rape	Robbery	Aggravated Assault	Burglary	Larceny-Theft	Motor Vehicle Theft
Total Number	11,356,566	29,505	56,093	464,973	484,713	2,729,061	4,989,336	915,297
Percent of Total		.2%	.5%	4.1%	4.3%	39%	53%	8.9%

Source: Crime in the U.S., 1975.

Exhibit 3.42

Two-Way Table Illustration

	Type of Crime						
	Murder and Non-Negligent Manslaughter	Forcible Rape	Robbery	Aggravated Assault	Burglary	Larceny-Theft	Motor Vehicle Theft
SMSAs	16,490*	48,894	443,461	397,998	2,729,061	4,989,336	915,297
Other Cities	1,313	3,196	13,685	45,523	261,276	674,718	51,038
Rural	2,702	4,003	7,827	41,192	261,792	313,694	34,120

*Estimated totals for 1974-1975

Source: Crime in the U.S., 1975.

Exhibit 3.43
Four Step Interpretation of Cross Tabulations, Step One

Type of Crime
(Independent Variable - "Cause")

Value of Stolen Property (Dependent Variable - "Effect")	Burglary	Larceny	Vehicle Theft
1 - 49	35,140	256,050	500
50 - 99	20,120	70,460	600
100-249	30,400	50,550	4,310
250-999	37,000	17,180	20,070
1,000+	12,350	2,530	19,180
Not Ascertained	5,880	16,270	1,770

Source: Crime in the U.S., 1975.

Step 1: Raw data distributed by type of crime and value of stolen property.

Exhibit 3.44
Four Step Interpretation of Cross Tabulations, Step Two

Type of Crime
(Independent Variable - "Cause)

Value of Stolen Property (Dependent Variable- "Effect")	Burglary	Larceny	Vehicle Theft	
1 - 49				48.6%
50 - 99				15.2%
100-249				14.2%
250-999				12.4%
1000+				5.7%
Not Ascertained				4.0%
				100.1%

Step 2: Determine which variable is the dependent variable and percentage its distribution.

Exhibit 3.45
Four Step Interpretation of Cross Tabulations, Step Three

Type of Crime
(Independent Variable - "Cause")

Value of Stolen Property (Dependent Variable- "Effect")	Burglary	Larceny	Vehicle Theft	
$1-$49	24.9%			48.6%
50-99	14.3%			15.2%
100-249	21.6%			14.2%
250-999	26.3%			12.4%
$1000+	8.8%			5.7%
Not Ascertained	4.2%			4.0%
N	(140,890)			100.1%

Step 3: Percentage the dependent variable distribution for the Burglary Category

Exhibit 3.46
Four Step Interpretation of Cross Tabulations, Step Four

Type of Crime
(Independent Variable - "Cause")

Value of Stolen Property (Dependent Variable- "Effect")	Burglary	Larceny	Vehicle Theft	
$1-$49	24.9%	62.0%	1.2%	48.6%
50-99	14.3%	17.1%	1.3%	15.2%
100-249	21.6%	12.2%	9.3%	14.2%
250-999	26.3%	4.2%	43.3%	12.4%
$1000+	8.8%	1.0%	41.4%	5.7%
Not Ascertained	4.2%	3.9%	3.8%	4.0%
N	(140,890)	(413,050)	(46,360)	100.1%

Step 4: Percentage the dependent variable for each of the remaining independent categories.

- Sixty-two percent of all larcenies are in the $1 - $49 range, while only 1.2% of vehicle thefts and 24.9% of all burglaries are in this category.
- Comparison of the $1000+ category indicates that in contrast to the first observation, vehicle thefts are nearly five times the proportion of burglaries and burglaries are more than eight times the proportion of larcenies in this category.

Cross-classification tables are frequently used to interpret survey data by comparing the demographic characteristics of the respondent with his/her expressed attitudes. For instance, consider the results of a 1975 American Institute of Public Opinion (AIPO) Poll which asked a sample of the public the question, "Do you think the use of marijuana should be made legal or not? Specifically, we are interested in examining the relationship between college status, i.e., whether a person is a college student or not, and their response to this question." Exhibit 3.47 presents a shell of the 2x2 cross-classification table that could be used to address this question.

Let's assume that 1600 citizens were included in this survey and that 400 of the respondents were currently college students (deliberate oversampling of the college student population) and that the data were cross-tabulated, resulting in the table presented in Exhibit 3.48.

Scanning Exhibit 3.48 indicates a significant difference in opinion about legalizing marijuana between the public and college students. It is preferable, however, to compare the percentages for two reasons: 1) percentages are easier to understand and compare particularly in more complex tables and 2) the different number of college students (400) and the public (1200) requires the use of proportions to interpret these numbers.

Exhibit 3.49 clearly presents the relationship between college status and attitude about marijuana. However, most cross-tabulations do not result in such clear interpretations. To the contrary, ambiguity more often than not characterizes interpreting variable relationships. Most of the time, use of percentages can effectively communicate the nature of the problem. However, as will be presented in the next section, there are a number of inferential techniques for determining whether a statistically significant relationship exists.

Another method for examining the relationship between a pair of variables and for describing patterns in numerical data is the scatter diagram. In Exhibit 3.50 the table presents data on two variables for each of the ten cities in the hypothetical State of Paradise. Each city has been measured using a measure of population density and an indicator of the crime level. It seems plausible that the higher an area's population density, the more crime there is likely to be. Denser communities tend to have poorer populations, more minority populations, more juveniles and higher unemployment. Viewing the data helps to verify the hypothesized relationship.

Exhibit 3.47
Cross Tabulation Example

		College Students	Public
Response	Yes		
	No		
	No Opinion		

Question: Do you think the use of marijuana should be made legal or not?

Source: Sourcebook, 1976.

Exhibit 3.48
Cross Tabulation Example

		College Students	Public	Totals
Response	Yes	208	300	508
	No	172	840	1,012
	No Opinion	20	60	80
	Totals	400	1,200	

Question: Do you think the use of marijuana should be made legal or not?

Source: Sourcebook, 1976.

Exhibit 3.49
Cross Tabulation Example

		College Students	Public
Response	Yes	52% (208)	25% (300)
	No	43% (172)	70% (840)
	No Opinion	5% (20)	5% (60)
	Totals	100% (400)	100% (1200)

Question: Do you think the use of marijuana should be made legal or not?

Source: Sourcebook, 1976.

Exhibit 3.50

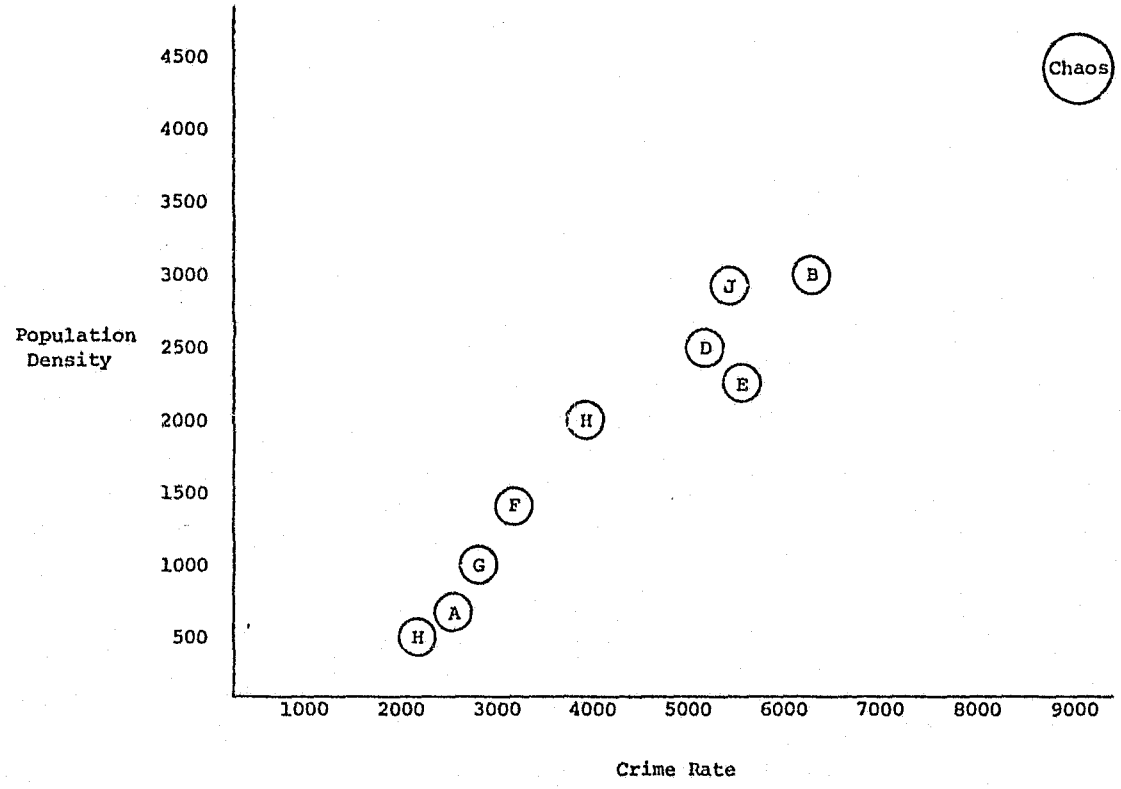
Scatter Diagram, Illustration

Cities	Population Density*	Incidence of Crime**
A	800	2500
B	3100	6200
Chaos	4500	9140
D	2600	5200
E	2300	5500
F	1500	2900
G	1300	2700
H	750	2200
I	2000	3800
J	3000	5500

* $\frac{\text{Total Population}}{\text{Area (in sq. miles)}}$

** Total Crime Index per 100,000 Population

Source: Hypothetical Data



Source: Hypothetical Data

Note in the scatter diagram in Exhibit 3.50 the following features:

a) each community has been plotted as a single dot

b) the horizontal and vertical axes have been proportionately scaled and properly and fully labeled

c) complete title and data source statements.

Interpretation of scattergrams usually consists of three types of approaches to the data. The first emphasizes the overall relationship exhibited by the data. In Exhibit 3.50 a strong positive linear relationship is visible. Other types of relationships include the curvilinear relationship illustrated in Exhibit 3.51. In this scatter diagram the monthly total incidence of burglary (seasonally adjusted) has been plotted for a five year period. A curve has been drawn through the plotted points which appears to "best fit" the data.

Many times an analyst is confronted by an ambiguous pattern of data in which no relationship is exhibited. However, a no relationship finding may be just as significant as finding a linear or curvilinear pattern in the data. For instance, in program evaluation or productivity studies, the analyst hypothesizes a certain relationship between program activities (independent variables) and evaluative criteria such as crime reduction or imporved efficiency (dependent variables). If no such relationship is established then certainly it would be a significant evaluative finding. It is expected that planned intervention will have an effect. If it does not, decision-makers need this information as much, if not more, than when such impacts are clear in one direction or another.

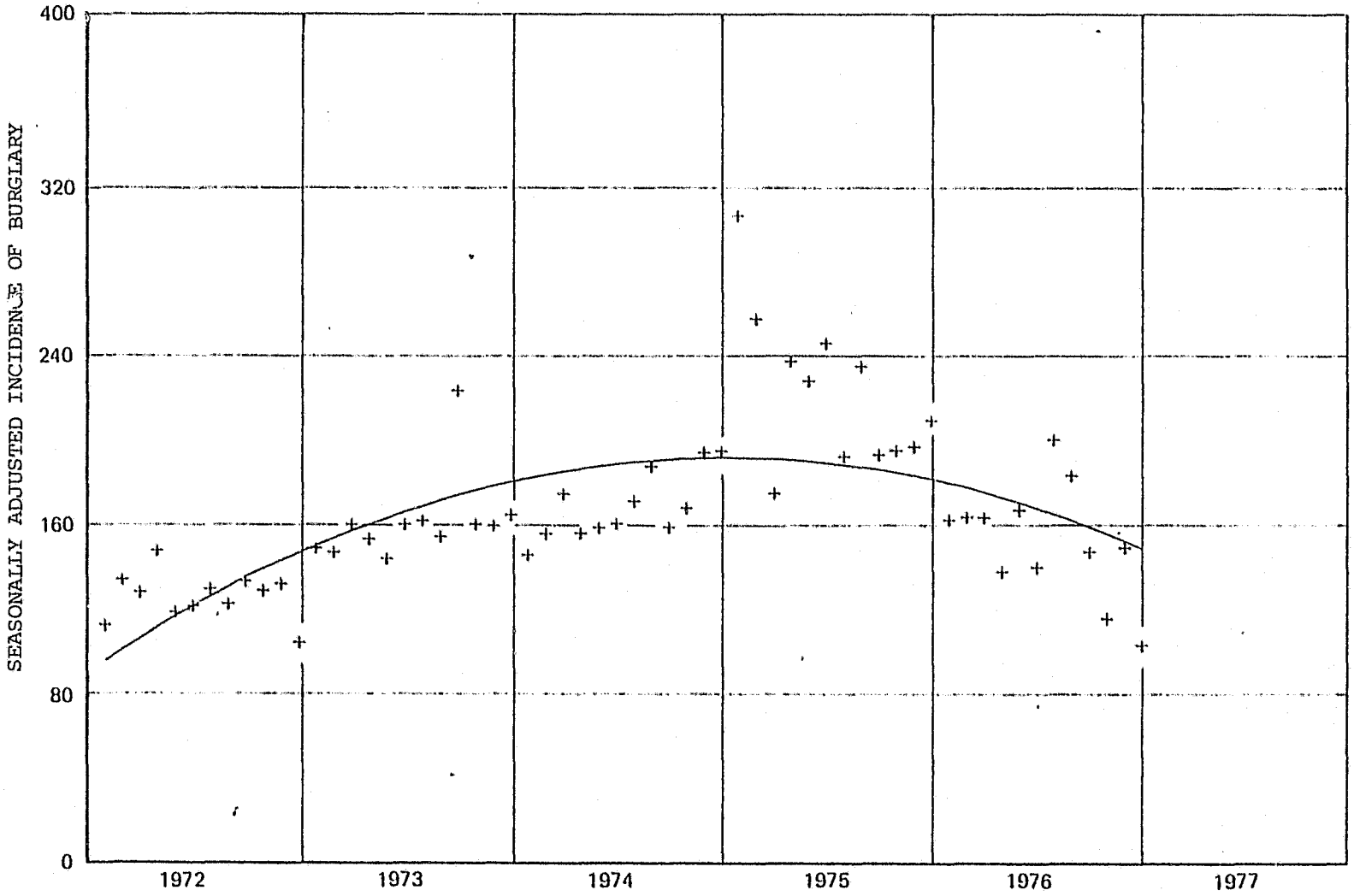
A second approach to interpreting scatter diagrams involves examining the tendency of the dots to cluster. In Exhibit 3.52 ten SMSA's have been plotted based on two attributes: total index crime per 100,000 population and police per 100,000 population. These ten SMSA are the highest and lowest in the U.S. relative to the total crime index. Note how these SMSA's also tend to have low police per capita rates, while those with high crime rates tend to have higher police per capita rates. Similarly, in Exhibit 3.50, note the two major clusters of cities--H, A, G, F and H, and D, J, E and B. Further analyses of these two exhibits might focus on identifying possible explanations for the clusters as well as on developing descriptive labels for each cluster that captures what it is that the cluster represents.

The final approach to interpreting scatter diagrams emphasizes, so-called, outliers. These are dots which have extreme values. In Exhibit 3.52 Las Vegas and Kingsport-Bristol are such outliers. By attempting to understand why these communities are unique, an interpretation can be enhanced.

Exhibit 3.51

Scatter Diagram Illustration,

Monthly Residential Burglary Trend in Peoria

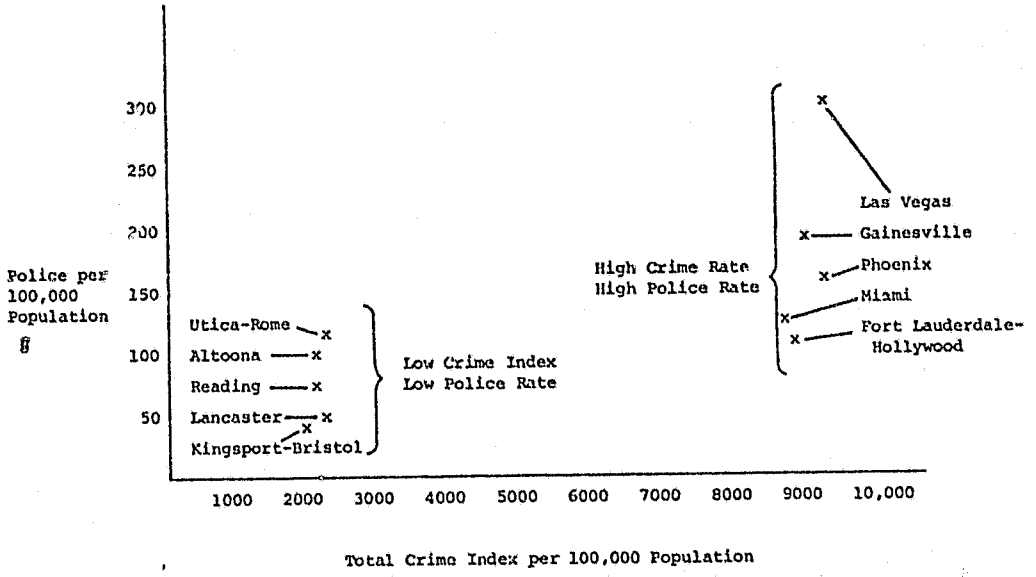


Data Source: Program Coordination Unit (1972)
Peoria Police Department: On-Line Information System (1973-1976)

Exhibit 3.52

Scatter Diagram, Illustration

		Officers		Pop.
Low SMSA's				
Altoona, Pa.	2112	113	82.7	136,638
Kingsport-Bristol, Tenn.	2159	88	34.7	253,721
Lancaster, Pa.	2244	128	38.8	329,545
Reading, Pa.	2167	194	64	303,110
Utica-Rome, N.Y.	2192	278	85.3	325,732
High SMSA's				
Phoenix, Ar.	9795	1901	162.0	173,300
Miami, Fl.	9130	1621	117.0	1,385,889
Las Vegas, Nev.	9318	934	300.2	311,153
Gainesville, Fl.	9328	209	170.3	122,751
Fort Lauderdale-Hollywood, Fl.	9252	883	108.7	812,221



Source: Sourcebook, 1976

Exercise #10 - Scatter Diagrams

Purpose

This exercise gives the participants an opportunity to practice preparing and interpreting scatter diagrams.

Activities

On a scatter diagram show the percent of total arrests and percent of all inmates in the State of Paradise for the City of Chaos and the other ten cities for 1975 using data in Exhibit 3.53.

Exhibit 3.53

STATE OF PARADISE

Incarceration and Arrests by Cities, 1975

	PERCENT OF POPULATION	PERCENT OF LAND AREA	PERCENT OF ALL INMATES	PERCENT ARRESTED FOR EACH OFFENSE							
				TOTAL ARRESTS	HOMICIDE	ROBBERY	ASSAULT	BURGLARY	LARCENY	FORGERY	DANGEROUS DRUGS
CITY A	1.00	1.33	1.38	1.25	0.00	.31	.27	.74	1.57	.26	.46
CITY B	1.13	1.28	1.28	2.00	3.28	.46	.75	1.66	.52	.40	.19
CITY C	1.46	1.20	2.33	2.40	.82	2.94	2.81	2.40	2.89	.93	.97
CITY D	4.23	1.56	3.57	4.62	5.74	11.44	4.93	6.50	7.96	2.38	5.67
CITY E	1.78	1.40	1.35	.67	.82	.62	.51	.38	1.15	.66	.68
CITY F	2.20	1.51	2.46	1.93	0.00	1.24	1.39	1.38	1.13	1.99	1.45
CITY G	15.63	.84	14.39	10.97	14.75	18.08	15.27	13.64	17.68	8.48	13.63
CITY H	2.33	1.20	1.79	3.01	0.00	1.39	1.66	3.23	2.89	1.59	1.82
CITY I	1.91	1.36	1.28	1.74	.82	0.00	.54	1.25	1.03	.93	.65
CITY J	20.62	1.02	38.60	27.08	34.43	45.13	43.25	35.47	32.89	52.72	40.17
TOTALS											

Exhibit 3.53

STATE OF PARADISE

Incarceration and Arrests by Cities, 1975

	PERCENT OF POPULATION	PERCENT OF LAND AREA	PERCENT OF ALL INMATES	PERCENT ARRESTED FOR EACH OFFENSE							
				TOTAL ARRESTS	HOMICIDE	ROBBERY	ASSAULT	BURGLARY	LARCENY	FORGERY	DANGEROUS DRUGS
CITY A	1.00	1.33	1.38	1.25	0.00	.31	.27	.74	1.57	.26	.46
CITY B	1.13	1.28	1.28	2.00	3.28	.46	.75	1.66	.52	.40	.19
CITY C	1.46	1.20	2.33	2.40	.82	2.94	2.81	2.40	2.89	.93	.97
CITY D	4.23	1.56	3.57	4.62	5.74	11.44	4.93	6.50	7.96	2.38	5.67
CITY E	1.78	1.40	1.35	.67	.87	.62	.51	.38	.15	.66	.68
CITY F	2.20	1.51	2.46	1.93	0.00	1.24	1.39	1.38	1.13	1.99	1.45
CITY G	15.63	.84	14.39	10.97	14.75	18.08	15.27	13.64	17.68	8.48	13.63
CITY H	2.33	1.20	1.79	3.01	0.00	1.39	1.66	3.23	2.89	1.59	1.82
CITY I	1.91	1.36	1.28	1.74	.82	0.00	.54	1.25	1.03	.93	.65
CITY J	20.62	1.02	38.60	27.08	34.43	45.13	43.25	35.47	32.89	52.72	40.17
TOTALS											

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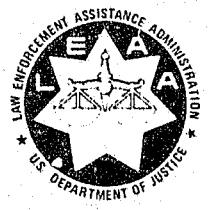
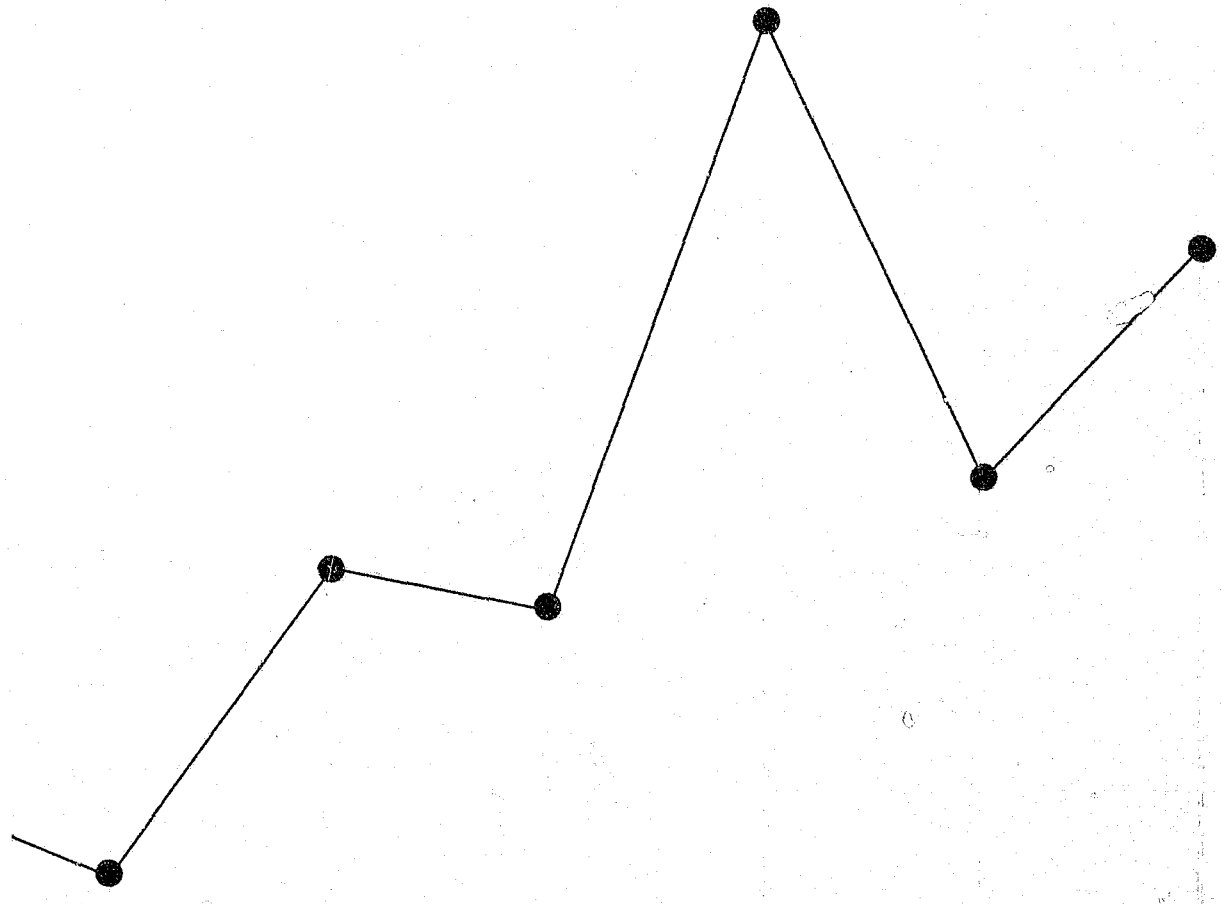


Text
Volume Two

Introduction to Analysis of Crime and the Criminal Justice System



Introduction to Analysis of Crime and the Criminal Justice System

James M.H. Gregg, Acting Administrator
Perry A. Rivikind, Assistant Administrator
Office of Operations Support

U.S. Department of Justice
Law Enforcement Assistance Administration
Washington, D.C. 20531

1977

This work was performed by Abt Associates Inc., Cambridge, Massachusetts, for the Law Enforcement Assistance Administration under Contract No. J-LEAA-001-77. John Moxley, Training Division, Office of Operations Support, LEAA, served as project monitor. Points of view or opinions stated in this document do not necessarily represent the official position or policies of the U.S. Department of Justice.

U.S. Department of Justice
Law Enforcement Assistance Administration
Washington, D.C.
1977

INTRODUCTION TO ANALYSIS OF CRIME AND THE CRIMINAL JUSTICE SYSTEM

FOREWORD
ACKNOWLEDGEMENTS

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Foreword

The Law Enforcement Assistance Administration is actively engaged in providing assistance to state and local governments to support their planning capabilities. Good planning is indispensable to the development and implementation of effective programs for improving criminal justice and reducing crime. Planners know that they must begin with an analysis of the crime and criminal justice problems they face and that the chances for a rational allocation of the system's scarce resources are enhanced when the relevance of the data to the problem at hand is clearly apparent.

A powerful tool at the planner's disposal is the data collected and analyzed during the earliest steps of the planning process. However, it is in these early steps that the greatest difficulties are encountered.

The expertise of analysts, planners, researchers, statisticians, and of greatest importance, people who have had direct personal experience with state and local crime analysis and planning processes have been tapped by LEAA to develop and deliver a training course which is an Introduction to Analysis of Crime and the Criminal Justice System. This training course is being offered to state and local governments to assist and support their capabilities to identify, acquire, and utilize the best available data, analytic techniques, and problem-solving methods.

LEAA has developed a training course in Planning, and has under development a course in Evaluation. The design of these programs of instruction is intended to form a comprehensive and complementary package for the assistance of state and local criminal justice agencies. These three courses, the Planning course, and the Analysis and Evaluation courses--once successfully pilot-tested--are being offered by the LEAA sponsored Criminal Justice Training Center system.

The analysis course materials, including the Text, Instructor Guide, and Administrative Plan, are to be considered

in draft form until the final pilot-testing of the materials is successfully completed by the Criminal Justice Training Center at the University of Southern California. Upon successful pilot-testing in December, 1977, the material and course are to be made available throughout the Training Center system during 1978.

Acknowledgements

The Introduction to Analysis of Crime and the Criminal Justice System curriculum material is the product of over a year's effort on the part of numerous practitioners, academics, and professional organizations. This development process was divided into two phases. During the initial phase, the curriculum development effort was coordinated by Abt Associates. Five pilot offerings of the course were delivered by the State University of New York at Albany and were evaluated by the American Institutes of Research. As a result of these pilot experiences, a revision of the curriculum was undertaken.

Overall supervision of the curriculum development and revision effort was provided by Seth I. Hirshorn with the assistance of Laura R. Studen. Vincent O'Leary supervised the initial pilot offerings of the course given by SUNY-Albany, and Harris Shettel provided evaluation comments during the initial pilot offerings of the course.

Considerable assistance in the early planning stages of this project was provided by the National Conference of State Criminal Justice Planning Administrators, National Association of Criminal Justice Planning Directors, Criminal Justice Statistics Association, the National League of Cities/U.S. Conference of Mayors, and the National Association of Counties.

During the initial phase of course development, overall direction of the curriculum and delivery of the pilot offerings was a cooperative endeavor within LEAA. Primarily involved were the Office of Planning and Management, the National Criminal Justice Information and Statistics Service, and the Training Division of the Office of Operations Support. Leonard Oberlander of the Office of Planning and Management and Marianne Zawitz of the Statistics Division monitored the first phase of the Project. The revision phase of the course's development was directed by the Training Division, Office of Operations Support. John Moxley of the Training Division was project monitor during this revision phase.

The revision of the material was assisted by the formation of an Advisory Group. This group of practitioners, identified on the following page, provided critical judgement in further developing and improving the curriculum.

Finally, recognition must be given to the pilot course instructors and participants who provided both patience and suggestions in recommending revisions to the curriculum--recommendations which are reflected in this material.

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Evaluator: Harris Shettel

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Ed Minnihan	Wisconsin Council on Criminal Justice
Al Benson	Washington Metropolitan Council of Governments

U.S. Department of Justice
Law Enforcement Assistance Administration
Washington, D.C.
1977

INTRODUCTION TO ANALYSIS OF CRIME AND THE CRIMINAL JUSTICE SYSTEM

MODULE 3: DATA INTERPRETATION – CRIME

This work was performed by Abt Associates Inc., Cambridge, Massachusetts, for the Law Enforcement Assistance Administration under Contract No. J-LEAA-001-77. John Moxley, Training Division, Office of Operations Support, LEAA, served as project monitor. Points of view or opinions stated in this document do not necessarily represent the official position or policies of the U.S. Department of Justice.

MODULE ABSTRACT

Title: Module 3: Data Interpretation - Crime

Lecturer:

Objectives:

A major theme of this training program is to develop tools and skills essential for criminal justice analysis. Descriptive and inferential statistics are a traditional starting point for the interpretation of crime data, and, thus, are the focus of this module.

The emphasis throughout is on practical, useful and readily understood methods. Mathematical theory is not dealt with; instead, demonstrating problem-solving using the statistics is the primary goal. In going over the following material, the reader should focus on: (1) how the results of the various calculations are used to interpret crime data; and (2) when the use of a specific analytic tool is appropriate.

In the second portion of the module inferential tools are presented which have wide application to two generic problems encountered by analysts of crime. The first involves inherent problems of explaining crime. Two methods which have application to crime data and that aid in examining the relationships between crime and other variables are presented. The second problem generic to crime analysis and planning is prediction. In this module the emphasis is on easy to use and interpret prediction methods deemphasizing theory but covering the limits and strengths of the prediction methods.

After completing this module, participants should be able to:

1. Identify and distinguish between:
   - measures of central tendency and measures of variation
   - mode, mean, and median
   - index of qualitative variation, range and average deviation
   - pie charts, bar graphs, time charts, and frequency histograms
   - descriptive and inferential statistics
2. Calculate and interpret the following:
   - rates, percentages , percent change
   - mode, median and median
   - range, index of qualitative variation, and average deviation
   - a percentaged cross classification table
   - scatter diagrams

3. Define, calculate and interpret the following:
   - chi square statistic
   - correlation coefficient
   - regression coefficients
4. Be able to explain and utilize the following concepts:
   - central tendency
   - variation
   - distributions
   - association
   - independence/dependence
   - prediction
   - time series model
   - causal model
5. Be able to explain the purpose and outline the general process of statistical tests.

MODULE 2

Data Interpretation--Crime

Start of Volume Two

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III. INFERENTIAL TOOLS

Inference in crime analysis is the process of moving from a small sample of data and an incomplete knowledge of a jurisdiction to generaliztions about the nature of crime and its consequence. Problem identification and formulation begins with individual and collective intuition; intuition that is based upon some degree of knowledge of the local crime problem. Data are then collected from a variety of sources which address the questions and issues that have intuitively been identified. The various descriptive tools presented in the previous sections are used as aids in developing generalizations about the community crime problem. However, the high cost of complete information, the lack of comprehensive data and the availability of sample data suggest the use of statistical inference in the formulation of problem statements.

In this portion of Module 3 two concepts are discussed: association and prediction. Measures of association are used in determining the strength of the relationship between two or more variables. The first method to be discussed is the Chi-Square test of independence used to aid in the analysis of cross classification tables. For example, consider a study which has organized data for the City of Chaos into its five major neighborhoods. Recently the Mayor of Chaos surveyed residents of the city asking them if they had a high or low regard for local law enforcement efforts. Exhibit 3.54 is the shell of the resulting cross-classification. If the two classifications are dependent then the proportion of high and low responses systematically varies from neighborhood to neighborhood. Bringing this relationship to the Mayor's attention would help to target resources for law enforcement in neighborhoods of the city where the greatest impact might be achieved.

EXHIBIT 3.54

Chaos City Survey, Cross Tabulation Shell

		Neighborhoods				
Regard for Police	High Regard					
	Low Regard					

A second measure of association is the correlation coefficient which is used to determine the numerical strength of a relationship between two quantitative variables, and to help in the interpretation of scatter diagrams. It is a convenient single summary statistic widely used in the social sciences to characterize bivariate relationships.

A discussion of methods of prediction concludes the module. While the emphasis is on methods useful in determining a point-estimate of some future condition, an overview of alternative forecasting methods is presented. A point-estimate is a single value of a variable of interest, such as prison population in the hypothetical State of Paradise, determined for some future date (such as next year or five years in the future) and bound by a confidence interval placed on the point-estimate. For example, given historical prison population data, regression methods provide a means to determine a point-estimate prediction of the prison population in 1980 or 1985 and to develop a sense of the relative accuracy of the prediction.

A. Measures of Association

This section is divided into two parts. In the first the Chi-Square statistic is defined and examples of its application are presented. In the second part the correlation coefficient's use is presented. Both presentations emphasize the definition of these measures of association, how they are applied, and how they are interpreted.

Statistical tests are an important aspect for using both measures of association and in regression analysis covered in the next section. A statistical test is a step-by-step process used to help organize and interpret various inferential statistics. This process consists of:

1) Stating a Null Hypothesis

A null hypothesis is a mathematical statement that suggests there is no relationship between the variables being studied. An example null hypothesis is that "there is no relationship between where a person lives in the City of Chaos and his attitude toward the police.

2) Stating an Alternative Hypothesis

An alternative hypothesis is simply the affirmative statement of the null hypothesis; i.e., "there is a relationship between where a person lives in the City of Chaos and his attitude toward the police."

3) Selecting the Appropriate Statistical Test

A statistical test is a means for determining the statistical significance of the association between two variables. It is a test in that a calculated statistic (from the data) is compared to a predicted value of the statistic obtained from tables of such statistics. What is being tested is whether the measured association could reasonably be attributed to sampling errors (i.e., unrepresentative). This presentation is restricted to the Chi-Square test.

4) Determining the Level of Significance to be Applied to the Problem

The level of significance is interpreted as the probability of an association having resulted from sampling error, i.e., if the level of significance is set at .05, this would indicate the probability of the observed association having resulted from sampling error was 50/1000.

5) Calculating the Test Statistic

6) Comparing the Test Statistic to Table Values

7) Interpreting the Finding(s) of the Test.

Problems in utilizing such tests result from the improper statement of the null hypothesis, a misunderstanding of the underlying assumptions of such tests, and the misinterpretation of the findings. Perhaps the greatest danger in applying measures of association is what is referred to as a "spurious" correlation. A relationship is spurious when either there are illegitimate inferences of causation or when two variables are related only by a third:

> Studies have indicated a high correlation between poverty and delinquent behavior. Children of poor families naturally tend toward crime and delinquency.

The point here is that the existence of a correlation does not prove the causal connection. As an example of the second problem, consider the earlier discussion of the relationship between population density and the crime rate. The model implied here is

higher density

↓

higher crime rate

which apparently has some merit. However, population density does not directly cause crimes to occur. Instead, there must be some intervening factors such as reduced police visibility which result in the higher crime rates:

higher density

↓

less police visibility

↓

higher crime rate

A final problem in making inferences is suggested by Exhibit 3.52. In this scatter diagram only the extreme SMSA's are presented. What would the scattergram look like if all SMSA's were plotted? Could the same inferences be drawn about the relationship between law enforcement and crime incidence?

CONTINUED

3 OF 5

1. Chi-Square Test of Independence

To illustrate the Chi-Square test of independence the hypothetical survey undertaken in Chaos concerning citizen regard for law enforcement has been completed. Responses to the question, "Would you say, in general, that your local police are doing a good job or a poor job?" are classified by the neighborhood of the respondent in Exhibit 3.55. The first step in determining whether the two classications are independent is to state the null hypothesis:

a) Null Hypothesis: neighborhood is independent of attitude toward police.

The next step is to state the alternative hypothesis:

b) Alternative Hypothesis: attitude is dependent on the neighborhood of the respondent.

The third step is to select an appropriate test statistic. The Chi-Square test is designed to measure the covariation in two

EXHIBIT 3.55

Neighborhoods

	I	II	III	IV	Total
Good Job	39	21	17	32	150
Poor Job	6	24	58	55	50
Total	45	45	25	37	200

Source: Hypothetical Data

qualitative variables based on the number of cases in each category. Selection of the Chi-Square test is based on 1) the need to interpret a cross classification table and 2) a total count of five or more in each cell of the table.

c) Test Statistic: Chi-Square (χ^2).

The fourth step is to determine the level of significance to be applied to the problem. Stated another way, the need is to establish a rejection region for values of the calculated Chi-Square. If the test statistic falls into the rejection region then the null hypothesis is rejected.

Two pieces of information are necessary to establish a rejection region: the level of significance desired (usually .05), and the degrees of freedom associated with the problem. Degrees of freedom refer to the number of data points which may vary after certain restrictions are placed on the data. The concept is important since the Chi-Square statistic is a probability distribu-

tion which varies according to the number of degrees of freedom: change the degrees of freedom and you change the shape of the Chi-Square probability distribution, and consequently, the table value of the Chi-Square statistic used to establish a rejection region.

In Chi-Square tests the number of degrees of freedom is calculated using the formula:

$$\text{Degrees of Freedom (df)} = (R-1)(C-1)$$

where: R = number of rows in the cross classification table
C = number of columns in the cross classification table.

In Exhibit 3.55 there are two rows and five columns. Therefore, the number of df = (2-1)(5-1) = 4. Consequently, the null hypothesis can be rejected if the tabulated value of χ^2 is less than the table value of χ^2 for the level of significance (a) equal to .05 and df = 4 which is, according to Exhibit 3.56, 9.49.

EXHIBIT 3.56

Selected Values of Chi-Square

df	a=.05
1	3.84
2	5.99
3	7.81
4	9.49
5	11.07
6	12.59
7	14.07
8	15.50
9	16.91
10	18.30

Source: Hypothetical Data

d) Rejection Region: Chi-Square (calculated) less than or equal to 9.49.

The fifth step in the analysis is the calculation of the χ^2 from the data in Exhibit 3.55. This is a two-part procedure. First, it is necessary to estimate the expected cell counts. The expected cell counts are the cell counts we would expect assuming the null hypothesis was true, i.e., attitudes were independent of neighborhood. These expected cell counts are calculated independent of neighborhood. The expected cell counts are calculated using the formula:

$$\text{Expected Cell Count (E)} = \frac{(\text{Row Total})(\text{Column Total})}{\text{Total Number in Sample}}$$

For data in Exhibit 3.55 the expected cell counts are:

Good Job, Neighborhood I= $\frac{(150)(45)}{200} = 11.25$

Good Job, Neighborhood II= $\frac{(150)(45)}{200} = 11.25$

Good Job, Neighborhood III= $\frac{(150)(25)}{200} = 18.75$

Good Job, Neighborhood IV= $\frac{(150)(37)}{200} = 27.75$

Good Job, Neighborhood V= $\frac{(150)(24)}{200} = 18.00$

Poor Job, Neighborhood I= $\frac{(50)(45)}{200} = 11.25$

Poor Job, Neighborhood II= $\frac{(50)(45)}{200} = 11.25$

Poor Job, Neighborhood III= $\frac{(50)(25)}{200} = 6.25$

Poor Job, Neighborhood IV= $\frac{(50)(37)}{200} = 9.25$

Poor Job, Neighborhood V= $\frac{(50)(24)}{200} = 16.80$

The second part in calculating χ^2 is applying the following formula to the data:

$$\chi^2 = \Sigma \frac{(O-E)^2}{E}$$

where: χ^2= chi square statistic

O = observed cell counts

E = Expected cell counts

Substituting into this formula, chi square equals:

$$\chi^2 = \frac{(39-11.25)^2}{11.25} + \frac{(21-11.25)^2}{11.25} + \frac{(17-18.75)^2}{18.75}$$

$$+ \frac{(32-27.75)^2}{27.75} + \frac{(17-18.00)^2}{18.00} + \frac{(6-11.25)^2}{11.25}$$

$$+ \frac{(24-11.25)^2}{11.25} + \frac{(8-6.25)^2}{6.25} + \frac{(5-9.25)^2}{9.25} + \frac{(7-16.80)^2}{16.80}$$

$$\chi^2 = 82.15$$

e) Calculated $\chi^2 = 82.15$

The sixth step requires comparing the calculated χ^2 with the table value of chi square. Since calculated χ^2 (82.15) exceeds the table value (9.49) it can be concluded that the classification attitude about police performance and neighborhood are dependent. That is, we reject the null hypothesis that the two classifications are independent.

f) χ^2 (calculated) = 82.15

χ^2 (table) = 9.49

χ^2 (calculated) > χ^2 (table)

therefore reject the null hypothesis.

We can conclude based on this test that the distribution of respondents in the categories "good job" and "bad job" depends on the neighborhood in which the respondent resides.

Chi Square Test

Null Hypothesis: the two classifications are independent

Alternative Hypothesis: the two classifications are dependent.

Test Statistic:

$$\chi^2 = \Sigma \frac{(O-E)^2}{E}$$

Rejection Region: Reject null hypothesis if χ^2 (calculated) exceeds χ^2 (table) for a = .05 and dfE = (R-1)(C-1).

The Chi-Square test should be used in conjunction with percent comparisons of cross classifications, thus enriching the interpretations of the data. The two examples in this section have not used percent comparisons. How might conclusions reached be elaborated and enhanced by percentages from the respective tables?

Example

Consider the following table that uses the same Chaos City survey data; but here cross classified by race of respondent:

	White	Negro	Totals
Good Job	80	25	150
Bad Job	45	50	50
Totals	125	75	200

1) H_o: Classifications are independent

2) H_a: Classifications are dependent

3) Test Statistic: χ^2

4) Rejection Region: a = .05, df = (R-1)(C-1) = (2-1)(2-1) = 1 χ^2 (table) = 3.84 (see Exhibit 3.47)

5) Calculated χ^2 =

1. Expected cell counts =

Good Job, Whites $\frac{(150)(125)}{200} = 93.75$

Good Job, Blacks $\frac{(150)(75)}{200} = 56.25$

Bad Job, Whites $\frac{(50)(125)}{200} = 31.25$

Bad Job, Blacks $\frac{(50)(75)}{200} = 18.75$

2. $\chi^2 = \Sigma\frac{(O-E)^2}{E} = \frac{(80-93.75)^2}{93.75} + \frac{(25-56.25)^2}{56.25} + \frac{(45-31.25)^2}{31.25} + \frac{(50-18.75)^2}{18.75}$

$\chi^2 = 38.78$

6) χ^2 (calculated) (38.78) is greater than χ^2 (table) (3.84), therefore reject null hypothesis.

7) Conclusion is that the distribution of attitudes towards whether police are perceived as doing a good or bad job depends on the race of the respondent.

EXERCISE 11

CHI-SQUARE TEST

Purpose

This exercise gives the participants an opportunity to practice the chi-square test of independence.

Activities

From the data in Exhibit 3.57 analyze and interpret the results of the survey of residents of the State of Paradise, using the Chi-Square test of independence.

Exhibit 3.57

STATE OF PARADISE

Burglary Crime Trends, by Area, 1974 and 1975

AREA	1974	1975
Urban	20,152	25,628
Urban-Rural	8,196	7,105
Rural	10,050	8,050

STATE OF PARADISE

Victimization Survey Results, Burglary, 1975*

	Urban	Urban-Rural	Rural
Most Important	200	55	31
Very Important	356	52	28
Important	90	31	158
Slightly Important	52	50	62
Not Important	41	62	81
No Response	61	50	40

* How important is Burglary in terms of your community's crime problem (5-Most important, 4-Very important, 3-Important, 2-Slightly important, 1-Not important)

2. Correlation Coefficient

One means of summarizing the relationship displayed in a scatter diagram is the correlation coefficient. In this section Pearson's correlation coefficient is presented as a tool used to indicate the nature and strength of the relationship between two quantitative variables as well as a means of interpreting scatter diagrams.

In Exhibit 3.50 crime rates were plotted against population densities for the ten cities in the hypothetical state of Paradise. It has been assumed in this example that the crime rate is the dependent variable (Y) and population density is the independent variable (X). If these two variables are linearly related then the correlation coefficient is a measure of the degree of relationship present. Two characteristics of the correlation coefficient are important:

- the sign (+) or (-) indicates whether the relationship is positive or negative, direct or inverse.
- the coefficient varies in size from +1.0 to -1.0. A + 1.0 indicates a perfect positive correlation; a 0 indicates the lack of any relationship, and -1.0 a perfect negative correlation.

In order to calculate the correlation coefficient for the data in Exhibit 3.50 the following formula is used:

$$\text{Correlation Coefficient (r)} = \frac{\Sigma XY - (\Sigma X)(\Sigma Y)/N}{\sqrt{\Sigma X^2 - \Sigma X^2/N}\ \sqrt{\Sigma Y^2 - (\Sigma Y)^2/N}}$$

where: Y = dependent variable values

X = independent variable values

N = number of cases/observations

For this problem N = 10, and using the following table format, the calculation of the correlation coefficient requires, first the calculation of the individual summations, and secondly, the substitution of the summations into the formula.

X	Y	X^2	Y^2	XY
800	2,500	640,000	6,250,000	2,000,000
3,100	6,200	9,610,000	38,440,000	19,220,000
4,500	9,140	20,250,000	83,539,600	41,130,000
2,600	5,200	6,760,000	27,040,000	13,520,000
2,300	5,500	5,290,000	30,250,000	12,650,000
1,500	2,900	2,250,000	8,410,000	4,350,000
1,300	2,700	1,690,000	7,290,000	3,510,000
750	2,200	562,500	4,840,000	1,650,000
2,000	3,800	4,000,000	14,440,000	7,600,000
3,000	5,500	9,000,000	30,250,000	16,500,000
Σ 35,800	45,640	60,052,000	250,749,000	81,000,000

$\Sigma X = 35,800$

$\Sigma Y = 45,640$

$\Sigma X^2 = 60,052,500$

$\Sigma Y^2 = 25,074,960$

$\Sigma XY = 81,000,000$

Substituting in the formula for the correlation coefficient after laboriously calculating the various summations results in an r = .98019. Thus a strong positive correlation exists between the independent variable, population density and the dependent variable, crime rate. That is, relatively high density communities are associated with higher crime rates.

As a second example consider the scatter diagram presented in Exhibit 3.52. Here the calculated correlation coefficient is .73754 which interpreted means that a strong positive correlation exists between the independent variable, police per 100,000 population and the total crime index per 100,000 population which is the dependent variable. That is, communities with relatively large numbers of police tend to have higher crime rates. This example illustrates the difficulty in establishing which is the dependent and which is the independent variable. In statistical inference as in all of criminal justice analysis there is no substitute for common sense and plausibility in making persuasive arguments.

> "Because that's where they keep the money"--Willie Sutton, when asked why he robbed banks."(12)

EXERCISE 12

CORRELATION ANALYSIS

Purpose

This exercise gives the participants an opportunity to practice calculating and interpreting correlation coefficients.

Activities

a) Calculate the correlation for the residential and non-residential burglary crimes for the ten cities in the State of Paradise for 1975 using data in Exhibit 3.58 and 3.59.

b) Calculate the correlation coefficient for burglary crime trends and motor vehicle crime trends for the ten cities in the State of Paradise for 1974, using data in Exhibit 3.60 and 3.61.

c) Calculate the correlation coefficient for the City of Chaos and the ten other cities in the State of Paradise for 1975 regarding judges as a percent of total judges and cases filed as percent of total cases filed using data in Exhibit 3.62.

d) Interpret each of these analyses.

Exhibit 3.58

STATE OF PARADISE

Residential Burglary Crime Trends, by City, 1974 and 1975

JURISDICTION	OFFENSES					1974 Offenses Per 1000 Housing Units
	1974		1975		% Change in Rate	
	Number	Rate*	Number	Rate*		
STATE TOTAL	23,493	8.98	26,616	10.03	11.7	25.5
City A	788	4.61	772	4.44	- 3.7	12.4
City B	1,254	6.30	1,226	5.97	- 5.2	17.9
City D	620	3.61	973	5.60	55.1	9.8
City E	1,102	4.70	1,327	5.56	18.3	13.5
City F	477	2.93	606	3.72	27.0	7.6
City G	6,264	14.27	7,248	16.31	14.3	40.3
CHAOS	10,435	14.80	11,582	16.05	8.4	44.6
City H	2,145	8.58	2,354	9.30	8.4	25.6
City I	305	2.74	395	3.50	27.7	6.9
City J	103	1.51	133	1.91	26.5	4.8

* Rate = number of crimes per 1,000 population

Source: Hypothetical data.

Exhibit 3.59

STATE OF PARADISE

Non-Residential Burglary Crime Trends, by City, 1974 and 1975

JURISDICTION	OFFENSES				1974 Offenses Per 1000 Commercial Establishments**
	1974		1975		
	Number	Rate*	Number	Rate*	
STATE TOTAL	13,702	5.27	14,367	5.45	401.0
City A	515	3.01	590	3.39	241.9
City B	625	3.14	718	3.50	254.6
City D	627	3.65	622	3.58	240.5
City E	825	3.52	862	3.61	275.1
City F	997	6.11	905	5.56	387.2
City G	3,445	7.85	3,395	7.64	589.9
CHAOS	4,834	6.86	5,412	7.50	584.8
City H	1,265	5.06	1,131	4.47	415.2
City I	418	3.75	498	4.41	226.4
City J	151	2.21	234	3.37	116.3

* Rate = number of crimes per 1,000 population

** Commercial establishments = wholesale + retail establishments

Source: Hypothetical data.

Exhibit 3.60

STATE OF PARADISE
Burglary Crime Trends by City, 1974 and 1975

JURISDICTION	OFFENSES			
	1974		1975	
	Number	Rate*	Number	Rate*
STATE TOTAL	58,398	14.33	80,983	15.47
City A	1,303	7.61	1,362	7.82
City B	1,951	9.81	1,944	9.47
City D	1,247	7.25	1,595	9.17
City E	1,927	8.21	2,189	9.17
City F	1,474	9.04	1,511	9.28
City G	9,809	22.34	10,643	23.94
CHAOS	15,269	21.65	15,994	23.55
City H	3,412	13.65	3,485	13.77
City I	752	6.75	893	7.90
City J	254	3.71	367	5.28

* Rate = number of crimes per 1,000 population

Source: Hypothetical data.

Exhibit 3.61

STATE OF PARADISE

Motor Vehicle Crime Trends by City & State, 1974 and 1975

JURISDICTION	OFFENSES					
	1974			1975		
	Number	Rate*	Rate** (Vehicles)	Number	Rate*	Rate** (Vehicles)
STATE TOTAL						
City A	249	1.45	1.66	280	1.60	1.73
City B	325	1.63	2.29	354	1.72	2.35
City D	123	0.83	1.12	142	0.93	1.23
City E	301	1.75	2.18	288	1.65	1.99
City F	345	1.47	1.94	371	1.55	1.97
City G	2,283	5.20	6.56	2,569	5.77	6.96
CHAOS	5,042	7.16	9.23	4,551	6.31	7.96
City H	243	1.49	1.62	245	1.50	1.57
City I	502	2.01	2.77	448	1.77	2.34
City J	105	0.94	1.20	122	1.08	1.28

* Rate = number of crimes per 1,000 population

** Rate = number of crimes per 1,000 registered vehicles

Source: Hypothetical data.

Exhibit 3.62

STATE OF PARADISE

Comparative Workload Data by District Court Judicial District and Administrative Judicial District, by City, 1975

DISTRICT COURT JUDICIAL DISTRICT		POPULATION AS PERCENT OF TOTAL POPULATION	RANK	JUDGES AS A PERCENT OF TOTAL JUDGES	RANK	CASES FILED AS PERCENT OF TOTAL CASES FILED	RANK	FELONY CASES FILED AS A PERCENT OF TOTAL FELONY CASES FILED	RANK	MISDEMEANOR CASES FILED AS A PERCENT OF TOTAL MISDEMEANOR CASES FILED	RANK	OTHER CASES FILED AS A PERCENT OF TOTAL OTHER CASES FILED	RANK
A	1	1.25	4	2.73	10	1.76	5	1.99	9	2.14	5	1.27	4
	2	2.39	11	3.83	15	3.11	15	1.83	7	4.46	16	1.67	7
	3	2.68	15	3.28	14	2.42	10	2.14	10	3.08	12	1.66	6
B	4	5.31	20	7.10	21	4.67	19	3.30	17	5.21	20	4.18	20
	5	8.45	22	8.74	22	9.41	22	7.87	22	11.95	24	6.56	22
CHAOS	6	21.88	24	13.66	24	16.66	24	23.71	24	8.49	22	25.56	24
	7	2.30	10	2.19	4	2.46	11	.92	3	3.02	11	1.97	11
	8	2.75	17	2.19	5	2.78	13	2.30	13	3.23	13	2.30	14
	9	1.16	3	1.64	1	1.07	3	.70	1	1.34	4	.79	3
	10	2.03	8	2.19	6	1.19	4	1.13	4	.98	2	1.46	5
D	11	2.60	14	2.19	7	3.34	16	2.48	14	4.34	15	2.26	13
	12	1.86	5	2.19	8	2.13	6	1.86	8	2.47	6	1.77	9
G	13	16.07	23	10.93	23	15.04	23	18.08	23	10.13	23	20.46	23
	14	5.60	21	4.92	19	6.53	21	4.07	20	7.89	21	5.20	21
E	15	1.97	7	2.73	11	2.40	8	1.68	6	2.74	9	2.09	12
	16	2.08	9	2.73	12	2.37	7	2.21	11	2.73	8	1.96	10
	17	1.95	6	2.19	9	2.42	9	2.29	12	3.00	10	1.75	8
F	18	1.00	2	1.64	2	1.02	2	1.60	5	1.20	3	.74	2
	19	2.70	16	4.37	16	3.77	17	3.41	18	4.65	17	2.76	16
	20	4.72		4.37	17	4.76	20	4.81	21	5.27	19	4.15	19
G	21	2.59		4.37	18	2.74	12	3.13	16	2.52	7	2.97	17
	22	2.45	12	2.73	13	2.96	14	3.97	19	3.34	14	2.40	15
H	23	3.48	18	5.46	20	4.28	18	2.03	15	5.08	18	3.49	18
I	24	.64	1	1.64	3	.68	1	.87	2	.73	1	.59	1
TOTALS		100.00		100.00		100.00		100.00		100.00		100.00	

Source: Hypothetical Data

B. Methods of Prediction

The systematic analysis of crime patterns over time is an essential part of criminal justice planning because of the following:

a. Prevention of crime is one basic goal of the criminal justice system.

b. Criminal justice resources are limited; crime prevention priorities and the crime conditions that are responsive to local remedial action must be identified.

c. Evaluation of existing crime prevention programs and assessment of the likely consequences of future crime prevention strategies are most effectively accomplished through the analysis of past and present crime data.

d. All programmatic planning aimed at controlling crime involves some type of analysis--this may be a hunch, intuition, or be the product of a more formal procedure.

e. There is continually greater reliance on more systematic techniques for analyzing crime trends and predicting crime as the criminal justice system acquires more and better quality data, installs computer facilities, and statistical techniques are refined and mastered.

Time trend analysis is a technique for categorizing and studying movements in time series data (that is, movements in data consisting of successive values of a variable at monthly, yearly, or other regular time intervals). All types of crime-oriented data, e.g., UCR, victimization, system performance, system resources, and juvenile justice, are amenable to time trend analysis. The only constraints are "availability" (i.e., having similar data from year to year) and compatability of different year and different jurisdiction data. This section will focus on trends in index crimes to illustrate the techniques of prediction. Two examples of time series of index crimes used are annual robbery data in a city's residential areas, and monthly auto thefts for the year 1974 that occurred during the high crime hours.

What is the value of time trend analysis? Change over a short time period--most notably that from one year to the next--can be misleading. Longitudinal data enable the analyst to fully conceptualize crime patterns and also facilitate further analyses. This has relevance for the following:

- Putting crime statistics in historical perspective. A static picture of this year's crime does not say much about long term trends that may carry into the future.

- Assessing the relationship between existing programs and crime conditions. For example, a sharp increase in reported rape between 1973 and 1974 after eight years of slow but steady increases might suggest that a program implemented in 1974 making it easier and less embarassing for women to report a rape is an important explanatory factor.

- Developing hypotheses concerning the factors that contribute to crime that might be tested using additional non-crime data.
- Estimating present year data. For instance, UCR data often are not published for almost a year after they are collected. Time trend analysis makes it possible to use data from past years to develop estimates of current data. A locality's crime profile for the current year can be constructed from these estimates for planning and analytic purposes.
- Determining the need for remedial actions. For example, a planner may discover that the homicide rate in Chaos City increased significantly in 1975, a fact that might encourage consideration of a range of programmatic responses. A review of crime trends for the prior five year might disclose that the homicide rate is suceptible to large proportional changes--both increases and decreases--but has, in fact, changed relatively little since 1969. The planner could then reasonably conclude that the increases in 1975 do not represent a fundamental shift. (See Exhibit 3.63 on the following page.)
- Forecasting. An analysis of past crime trends may permit one to make certain assumptions about future directions of crime. Based on these assumptions one can employ certain statistical techniques to more systematically predict future crime levels.

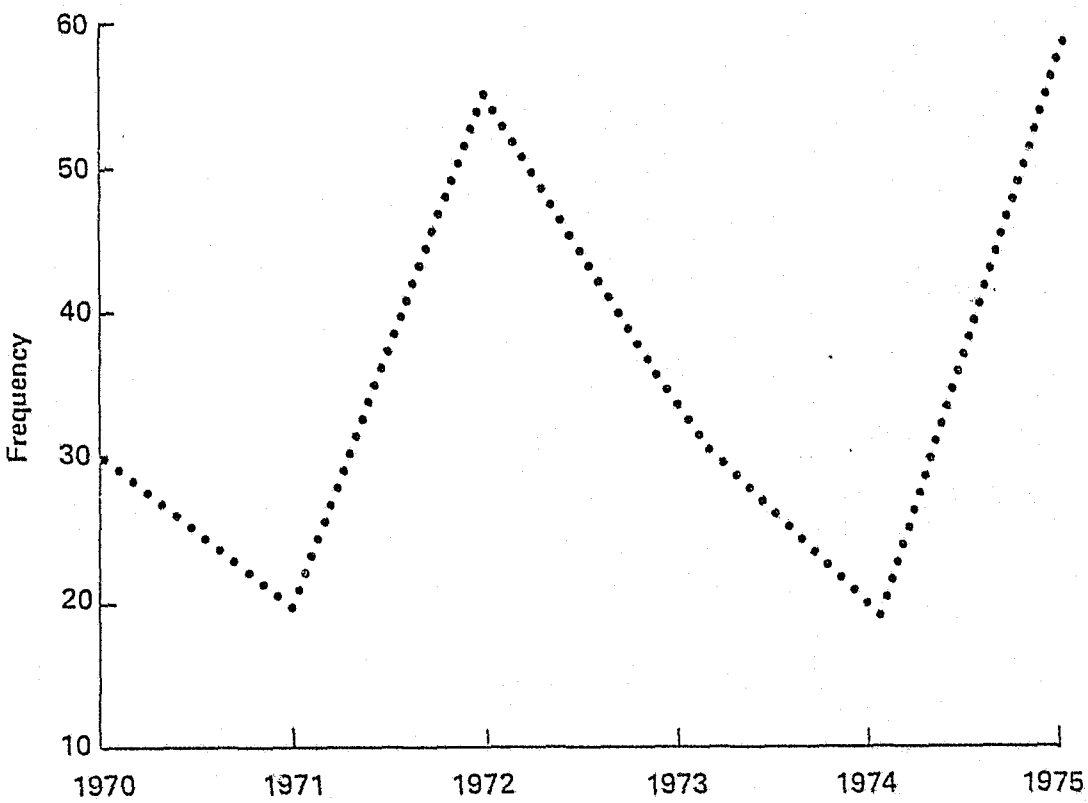
1. Forecasting Crime on the Basis of Time Series Data

Why should one forecast crime? The reasons have been suggested above. To recapitulate:

- In order to establish crime prevention priorities to receive limited criminal justice resources;
- To assess future programmatic needs; and
- To apply more accurate and systematic techniques that the more informal forecasting criminal justice planners already do.

The future is always to some degree uncertain. Thus, no forecast is safe from error. Unforseen events can overturn a forecast. For example, the introduction of better anti-theft devices in cars can alter the trend in auto thefts. The procedures of

EXHIBIT 3.63
HOMICIDE: FIVE-YEAR TREND FOR CHAOS CITY, 1970-1975



Source: Hypothetical Data

extrapolation and forecasting require the tacit assumption that there are to be no major shocks to the "social system," that is, all relevant factors such as demographic and economic conditions remain stable. Although forecasting can be quite helpful in programming (e.g., in the development of three-year plans), the possibility of large error, due to unforseen, indeed unforseeable, conditions, in prediction exists.

Generally, one can make more accurate forecasts on the basis of longer time series than on the basis of shorter ones. Shorter time series have a tendency to mask anomalous fluctuations. For example, a three-year series of annual robbery data might look like that which appears in Exhibit 3.64. A longer ten-year series might reveal a very different trend, as seen from Exhibit 3.65. In order to minimize the error in prediction, it is necessary to use as long a time series as is available.

Certain crimes, particularly indoor crimes and crimes of passion, may not be responsive to law enforcement efforts. For those crimes, prediction, as a basis for future crime prevention strategies, may not be valuable.

Predicting crime merely on the basis of past crime assumes that past crime is the best "predictor" of future crime. This may be true in some cases, yet this forecasting model ignores the influence that changes in socioeconomic and demographic characteristics have on crime. The characteristics of the population that have been found to most influence crime are the following:

- the proportion of young people in the population;
- population growth;
- population mobility;
- family stability; and
- poverty.

Incorporation of these demographic variables into a prediction model are not discussed in the text, however, appropriate references in the selected bibliography at the end of the module have been made.

There are additional sources of data such as characteristics of offenses (e.g., the proportion of homicides involving firearms, the proportion of rapes in which the offender was totally unknown to the victim) and "population at risk" (e.g., adjusting the number of auto thefts by the number of automobiles) that would provide a more detailed picture of the crime profile over time. For planning purposes these data should be included in forecasting models.

Similarly, a comparison of crime trends among similar jurisdictions or among sub-jurisdictional units produces a more useful analysis (see Exhibit 3.66).

It must be remembered that programmatic response to predicted crime problems are not found only in law enforcement. The planner must also examine a range of courts and corrections system policies

EXHIBIT 3.64
THREE YEAR TIME SERIES OF ANNUAL ROBBERY DATA, CHAOS CITY, 1971-1974

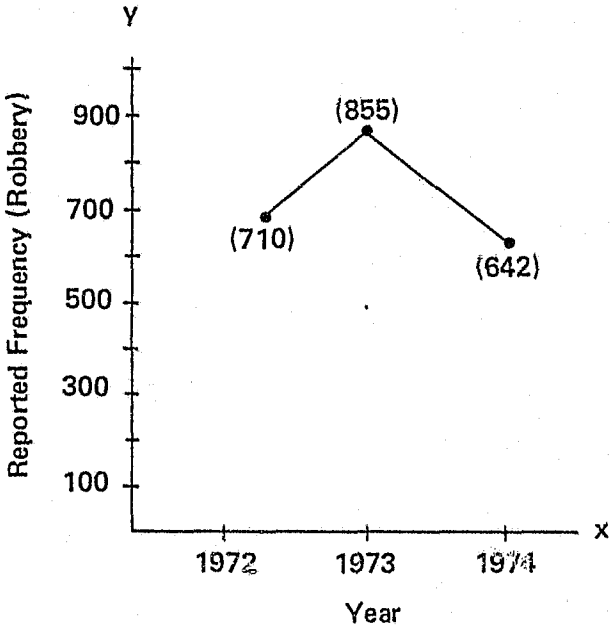
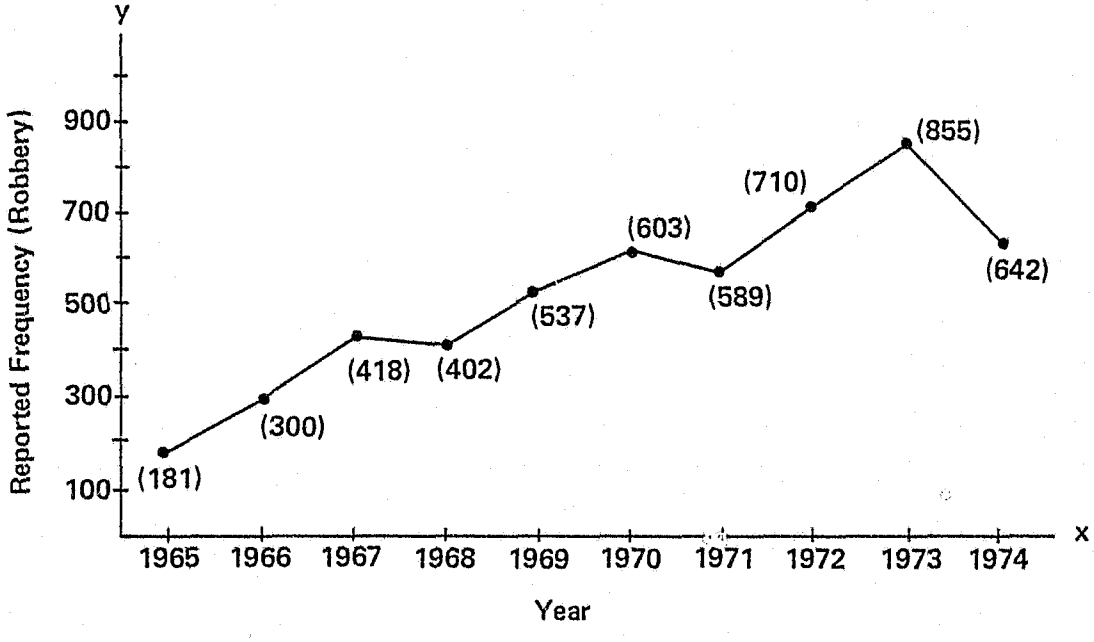
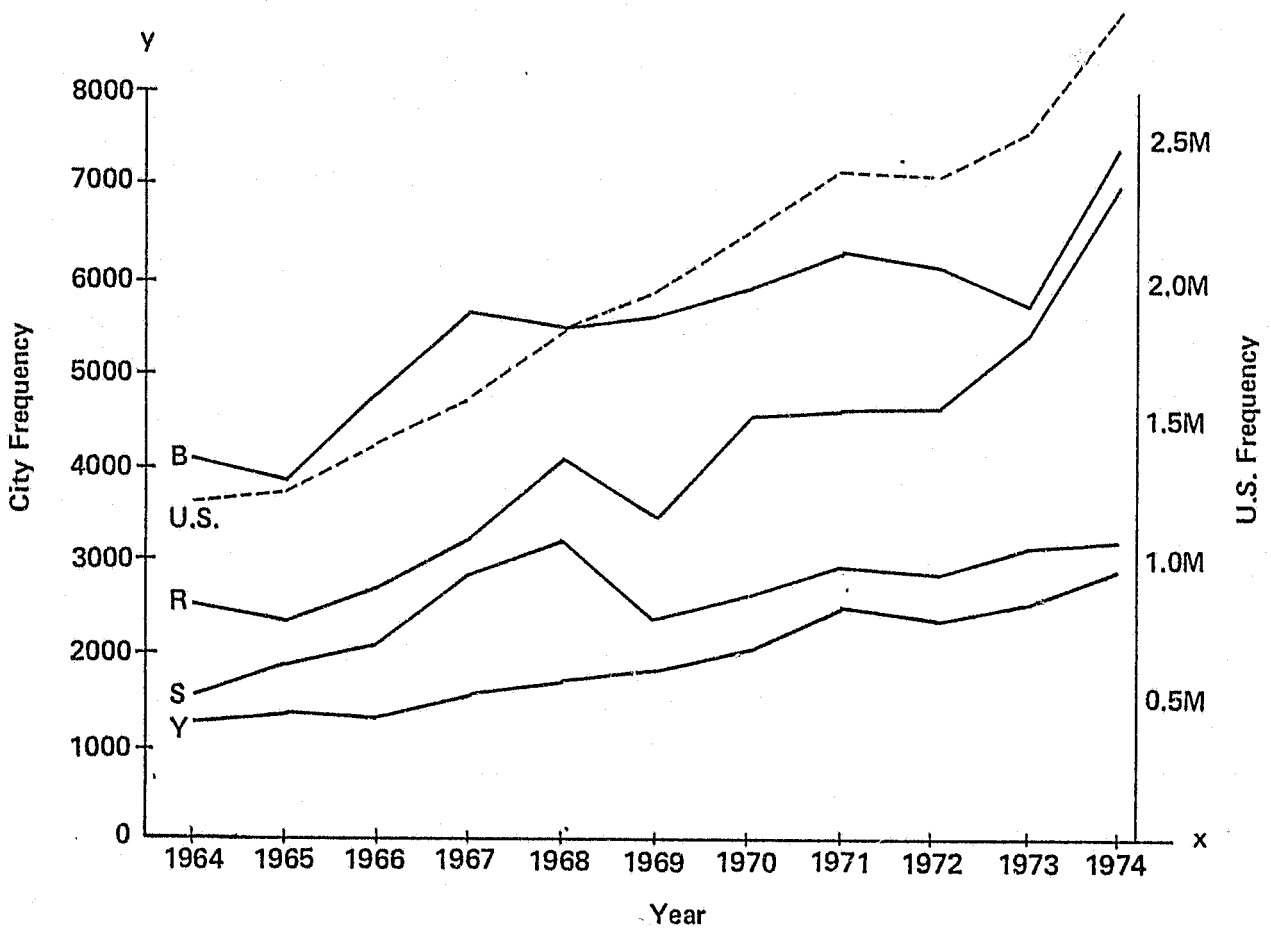


EXHIBIT 3.65
TEN YEAR TIME SERIES OF ANNUAL ROBBERY DATA, CHAOS CITY, 1965-1974



Source: hypothetical data

EXHIBIT 3.66
ANNUAL FREQUENCY OF REPORTED BURGLARY FOR FOUR CITIES,
1964-1974



to explain past and present crime conditions and to predict future crime trends.

2. Forecasting Tools

There are three main elements of any forecast. First, the analyst must decide on a time frame for the specific prediction. Changing the points in time for the prediction could affect both the specific tool to be used as well as the final product. Second, all forecasts rely on the past and specifically use relevant historical data to make predictions. This assumes the past, or some portion of the past, is a good predictor of the future. The third element is that forecasts are characterized by risk and uncertainty which will inevitably produce errors in the analyst's predictions.

There are basically two types of forecasting methods, one of which will be presented in this section. The time series model utilizes historical data of the variable to be forecast in making a prediction. This model assumes that the trends that occurred in the past will recur in the future. Such models are unable to account for significant policy changes or environmental changes and, hence, are limited in measuring the impact of proposed actions. Their major use is in establishing a baseline predition which assumes maintaining current conditions and trends.

The second type of forecasting method is the causal model. This technique utilizes a closely associated variable to make a prediction of a second variable. That is, population growth is a good indicator of index crime change, and so the analyst uses readily available population projections to model and predict the crime rate. Causal models, in addition to being difficult to develop, require more historical data than do time series models, and the ability to accurately predict the independent variable (population). However, causal models can more readily incorporate policy or environmental changes.

- Smoothing Techniques

One method of making a short term projection is to apply smoothing techniques to the data. One such smoothing technique is a simple moving average. This technique has been applied to the burglary data in Exhibit 3.67. The formula for calculating the simple moving averages is as follows:

MOVING AVERAGE

$$X_{t+1} = \frac{X_{t-1}}{N}$$

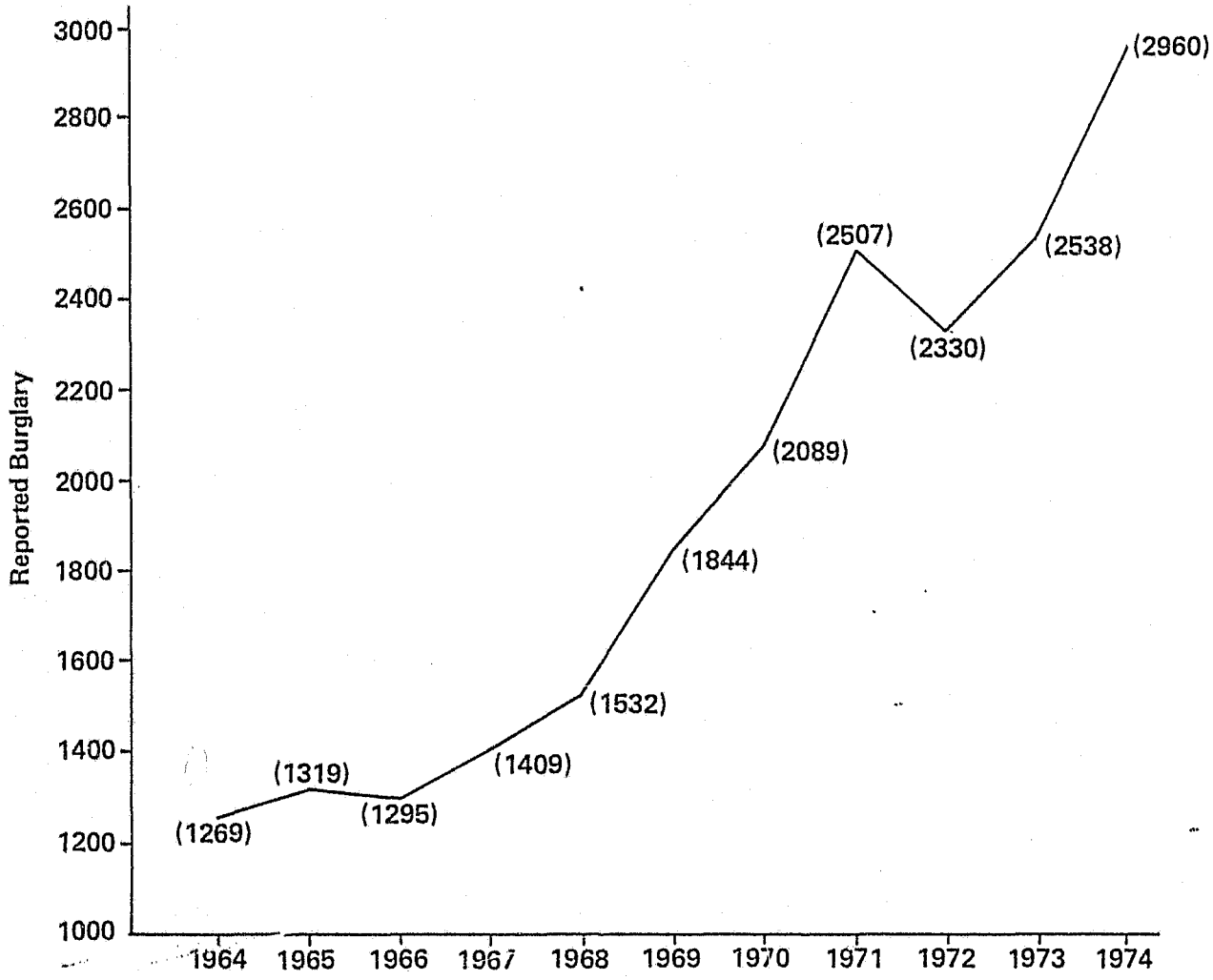
where

X_{t+1} = predicted value

X_{t-1} = observed value

N = number of prior time intervals

EXHIBIT 3.67
SCATTER DIAGRAM OF ANNUAL FREQUENCY OF REPORTED BURGLARY
FOR CHAOS CITY, 1964-1974



Source: hypothetical data

Example

Year	Reported Burglaries
1965	1319
1966	1295
1967	1409
1968	1532
1969	1844

(1) $X_{1970} = \frac{1319 + 1295 + 1409 + 1532 + 1844}{5}$

$X_{1970} = 1480$

(2) $X_{1971} = \frac{1295 + 1409 + 1532 + 1844 + 1450}{5}$

$X_{1971} = 1512$

(3) $X_{1972} = \frac{1409 + 1532 + 1844 + 1480 + 1512}{5}$

$X_{1972} = 1555$

(4) $X_{1973} = \frac{1532 + 1844 + 1480 + 1512 + 1555}{5}$

$X_{1973} = 1585$

(5) $X_{1974} = \frac{1844 + 1480 + 1512 + 1555 + 1585}{5}$

$X_{1974} = 1595$

Time Period	Observed Burglaries	Five-Year Forecast
1965	1319	
1966	1295	
1967	1409	
1968	1532	
1969	1844	
1970		1480
1971		1512
1972		1555
1973		1585
1974		1595

Exhibit 3.68 presents a crime pattern containing two components: the smooth component, representing the general long-term sweep of the data, called the long-term trend of the series; and the fluctuating component, which describes the changes at regular time intervals--annually, seasonally, or hourly. In order to most accurately predict crime one must first make assumptions about the long term trend of the series, whether the fluctuating component will behave in the future as it has in the past, and what can be said about the general sweep of the data: is it curved, linear, or random? Understanding the time varying behavior of crime requires consideration of a number of factors, such as, have there been any changes in the statutory definitions of crime, police reporting procedures, population demographics, or the environment of the jurisdiction that would suggest a change in crime trends. Have crime prevention programs been implemented or, are there possible changes in federal, state or local laws that would influence the crime trend?

- Visual Estimation

If the long-term trend seems roughly linear and other variables appear irrelevant, predictions for 1975 may be made using straight line projection or extrapolation, the second time series method to be introduced in this section. Linear regression ("least squares") analysis is one approach to choosing the line; it assumes the long-term pattern of change to be fairly constant in rate. Calculations can be made easily by computer or calculator. Linear regression as a method can adjust a prediction based on a whole series of variables and in this context is a causal model. Here it is used only as a mathematical tool for defining a line which "best" fits the data so that one can extend that line as a predictive tool. Visual estimation techniques will be used here for illustrative purposes.

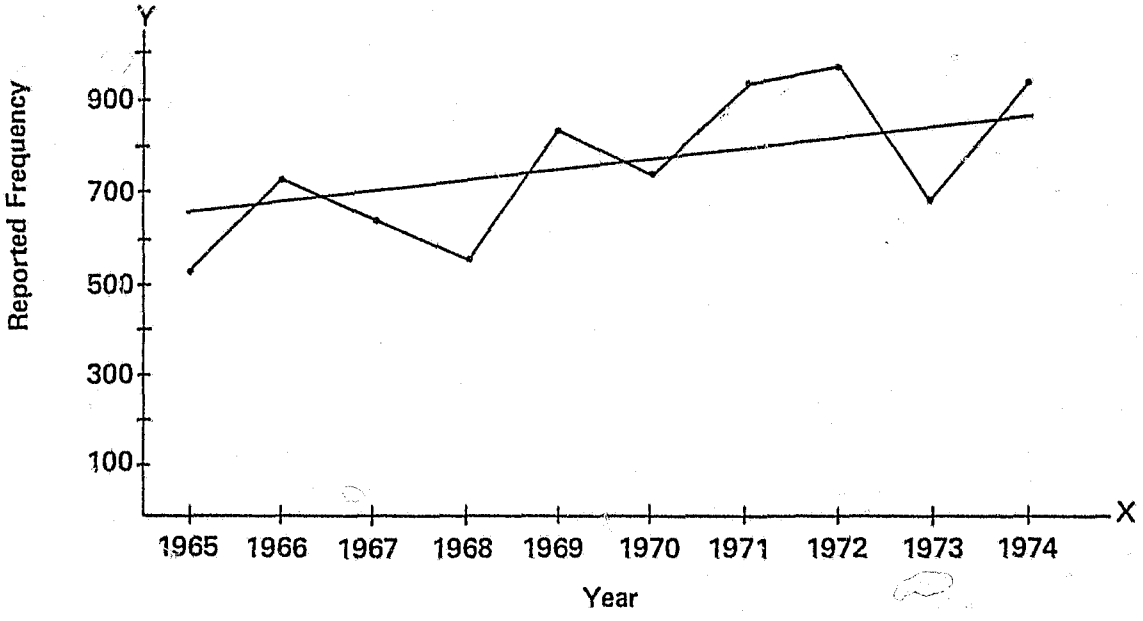
One can estimate what burglary will be in 1975 by drawing the line that defines the long-term sweep of the series presented in Exhibit 3.67. Set a ruler through what appears to be the center of the graph of annual reported frequencies and then adjust the ruler until half of the points are above the line and half are below. Extend the line one year into the future to predict the frequency of burglary for 1975 as shown in Exhibit 3.69. What is the prediction?

There is error associated with this prediction for two principal reasons: 1) this is a visual estimation of the line that describes the trend--regression analysis defines the line algebraically consequently with greater accuracy; and 2) a predicted frequency, even one based on regression analysis, is an extrapolation beyond the given data and thus is an estimate. One can calculate the "standard error" of the prediction and develop a range about the estimate which would allow one to be more confident about the prediction.

- Linear Regression

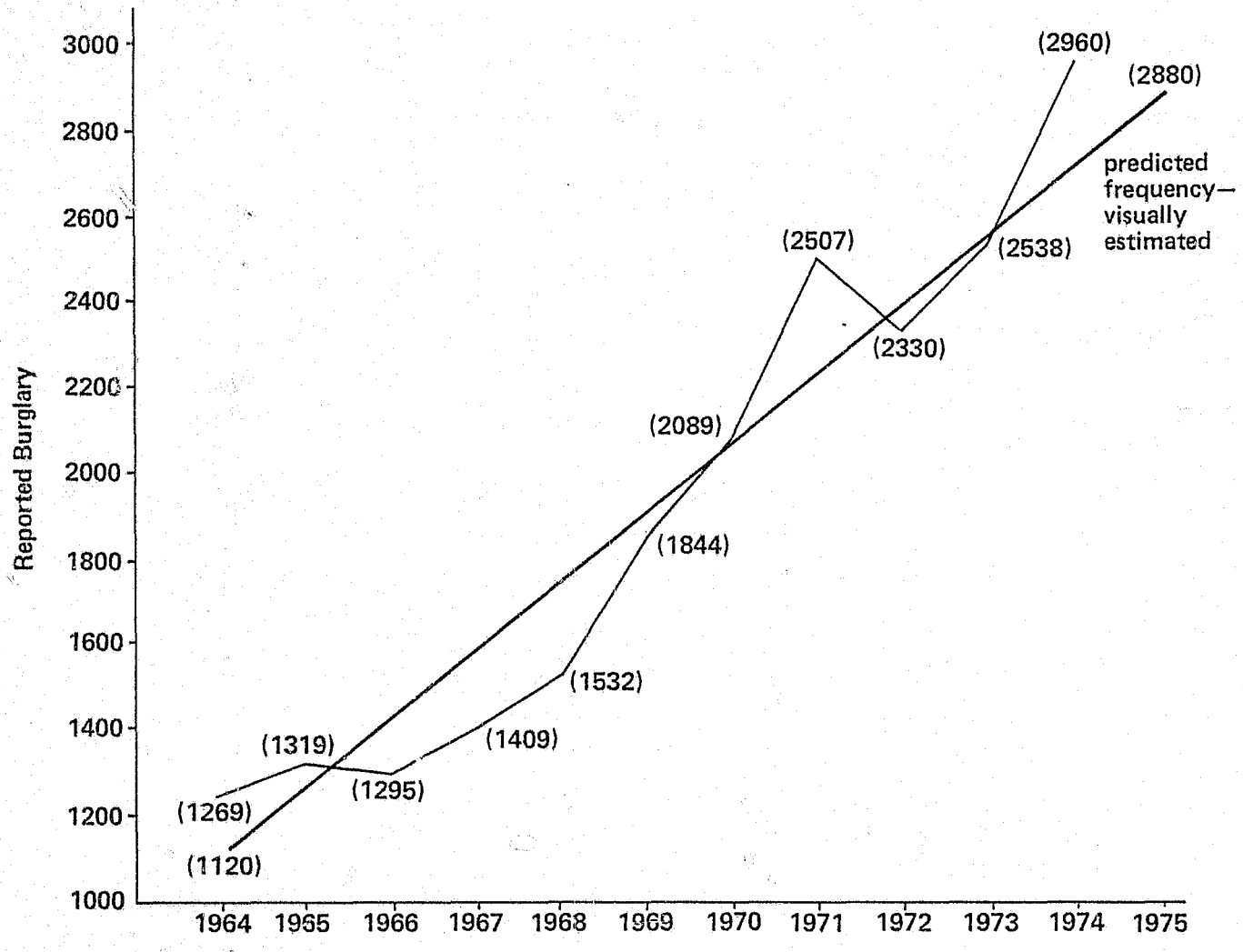
Linear regression is a prediction method that determines a line which "best fits" a given time series. Following is an example, utilizing the burglary data in Exhibit 3.69, of how regression is applied in determining a predicted amount of burglary for 1975.

EXHIBIT 3.68
TREND AND FLUCTUATION OF CRIME PATTERNS, 1965-1974



Source: hypothetical data

EXHIBIT 3.69
ANNUAL FREQUENCY OF REPORTED BURGLARY WITH VISUALLY ESTIMATED REGRESSION LINE FOR CHAOS CITY, 1964-1974



Source: hypothetical data

Example:

PART I. CALCULATION OF PREDICTED FREQUENCY OF BURGLARY FOR 1975 IN CHAOS CITY USING LINEAR REGRESSION ANALYSIS

1.

YEAR	X	Y	XY	X^2	Y^2
1964	1	1269	1269	1	1610361
1965	2	1319	2638	4	1739761
1966	3	1295	3885	9	1677025
1967	4	1409	5636	16	1985281
1968	5	1532	7660	25	2347024
1969	6	1844	11064	36	3400336
1970	7	2089	14623	49	4363921
1971	8	2507	20056	64	6285049
1972	9	2330	20970	81	5428900
1973	10	2538	25380	100	6441444
1974	11	2960	32560	121	8761600
Sum	66	21092	145741	506	44040702

2. Σ = Sum

ΣX = 66
ΣY = 21,092
ΣXY = 145,741
ΣX^2 = 506
ΣY^2 = 44,040,702

3. $$b = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{N\Sigma X^2 - (\Sigma X)^2}$$

$$= \frac{(11)(145741) - (66)(21,092)}{N(506) - (66)^2}$$

$$= \frac{1,603,151 - 1,392,072}{5566 - 4356}$$

$$= \frac{211079}{1210} = 174.45$$

4. $$a = \frac{\Sigma Y - b\Sigma X}{N} = \frac{21092 - (174.45)(66)}{11}$$

$$= \frac{21,092 - 11,513.7}{11} = \frac{9578.3}{11} = 870.75$$

5. For the predicted frequency of burglary,

$\hat{Y}_{1975} = a + b X_{1975}$

$X_{1975} = 12$, so

$\hat{Y}_{1975} = 870.75 + (174.45)(12)$
$= 870.75 + 2093.40$
$= 2964.15$
= Pred. freq. of burglary for 1975

Note: · Compare the visual estimate with the least-squares estimate in Exhibit 3.70.

PART II. CALCULATION OF CORRELATION COEFFICIENT BETWEEN YEAR AND BURGLARY FREQUENCY, CHAOS CITY, 1964-1974

1. r = Person's Correlation Coefficient

$$r = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2]\ [N\Sigma Y^2 - (\Sigma Y)^2]}}$$

2. $N\Sigma XY - (\Sigma X)(\Sigma Y) = 211{,}079$

$[N\Sigma X^2 - (\Sigma X)^2] = 1{,}210$

$[N\Sigma Y^2 - (\Sigma Y)^2] = 484{,}447{,}772$ (See below)

$[11\ (44{,}040{,}702) - (21092)^2\ ] = 484{,}447{,}772$

3. $$r = \frac{211{,}079}{\sqrt{(1210)\ (39{,}575{,}258)}} = \frac{211{,}079}{\sqrt{47{,}886{,}062{,}180}}$$

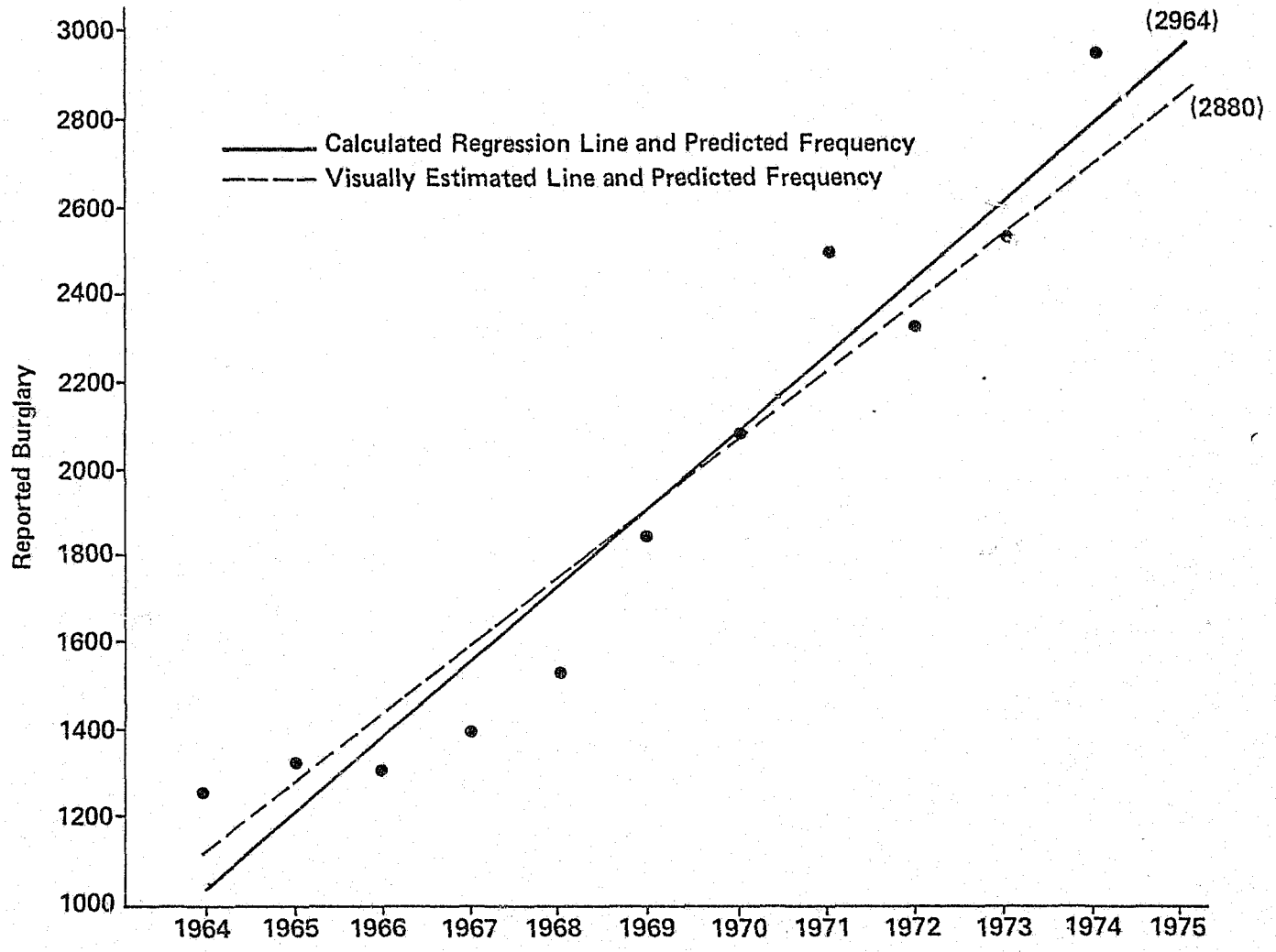
$$r = \frac{211{,}079}{218{,}830}$$

$r = +.9645$

4. r^2 = Coefficient of Determination

$r^2 = .9303$

EXHIBIT 3.70
COMPARISON OF VISUALLY ESTIMATED AND CALCULATED REGRESSION LINES, REPORTED BURGLARIES, CHAOS CITY, 1964-1974



Source: hypothetical data

For any regression line a 95% confidence interval can be calculated based on the prediction (i.e., one can determine, according to an algebraic formula, a range of predicted frequencies with a 95% probability of covering the true incidence of aggravated assault for 1975). An analyst has options of any percent confidence--although the higher the confidence required, the larger the interval will be.

Example

Consider the data on aggravated assault presented in Exhibit 3.71. A method of estimating a 95 percent confidence interval.

1. If there are:

   5 data points -- multiply the range of the residuals by 2.543
   6 data points -- multiply by 1.546
   7 data points -- multiply by 1.194
   8 data points -- multiply by 1.016
   9 data points -- multiply by 0.905
  10 data points -- multiply by 0.830
  11 data points -- multiply by 0.777
  12 data points -- multiply by 0.735

2. Calculation of the range of the residuals: subtract the frequency above the line that is farthest from the line from the corresponding point on the line; do the same for the frequency below the line; then subtract those two residuals and multiply by the appropriate number above.

Upper Residual:	1,360	-1,576	= -216
Lower Residual:	995	- 696	= 299
Range of the Residuals:	299	-(-216)	= 515

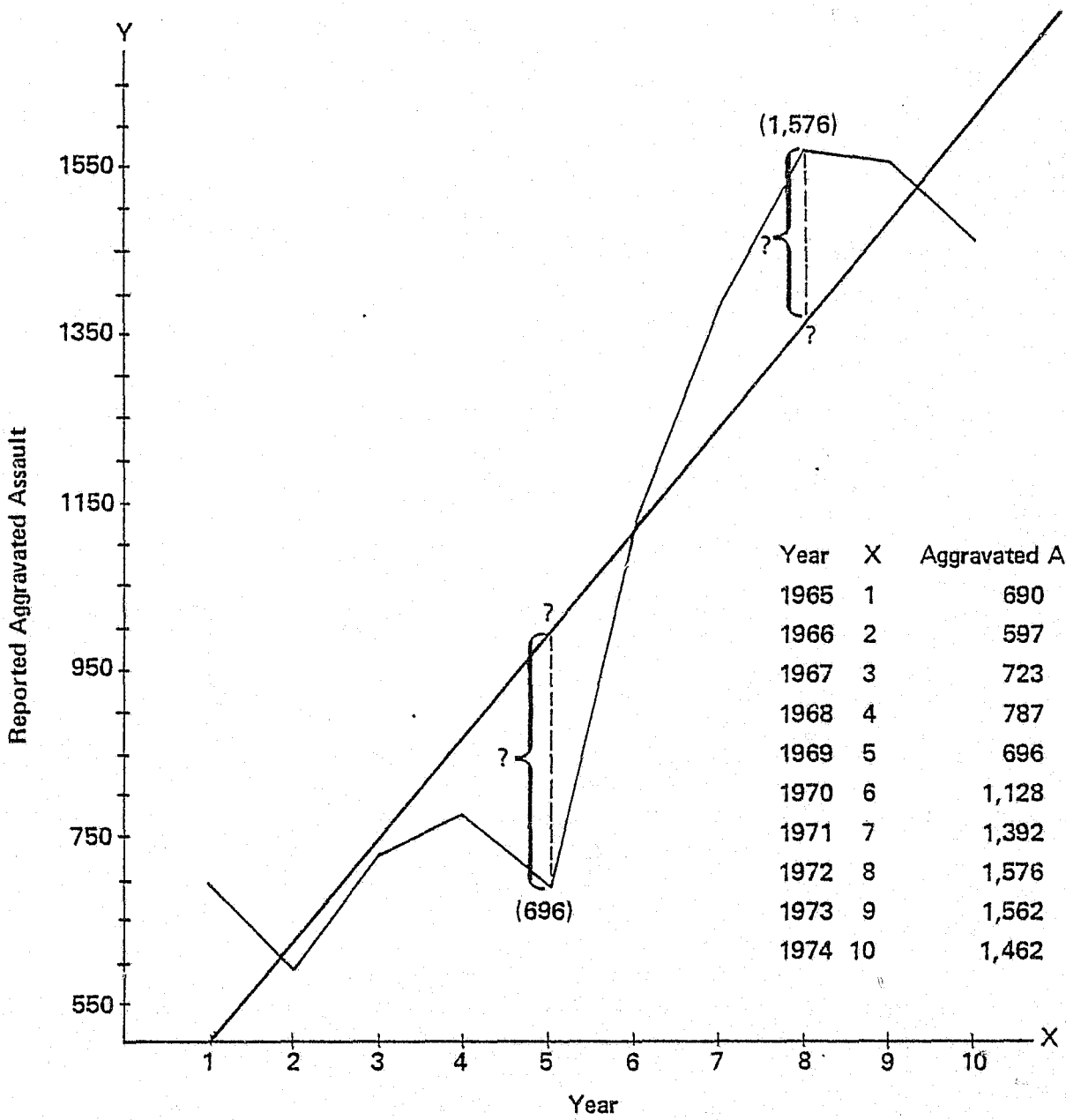
3. Calculate the confidence interval for the predicted frequency of aggravated assault in 1975 for eight years, nine years, and ten years prior to 1975.

   Confidence Intervals:

   8 points -- 1742 $\pm$ 523
   9 points -- 1742 $\pm$ 466
  10 points -- 1742 $\pm$ 427

   What happens to the 95 percent confidence interval as the time series is extended?

EXHIBIT 3.71
CALCULATION OF THE RANGE OF THE RESIDUALS, SIMPLE METHOD



Year	X	Aggravated Assault
1965	1	690
1966	2	597
1967	3	723
1968	4	787
1969	5	696
1970	6	1,128
1971	7	1,392
1972	8	1,576
1973	9	1,562
1974	10	1,462

Source: hypothetical data

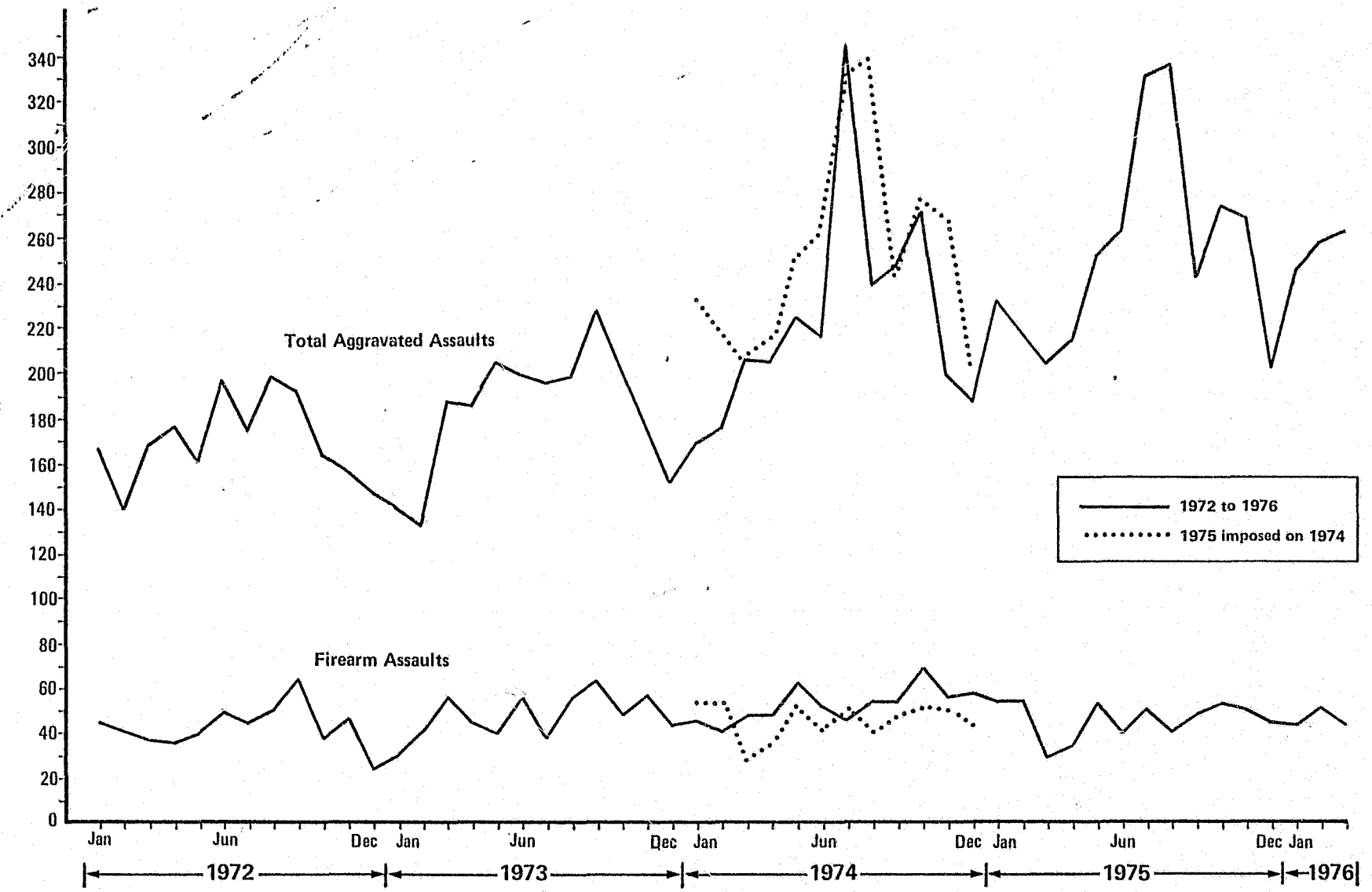
Two contributors to a wide confidence interval are predictions into the distant future or predictions based on a very short time series. Another is wide fluctuations in reported frequencies, i.e., the further the frequencies are from the regression line, the greater the possible error of the estimate.

The problem of wide fluctuations can be addressed by predicting on the basis of a monthly, rather than a yearly, time series, i.e., there can sometimes be less error associated with a prediction based on a 60-month series than on a five-year series. In addition, monthly series data may reveal short-term trends not disclosed by yearly data, such as seasonal variations. (See Exhibit 3.72).

Sometimes the basic long-term factors affecting crime change so sharply that it is more reasonable to break the overall time period into segments for trend analysis than to attempt to apply a single pattern to the period as a whole. For example, a police department might have implemented a program in 1972 aimed at stricter enforcement of gun control legislation. This might explain the trend in the time series of armed robberies shown in Exhibit 3.73. How would one make a prediction in this case? One approach would be to attempt to account for the reversal in direction so that a reasonable assumption can be made that the change in direction is not anomalous fluctation in a longer term trend. Use the pivotal point (1972) as the new starting year or month of a linear time series and predict on the basis of this sub-series segment.

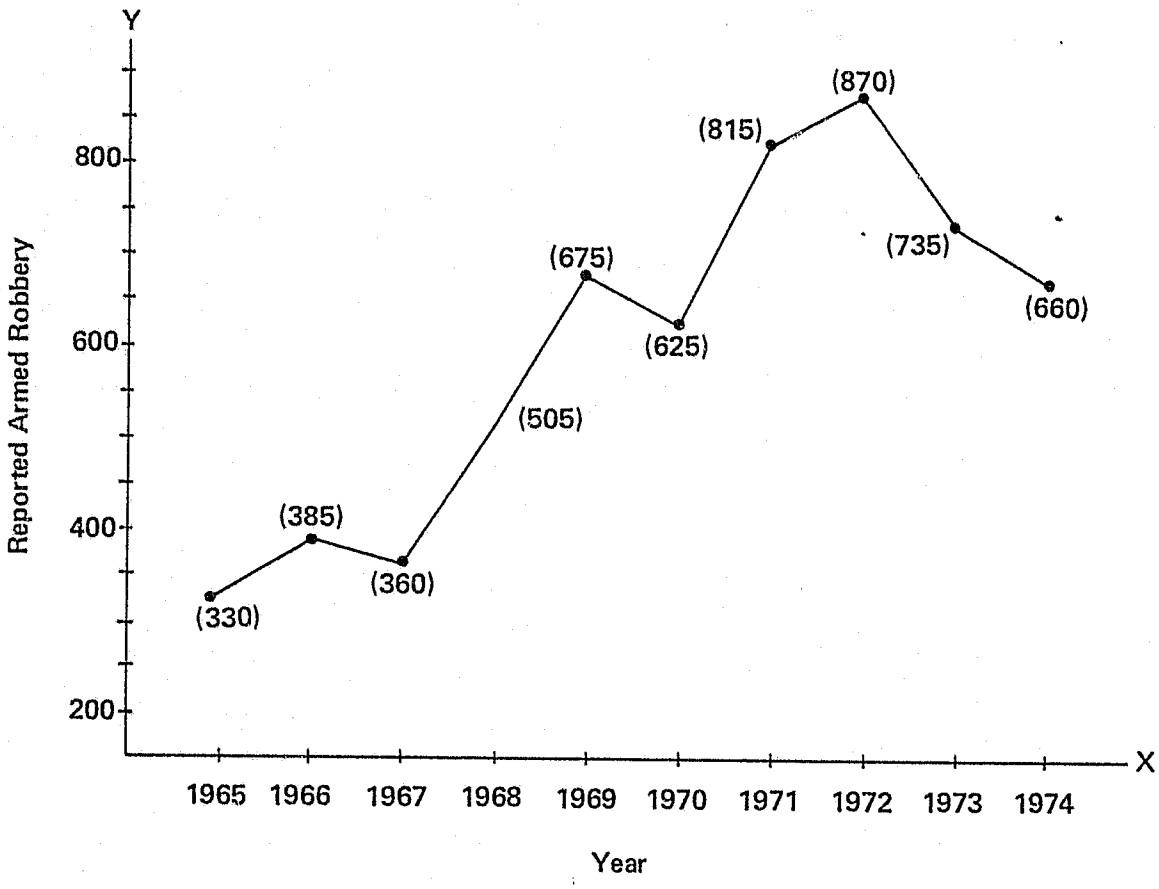
It is important to be aware that there are trends that appear completely random, as in Exhibit 3.74. It is virtually impossible to make valuable predictions with such data. Trends may also be shaped as in Exhibit 3.75. In these two cases, mathematical models may be employed to make predictions based on the total period, or the series may be partitioned, as mentioned above, into segments. The most accurate forecasting depends on the choice of the curve or line that best describes the trend being considered. This requires analysis of past patterns, as well as assumptions about the future, i.e., consideration of all of the factors that may direct the trend a certain way.

EXHIBIT 3.72
AGGRAVATED ASSAULT, CHAOS CITY, 1972-1976



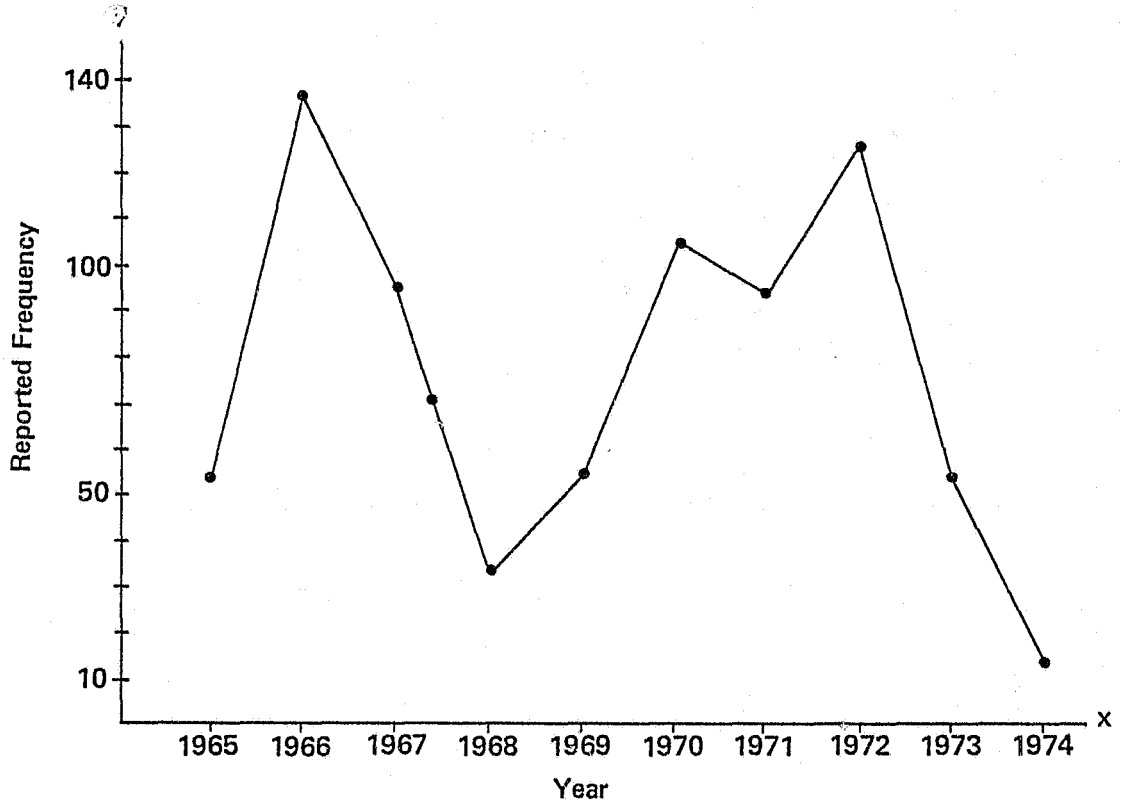
SOURCE: Calculated from the Boston Police Department's monthly submissions to the F.B.I.'s Uniform Crime Reports.

EXHIBIT 3.73
TIME SERIES FOR ARMED ROBBERY, CHAOS CITY, 1965-1974



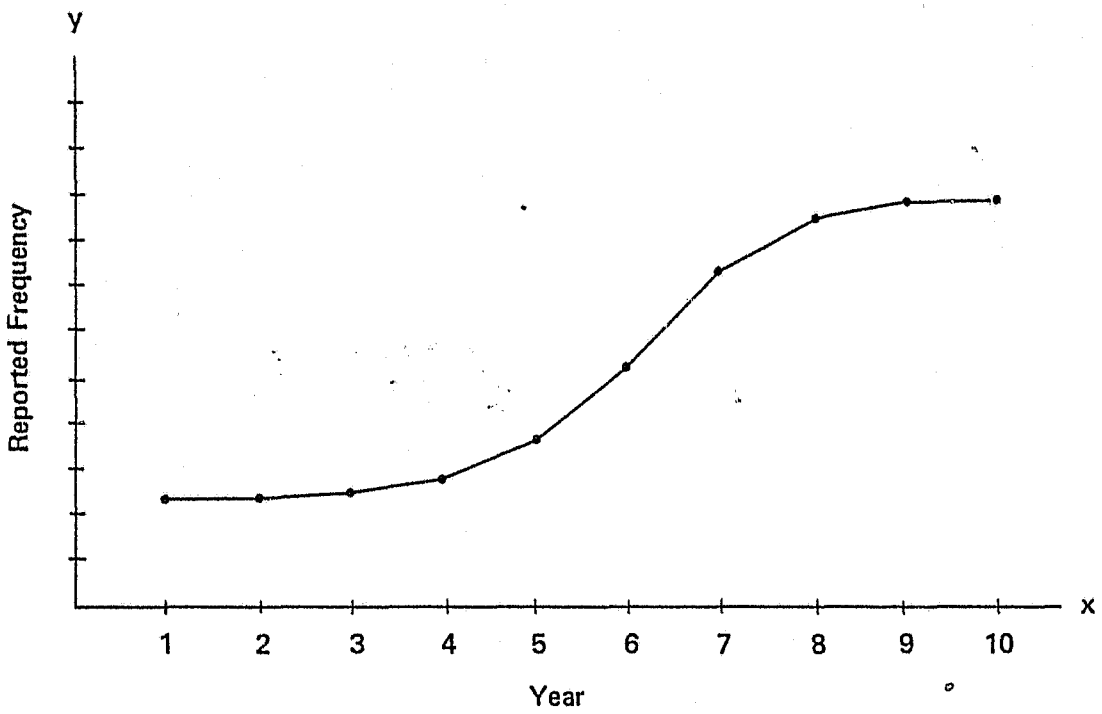
Source: hypothetical data

EXHIBIT 3.74
NON-LINEAR TIME SERIES OF REPORTED CRIME, 1965-1974



Source: hypothetical data

EXHIBIT 3.75
CURVILINEAR TIME SERIES OF REPORTED CRIME, YEAR 1 TO YEAR 10



Source: hypothetical data

EXERCISE 13

PREDICTIONS

Purpose

To give participants practice in making projects using moving averages and linear regression.

Activities

a) Using moving averages make projections for motor vehicle crimes for the city of Wreck for the years 1977, 1978, 1979 and 1980 based on data in Exhibit 3.76.

b) Using linear regression calculate the number of motor vehicle crimes for 1977, and compare the results with a visual estimate for the same year. Plot both, together with actual data, on a scatter diagram. Calculate the confidence interval for the 1977 projections and interpret your calculations.

Exhibit 3.76

Motor Vehicle Crimes for City of Wreck

Year	Number of Offenses
1969	287
1970	301
1971	325
1972	345
1973	406
1974	354
1975	371
1976	448

MODULE 3--END NOTES

(1) Audrey Haber and Richard P. Runyou, General Statistics (3d ed.; Reading, Mass.: Addison-Wesley, 1977), p. 6.

(2) Mendenhall, Ott and Larson, Statistics: A Tool for the Social Sciences (Boston: Duxbury Press, 1974), pp. 42-92.

(3) Ibid.

(4) Adapted from Loether and McTavish, Descriptive and Inferential Statistics (Boston: Allyn & Bacon, 1977), p. 89.

(5) Mendenhall et al., op. cit.

(6) Cf. Block, "Homicide in Chicago: A Nine-Year Study (1965-1973)," 66 Journal of Criminal Law and Criminology 496 (1976).

(7) Thorsten Sellin and M.E. Wolfgang, The Measurement of Delinquency (Wiley, 1964); and Alfred Blumstein, "Seriousness Weights in an Index of Crime," American Sociological Review 39 (1974), p. 854-864. The original Sellin and Wolfgang scale assigns points according to the degree of violence or property loss in a crime. In our scale here we have tried to assign values to specific crime types according to the average amount of violence and property loss occuring during these crime types of Minnesoty. In the case of aggravated assault, we are less certain about what value to assign than for the other crime types; we have little data about the average amount of personal injury suffered by victims of these crimes.

(8) Leonard Oberlander, ed., Quantitative Tools in Criminal Justice Planning (Washington, D.C.: LEAA, 1976), Chapter Seven.

(9) Heller and J.T. McEwen, "Applications of Crime Seriousness Information in Police Departments," Journal of Research in Crime and Delinquency (January 1975, vol. 12, no. 1), pp. 44-50.

(10) Adapted from Dickinson McGaw and George Watson, Political and Social Inquiry (New York: John Wiley & Sons, Inc., 1977), pp. 264-67.

(11) Sourcebook, 1976.

(12) Edward R. Tufte, Data Analysis for Politics and Policy, (Englewood Cliffs: Prentice-Hall, 1974), p. 1.

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N O T E S

U.S. Department of Justice
Law Enforcement Assistance Administration
Washington, D.C.
1977

INTRODUCTION OF ANALYSIS OF CRIME AND THE CRIMINAL JUSTICE SYSTEM

MODULE 4: DATA INTERPRETATION – SYSTEM

This work was performed by Abt Associates Inc., Cambridge, Massachusetts, for the Law Enforcement Assistance Administration under Contract No. J-LEAA-001-77. John Moxley, Training Division, Office of Operations Support, LEAA, served as project monitor. Points of view or opinions stated in this document do not necessarily represent the official position or policies of the U.S. Department of Justice.

MODULE ABSTRACT

Title: Module 4: Data Interpretation - System

Lecturer:

Objectives:

The major goal of this module is to provide participants with information and tools used to analyze system performance and resource utilization. After completing this module, participants should be able to:

- Interpret transaction statistics for their jurisdictions.
- Interpret a disposition tree.
- Identify four benefits of using transaction statistics.
- Demonstrate a knowledge of how to correlate demographic and environmental data to offender flow statistics.
- Prepare and interpret a system flow chart for their jurisdictions incorporating the law enforcement, courts and corrections subsystems.
- Identify resource data in assessing system capabilities.

MODULE 4

Data Interpretation--System

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I. INTRODUCTION

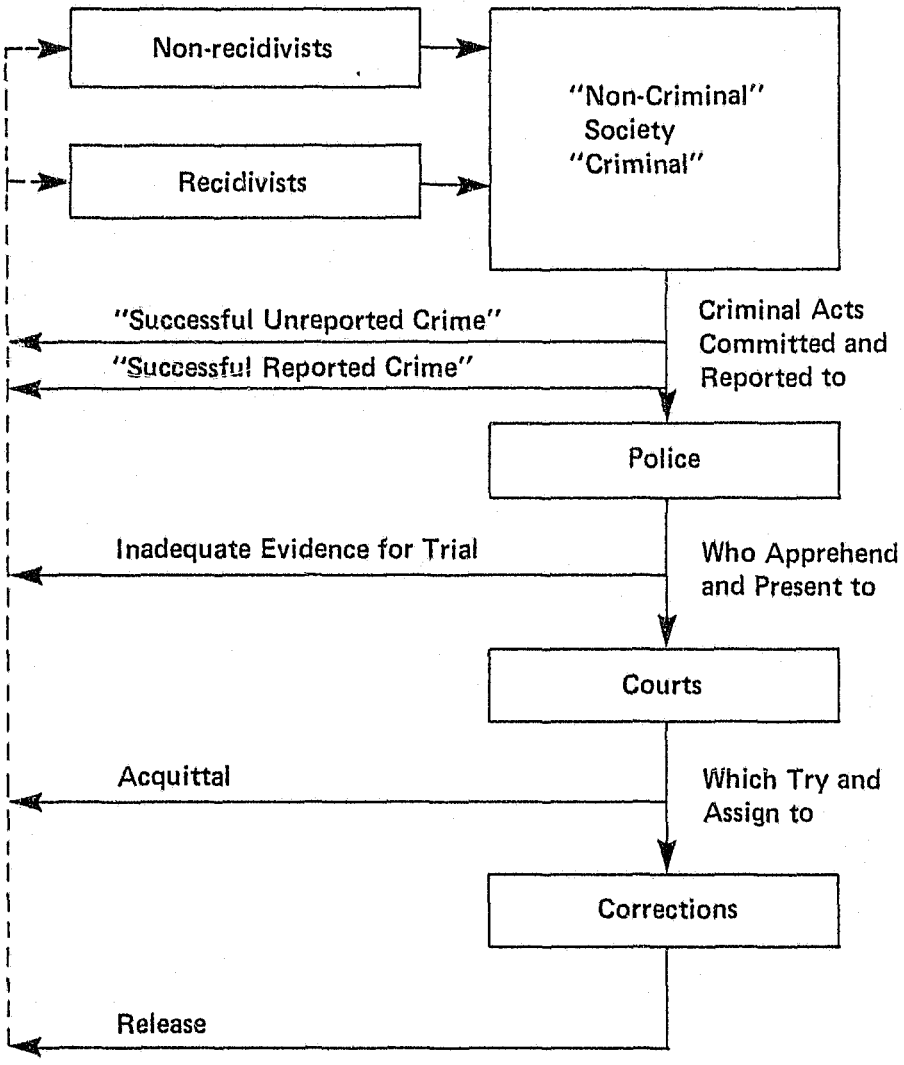
The criminal justice system is a collection of agencies that perform an enormous complex of operations and whose activities are organized in a sequential manner in response to the problems created by the commission of criminal acts. The purpose of these agencies and of their activities is to respond to these criminal acts in such a manner as to reduce or prevent crime, i.e., the primary response and goal of the criminal justice system is a case flow of just dispositions so that the innocent might be freed, in as expeditious a manner as possible, the guilty rehabilitated or prevented from the commission of further criminal acts, and society protected to the maximum extent possible. A model of the system is presented in Exhibit 4.1.

In systems terms, the elements of the criminal justice system are the offender and other individuals who have been arrested for the commission of criminal acts, criminal justice agencies and their personnel, equipment and facilities. The outputs of the criminal justice system are the flow of individuals through the system toward a speedy and just disposition, and the primary external inputs to the system are the collection of criminal acts committed and the calls for service they generate. The legal code and statutes which define crime and the criminal justice agencies provide the framework for the delivery of criminal justice services.

External to the system are some secondary inputs such as community attitudes toward crime, public per capita expenditures for the criminal justice system, and educational levels of personnel and personnel training. The system also generates, within its parts or subsystems, some outputs which are inputs to the succeeding parts of the system. For example, calls for service and the number of personnel available influence the number of dispatches made. The number of dispatches made, in turn, influences the number of arrests that are made, and the number of arrests made in the law enforcement subsystem serves as an external subsystem input to the judicial subsystem, influencing its own internal, interim output of workload. Workload, in turn, serves as an input to trial dates and consequently, trial times. In studying system response, these internal inputs or stimuli must be analyzed in terms of their effect on the system response--or output.

Law enforcement, courts and correctional agencies, their personnel and their facilities interact in such a way that responses to criminal acts are made and case flows established. The agencies, their personnel, facilities, equipment and budgets, as they respond to the offender and his acts, can be considered the primary elements of the criminal justice system; the primary inputs to the system are the criminal acts, and the primary output, the offender and case flow and the time relationships involved in the processing of the individual through the system.

EXHIBIT 4.1
CRIMINAL JUSTICE SYSTEM FLOW CHART



*Source: Adapted from "A Systems Approach to the Study of Crime and Criminal Justice" by Alfred Blumstein and Richard Larsen; *Operations Research for Public Systems,* Morse and Bacon, MIT Press, 1967.

Law Enforcement Agencies

The most important objective of law enforcement is to preserve the peace in a manner consistent with the freedom secured by the Constitution. Law enforcement alone does not bear the responsibility for preserving a peaceful society; that responsibility is shared by each element of society--each person, each institution, and each area of government. However, because crime is an immediate threat to the order of all communities, law enforcement agencies must exist to overcome that threat and to reduce the fear of it.

Law enforcement agencies are responsible for the preservation of law and order through the prevention of misconduct and crime, the arrest of offenders, the detention of arrestees until they are cleared or remanded for trial, and for keeping a record of the offenses reported and the arrests made. The duties of the agencies in fulfilling these functions are: traffic, patrol, criminal investigations, communications and maintaining jails.

The Courts

The court subsystem of the criminal justice system encompasses the judicial, prosecutorial and defense agencies of the system. The criminal court subsystem should perform the following functions:

- swiftly determine the guilt or innocence of those persons who come before it;
- sentence guilty offenders in such a way that their rehabilitation is possible, and that others are deterred from committing crimes; and
- protect the rights of society and the offender.

Typically, the District Attorney is charged with representing the state in the prosecution of criminal actions that violate the State Criminal Code. The District Attorney may also represent the state in Grand Jury matters, aiding in the formulation of accusations and prosecuting those accused.

The majority of the District Attorneys' offices set court dockets, take part in criminal investigations and receive complaints.

Corrections

Corrections is the subsystem concerned with post-conviction supervision of offenders and their rehabilitation. State-level penal institutions (adult and juvenile), state work release centers, and state-operated adult probation and parole systems normally fall under the jurisdiction of a Department of Corrections (DOC) or Offender Rehabilitation.

As the name implies, one purpose of "corrections" is to correct, or in other words, see to it that the offender (after completing his obligation to society) is able to avoid further criminal activity.

While this is the desired result after the offender leaves "corrections," DOC first must be concerned with a more immediate

objective--custody. It is the lawful duty of departments of corrections to maintain proper custody of offenders sentenced to confinement in state penal facilities. In the case of probation and parole, proper supervision is the objective. In either case, a major concern is protecting the public, while helping the offender to avoid further criminal behavior.

The following material emphasizes a number of techniques used to interpret system data. These tools provide a means of understanding two critical system attributes: performance and capability. In the first section of the module, performance analysis is discussed, emphasizing the interpretation of transaction statistics. The second section presents a discussion of the analysis of resource data, focusing initially on resource indicators. The section and module conclude with a presentation of an Integrated Analysis Model that combines both resource and performance data to help formulate criminal justice system problems.

EXERCISE #4

CONSTRUCTING A SYSTEM MODEL

Purpose

The purpose of this exercise is to familiarize participants with methods for constructing a system flow chart.

Activities

Each participant is to construct a system flow chart of their jurisdictions emphasizing major components and their interrelatedness. The prepared chart should be fully labeled and will be used to discuss variations in the structures and processes of local and state criminal justice systems.

II. MEASURING SYSTEM PERFORMANCE

A. Performance Data Analysis

Many of these performance indicators utilized by criminal justice practitioners are problematic at best. Usually such indicators are found to be agency-specific and not reflective of a system-wide perspective. Police agencies, for example, generally underscore arrest rates as a measure of their performance and a justification for budgetary increases. Such indicators, however, may not be reflective of high-quality police performance in that efforts devoted to preventing incidents from developing into arrest situations (such as family altercations) go unnoted. Similarly, arrest statistics do not reflect decisions occurring at other stages of the system, such as judicial and correctional processing. In like manner, a standard measure of prosecutorial effectiveness is the conviction rate--the number of convictions obtained through guilty pleas or trial (either by judge or jury). However, it is quite possible that a prosecutor may maintain a high conviction rate by inducing guilty please to lesser charges rather than prosecuting to the full extent of the law.

Aside from being agency-specific, most performance indicators are based on summary statistics often limited to one particular stage of criminal processing. Each criminal justice agency, be it police, courts, or corrections (at all levels of government) generally collects and reports its own summary tabulations. The unit of count (the main focus of interest) changes with each organizational structure. Thus, police record arrests, the courts record cases and correctional institutions tabulate individuals with little regard to the interrelationship among agencies. Summary tabulations, the foundation for most official reports, severely handicap the growth of knowledge regarding crime and its control as well as reducing the possibilities for effective planning. While we may have a reasonable estimate of how many crimes are known to the police and less accurate knowledge regarding arrest trends, we know relatively little about dispositions at later stages, especially those involving courts and correctional decisions. With many of the criminal justice data now available, it is virtually impossible to relate initial police decisions to outcomes at later stages; for example, the proportion accorded alternative sentences. Existing data sources give little indication of various alternative routes which offenders follow in criminal processing and of which demographic characteristics are associated with dispositions occurring at various stages.

1. Summary Tabulations

Perhaps one of the best examples of summary tabulations disseminated on a national level is found in the Uniform Crime Reports (UCR) reflecting the amount of crime known to the police and those cleared by arrest. While many of the data reported in the UCR serve many useful purposes, especially with reference to the nature of crime occurring across the United States, information is still limited because of its summary format. An example is

provided in Exhibit 4.2, showing the disposition of those persons formally charged by the police in 1975. Of those formally charged, 64.5 percent were found guilty (either of the original charge or a lesser one), 16.5 percent were acquitted or dismissed, and 19.0 percent were referred to juvenile court. Within aggregate offense groups of violent and property index crimes, distinct variations are evident. Although 47.9 percent of those charged with a violent index offense are found guilty, compared to 41.5 percent of those charged with a property index offense, distinctions are noted in the offense for which these offenders were convicted. Thirty-nine point three percent of all violent offenders were convicted of the offense with which they were originally charged, compared to 38.1 percent or property offenders. Only 13.3 percent of those arrested for property crimes were acquitted or had the charges against them dismissed, but 29.0 percent of those arrested for violent crimes were acquitted or had the charges against them dismissed.

While the above information is useful, the extent of its utility is limited. Although many defendants are convicted of charges other than those for which they were originally arrested, there is no way of obtaining information regarding which factors are likely to differentiate between these two outcomes. For example, what effect do bail dispositions (either granting or denying of bail) have on sentence outcome--the probability of being convicted? Do those offenders who gain sentencing concessions in the form of reduced charges receive less severe sentences and serve less time than those convicted on the original charge? Similarly, it is not known which characteristics may distinguish among those acquitted or dismissed and those eventually found guilty. Such information would prove valuable not only in providing a better understanding of the criminal justice process but also serve as a foundation for a more rational allocation of scarce resources.

2. Transaction Statistics

If one purports to view the criminal process as a system with interrelated functions and decisions networks, then data should reflect this perspective. While various government commissions from the early Wickersham Committee to the more recent National Advisory Commission on Criminal Justice Standards and Goals have argued for the accumulation of system-wide data, such data sources have been slow in developing (see Module 2). In fact, it is only within the last few years that a new method of improved data collection and reporting has begun to emerge as a supplement to traditional summary tabulations. Here, one is speaking about the advent of offender-based transaction statistics (OBTS) which attempt to provide statistical information based on those offenders being processed. These data are "transactional" since the individual offender is the unit of count, thus providing the means of linking various segments of the criminal justice system to one another. Under an ideal transactional system, information is recorded each time a decision is made regarding an

EXHIBIT 4.2

DISPOSITION OF PERSONS FORMALLY CHARGED BY THE POLICE, 1975

OFFENSE	Number of Persons Charged (Held for Prosecution)	Guilty		Acquitted or Dismissed	Referred to Juvenile Court
		Offense Charged	Lesser Offense		
Total	1,556,071	60.7	3.8	16.5	19.0
Violent Crime	43,287	39.3	8.6	29.0	23.1
Property Crime	279,975	38.1	3.4	13.3	45.2

offender, including the date on which the decision was made. Thus, decisions made at one point (e.g., to deny bail) may be related to those occurring at other stages (e.g., sentence length) along with an analysis of various demographic characteristics, such as age, race, and sex of the offender.

- Disposition Tree Data Displays

The OBTS system has stimulated the development of a data display known as the "disposition tree." The disposition tree depicts the various levels in the criminal justice system at which the adult felony arrestee can receive a final disposition. Both numeric totals and percent calculations are indicated. These enable the user to relate the specific level of disposition (arrest, prosecution, or court) or type of disposition (release, probation, jail, etc.) to the total of OBTS felony arrest dispositions.

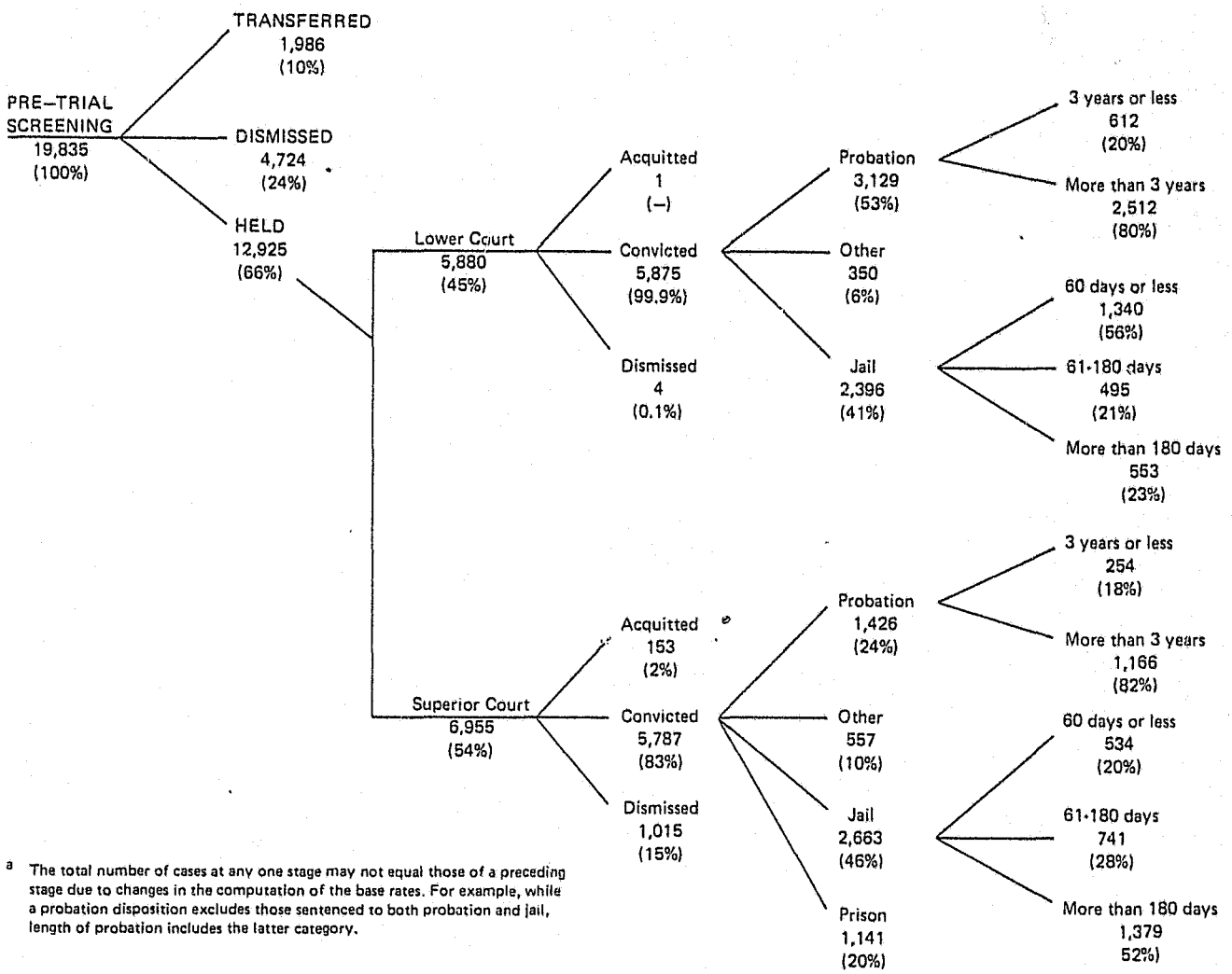
In addition to displaying numeric and percent data, a series of elapsed time reports are also part of the disposition tree package. These reports show the elapsed time in days from the date of each felony arrest to the date of final disposition, regardless of whether that disposition takes place at the law enforcement or courts level.

- Offender Flow Analysis

As an example of an operating transactional data system and the advantages which it offers, the following discussion focuses on the prototype produced by the California Bureau of Criminal Statistics (BCS). Since BCS has long maintained an active arrest and superior court register containing many of the data that would be required to support a functioning OBTS system, it was possible to retabulate a block of data in a transaction format. These data, including twelve counties and covering a three-year span (1969-71), track individual offenders from the point of arrest to sentence outcome at both lower and superior court levels.

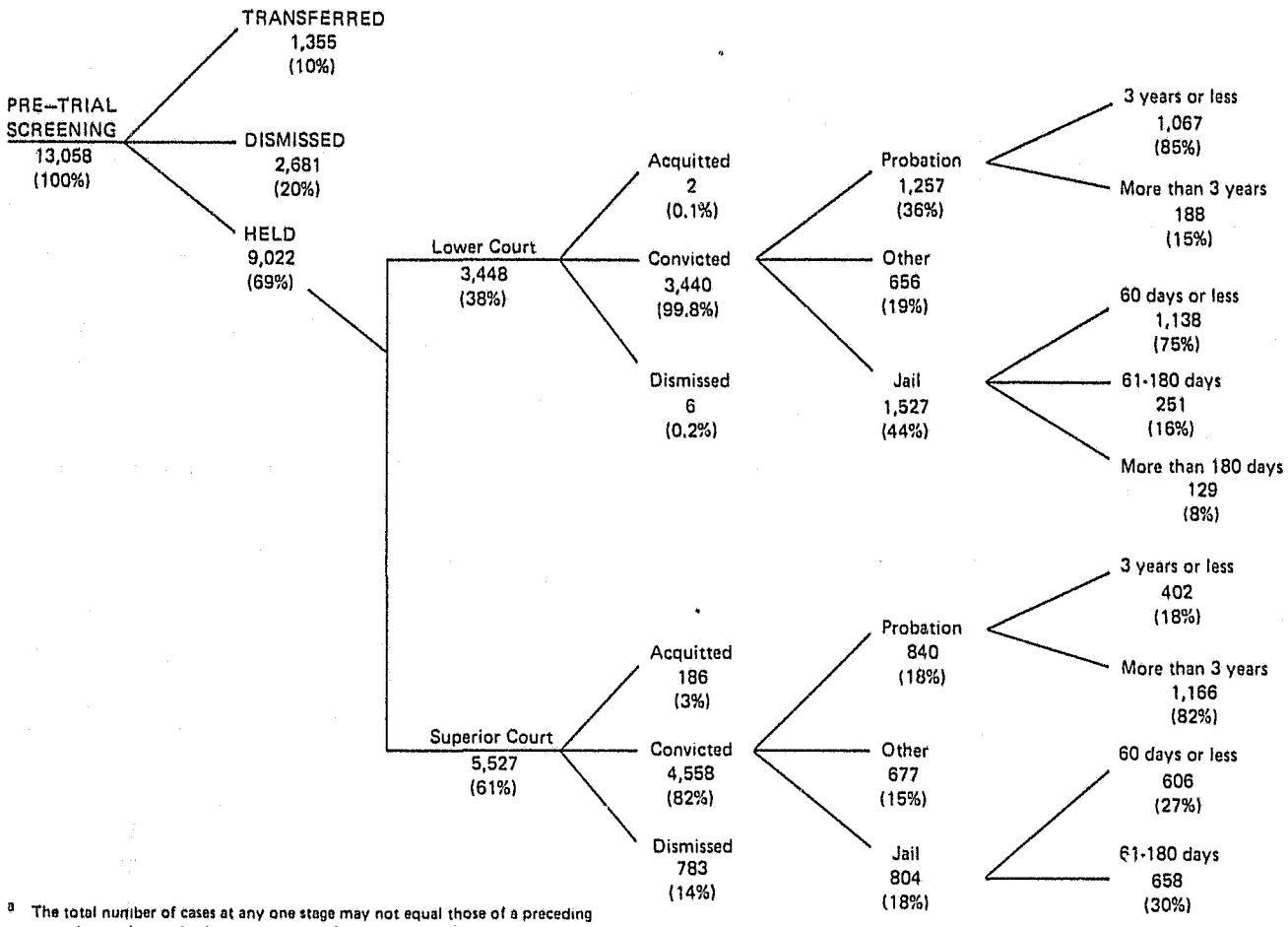
Exhibit 4.3 and Exhibit 4.4 are based upon the BCS initial transaction data set and depict the flow of adult felony offenders through various decision making stages for both urban and rural counties using the disposition tree form. While the decision points depicted in these flowcharts are limited due to the lack of correctional data and other pieces of information such as bail determination, they nonetheless give a fairly good approximation of a working OBTS model. It is interesting to note, for example, that approximately 1/5 of both urban and rural arrestees have their cases dismissed prior to trial. What may account for these pre-trial case dismissals? Are such a high proportion of initial arrest decisions based upon evidence that cannot later support a conviction? Keeping in mind the fact that all cases contained in these figures represent original felony arrests, it is instructive to note the high proportion of offenders handled at

EXHIBIT 4.3
FLOW OF CALIFORNIA FELONY OFFENDERS: URBAN AREAS[a]



[a] The total number of cases at any one stage may not equal those of a preceding stage due to changes in the computation of the base rates. For example, while a probation disposition excludes those sentenced to both probation and jail, length of probation includes the latter category.

EXHIBIT 4.4
FLOW OF CALIFORNIA FELONY OFFENDERS: RURAL AREAS[a]



[a] The total number of cases at any one stage may not equal those of a preceding stage due to changes in the computation of the base rates. For example, while a probation disposition excludes those sentenced to both probation and jail, length of probation includes the latter category.

the lower court level with resulting misdemeanor convictions. Of those held for prosecution, 45 percent of the cases are handled at the lower court level in urban areas, compared to 38 percent handled at the lower court level in rural areas.

Of further interest with regard to these flow charts are differences in outcomes between urban and rural counties. At the lower court level, for example, urban offenders are far more likely to obtain probation (53 percent) than their rural counterparts (36 percent). At the same time, however, 80 percent of all urban offenders receiving probation at the lower court level are sentenced to more than three years, compared to 15 percent of the rural offenders--a substantial difference of 75 percentage points. The above comparisons demonstrate another advantage of transaction statistics; that is, the ability to analyze processing data across jurisdictions or for different levels of the criminal justice system. Differences can then be noted and problem areas highlighted. Of those convicted at the superior court level, approximately 1/5 of all urban and rural offenders receive a prison disposition. If one were to consider all convictions (at either the lower or superior court level), the percentage receiving a prison disposition is considerably lower--around ten percent. This is especially enlightening when one remembers that all original arrest offenses provided for a prison term of some kind.

Although the data used in this example are preliminary in that many stages in the processing of offenders are omitted, they nonetheless demonstrate the type of information that can be obtained when criminal justice data are recorded on a transactional format. It is possible to see at a glance the path along which offenders are traveling and the types of dispositions that are occurring. Decisions made at one stage can be related to those occurring at a later stage, a possibility that is precluded with the use of summary tables. A further possibility derived from the use of transaction statistics is the ability to relate various demographic characteristics such as age, race, and sex to each decision point. Again, a major limitation of summary statistics has been the inability to determine who the clients of the criminal justice system are as they proceed through the various processing stages.

- Demographic and Other Correlates

As an example of the ability to relate demographic characteristics to outcome decisions, one can again refer to the initial three-year block of California transaction data. Exhibit 4-5 (Tables 1 and 2) show lower court sentencing dispositions in rural and urban areas by an offender's sex. In each of these tables, sentence outcome includes jail, probation and other dispositions such as the use of fines. Both bivariate and standardized percentage figures are presented. Very simply, bivariate tables show the relationship between sentence outcome (jail, probation or other) and sex without consideration of an offender's previous criminal history. An examination of the bivariate sections of

EXHIBIT 4.5

COURT SENTENCING DISPOSITION, BY SEX

TABLE 1 Lower Court Sentencing Disposition in Rural Areas, by Sex: Bivariate and Standardized Relationships (by Original Charge, Prior Record, and Status)

	BIVARIATE		STANDARDIZED	
Sentence	Male	Female	Male	Female
Jail	45%	38%	45%	41%
Probation	35%	48%	35%	46%
Other	20%	14%	20%	13%
	100% (2,977)	100% (463)	100% (2,953)[a]	100% (457)[a]

[a]Column totals do not equal those in original table because of missing cases.

TABLE 2 Lower Court Sentencing Disposition in Urban Areas, by Sex: Bivariate and Standardized Relationships (by Original Charge, Prior Record, and Status)

	BIVARIATE		STANDARDIZED	
Sentence	Male	Female	Male	Female
Jail	44%	25%	42%	31%
Probation	50%	70%	51%	64%
Other	6%	5%	6%	4%
	100% (5,002)	100% (873)	100% (4,966)	99%[a] (864)[b]

[a]Percentages do not equal 100% because of rounding.

[b]Column totals do not equal those in original table because of missing values.

Tables 1 and 2 reveals that female offenders generally fare better than their male counterparts--that is, while males are more likely to receive jail dispositions, females are more likely to be placed on probation. Forty-five percent of the male offenders in rural areas receive a jail disposition, compared to 38 percent of the female offenders. The corresponding figures for urban areas are 44 percent and 25 percent for male and female offenders, respectively.

At this point, one is provided with basic information regarding sentencing differentials between male and female offenders. It is possible, however, to refine this information by introducing additional data regarding an offender's criminal history. One knows intuitively, for example, that individuals with more serious prior records are likely to receive the more severe dispositions. Thus it is possible that male and female offenders with similar prior records receive similar dispositions. The data utilized here contained information regarding the original arrest charge (violent, property, drug and other offenses), previous criminal record and criminal status at the time of arrest (whether the offender was under some form of supervision such as parole). The standardized parts of Tables 1 and 2 simply introduce or control for these three factors. In other words, those male and female offenders with similar charges, similar prior records, and similar criminal status are considered together.

In the standardized portions of Tables 1 and 2 one can note that the differences between male and female offenders decrease when one considers original charge, prior record and status. In more technical terms, then, one can say that criminal history factors explain some of the variance between sentence outcome and sex. Differences between male and female offenders are more pronounced in urban than in rural areas. Under the standardized sections, while 42 percent of urban male offenders receive a jail disposition, only 31 percent of the female offenders receive a similar disposition. In rural areas the respective figures are 45 percent for male and 41 percent for female offenders.

As a last example, Exhibit 4.6 (Tables 3 and 4) shows similar information with respect to the race of apprehended offenders. While the bivariate sections of both tables show that black offenders generally receive more severe dispositions than their white counterparts, differences are more pronounced in rural compared to urban areas. After standardizing for original charge, prior record and status, racial differences virtually disappear in urban areas, but still remain in rural areas.

Analysis similar to that undertaken here can also be utilized at other stages of criminal processing where decisions are being made. Thus it is possible to examine age, race and sex differences at the superior court level or with regard to the length of probation or jail commitments. It is also possible to utilize more sophisticated analytic techniques such as regression analysis, path analysis or predictive attribute analysis. The application of these multivariate analytic techniques, however, is beyond the

EXHIBIT 4.6

COURT SENTENCING DISPOSITION, BY RACE

TABLE 3 Lower Court Sentencing Disposition in Rural Areas, by Race: Bivariate and Standardized Relationships (by Original Charge, Prior Record and Status)

	BIVARIATE		STANDARDIZED	
Sentence	White	Black	White	Black
Jail	44%	60%	44%	56%
Probation	37%	26%	38%	26%
Other	19%	14%	19%	18%
	100%	100%	101%[a]	100%
	(3,245)	(108)	(3,216)[b]	(108)

[a]Percentages do not equal 100% because of rounding.

[b]Column totals do not equal those in original table because of missing values.

TABLE 4 Lower Court Sentencing Disposition in Urban Areas, by Race: Bivariate and Standardized Relationships (by Original Charge, Prior Record, and Status)

	BIVARIATE		STANDARDIZED	
Sentence	White	Black	White	Black
Jail	39%	47%	40%	42%
Probation	54%	49%	53%	54%
Other	6%	4%	6%	4%
	99%	100%	99%[a]	100%
	(4,824)	(875)	(4,783)[b]	(873)

[a]Percentages do not equal 100% because of rounding.

[b]Column totals do not equal those in original table because of missing cases.

scope of the present discussion.

As a final point drawn from the present example, transaction data have much utility for addressing crucial concerns and issues in criminal justice processing. While many research attempts have been made to assess the issue of differential sentencing, most of the findings have proven contradictory. That is, while some studies have shown that blacks and other minority groups (or youthful offenders or female offenders) receive more severe treatment, other studies have shown no differences in treatment. These disparate conclusions have been reached regardless of the sophistication of the research--whether control variables have been introduced or tests of significance employed. Yet a partial explanation for these contrary findings may lie in the nature of the data used to explore the issue of differential sentencing. Briefly, most studies have employed only one indicator of sentence severity--that most often being the length of confinement imposed by the trial judge (or jury). Criminal justice, however, is a dynamic, not a static process, in that decisions made at one stage may be strengthened, diluted, or left unchanged by those occurring at a later point in time.

Because transaction data reflect this dynamic aspect of criminal processing, decisions made at one point may be compared to those occurring at later points. Even in this preliminary data set, it is possible to examine both sentence outcome and the length of time sentenced to probation or jail terms. While it is possible that certain groups of offenders are more likely to receive longer sentences than others when confined, it may also be the case that these groups are less likely to actually be confined. Similarly, while most previous sentencing research has focused upon those offenders adjudicated in superior court or its equivalent (e.g., Federal District Court), municipal court decisions have been relatively ignored. Since transaction data provide a longitudinal perspective, analysis can be undertaken at both the lower and superior court levels. Transaction data thus serve to underscore the complexity of the sentencing process and the fact that erroneous conclusions may be drawn by not taking a system perspective.

- Additional Uses of Transaction Statistics

A number of examples have been explored in an attempt to demonstrate some of the advantages associated with transaction statistics and, correspondingly, some of the limitations to be found in summary tallies of crime data. One can see that transaction statistics allow one to trace the flow of offenders through various stages of the criminal justice system noting what alternative decisions occur and the demographic characteristics of offenders associated with these decisions. Because transaction statistics reflect the complexity of criminal processing, a number of other benefits also accrue to their use.

Processing Time.

Traditionally, crime control agencies have recorded and reported their statistics based on the calendar or fiscal year. Such a

method may reflect agency workload and underpin requests for budget allocations, but it provides no useful information regarding the amount of time required to process various offenders from one stage to the next and the effects of time variation on dispositional outcome. The necessity for such information is underscored by the backlog of cases in courts across the country and the effects of such backlogs on the administration of justice.

Clearly, the length of time from charge to disposition (including intervening time lags from stage to stage) is a crucial indicator of the performance of criminal processing. Unfortunately, adequate data facilitating the investigation of the effects of time passage have been nonexistent. Unlike prior data collection techniques, in which processing dates are lost in summary tabulations, OBTS records the various dates on which decisions regarding the offender are made. It is thus possible to identify the specific stages at which backlogs occur and assess the effects of these backlogs on dispositions at later stages. Similarly, informed decisions, based on more adequate information, can be made regarding a strategy or program to relieve congestion at these points and thus improve the delivery of criminal justice services.

Recirculation of Offenders.

Under present conditions it is difficult, if not impossible, to adequately account for the recirculation of offenders through the criminal justice system. One now has little information regarding those repeaters who had prior exposure to the system, much less the various alternative routes which they may have followed. Without such information, it is difficult to judge the effect of the crime control system on various categories of offenders, much less to provide for needed changes.

One's view of crime control is surely incomplete and possibly distorted when one fails to take into account those with prior records who again find themselves to be clients of the system. Under OBTS, criminal histories of these individuals can be gathered allowing a comparison of their social and demographic characteristics with those of first offenders. Transactional data allow one to chart the movement of both first offenders and repeaters. Comparisons can then be made at any given point. For example, are there observable differences between first offenders and recidivists in terms of the average processing time from arrest to disposition? Do repeaters attempt to wait out the system in order to obtain more favorable sentencing dispositions? These and related questions can be explored when relevant information is recorded on each individual offender. It is thus possible to determine the status of any given person at any particular processing stage for any particular point in time.

Input and Output.

A transactional data system allows for the examination of the effects of decisions made at one stage on those made at a later point. As was noted previously, most criminal justice data are

discontinuous in that they are compiled by divergent agencies at separate processing stages of the criminal justice system. Under such conditions outputs at one point cannot be related to inputs at other points. One cannot compute, for example, the percentage of those held in pre-trial detention who subsequently received a prison commitment, nor can one assess the effects of type of counsel on bail decisions or sentence outcome. As each offender proceeds through the system, numerous decisions are made altering his status: whether to release or hold him prior to trial; what type of counsel, if any, will assist him in his defense; if convicted, whether he will remain under supervision in the community or be sent to a penal institution, and so on. Each of these status-altering decisions requires the allocation of different resources and may place severe strain on the operation of the criminal justice system. For example, dramatic shifts in the flow of offenders, from incarceration to probation options, may well require both a conceptual and operational reorientation. Therefore, information pertaining to such potential shifts should be of vital importance to criminal justice practitioners.

Monitoring of the System.

Coupled with the above, transaction data provide the capacity for a continual monitoring of the criminal justice system. As was noted earlier, criminal processing is dynamic rather than static. Therefore, the system is quite responsive to changes in legislation or appellate court decisions, as well as to the implementation of new treatment strategies or diversion programs. For example, preliminary analysis of the California OBTS data showed a significant increase in the number of felony defendants convicted at the superior court level after 1969. This trend was consistent with a revision in the penal law occurring early in that year. Section 17 of the California Penal Code was amended to allow certain felony offenses to be processed as misdemeanors. Under certain specified conditions, an offense punishable by imprisonment in the state prison, or by fine or imprisonment in the county jail, could be disposed of by the municipal court as a misdemeanor. As a result, while the total number of convictions increased for each consecutive year from 1969 through 1971, the increase was entirely absorbed by the lower court.

Crime-Specific Analysis.

Since the early 50's, with the advent of Wolfgang's classic study of homicide patterns, attention has focused upon crime-specific analysis in an attempt to discern underlying regularities associated with specific criminal events. With regard to criminal justice processing, defendants often experience different outcomes depending upon the crime with which they are charged. Often certain charges may lead to differential plea bargaining opportunities in that they are more likely to be reduced than others. Since transaction statistics would generally record the offense for which the individual was convicted as well as the original charge, it would be possible to examine the charge reduction processes as

well as the movement of specific offender groups through the system. Similarly, information provided would be responsive to legislative changes in the definition of criminal acts. The state of Wisconsin, for example, recently changed its rape laws creating four degrees of sexual assault with a differential penalty structure depending upon the amount of force used. It is quite likely that this change in substantive criminal law will also effect a change in criminal processing.

- Implementation of Transaction Statistics

At the beginning of this discussion, it was noted that although statewide OBTS systems have been proposed since the late 1960's, actual on-line data are quite scarce. This deficiency is not surprising considering many of the problems involved in implementing such a data collection system in most states. Most law enforcement agencies, for example, are concentrated in city and county jurisdictions. Probation services are generally organized on the county level, with felony penal institutions being administered by the state. Understandably, there may be some reluctance on the part of these agencies to relinquish what they believe to be part of their autonomous and independent operation. Perhaps the best method of transaction data collection is through a central agency located within each state with responsibility for compiling and recording criminal justice processing data. Whereas slightly more than half the states have such an agency for criminal justice statistics, only a few states have operational or nearly operational OBTS programs. Conventionally, most criminal justice agencies have recorded and reported their own statistics, determining for themselves which types of data are important. Typically, as was noted, such statistics reflect agency workload in a form which is of little value to the wider criminal justice community.

In certain instances local agencies may be hesitant to forward their data to some central agency for compilation. From the point of view of the local criminal justice agency, the time and procedural changes needed to implement such a system may not outweigh the advantages to be gained. Further, the coordination of various operational parts in such a data collection effort also present imposing obstacles. It is no simple task to monitor hundreds of local agencies in the use of standard reporting forms, to check the reliability of data and to see that information is submitted on time.

Administrative and organizational problems, such as those noted above, have hindered the development of offender-based transaction statistics, for each state is, in a real sense, tied to its traditional procedures and organizational capabilities. Retooling existing operations to meet OBTS requirements may require major revisions. It is, however, possible to obtain some of the benefits of a transaction data collection system without a complete retooling of resources.

It should be possible, for example, to draw a sample of offenders from arrest records maintained by local police agencies. This

sample could then be linked to judicial and correctional processes to obtain some estimate of the flow of offenders through the system. While there are many different sampling processes, a random sample stratified on the basis of offense and offender characteristics would probably prove optimal. Some inferences could then be made to the general population of offenders proceeding through the criminal justice system.

The advantages to be gained with an offender-flow model are considerable. Overall, transaction data provide more basic information regarding the operation and performance of the criminal justice system than have previously been available, especially with summary statistics. Many of these benefits have been presented and discussed. Following is a case study which further illustrates their uses, strengths, and limitations.

B. Criminal Justice System Performance--Case Study (To Be Provided By Instructor)

EXERCISE #15

Measuring System Performance

Purpose:

The purposes of Module 4 are to present the concept of performance-based research and to introduce transaction statistics as a means of supplying continuous measurement of criminal justice system performance. It includes detailed descriptions of various parts of the system and is designed to encourage participants to perceive the interrelationships and implications for research and programmatic activities. This exercise is intended to:

- Provide practice in developing programmatic approaches to solving a crime problem and in assessing the outcomes of those approaches; and
- Build awareness of the impact of change in one part of the system on other segments.

Activities:

The exercise consists of three basic phases. Participants should outline the given crime problem and review the activities which are to be performed. After dividing into their work groups each group should develop three possible approaches to solving the crime problem (outlined below) and examine the benefits and drawbacks of each approach. Finally, the plenary session should reconvene and each group should present its findings for discussion.

The problem to be addressed in the exercise is a real one in many areas of the United States: the number of crimes committed by persons awaiting case dispositions on previous charges. Most criminal defendants are released prior to their trials through a variety of programs and under various degrees of supervision, as required by law. Particularly in felony cases which must await trials in overburdened and backlogged courts, the time between an accused person's initial appearance before a court or magistrate and the disposition of his or her case can stretch over weeks or months. One consequence is that there are documented instances in which offenders have been arrested on new charges several times before their original cases were disposed of. This problem was noted by the National Advisory Commission on Criminal Justice Standards and Goals. It has been raised in both the professional literature and the public press, and has become a matter of concern for citizens and government officials.

Dicer County Example and Data

For this exercise, participants are asked to consider the problem in an area called Dicer County. In a time of rising crime rates, criminal justice system officials and citizens of this county have become particularly alarmed at the number of crimes committed by persons already awaiting case disposition on previous felony charges. Official statistics there indicate that 15 percent of persons accused of felonies commit additional crimes in the period between their initial court appearances and case dispositions.

Dicer County is an urban/suburban industrial area with a total population of approximately 1,800,000. Its principal city, Dicer, has a mayor and city council government which operates independently from the County. The County is administered by a Board of Commissioners who submit an annual county budget to the state legislature for approval. Included in this budget are items for the County's District Attorney and staff, sheriff's department, courts, including grand jury operations, an adult detention center and correction institution, and county probation and parole programs.

It is through the County's Court of Common Pleas, Criminal Division, that the felons described above must pass. In 1976 there were approximately 7,000 felony case complaints. Verdicts were issued in 6,000 cases in that year. Some 20 percent of the defendants were found guilty, and 35 percent made guilty pleas which were accepted by the court, for a total of approximately 3,300 cases.

If, as county research indicates, 15 percent of the persons accused in felony cases commit further crimes while awaiting disposition of their earlier cases, then approximately 900 crimes were committed by defendants awaiting those 6,000 verdicts.

Accused felons in Dicer County may be grouped into six categories:

- 40% Those released on their own recognizance, with supervision (ROR);
- 5% Supervised release;
- 10% Those released on bonds;
- 35% Those released on normal bail;
- 6% Those diverted, after charge but prior to disposition, to an intervention program;
- 4% Those detained in jail.

The mean time between initial court appearance and case disposition for accused felons in this Dicer County court is 8.1 months.

Step 1 - Participants in the exercise should identify and discuss possible system changes designed to have an impact on this crime problem. Each small group is to develop three programmatic approaches to reducing the number of crimes committed by accused felons. The approaches and their potential effects must

be carefully considered including (1) impacts on the criminal justice system in Dicer County; (2) the impacts on system components in the municipalities of the county; and (3) the possible effects outside the county.

Step 2 - For each of the three approaches, the group should list in the formats suggested below:

- Potential effects which the three programmatic changes could have on other parts of the criminal justice system;
- Advantages/Liabilities of each of the proposed changes.

Format I

Proposed Changes	Impacts on Municipalities	County	State
#1			
#2			
#3			

Format II

Proposed Changes	Impacts on Police	Courts	Corrections
#1			
#2			
#3			

III. MEASURING SYSTEM CAPABILITIES

This section addresses the criminal justice system from the perspective of workload and resources. In previous discussions about crime statistics the various components of the criminal justice system were only secondarily considered. However, in resource analysis a complete knowledge of the criminal justice system is most critical. Not only must one know which agencies do what at what points in the system, but one also needs to know about the lines of communication, information and paper flow, and staff functions. One needs to consider the activities and processes which influence resource requirements and hence link system capabilities.

Crime statistics can help to define the system's capabilities, or the level of response the system can make. Ultimately, this level of response is traceable to resources. Before reaching the specifics of what data are available or should be collected and how they should/can be analyzed, it is important to identify the resources of the criminal justice system. Examples of such resources are listed below:

- police officers
- police equipment
  - communications
  - record-keeping
  - dispatch
  - vehicles
  - weapons
  - lock-up
- magistrates and judges
- secretaries
- hearing and court rooms
- constables
- court information and record-keeping systems
- adult and juvenile detention facilities
- detention staff
- prisons, institutions, and other residential facilities
- adult and juvenile probation offices, equipment, and staff.

It should be emphasized that a comprehensive planning effort encompasses consideration of all resources and capabilities in a community. Although an analysis of "system" capabilities serves as a primary focus for this module, it in no way underestimates

the importance of using resources outside the criminal justice system to improve system performance.

Throughout this program of instruction reference is made, either explicitly or implicitly, to the special problems of the juvenile justice system. Module 3 addressed the question of trend analysis of criminal justice statistics. Techniques for predicting changes in the various index crimes have been reviewed and problems with forecasting criminal activity have been summarized. Comparable issues to those discussed previously apply to the area of juvenile crime. Problems noted earlier in this text regarding the availability of data on age distributions, restrictions on access to certain forms of juvenile justice records, and particular problems in the reporting of juvenile crime may tend to increase the difficulty of forecasting in the area of juvenile crime. It is worth emphasizing, however, that the demographic characteristics associated with collective youth crime may be different from or more narrow than those generally used to predict crime trends. Specification of expected growth in inner city youth cohorts will be only partially correlated with national age trends.

Issues in resource development are also quite comparable to those discussed in other parts of this section. However, specific problems relating to the juvenile justice system include the role of numerous interest groups in any modification of juvenile justice programs, the need for a wide range of treatment approaches due to the strong rehabilitative emphasis in juvenile justice, and problems relating to ambiguities in the rights of juveniles to receive the full due process provisions associated with adult criminal justice. A broader problem is that the greater decentralization of the juvenile correctional system tends to increase the number of local areas concerned with or unhappy about specific programs, but to decrease the concentration of juveniles into large institutions which have high visibility with a broad public.

A. Resource Data Analysis

If money is to be well spent, and if the criminal justice system is to be made more efficient, careful and thorough analysis is needed. Planning should be based on information about the optimal utilization of resources and the project impact of different models of resource allocation which are the products of interpreting system data.

Criminal justice planners are being asked to become involved in data and information collection, analysis, and data utilization. Whether using manual files or computers, the planner must become involved with these aspects of data to determine what information on resources is available, what is missing, and what approaches exist for getting better information. Since crime or survey (victimization) statistics have already been discussed in previous sessions, this section focuses on the items of information dealing with manpower, equipment, and facilities.

Planning is essentially the optimal allocation of resources. This process requires four basic steps:

STEP 1: Examine what is happening in the system.

STEP 2: Formulate questions about occurrences in the system.

STEP 3: Analyze these occurrences.

STEP 4: Formulate responses and recommendations.

Each of these steps is discussed further below.

The first step is to identify each agency responsible for a processing function in the system. A flow chart depicting each processing stage in the criminal justice system should be created. A budget--broken down into salaries, benefits, capital costs, maintenance and repair of equipment, purchases of new equipment, office supplies, staff training (to include overtime pay, consultants, travel, and materials)--may be obtained along with other data on:

- number of staff by job classification, race, and sex (people resources and their skills);
- amount of space for each basic function (space affects capital costs, working conditions, availability to clients, client and staff attitudes);
- number of clients (definition will vary by type of agency) by age, race, and sex; length of time in agency (workload);
- list of equipment and assessment of condition (tools necessary to quality/efficient job performance); and
- who is responsible to whom at each stage of the system, i.e., who is the "manager for that stage"; and what is the source of the funding (affects coordination, cooperation, and consolidation of effort).

The second step is to compare these data to the statistics on the flow of cases to ascertain the workload and impact of the agency activities. This comparison can be summary or detailed depending on the statistics available from manual and/or automated information sources. In the third step--analysis--some possible formats to be considered include:

- imapct vs. quantity of resources (staff, facilities, costs). Impact measures could be reported crime rates, clearance rates, rearrest or recidivism rates.
- number of staff by job classification, salary, race and sex;
- operating space--for each type of activity--compare to workloads--again among agencies and geographical areas;

- duplications in staff activities and in use of space;
- facility/service utilization--how many people used the facility/service for how long ("vacancy rates");
- accountability patterns--who is responsible to whom, for what; and
- budgets/costs compared to workloads and impact.

The net effect should permit the analysis of resouces in conjunction with transaction data. Step four--formulating responses--should result in the improved utilization of resources and a more effective as well as efficient criminal justice system.

B. Resource Data Collection

Obtaining and analyzing data are at the heart of the process. In addition to a variety of computerized record systems which can provide useful management data either as a by-product of the system or directly designed for management purposes already available in many jurisdictions, another source which can assist both planners and agency administrators in resource planning and utilization is operational agency information systems. One such system is PROMIS, a computer-based information system for prosecutors which utilizes resource information and implements guidelines and priorities for making the best use of those resources. This is a system built to assist prosecutors in the management of case selection and dockets.

Aside from computerized management information systems, which represent formal sources of information to managers of criminal justice agencies, manual "casual" samples--designed for specialized purposes--can provide management with useful information supplementing that found in formal management reports. In particular, casual samples can be in the form of periodic direct observations (perhaps self-reported) of personnel work practices and tasks which, because of their detail, may escape inclusion in management reports.

In many respects, casual samples are needed to supplement experience in the interpretation of trends observed in management reports. For example, monthly reports of the number of judge-hours per case may be available--maybe by type of case--for the Chief Justice or the court administrator's review. If these statistics are also organized by judge, the reviewer can monitor the fluctuation both by judge and across judges, by type of case. Experience suggests that a certain range of variation can be expected. However, direct observation of the length of time that various judges hold court and the manner in which court sessions are conducted, can yield valuable insights as to why variations outside the normal range may be occurring or whether a relatively stable degree of variation is "reasonable" for trials to be conducted efficiently, yet fairly.

Another possible application of casual samples can be drawn from an example in probation. Suppose monthly caseloads are tallied in management reports to the Chief Probation Officer, and that, until

recently, caseloads have been fluctuating around 30 per officer at any given time. In the last three months, however, caseloads have steadily climbed to almost 40, and the number of probation officers has not changed. An immediate reaction is to plan hiring additional probation officers to support what is evidently a shirt in sentencing policy. Unless, however, there is some reason to believe that a caseload size of 30 is "better" than one of 40--aside from the notion that lower caseloads means more attention to each case--then the Chief Probation Officer (or his or her superior) might be wise to perform a special survey of day-to-day activities of probation officers: how many clients are seen, how much time is spent with each, how much time is spent in travel, etc. It may prove to be possible to have the same amount of activity (or at least not appreciably less) by reassigning cases, by modifying contact procedures for certain cases, or by providing greater incentive to probation officers to work more efficiently.

Supplemental information can be obtained by a variety of techniques. Most common is the agency survey. The agency survey is a difficult task, for several reasons:

- Most agencies receive innumerable requests for information and for survey participation. It seems these days that to obtain an M.A. or a Ph.D. one must conduct a survey, and criminal justice personnel/agencies are prime targets.
- Most agencies have very limited record-keeping systems and so have to collect the data manually for each question.
- Survey questions mean "different things to different people."

Survey questions should be direct and require simple, basic information. If staff is available to compile the information for agencies, as is the case in the expenditure and personnel surveys sponsored by LEAA, and planners have managed to institute a periodic agency survey, then the rate of response may be sufficient, and survey results may be of significant local utility. Attached is a sample of a basic questionnaire (Exhibit 4.7). The information received through this survey was helpful in showing patterns, and especially in identifying needs and problems.

A technique for obtaining these data jurisdiction-wide is through a monitoring and evaluation program. Rather than provide a detailed program description, the following list exhibits the information obtained through such a source:

- number of clients (where relevant) and services provided, by race, sex, and referral source;
- rearrest and recidivism data;
- staff job descriptions and the degree to which these are followed;
- staff training needs;

EXHIBIT 4.7

QUESTIONNAIRE ON RESIDENTIAL FACILITIES FOR JUVENILES

1. Name of Facility_____

2. Address_____Phone_____

3. Person Completing the Survey_____

4. How many years has the facility been operating?_____

5 Do you serve boys?_____ages_____; girls?_____ages_____.

6. How many residents can be accommodated at one time?_____boys_____girls.

7. Approximately how many residents do you accept each month?_____boys?_____ girls?_____.

8. What is the average length of stay?_____boys?_____, girls?_____.

9. How many residents did you have in 1975?_____WM? _____, WF?,_____ BM?_____, BF?_____.

10. What percentage of your residents formerly lived in Allegheny County? _____%, Pennsylvania - outside Allegheny County? _____%, outside of Pennsylvania?_____%.

11. In 1975 how many of your residents were dependent or neglected_____; status offenders_____; adjudicated delinquents_____; other, specify__ _____

12. Do you receive per diem costs and/or fees?_____. If yes, how much per child? $_____. If yes, how much was received in 1975?_____. Who were these sums paid by?_____

13. What criteria are used in screening potential residents?_____

14. Who may refer residents to your facility?_____

_____

_____

EXHIBIT 4.7 (cont.)

15. In 1975 who made most of the referrals?_____

_____

_____

16. What was the total number referred by source?

Referral Agency	Number Referred
_____	_____
_____	_____
_____	_____
_____	_____

17. How many were accepted by source?

Referral Agency	Number Referred
_____	_____
_____	_____
_____	_____
_____	_____

18. Give the main reasons for refusal?_____

_____

19. Do you offer the following services? If you do and you feel that the quality is adequate, check under (A).

	YES	A	NO		YES	A	NO
Educational	( )	( )	( )	Individual Counseling	( )	( )	( )
Skill Training	( )	( )	( )	Group Counseling	( )	( )	( )
Job Placement	( )	( )	( )	Family Counseling	( )	( )	( )
Arts and Crafts	( )	( )	( )	Psychiatric Treatment	( )	( )	( )
Recreational	( )	( )	( )	Legal Service	( )	( )	( )
Medical Treatment	( )	( )	( )	Consumer Education	( )	( )	( )
Dental Treatment	( )	( )	( )	Budget Planning	( )	( )	( )
Health Education	( )	( )	( )	Financial Management	( )	( )	( )
Other, specify_____					( )		

20. How many full-time professional staff do you presently have?_____

EXHIBIT 4:7 (cont.)

21. If the number of staff is sufficient to handle the residents you presently have, check under (A).

Personnel (Job Class)	WM	BM	WF	BF	SALARY RANGE	(A)
_____	____	____	____	____	_____	( )
_____	____	____	____	____	_____	( )
_____	____	____	____	____	_____	( )
_____	____	____	____	____	_____	( )
_____	____	____	____	____	_____	( )
_____	____	____	____	____	_____	( )

22. Can your facility recommend the transfer of residents during their stay?_____

If yes, where are they usually transferred and why?

Facility/Service	Purpose	Number Transferred in 1975
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

23. Is family involvement encouraged during the stay of your residents?_____

If yes, what kind of involvement?_____

_____

24. When your residents are released, does follow-up contact occur?_____

25. If yes, how frequently?_____

26. Your total budget in 1974 was $ _____ in 1975 $_____

27. In 1975, what percentage of your budget came from local government_____%, State government_____%, Federal government_____%, private organizations or foundations_____%, business _____%, private citizens_____%, other _____%.

EXHIBIT 4.7 (cont.)

28. State the objectives of your facility. If a private organization, enclose by-laws.

29. Give suggestions for solving the problems you encounter while trying to accomplish your objectives.

Problem	Suggested Solution

SOURCE: Allegheny County Regional Planning Commission

- clients'/community's perceptions of services or activities;
- internal management and administration strengths and problems;
- lines of communication with other agencies, degree of cooperation or coordination;
- workloads;
- costs;
- staff selection and promotion criteria and procedures, career ladders;
- staff morale and motivation; and
- quality of service.

C. Application of Management and Administrative Statistics

Management and Administrative Statistics (MAS) provide criminal justice managers with summary data on costs, personnel allocations, productivity measures, workloads, and other activities and tasks as they relate to equipment, facilities and resources in general. These statistics are intimately related to statistics measuring the performance of the criminal justice system, since--among other things--system performance depends on the quantity and quality of resources available to it. Planners need to determine what they can learn from MAS. Some of the questions that data can be used to respond to include:

- Number of police officers to cover what geographical area with what population density and what reported crime rate?
- Relationship between citizens and the police. Do people report crimes? Do victims prosecute? Do witnesses and victims give good descriptions of the perpetrators?
- Where and how long are defendants held before they are arraigned? How much time does a police officer spend with the person arrested prior to arraignment?
- How many cases are dismissed by the magistrate, by crime type, and why?
- How much time passes between arrest and hearing, and arrest and trial? Why?
- Who is held on what type of bond and why?
- What are the conviction rates? How many and why are cases disposed prior to trial?
- Do any of these factors vary by crime type? By offender background? How?

- What factors appear to determine the flow of sentenced defendants to county facilities/ programs? To state facilities/programs?
- How many clients does a probation officer have? What does the probation officer do?

While answers to these questions can be found in part by examining data other than MAS, a deeper analysis suggests the need for data relating directly to criminal justice system resources. Why does one need to know these things? Without such in-depth knowledge one cannot know what the criminal justice system problems are, as opposed to simply crime problems or system performance problems. What might be done to solve them, or what the effects will be of any changes, can better be understood by considering the full range of possibilities in the utilization of system resources.

Exhibit 4.8 on the following pages illustrates how quantitative performance indicators have been developed as measures of "system performance." Questions about resources always end up involving the use of those resources. The use of resources likewise involves both the workload and the quality of the activity/product/performance. Because of this need to evaluate utilization and performance --which involves value judgments--it is critical that agencies adopt standards, goals, and performance objectives. The planner must also have standard measures for comparison. The National Advisory Council on Standards and Goals has provided some criteria to use in establishing performance and productivity.

D. Action Plan Cost Analysis--Case Study

(To be provided by Instructor.)

E. Integrated Analysis of Performance and Resources

Whether computerized or manual, periodic (monthly, quarterly, or annual) data are invaluable to the development of management insights. Information about a) the magnitude of available resources and their allocation, and b) the values of performance indicators (numerical measures) can be used to understand the nature of the relationship between capabilities and performance. This understanding can be used for two major purposes:

- measuring the "elasticity" or performance indicators (covered in the next section) relative to changes in resource levels;
- correlating agency-to-agency resource change effects.

The "elasticity" concept provides an index of the resultant change in values of performance indicators, occurring from planned changes in resource levels. For example, how many more (or less) residential burglaries would be committed as a result of incremental changes to police patrol strength? Or, what difference would occur in criminal justice processing times with the addition of a new judge and/or the facilities, equipment, and staff for that judge?

Exhibit 4.8

Quantitative Performance Indicators, Chaos County, 1971-1975

	1971	1972	1973	1974	1975
I. SYSTEM INDICATORS (Degree of Change)					
A. Crime Rate County-Wide (Part I)	-1.1%	-8.1%	+18.2%	-5.4%	+18.7%
B. Criminal Court Productivity (Indictments vs. Dispositions)	-11.3%	-4.0%	+20.4%	+9.2%	+9.6%
C. Criminal Court Average Time Indictment to Disposition	+35 days	+10 days	+8 days	-149 days	-
D. Criminal Court Average Time Arrest To Trial	-	-	-	134 days	-
E. Recidivism	-	-	-	-	-
F. Pre-trial Diversion--All Programs (No. of Cases)	-	-	508	1,471	1,665
G. Unreported Crime (Chaos City)	*	*	*	49.7%	*
II. SUBSYSTEM INDICATORS					
A. Reported Crime					
1. Crime Rate/100,000 Population (UCR)					
a. Part I Offenses					
(1) Chaos County (Less Chaos City)	1,746	1,661	2,207	2,208	2,564
(2) Chaos City	6,179	5,520	5,264	5,949	6,560
(3) Total	3,180	2,885	3,409	3,345	3,969
b. Violent Offenses					
(1) Chaos County (Less Chaos City)	101	117	123	172	212
(2) Chaos City	937	943	966	905	1,018
(3) Total	383	380	384	396	480
C. Property Offenses					
(1) Chaos County (Less Chaos City)	1,629	1,545	2,048	2,036	2,352
(2) Chaos City	5,242	4,576	4,298	5,042	5,542
(3) Total	2,798	2,506	2,771	2,948	3,489

* Data Not Available

Exhibit 4.8 (cont.)

	1971	1972	1973	1974	1975
d. Part II Offenses					
(1) Chaos County (Less Chaos City)	*	*	*	2,224	2,452
(2) Chaos City	*	*	4,442	4,546	5,241
(3) Total	*	*	*	2,926	3,413
e. Total Part I and Part II Offenses					
(1) Chaos County (Less Chaos City)	*	*	*	4,432	5,016
(2) Chaos City	*	*	9,706	10,495	11,802
(3) Total	*	*	*	6,271	7,382
2. Victimization (Chaos City)**					
a. Crimes Reported to Police (%)					
(1) Personal				31	
(2) Violent				44	
(a) Rape				51	
(b) Robbery				56	
(c) Assault				37	
(3) Theft				24	
(a) Personal Larceny with contact				42	
(b) Personal Larceny without contact				23	
(4) Household Crime				42	
(a) Burglary				50	
(b) Larceny				22	
(c) Auto Theft				66	
(5) Commercial				78	
(a) Burglary				73	
(b) Robbery				97	

** "Criminal Victimization Surveys in 13 American Cities," National Crime Panel Survey, U.S. Department of Justice, Law Enforcement Assistance Administration.

Exhibit 4.8 (cont.)

	1971	1972	1973	1974	1975
b. Number of Victimizations					
(1) Personal				47,200	
(a) Crimes of Violence				15,400	
(b) Crimes of Theft				31,700	
(2) Household				39,600	
(3) Commercial				7,100	
(4) Total				93,800	
B. Police					
1. Arrest Patterns					
a. Arrests					
(1) Part I Offenses (Adult/Juvenile)					
(a) Chaos County (Less Chaos City)	*	*	*	1,319/ 2,177	2,805/ 2,230
(b) Chaos City	2,852/ 1,890	2,831/ 1,826	2,000 1,349	2,307/ 1,775	2,933/ 1,940
(c) Total	*	*	*	3,626/ 3,952	5,738/ 4,170
(2) Violent Offenses (Adult/Juvenile)					
(a) Chaos County (Less Chaos City)	*	*	*	*	654/ 236
(b) Chaos City	1,371/ 341	1,393/ 324	1,062/ 246	910/ 178	983/ 260
(c) Total	*	*	*	*	1,637/ 496
(3) Property Offenses (Adult/Juvenile)					
(a) Chaos County (Less Chaos City)	*	*	*	*	2,151/ 1,994
(b) Chaos City	1,481/ 1,549	1,438/ 1,502	938/ 1,103	1,392/ 1,601	1,950/ 1,680
(c) Total	*	*	*	*	4,101/ 3,674

CONTINUED

4 OF 5

Exhibit 4.8 (cont.)

	1971	1972	1973	1974	1975
(4) Part II Offenses (Adult/Juvenile)					
(a) Chaos County (Less Chaos City)	*	*	*	9,959/ 5,967	10,551/ 6,057
(b) Chaos City	17,017/ 2,630	17,895/ 2,799	16,923/ 3,037	17,097/ 2,120	17,415/ 2,142
(c) Total	*	*	*	27,056/ 8,087	27,966/ 8,181
(5) Total Offenses (Adult/Juvenile)					
(a) Chaos County (Less Chaos City)	*	*	*	15,230/ 7,648	
(b) Chaos City	19,862/ 4,520	20,690/ 4,625	18,923/ 4,386	19,404/ 4,391	20,348/ 4,534
(c) Total	*	*	*	34,634/ 12,039	33,704/ 13,745
b. Clearance Rates (Percent)					
(1) Part I Offenses					
(a) Chaos County (Less Chaos City)			*	9	15.6
(b) Chaos City			15.2	15.0	15.5
(c) Total			*	12.3	15.6
(2) Violent Offenses					
(a) Chaos County (Less Chaos City)			*	31.7	35.4
(b) Chaos City			31.3	31.7	31.1
(c) Total			*	31.7	32.5
(3) Property Offenses					
(a) Chaos County (Less Chaos City)			*	7.1	13.8
(b) Chaos City			12.3	12.1	12.7
(c) Total			*	9.7	13.2
(4) Part II Offenses					
(a) Chaos County (Less Chaos City)			*	*	48.2
(b) Chaos City			64.7	66.6	62.9
(c) Total			*	*	55.3

Exhibit 4.8 (cont.)

	1971	1972	1973	1974	1975
(5) Total Offenses					
(a) Chaos County (Less Chaos City)			*	*	31.5
(b) Chaos City			38.1	37.4	36.6
(c) Total			*	*	34.1
2. Administration					
a. Communications Regions	1	2	4	1	5
b. County-Wide Communications System	-	-	-	-	Funded
c. Clean Terminals Installed In County	14	2	3	0	0
d. Identification System (inquiries per month)	*	*	*	185	248
e. Municipalities having Full-Time Police Officers/Service	85.7%	*	90%	90%	90%
f. Police Officers Trained (percent completed basic training at Chaos County Police Training Academy)	*	*	5.4%	5.7%	3.2%
3. Minor Judiciary					
1. Criminal Cases Filed					
a. City Magistrates	24,388	25,515	23,309	23,851	24,993
b. District Magistrates	*	*	*	27,842	34,545
2. Mean Time from Arrest to Arraignment					
a. Violent Crime	*	*	*	less than 1 day	*
b. Total Part I Crime	*	*	*	less than 1 day	*
c. Total Part I and Part II Crime	*	*	*	1 day	*
3. Arraignment - Bonding Decision					
a. City Magistrates					
(1) Nominal	*	*	*	*	27.7%
(2) Jail	*	*	*	*	35.2%
b. District Magistrates					

Exhibit 4.8 (cont.)

	1971	1972	1973	1974	1975
(1) Nominal	*	52.0%	60.0%	31.7%	55.6%
(2) Jail	*	18.1%	12.3%	15.3%	21.0%
4. Preliminary Hearing Dispositions (Percent HELD for Court)					
a. Part I Offenses					
(1) City Magistrates	52.8	47.5	49.8	49.3	56.6
(2) District Magistrates	*	*	48.8	*	55.6
b. Violent Offenses					
(1) City Magistrates	38.7	38.1	40.9	76.2	62.3
(2) District Magistrates	*	*	43.8	*	57.6
c. Property Offenses					
(1) City Magistrates	*	*	54.7	48.4	53.8
(2) District Magistrates	*	*	45.7	*	54.4
d. Part II Offenses					
(1) City Magistrates	20.4	14.6	29.9	11.8	14.0
(2) District Magistrates	*	*	35.3	*	17.8
e. Total Offenses					
(1) City Magistrates	24.9	18.6	32.2	16.3	20.4
(2) District Magistrates	*	*	38.0	*	24.0
5. Percent Detained in County Jail at Arraignment and Dismissed at Preliminary Hearing	*	27.1	13.3	*	30.4
D. Court of Common Pleas, Criminal Division					
1. Administration					
a. Case Terminations Prior to Trial					
(1) Part I Offenses	24.3%	23.4%	41.2%	21.8%	29.6%
(2) Part II Offenses	23.2%	19.1%	32.5%	13.0%	28.7%
(3) Total Part I and Part II Offenses	23.6%	21.4%	35.2%	15.8%	29.0%
b. Mean Time from Indictment to Disposition (days)					

Exhibit 4.8 (cont.)

	1971	1972	1973	1974	1975
(1) All Dispositions Less Nolle Prossed	191	201	209	57	*
(2) Nolle Prossed	926	211	342	72	*
(3) Guilty Plea	213	194	204	55	95
(4) Non-Jury Trial	169	192	198	57	94
(5) Jury Trial	289	235	214	81	122
c. Mean Time from Date Complaint Filed with Clerk of Courts					
(1) All Dispositions Less Nolle Prossed	*	*	*	134	*
(2) Nolle Prossed	*	*	*	164	*
(3) Guilty Plea	*	*	*	128	128
(4) Non-Jury Trial	*	*	*	138	129
(5) Jury Trial	*	*	*	151	142
d. Productivity (Indictments to Dispositions)	85.6%	81.6%	102%	111.2%	120.8%
e. Average Disposition per					
(1) Judge	590	*	677	674	664
(2) District Attroney	318	260	393	218	245
(3) Public Defender	186	175	193	124	*
f. Outstanding Indictments	*	5,111	2,474	1,802	1,701
2. Prosecution and Defense					
a. Disposition by Attorney Type (percent)					
(1) Acquittals and Dismissals					
(a) Private Attorney	39.7%	38.5%	36.9%	*	*
(b) Public Defender	23.9%	21.8%	27.3%	*	*
(2) Convictions					
(a) Private Attorney	77.2%	61.5%	61.3%	*	*
(b) Public Defender	60.3%	78.2%	72.7%	*	*
b. Sentencing - All Offenses (percent)					
(1) Fine	30.5%	34.2%	21.5%	14.9%	13.0%
(2) Probation	45.0%	47.6%	58.3%	70.1%	58.0%
(3) State Correctional Institution at Chaos City	9.1%	7.1%	7.9%	6.8%	12.1%

Exhibit 4.8 (cont.)

	1971	1972	1973	1974	1975
(4) County Prision	3.4%	2.4%	2.9%	2.3%	4.5%
(5) Muncy, Camp Hill, Greensburg, all others	8.1%	5.2%	7.0%	5.9%	12.3%
c. Pre-Trial Diversion - ARD	-	-	508	938	1,665
d. Pre-Sentence Investigations (percent of total dispositions)	*	12.3%	17.2%	13.6%	15.5%
e. Behavior Clinic Examinations (percent of total dispositions)	*	11.6%	10.8%	10.8%	10.3%
E. Court of Common Pleas, Family Division, Juvenile Section					
1. Dispositions (percent)					
a. Males (White/Non-White)					
(1) Dismissed	*	68.8/65.1	46.4/40.5	48.9/48.7	46.5/45.7
(2) Probation	*	13.7/14.2	27.5/29.2	26.2/18.7	31.7/31.0
(3) Institution or Agency Placement	*	17.5/20.7	26.1/30.3	24.9/32.6	21.8/23.3
b. Females (White/Non-White)					
(1) Dismissed	*	60.1/59.6	38.4/37.7	47.4/39.9	36.9/39.7
(2) Probation	*	8.5/12.3	26.0/28.0	25.9/28.2	25.7/31.1
(3) Institution or Agency Placement	*	31.4/28.1	35.6/34.3	26.4/31.9	37.4/29.2
2. Disposition Charge (Male/Female) (percent)					
a. Part I	*	93.9/6.1	97.4/2.6	97.4/2.6	94.7/5.3
b. Part II	*	73.3/26.7	84.0/16.0	77.5/22.5	87.5/12.5
c. Part I and Part II	*	80.1/29.9	87.5/12.5	89.2/10.8	91.9/8.1
d. Juvenile Offenses	*	51.3/48.7	55.0/45.0	48.8/51.2	60.8/39.2
e. Abuse	*	53.0/47.0	57.1/42.9	51.6/48.4	59.1/40.9
3. Recidivism					
a. On Probation	*	*	*	4.2%	5%
b. Intake (re-appearance)	*	*	*	*	19.5%

Exhibit 4.8 (cont.)

	1971	1972	1973	1974	1975
F. Corrections					
1. Detention					
a. Adult					
(1) Residents Served					
(a) Males (White/Non-White)	3,679/ 3,809	3,661/ 3,056	3,663/ 2,964	'3,424/ 3,112	3,764/ 3,683
(b) Females (White/Non-White)	191/235	181/272	237/301	199/306	231/345
(2) Average Daily Population	412	403	368	378	414
(3) Average Days in Detention	19.8	20.5	18.7	17.3	17.3
b. Juvenile					
(1) Residents Served					
(a) Males (White/Non-White)	*	*	*	*	1,057/807
(b) Females (White/Non-White)	*	*	*	*	346/200
(2) Average Daily Population	*	*	87	*	
(3) Average Days in Detention	9.5	8.8	8.8	7.3	12
2. Probation (County) (Less ARD) Adult					
a. Office Caseload	3,736	3,939	4,127	4,943	5,846
b. Caseload Characteristics (% Male/ % Black)	77/51.4	*	89.3/37.7	79/29	86/28
c. Average Min. Sentence	*	340/724	391/506	*	*
d. Caseload per Officer	107	106	136	83	80
e. Recidivism Rate	14.8%	*	*	22.1%	10.3%

While these questions are difficult to answer, it is clear that answers would be invaluable toward making the most effective and efficient use of police officers, judges, parole officers, correctional facilities, or whatever.

Correlating agency-to-agency impacts of resource changes represents a "longitudinal" approach to resource analysis. Examples of this type of effect abound. A graphic conceptualization of this type of analysis, and how it relates to the type of analysis described above, is presented in Exhibit 4.9. Effects can be gleaned from "elasticity" analysis. Implications of changes in the value of a performance indicator in one agency can be compared to the change in value of a related performance indicator for another agency. An example may serve to clarify this concept.

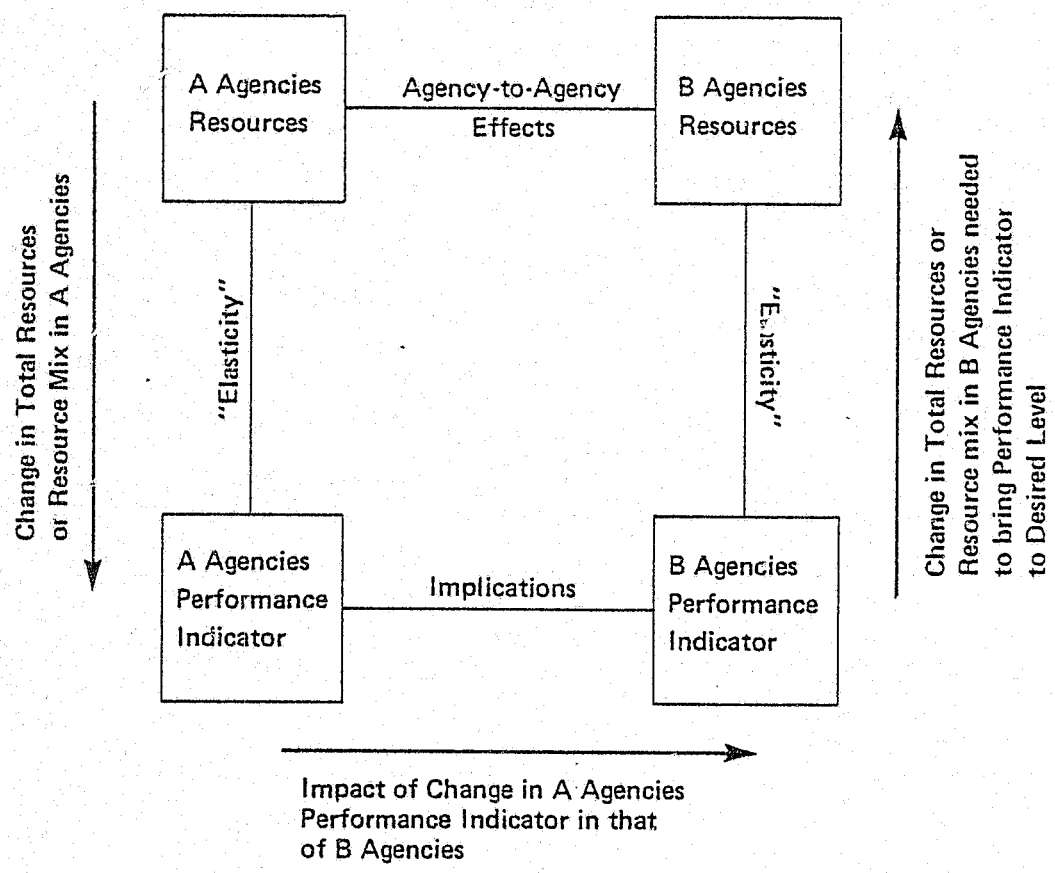
Suppose an anti-burglary unit is introduced as a new program in a local police department, with its known resource implications (personnel, facilities, equipment, training). Further, suppose that there is a reasonable expectation that adult burglary arrests will increase by 20%. This would result in almost a 20% increase in cases presented to the prosecutor. This is the "elasticity" measure for Agency A (the police department), adult arrests being the performance indicator for Agency A. From the experience of the Chief Prosecutor it is known that approximately 35% of arrests for burglary lead to the filing of burglary charges. Since the anti-Burglary Unit is less likely to arrest and release an adult than might a regular patrol officer (to preserve its pretigious image), the analyst estimates that the figure is closer to 50%. Thus, an increase of 10% (50% of 20%) to the prosecutor's workload is expected. This is the implication of Agency A's performance indicator (arrests for burglary) to a related performance measure for Agency B (prosecutor's burglary workload).

As the final step in the analysis, the prosecutor's office must determine the impact of a 10% increase in the burglary "workload" on prosecutorial resources. The only available useful statistic is the average prosecutor caseload (for all cases in the previous year), which for the sake of continuing the numerical example, we assume to be 100 cases per year (700 cases in the past year); if burglaries comprise 30% of the cases, and a 10% increase in the burglary caseload is expected, then the prosecutor can expect about 21 more burglary cases during the coming year (making the total number of cases 721). In order to maintain an average of 100 cases per prosecutor per year, a total of 7.21 prosecutors would be needed. The 0.21 suggests that at least a new part-time prosecutor be hired.

This illustration is over-simplified. For example, only one court level is used; it is assumed that there are no diversion programs for which burglary suspects might qualify; it uses a gross average for a measure which should have been more specific (not accounting for differential case preparation times); and it assumes the validity (with limits) and availability of data, and most

EXHIBIT 4.9

INTEGRATED ANALYSIS OF RESOURCE AND SYSTEM PERFORMANCE FOR TWO TYPES OF AGENCIES



importantly it requires the presence of someone on the planning staff who develops the lines of communication to obtain the data, and has the experience and patience to work it through. Nevertheless, the integrated analysis process has been demonstrated by the example, and that process is the thrust of this course.

N O T E S

U.S. Department of Justice
Law Enforcement Assistance Administration
Washington, D.C.
1977

INTRODUCTION TO ANALYSIS OF CRIME AND THE CRIMINAL JUSTICE SYSTEM

MODULE 5: IMPLEMENTATION

This work was performed by Abt Associates Inc., Cambridge, Massachusetts, for the Law Enforcement Assistance Administration under Contract No. J-LEAA-001-77. John Moxley, Training Division, Office of Operations Support, LEAA, served as project monitor. Points of view or opinions stated in this document do not necessarily represent the official position or policies of the U.S. Department of Justice.

MODULE ABSTRACT

Title: Module 5, Implementation

Lecturer:

Objectives:

The major goal of this module is to provide participants with a method for rationally organizing the analysis tasks through use of an Analysis Plan.

After completing this module, participants should be able to

- identify and describe all the major components of an analysis plan;
- cite the purposes and uses of these various components;
- list three techniques (Gantt chart, manpower allocation schedule, PERT diagram) which can assist the planner in developing a realistic analysis plan; and
- develop an original analysis plan.

MODULE 5

Implementation

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MODULE 5

IMPLEMENTATION

I. ANALYSIS PLAN--AN OVERVIEW

The ability to organize the analysis process so that it proceeds smoothly and on time is a skill which will be useful throughout a planner's career. This module discusses how development and use of an analysis plan can assist substantially in this organization process, what major components are normally included in such a plan, and what level of detail is appropriate.

An analysis plan is a written document which systematically outlines the major components of the analysis task from the initial statement of the analytic problem to estimation of the costs and elaboration of a dissemination plan. As illustrated in Exhibit 5.1, development of an analysis plan forces the planner to consider why a particular analysis is worth undertaking, what needs to be analyzed, how the analysis will be undertaken, when and by whom the work will be done, and to whom and how the results should be transmitted. The various steps in development of an analysis plan and the components of the plan are also indicated in Exhibit 5.1, and will be discussed in detail later.

Since analysis plans are not routinely used by some public agencies, a planner might well ask whether it is worthwhile spending time on preparation of such plans when this time could be used on analysis itself. A general answer is that careful preparation of an analysis plan for any sizeable analysis task is almost certain to produce more reliable results and produce them more efficiently. Undesirable alternatives which are sometimes used by planners and researchers instead of analysis plans include random "data grubbing" or analysis based on someone's vague ideas which have not been carefully thought through. Inefficiency and missed opportunities characterize such approaches.

The major benefits to a planner from preparing an analysis plan include:

- early agreement on the problem and the product;
- a greater probability of producing a good product because the exercise of writing out in detail the major concepts and procedures forces the planner to think more clearly and carefully about precisely what should be done;
- the benefit of review and comments which can be obtained more easily from others when a written plan is available; and
- more realistic and effective allocation of resources.

An analysis plan, from a manager's or supervisor's point of view, has the following advantages:

- provides direction, helps to organize, and reduces uncertainty and risk;
- gives the manager a better ability to judge the relative priorities, uses and resource requirements of various proposed analysis tasks;
- enables staff to be more satisfied since their own analysis projects, when evaluated on the basis of clear analysis plans and conducted according to those plans, can be adequately supported and should result in a superior product;
- reduces uncertainty by assisting the manager in making a realistic assessment of what the office can accomplish given present staff and funding; and
- provides the manager with concrete proposals for analysis which could be carried out with additional funding.

From the perspective of the city manager, mayor or taxpayer, analysis plans help to ensure that a useful product will result from the agency funds expended. Such plans also may permit participation in the setting of analysis priorities by citizens and other important actors within the jurisdiction who may have to use the results or support the work.

Sometimes development of an analysis plan is mandatory. Grant applications, whether for federal funds such as LEAA planning funds or for foundation funds, are essentially analysis plans, although a particular format may be specified by the grantor. In such cases, skills in developing a clear analysis plan will often mean the difference between funding or no funding.

II. DEVELOPING THE COMPONENTS OF AN ANALYSIS PLAN

There are obviously many possible ways of organizing an analysis plan, but the major components generally tend to be similar. A simplified version of these common components is illustrated in Exhibit 5.1. The process should be thought of as a flow with steps which overlap and feed back into each other. The components of the final analysis plan represent the end product of this process.

A. Statement of the Problem

The first step, a clear statement of the problem, is crucial to the entire analysis since all the other developmental stages build on it. Problem formulation is discussed in more detail in Module 1. Whether the problem is large (e.g., "What were the dimensions of the crime problem in the state during the last year?") or small (e.g., "Bicycle thefts have increased during the past year in this town, and a group of parents want to know why."), it is helpful to write out a description of the problem and ask:

- Is the problem stated as precisely as possible?
- Is it likely the results of analysis will be useful in solving the problem?
- Do others concerned with the problem agree on how it has been formulated?

B. Audience Identification and Use for Products

Once the problem is stated, it is useful to identify the audience and the use for the analysis products. This step is important because it will determine the type of output to be produced, the level of analysis in some cases, often the type and amount of money available for the analysis, and certainly the presentation and dissemination plans. Larger analysis tasks tend to have multi-level audiences and varied uses. For such tasks, identification of the primary and secondary audiences and uses is helpful. Questions to be asked during this task include:

- For whom will this analysis be performed? What are the priority and special intersts of this individual or group(s)?
- Who else would like to know the results and why would they be interested?
- Whose support is needed for the analysis?
- How would you expect the analysis findings could be used to improve the existing situation?

EXHIBIT 5.1
ANALYSIS PLAN DEVELOPMENT STATES, ANALYSIS PLAN COMPONENTS, AND USES

STAGES IN DEVELOPING AN ANALYSIS PLAN	State *problem* for which analysis is needed	Identify *audience* & *use* for findings	Specify desired products (questions to be answered)	Review available information & formulate *hypotheses* to be tested	Identify *variables* needed & measurement of variables	Identify & select *data sources*	Select *analysis techniques*	Determine target *manpower, equipment* and *time* needed	Estimate *costs*	Select *presentation* format & *dissemination* procedure
ANALYSIS PLAN COMPONENTS	Statement of the Problem	Audience Identification & Use for products	Products	Hypotheses	List of variables & measures	Data Collection Plan	Selected Analysis Technique(s)	Work Plan	Costing	Presentation & dissemination plan
USE (WHAT EACH STAGE TELLS THE PLANNER)	WHY		WHAT			HOW		WHEN & BY WHOM	HOW MUCH	FOR WHOM
MODULE REFERENCE	MODULE 1: PROBLEM FORMULATION				MODULE 2: DATA COLLECTION		MODULE 3: DATA INTERPRETATION — CRIME MODULE 4: DATA INTERPRETATION — SYSTEM	MODULE 5: IMPLEMENTATION		MODULE 6: PRESENTATION OF FINDINGS

C. Desired Analysis Products

When determining the desired products, it is useful to list the questions which need to be answered and to ask:

- What do you want to know as a result of the analysis?
- How detailed do the answers need to be?
- How much support and documentation of the answers is required?

D. Hypotheses

Before developing the analysis plan further, it is important to review available data or research related to the problem. A thorough review can save substantial analysis time by identifying pertinent research already available, suggesting useful methods which have been used in similar problem areas, and indicating potential findings that may be applicable.

Based on this research, hypotheses can be formulated which will assist in selection of the variables to be examined. (A hypothesis is a tentative assumption made in order to test its logical or empirical consequences.) While it may sometimes seem that insufficient information is available to formulate reliable hypotheses, this step is important because it forces hard-headed evaluation of available data and assists in reducing the analysis task to a more manageable scale. Clearly, an ideal situation would be one in which all variables which appear to be related to the problem would be simultaneously examined and interpreted, resulting in a complete description and/or prediction about the issues being considered. However, time, cost and data availability constraints virtually always preclude such thorough analysis. Therefore, one of the criminal justice planner's tasks is to use the wealth of secondary data as a basis for determining what findings are likely (the hypotheses), thereby permitting rational selection of the most important variables for analysis. This selection of variables can always be altered if, during the analysis, findings indicate other variables are important. Questions to be asked during this task include:

- Have the available data and research pertaining to this problem been thoroughly reviewed and evaluated?
- Have individuals with substantial knowledge in this field been interviewed?
- Have primary sources been included in the review if secondary sources are inadequate?
- Are the hypotheses supported by the available data?
- Can the hypotheses be tested?
- Do the hypotheses indicate which variables are of primary interest (dependent variable) and which variables are expected to affect the dependent variables (independent variables)?

It should be noted that both quantitative and qualitative data can be useful in formulating and evaluating alternative hypotheses. Sources of quantitative data and methods of using the data were discussed in Modules 2, 3 and 4. However, qualitative techniques involving personal judgment such as "brainstorming" or use of the Delphi technique can also be used during hypothesis formulation.

In brainstorming, individuals with substantial experience and/or knowledge of the problem can be asked to contribute their ideas on possible hypotheses, no matter how unlikely the hypotheses may initially appear to be. These hypotheses are then listed and the most compelling selected. The brainstorming process helps ensure that a wide range of hypotheses are considered.

One use of the Delphi technique is to assemble a panel of experts, each of whom would be asked to contribute a hypothesis on the problem under consideration. The hypothesis given most often, or a new hypothesis which incorporates the answers given, could then be selected for testing.

E. Variables and Measures

Selection of the specific variables to be examined and determination of how to measure them is the next step. Based on the hypotheses, a preliminary list can be made of the variables which appear to be most important as well as the means of identifying how these variables can be measured. This list can then be used during the identification of data sources and selection of analysis techniques. During this step, questions may include:

- Have the related variables been listed in anticipated order of importance so that they can be added or dropped in order of priority, depending on data and resources available for the task?
- Have alternative measures been considered and the most desirable identified?

F. Data Sources

The list of variables and measures should be used for the identification and selection of data sources. A variety of data sources was discussed in Module 2 on Data Collection. The data identification and selection stage allows the planner to assess the accessability and cost of collection of possible sources of data. Modifications in the variable list may have to be made at this point if data for the best measure(s) are not available or cannot be obtained within the task resources. Questions to ask may include:

- Which agencies have data on the variables selected?
- If alternative sources are available for the same variable, which source would be quicker, less expensive, and more reliable?
- What potentially important data are not available? What substitutes can be used?

- Is any primary data collection needed? How is it justified?

G. Analysis Techniques

Selection of the most useful analysis techniques from the wide range available (some are discussed in Modules 3 and 4) is possible after the prior steps have been completed. This selection of techniques will be particularly dependent on both the data available and the products desired. In selecting the techniques to be used, the planner should ask:

- Are the analysis techniques consistent with the output needed, the hypotheses to be tested, and available data?
- Is available staff trained in the use of the techniques being considered, or can properly trained staff be obtained?
- What are the cost implications of the most appropriate analysis techniques?
- Will the audience identified be able to understand the use of the specific techniques?

H. Work Plan

One of the most important aspects of an analysis plan is the work plan for managing the analysis. Scheduling and resource allocation are needed to ensure that the analysis task actually gets done and is completed on time. A number of management tools are available to assist in this task. These tools help answer:

- How much and what types of manpower are needed to complete the analysis?
- When are various skills needed?
- Will delays in any of these analysis tasks hold up completion of the final product?

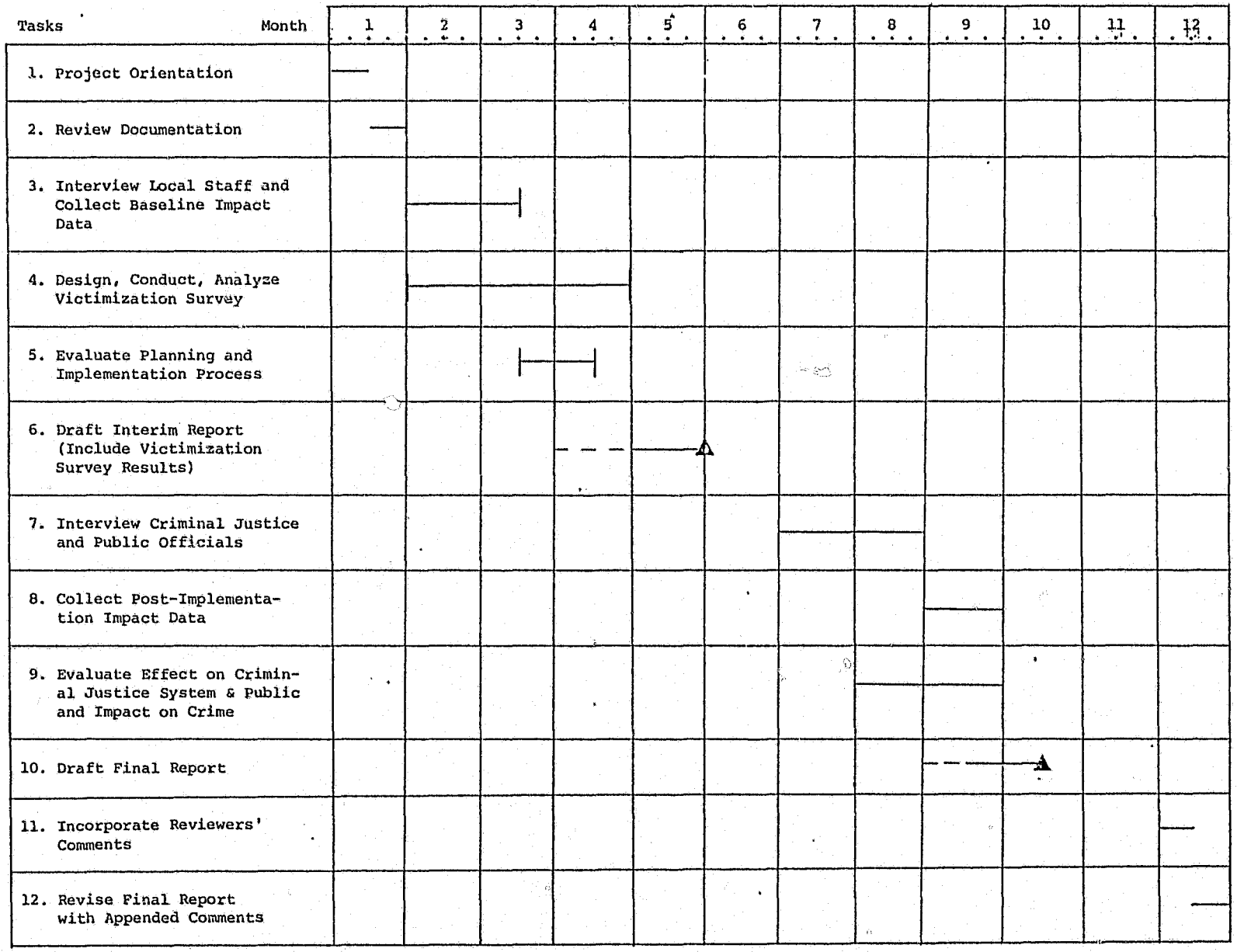
Several of the most commonly used management tools such as Gantt and manpower allocation charts are discussed in this module. The PERT technique is also discussed briefly. Although not widely used yet in criminal justice planning, PERT has proven to be helpful in managing complex and time-critical projects in other fields.

An example of a Gantt chart is illustrated in Exhibit 5.2. This method of scheduling tasks is a concept popularized by Henry L. Gantt in the early 1900s. The Gantt chart can assist the planner by formalizing time goals, disaggregating analytic tasks, and permitting a comparison to be made between the planned versus the actual progress of the analysis tasks. For example, this chart was developed to organize the development, implementation and interpretation of a major local victimization survey.

Once target dates, based on a preliminary estimate of staff productivity and availability, have been outlined on a Gantt chart, a

Exhibit 5.2

Gantt Chart
State Analysis of Local Crime Reduction Program Impacts



manpower allocation chart can be developed. An example is shown in Exhibit 5.3. Knowing how many man-hours to assign to each task requires experience or careful consultation with individuals who have recently completed similar kinds of tasks. A safety margin should be built in since many managers tend to underestimate the actual time needed to complete a task.

After a preliminary manpower allocation is made, the planner should check to ensure that the labor allocations are sufficient to permit completion of the task within the allotted time and that the staff assigned to various tasks actually will have the time available which has been allocated. If not, adjustments will have to be made to either the labor allocation schedule, the Gantt chart, or both until a satisfactory compromise is reached.

Another technique which can be particularly useful for large and/or complex analysis projects is PERT (Program Evaluation and Review Technique). The technique was developed in the late 1950s by the Navy for coordinating and controlling complex projects involving a number of geographically dispersed contractors. PERT allows the planner to examine relationships of tasks to each other over time. In turn, this information permits a "critical path" to be charted of the tasks which are expected to take the longest and which are crucial to completion of the task within a given period of time.

A simple application of this technique using the list of tasks presented earlier (see Exhibit 5.2) is shown in Exhibit 5.4. The tasks are shown as numbered circles (e.g., ①). The arrows between the circles indicate interrelationships and the direction in which the analysis is expected to progress. Solid arrows indicate a relationship but no activity time. Estimated completion time for each task is indicated in parenthesis under each activity

The PERT diagram represents a simple or first level diagramming of the first six tasks in the Gantt chart presented in Exhibit 5.2. By adding the times along the system lines, the critical path can be determined. From Task 2 where several tasks are undertaken simultaneously to Task 15 where all these simultaneous tasks must be completed before initiation of this task, the longest or critical path requires 12 weeks (the critical path flow is tasks 2, 5, 8, 9, 10, 11, 12, 15). In contrast, the other paths require nine weeks (2, 3, 6, 13, 14, 15) and 10 weeks (2, 4, 7, 13, 14, 15). Thus delays of three and two weeks respectively could be tolerated during the implementation of the other two paths without affecting the completion of the interim report, whereas any delay in the victimization survey activity (along the critical path) will in turn delay interim report completion. (In comparison, a Gantt chart, while simpler to construct, does not indicate which activities must be completed before others can begin, or which sequence of tasks should be given highest priority.)

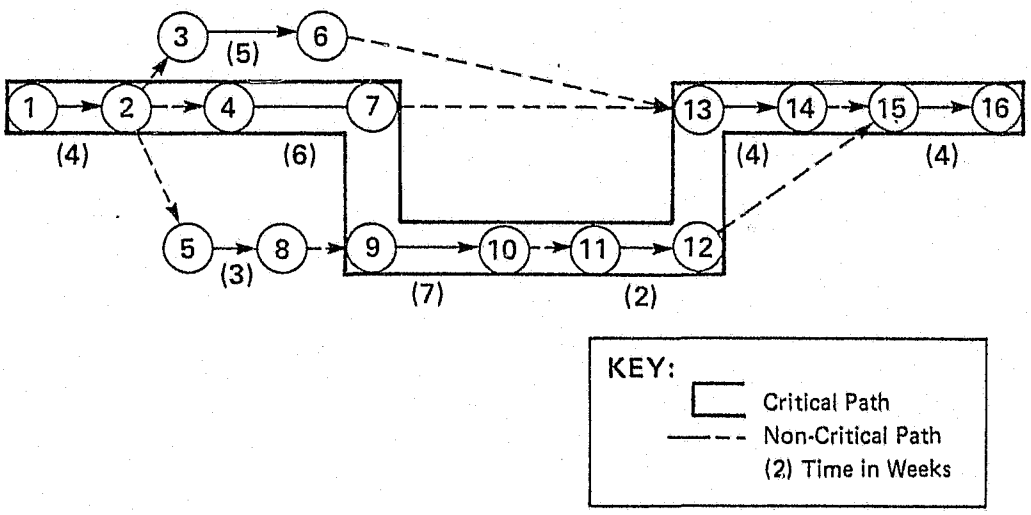
In an actual application, the PERT network would be specified in more detail. The classic PERT technique also contains procedures for estimating activity times where uncertainty is involved. Estimates are obtained for the "most likely time," "optimistic time,"

Exhibit 5.3

Labor Allocation Chart

Tasks / Month	Project Director	Deputy P.D.	Senior Analysts	Survey Designers	Analysts	Secretarial/ Administrative	Callers	Total Hours
1. Project Orientation	100	80				40		220
2. Review Documentation	100	80	160		320	40		700
3. Interview Local Staff and Collect Baseline Impact Data	173	160	80		512	160		1095
4. Design, Conduct, Analyze Victimization Survey	40	40	80	80	80	80	1600	2040
5. Evaluate Planning and Implementation Process	100	140	160		160	160		800
6. Draft Interim Report (Include Victimization Survey results)	100	60	80		80	160		480
7. Interview Criminal Justice and Public Officals	100	80			512	80		772
8. Collect Post-Implementation Impact Data	40	80				40		160
9. Evaluate Effect on Criminal Justice System & Public and Impact on Crime	140	120	120		120	40	540	540
10. Draft Final Report	140	120	80		80	160		180
11. Incorporate Reviewers' Comments	60	40				80		180
12. Revise Final Report with Appended Comments	40	40				80		160
Progress Reports	1253	1040	760	80	1864	1120	1600	7717 Total

EXHIBIT 5.4
PERT NETWORK WITH CRITICAL PATH INDICATED FOR ANALYSIS PROJECT



Event Identification

1. Start project
2. Complete project orientation and documentation review
3. Start interviewing local staff
4. Start collection of baseline impact data
5. Start design of victimization survey
6. Complete interviews with local staff
7. Complete impact data collection
8. Complete victimization survey design
9. Begin collection of victimization
10. Complete collection of victimization survey data
11. Begin analysis of victimization survey
12. Complete analysis of victimization survey
13. Begin analysis of the planning and implementation survey process
14. Complete analysis of the planning and implementation survey process
15. Begin draft of integrated interim report
16. Complete draft of interim report

and "pessimistic time," preferably from each individual task or subtask manager; the person directly responsible for the work is responsible for both the estimates and task completion.

PERT is most useful for large scale and complex tasks such as scheduling and tracking the tasks a large metropolitan or state criminal justice planning agency undertakes over a year period. However, PERT can also be useful on a more informal basis for smaller projects as well.

Project managers who have used PERT techniques say it is useful for:

- Understanding the relationships and precise nature of the constraints during the development of an Analysis Plan.
- During the implementation phase:
  - monitoring progress and slippage during implementation
  - identifying priorities for resource reallocation through use of the critical path as the highest priority
  - a management tool for reminding individual task managers of their schedules and progress.

Software programs for computerized PERT charting and monitoring are available. An example of the type of output available from a software package is shown in Exhibit 5.5. This exhibit shows information for one of the task managers during week 9 of the Analysis Tasks outlined in the PERT chart in Exhibit 5.4. A major advantage of this system is that it provides an automatic reminder to task managers about the status of the work for which they are responsible. This computerized system removes the onus from the project managers for reminding staff of their schedule commitments and the standardized reporting system similarly relieves managers of ongoing manual data collection.

I. Costing

Assessing the costs of the proposed analysis task should be fairly straightforward once the previous tasks have been completed. A sample budget in Exhibit 5.6 for a victimization survey illustrates use of major budget categories--Labor, Fringe Benefits, Equipment, Supplies, Telephone, Overhead, and General and Administrative costs. Labor costs, for example, are based on the labor allocations as presented in Exhibit 5.3. In developing a budget, the planner should assess the scope of the tasks (in the example, a telephone survey of 5,000 cases to be completed within six weeks), costs of other alternatives (e.g., other consultants or in-house staff work) and what the results of various alternatives are likely to be. Such information is essential to the planner when developing and justifying a budget.

EXHIBIT 5-5

State Analysis of Local Crime Reduction Program Impacts

Project Control Interim Progress Report 2/3/77

Page 1

COMPONENT: Local Programs OVERALL RESPONSIBILITY: John Buchanan PHONE: 5364

OFFICE	PERSON RESPONSIBLE	ACTION STEP DESCRIPTION	START DATE	TIME EST.*	TIME USED*	STA-TUS	% COMPL	PLAND COMPL	NEW COMPL	DOCUMENTATION FOR VERIFICATION
Analysis Design	James McPherson	Design Interviewing Instrument	1/3	5	5	C	100	1/7		Interview Instructions
Analysis Design	James McPherson	Training Interview Staff	1/10	2	2	C	100	1/11		Interview Assignments
Analysis Design	James McPherson	Conduct Interviews	1/12	18	20	I	95	2/3	2/8	Weekly Completion Check-lists
Analysis Design	James McPherson	Conclude Interviews				S	00	2/4	2/9	Completion Interview Checklist

* (in Days)

_____
SIGNATURE

This report lists each of the action steps for which you have primary responsibility. Please report current status of these activities in the following manner.

1. Check the information under status (STA.). "S" means that the action step is scheduled but not yet begun. "I" means that the action step is in progress. And "C" means that the action step is complete. The space under VERIFICATION lists the documentation required to verify completion of the action step. A "V" in the STATUS column indicates that the documentation has been received and recorded by the AIDP Office.

2. Examine the information under the percent complete (% COMPL.) and status (STA.) headings. If the information presented is longer correct, line through the incorrect information and place the correct information in the space above.

3. If you must request a completion date later than the date listed, write this new estimated completion date in the new completion date (NEW COMPL.) column. This request will be reviewed by the person responsible for your component.

4. Sign the report in the space provided and return the form to Dr. Buchannan's office.

Exhibit 5.6

SAMPLE BUDGET

Victimization Survey

Labor	Hourly Rate	Number of Hours	Cost
Project Director	12.21	52	635
Deputy Project Director	10.54	136	1433
Administrative	5.64	80	451
Survey Designer	8.65	422	3650
Survey Supervisor	8.03	350	2811
Survey Assistant	5.17	300	1551
Survey Services			
Coding	5.00	100	500
Interviewers	3.50	1600	5600
			16631
Fringe 30%			4989
Overhead 70%			11642
Total Direct Labor			33262
Costs			
Computer			1467
Printing			1000
Telephone			8400
Keypunch/Verification/Cleaning			1250
Total Direct Costs			12117
TOTAL DIRECT LABOR AND COSTS			45379
G & A 13%			5899
		TOTAL COSTS	51278

J. Presentation and Dissemination

Finally, the presentation and dissemination plan should be considered. Questions to ask at this stage might include:

- How would the audience(s) identified earlier affect the methods used in presenting the findings and recommendations?
- Given certain anticipated findings and knowledge about areas of possible resistance by the audience(s), what strategies would be most effective in presenting your analysis results and recommendations?

Many planners and analysts have found that early consideration of the first product helps to narrow the focus of the analysis and ensure that the presentation is appropriate to the audience. For example, if the primary audience is the criminal justice planning agency staff, a sophisticated presentation can be planned which assumes a given level of knowledge already exists. However, if the audience is the public potentially affected by a particular crime (e.g., residential burglary), the presentation will have to make the points more clearly and simply. For instance, graphics might be heavily used.

Dissemination plans will vary considerably, depending on the location(s) of the audience. Conveying the findings of analysis to a staff is quite different than informing private citizens. For example, an informed presentation accompanied by a technical summary of the analysis may be appropriate for a staff whereas newspapers, TV, and appearances before various organizations may be more appropriate for citizens. Dissemination plans may include early involvement of the audience so they may participate in the formulation of the analysis and in the dissemination plan. Presentation and dissemination guides for conveying analysis findings will be discussed more thoroughly in the next and final module of the course.

III. Task Complexity Versus Degree of Analysis Plan Development

While the basic elements of an analysis plan are generally the same regardless of task size or completion deadline, the planner will have to judge what degree of detail is warranted. An analysis plan of some type is recommended even for seemingly straightforward tasks, since many analysis tasks are actually more complicated to complete satisfactorily than they appear initially. However, some simple tasks with long lead times and ample staff resources might need only an informal analysis plan. Such a task might be a request by the principal of the local school to analyze school vandalism records before and after exterior lights were installed, the analysis to be completed over the summer.

On the other hand, a complex task with a short deadline almost certainly warrants a detailed and carefully considered plan. Generally, the more complex the task, and/or less time and resources available, the more detail is necessary so that the task can be completed well and on schedule. A request by the mayor for an analysis of recent teenage crime in the city to be presented to a Crime Advisory Commission, a citizens group and the press within six months is an example of the latter, especially if no additional staff resources are available. Such an analysis task would probably require a substantial amount of work, possibly including primary data collection, if a thorough job were done, and would require some hard choices about priorities. Preparation and agreement on an analysis plan during the early days of such a project would seem to be both a responsive and responsible undertaking for the criminal justice planner.

IV. Analysis Plan--Case Study (To Be Provided by Instructor)

EXERCISE #16

DEVELOPING AN ANALYSIS PLAN

Purpose

This exercise is designed to build on skills practiced in previous exercises and to give the planner an opportunity to develop a data analysis plan, including a data collection component. The process of developing a simple data analysis plan should generate many of the types of questions which would normally be encountered while developing analysis plans in a work situation. The training course situation gives participants an opportunity to discuss these questions with a group of peers and an instructor. Thus, the participant can receive personalized assistance which may not be available in the work situation.

Activities

Part I. The training session should break into five working groups. Each participant should select one of the following as an analysis problem:

- the problem (and secondary data collection plan) used in Exercise #4 on Secondary Data Sources
- one of the problems in Exhibit 5.7
- a crime or system problem of particular interest from the participant's own locality.

The following constraints should be used in developing the analysis plan:

- the items indicated in the analysis plan model, Exhibit 5.1, are to be included; these are:
  1) Statement of the problem
  2) Identification of the audiences and uses for the analysis products
  3) Desired products
  4) A list of available information and hypothesis
  5) A list of variables to be examined and how the variables would be measured
  6) A data collection plan
  7) A list of analysis techniques to be used with an indication of how they will be used
  8) A work plan including a list of the tasks to be completed, and a manpower allocation schedule
  9) A cost estimate
  10) A presentation and dissemination plan.

In addition, participants are to prepare a schedule and costing table, as well as a sample presentation formats. In developing an analysis plan the participant should assume that the analysis task must be completed within two months, and that total cost to produce the analysis product must not be more than $50,000.

Each participant should develop an individual analysis plan. When completed, the analysis plans should be discussed by participants in their small groups focusing on:

a. What difficulties were experienced in developing the plan;

b. The extent to which the major elements of their analysis plans differ from the model presented in the module;

c. Similarities and differences in participant analysis plans;

d. Whether analysis plans are used in the participant's agency or in criminal justice agencies with which the participant is familiar. If not, why not.

Each of the working groups should select a representative to a Review Panel. Each group should also select one analysis plan for competitive presentation to the Review Panel on Friday morning.

The Review Panel can select only one analysis plan for "funding", so each group should try to make their presentation as complete and convincing as possible. Part II of this exercise is included in the text for Module 6--Presentation of Findings. Each group is to make a 10 minute presentation of their plan to the Review Panel.

Exhibit 5.7

Listed below are three problems which are presented as "findings" from an analysis of system performance, and a list of three recommendations for dealing with each problem.

Findings:

1. The delay between arrest and trial for persons charged with burglary is eight months. It is desired to reduce this period to four months.
2. Forty percent of the people in jail at the time of the preliminary hearing have their cases dismissed at the hearing. Either these people should not have been detained or their cases should not have been dismissed, or both.
3. The juvenile detention facilities are filled, including 10% who have been adjudicated delinquent and are awaiting placement in another facility.

Recommendations:

Problem (1)
- a. Development of prosecutor priority systems to allow systematic control over case scheduling;
- b. Funding of court administrators to give Superior Court justices more time for actual trials;
- c. Creation of additional judgeships.

Problem (2)
- a. Establishment of supervised or programs for persons unable to meet other release criteria;
- b. Creation of special court sessions devoted exclusively to timely processing of the initial motions of detained defendants;
- c. Police legal advisors to forestall errors leading to dismissal of cases.

Problem (3)
- a. Funding of community-based juvenile custody services;
- b. Construction of a larger juvenile hall;
- c. Establishment of a large-scale diversion program to handle 20% of the juvenile caseload.

MODULE 5--SELECTED BIBLIOGRAPHY

Desmond L. Cook, Program Evaluation and Review Technique: Application in Education, Government Printing Office, Washington, D.C., 1971. A review of the basic characteristics of PERT.

Harvey M. Wagner, Principles of Operations Research, Prentice Hall Inc: Englewood Cliffs, New Jersey, 1969. Section 6.6 deals with critical path scheduling.

Claire Selltiz, Lawrence S. Wrightsman and Stuart Cook, Research Methods in Social Relations, Holt, Rinehart and Winston, Inc: New York, New York, 1976. A good general work on research and the analyses process. See, for instance, the chapters on "Logic and Analysis," "Selection and Formulation of a Research Problem," "General Problems of Measurement" and "The Research Report."

Several works related to proposal writing (which requires organization similar to that in analysis plans) include:

Mary Hall, Developing Skills in Proposal Writing, Oregon State System of Higher Education, Continuing Education Publications: Cornwallis, Oregon, 1971.

David R. Krathwohl, How to Prepare a Research Proposal, Syracuse University Bookstore: Syracuse, New York, 1966.

Norton J. Kiritz, Program Planning and Proposal Writing, The Grantsmanship Center: Los Angeles, California, Issue #3.

Ernest M. Allen, "Why Are Research Grant Applications Disapproved," Science, Vol. 132, November 1960, pp. 1532-1534.

NOTES

U.S. Department of Justice
Law Enforcement Assistance Administration
Washington, D.C.
1977

INTRODUCTION TO ANALYSIS OF CRIME AND THE CRIMINAL JUSTICE SYSTEM STATE CURRICULUM

MODULE 6: PRESENTATION OF FINDINGS

This work was performed by Abt Associates Inc., Cambridge, Massachusetts, for the Law Enforcement Assistance Administration under Contract No. J-LEAA-001-77. John Moxley, Training Division, Office of Operations Support, LEAA, served as project monitor. Points of view or opinions stated in this document do not necessarily represent the official position or policies of the U.S. Department of Justice.

MODULE ABSTRACT

Title: Module 6: Presentation of Findings

Lecturer:

Objectives:

The major objective of this module is to make participants aware of the factors which contribute to preparing and delivering effective presentations and reports. In addition, this module provides participants with feedback on analysis plan preparation and, thus, serves as a summary of other modules of the course.

Specifically, participants should be able to :

- Recognize the elements of a well-developed analysis plan and what to include in organizing an analysis effort;
- Identify and describe six guidelines to consider in preparing and delivering presentations on findings or in other circumstances which require the presenter to be convincing;
- Specify the general organization of a crime analysis report; and
- Specify three guides to follow in using quantitative data and statistics in written reports.

MODULE 6

Presentation of Findings

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EXERCISE #16
(CONTINUED)
ANALYSIS PLAN PRESENTATIONS

Once a draft of the analysis plan has been prepared, some thought should be given to how the plan is to be presented to the approving supervisory board or individual. First, the technical quality of the plan must be insured. Second, the way in which the plan is presented will influence the receptivity of the people who make policy decisions regarding the allocation of agency resources on researching criminal justice problems or issues. Check the technical quality of your work to minimize problems later as the plan is implemented:

- Is the problem stated clearly and accurately?
- Have the desired products and outcomes been identified?
- Is the hypothesis complete?
- Is the list of variables and measures comprehensive and realistic?
- Is the data collection plan specific and realistic?
- Are the techniques for analysis appropriate?
- Is the work plan realistic and within cost constraints?
- Has the dissemination plan considered the interests and concerns of the potential audience?

Once the analysis has been performed, careful consideration should be given to how to most effectively present and argue the possible alternatives explicit or implicit in what the analysis task uncovered.

Participants are to prepare a formal presentation of their proposed analysis plans. These presentations are to last no longer than 10 minutes. These presentations will be made to a student/faculty review panel which will judge each plan and presentation using the above criteria.

PRESENTATION OF FINDINGS

I. Introduction

All too frequently, the importance of preparing an effective presentation or report is underestimated, and essential facts and messages are lost or hopelessly distorted. "No time to prepare" is frequently used as the introduction to presentations, but the lack of preparedness costs the presenter much more than it does the listener or reader; it is the presenter's or writer's responsibility to make certain that the essential information is transmitted clearly, succinctly, and in a form meaningful to his/her audience. It sounds simple, but it's a skill that takes practice. This module will provide you with some helpful techniques in preparing presentations and written reports.

What constitutes an effective presentation or report? Think about presentations or reports which have impressed you. What separated good presentations from ones which made you wish you were sitting near the exit? Certainly one of the most important elements of a good report or presentation is interest; we are willing to tolerate the most confusing or tedious presentations if the topic area is sufficiently compelling to hold our interest. Unfortunately, only a small percentage of any audience has enough interest to sustain them through a confusing or rambling presentation. Clarity, then, is a second important element in report preparation and in making a good presentation. However, clarity is very difficult to achieve.

The kinds of presentations and reports criminal justice planners are often asked to make are difficult because they involve complex problems and a myriad of issues and concerns. Since the "system" is by nature highly interactive, it is difficult to focus on a single problem without posing clear implications on hundreds of other activities. Moreover, the criminal justice system operates within a social and community context that puts it into contact with other systems, other programs, other problems and other responses to problems. To write about one problem is to write about many problems, because the components of the system, and therefore its problems, are so intimately connected.

Separating out the essential parts of a problem or issue so that it can be dissected, and probed intelligently, is a skill and an art. It requires careful attention to what is relevant and what is not relevant, what is directly related to the problem and what only has tangential influence. The writer has the sometimes awesome responsibility of telling the audience what is important, why it's important, and what there is about the topic that should demand their attention. If the goal of the criminal justice planner in making a presentation is to provide the best information

possible to allow the best decisions possible, the presentation should function as a catalyst to dialogue and action. Since the focus of that dialogue is likely to reflect the focus of the presentation, it is especially important that the presenter have a clearly defined topic. Many times the presenter might therefore want to raise tangential issues in order to dismiss them. "While X is important and in some ways related to the problem at hand, it will not be the focus of today's discussion." Again, this relates back to preparation.

There are any number of ways to dissect the elements of a good presentation. The facts influencing effective communication have been researched and analyzed almost as much as all the thoughts that have been communicated. Since it is the concern of this module to improve your awareness about the importance of good presentations which enhance the communication of the results of analysis, six guidelines have been identified to serve as a "checklist" for planning presentations. These guidelines are also useful in evaluating ways of improving the use of presentations as an effective medium for communication between the planner and decision-maker.

All presentations, if they are to be effective in communicating ideas, must be planned. At least some planning must be done to consider how long the presentation must be in order to cover the topic areas the presenter wants the audience to consider. Some of the following guidelines if considered in advance, should help you plan your presentation sufficiently so that you won't have to introduce your topic by apologizing with "no time to prepare," even when time was available.

II. Guidelines for Making Presentations

Consider the following six guidelines for making presentations:

- Stick to the Priority Message;
- Stick to Terms that are Important to the Audience;
- Clarify and Interpret;
- Make Contrasts and Comparisons;
- Talk in Illustrations and Examples; and
- Anticipate Questions, Problems, Assumptions.

Now examine what each of these guidelines could mean for improving the quality of presentations of the type frequently made by criminal justice planners.

A. Stick to the Priority Message

Since few presentations are given much time (many planners find they have to talk about a whole year in 15-20 minutes), it is important that you establish one or two top priority messages. The goal then becomes at least communicating these messages, even if nothing else gets accomplished. As a presenter, accomplishing this goal means that, at the conclusion of the presentation, the audience will be left with these messages absolutely clear in their minds.

One of the problems with attempting to cover too much material in too little time is that the important issues become diluted and all messages become a blur. With too much information, the audience is likely to remember little, if anything. By concentrating on one or two topics and avoiding dwelling on less important issues, you give the audience the chance to concentrate on what you think is important. For example, in delivering a presentation based on a report, the presenter should not attempt to review the entire report for the audience. The presenter should concentrate only on the items of absolute importance, and refer the audience to other parts of the report for a discussion of less important topics. The presenter is often in the unique position of establishing priorities on the topic. Although the audience may eventually pose questions about new topics, the presenter will have established the priority messages--what is it that the audience must remember? Don't ask anyone to consider more than one or two messages at one time. If there are more than one or two top priority messages, additional meetings may be necessary. Although this is not always feasible, it is more desirable than bombarding an audience with too much information in a single meeting.

B. Stick to Terms that are Important to Audience

This requires some thought about who the audience is and what their interests and needs might be. Although you, as presenter, may not share this orientation, it is important that you take the responsibility of talking to the audience in terms that are important and meaningful to them. Know your audience well enough to determine which perspective on an issue or topic they are likely to respond to. Recognize the interests of individuals as well as the group, and frame your presentation in the language and interests most common to them. What is the audience likely to consider important, and how can you structure your presentation so that it is clear that you are sensitive to what is important to them, that you have considered their interests in preparing your findings, and that you have attached their importance to your own understanding of the problems and issues? There is no substitute for developing the ability to relate to the topic of your own presentation as your audience might relate to it; do this in advance, and the audience should be much more responsive to the priorities you have established.

C. Clarify and Interpret

The importance of clarity has already been mentioned. Clarity, however, can be taken one step further when the presenter has the ability to place what is being said into a context that the audience can understand. Essentially, the presenter should always show the audience what things actually mean to them. If what is being said can be grounded in what the audience already knows, it will be given a context that will reinforce both interest and memory.

Each priority message that the presenter has selected should be placed within a context which establishes a sense of the past, present, and future and what might actually happen, or what might be produced, as a result of an action on their part. For a planner, this is particularly important because the audience is likely to take some action based on the information being transmitted; the presenter should be clear about what results or effects are likely to take place, given certain prescribed courses of action. The presenter has not only to make the message clear, but the presenter has to make the message meaningful by interpreting what is being said.

D. Make Contrasts and Comparisons

Being able to establish clear contrasts and comparisons about what is being said with things people already know is another way to reinforce the context of the presentation. Developing contrasts and comparisons is particularly important when the priority messages are relatively new and innovative and when the

audience might have some difficulty in relating to new concepts, or in distinguishing them from similar problems or approaches. In addition, establishing a familiarity or commonality frequently makes people more receptive to new ideas because they feel more comfortable when on familiar ground.

Contrasts and comparisons can also be extremely useful when attempting to interpret what is being said in a way which is most meaningful to the audience. With careful comparisons, the audience may be able to envision more clearly the implications of what is being said and the possible effects or results certain actions are likely to produce.

E. Talk in Illustrations and Examples

Most people tend to remember and understand better when ideas are transmitted by picture or example. Again, by providing the audience with a context and grounding the presentation in familiar terms, the ideas are more likely to be clear to the audience and certainly are better remembered.

The criminal justice planner may be at an advantage when it comes to developing illustrations and examples, since the field lends itself so well to the use of charts, graphs, diagrams, and examples based on previous experiences. Instead of talking about a concept, the presenter should use illustrations and demonstrations; instead of assuming the audience understands the effects or implications, the presenter should use examples to illustrate likely outcomes. Keeping in mind the second guideline--using terms with which the audience is familiar whenever possible--illustrations and examples should be keyed to their experiences, rather than your own. In that way, the presentation becomes a lesson rather than an anecdote.

F. Anticipate Questions, Problems, Assumptions

Perhaps the most difficult task for the presenter is anticipating the concerns and reservations that the audience is likely to have about what is being said or suggested. In order to be prepared for a presentation, the presenter should try to conjure up all of the questions which might be asked about the presentation. This type of preparation does not guarantee that the presenter will have the answers; on the contrary, it should make the presenter more flexible and relaxed in the presentation with the knowledge of what is likely and what is not likely to be questioned. There are legitimate times to respond to a question by saying "I don't know." However, when you do know, you should be able to transmit both your position and the reasons for it. Typically, you have already asked the hard questions to yourself in formulating your position. Be prepared to hear them from the audience and to convince them as you did yourself.

III. Guidelines for Preparing Reports

Many of the same issues pertaining to oral presentations are also relevant to preparing written reports. In addition, however, there are a number of other concerns directly bearing on written reporting of crime analysis. These can be divided into two areas: organizing the report and specific guidelines on presenting quantitative data in written reports.

A. Organization of Reports

A basic structure from reporting crime analysis is presented in Exhibit 6.1. The Problem-Method-Finding report format is a convention in crime analysis as well as in social science research. Such an organization is an aid in assuring adequate detail, yet maintaining the brevity and clarity essential for planners to have an impact on decision-making.

Exhibit 6.1

Report Organization

1.0 Crime and/or Criminal Justice System Problem(s)

- --questions
- --issues
- --definitions

2.0 Analysis Methods

- --hypotheses
- --measurement of variables
- --data collection instruments and procedures
- --statistical methods used to interpret data

3.0 Findings

- --results
- --interpretation
- --conclusions
- --recommendations

Source: Adapted from Fred N. Kerlinger, Foundations of Behavioral Research. N.Y.: Holt, Rinehart and Winston, 1967.

B. Data Reporting

One of the most difficult aspects of reporting crime analyses is the skillful use of data in the text of written reports. Frequently, tables, charts, and computer printouts either totally overwhelm the reader, masking the important messages or scaring the reader away. A second equally poor approach to reporting data is to bury them in statistical appendices--two pages of text and 300 pages of computer printouts.

The purpose of presenting quantitative data is to provide the details essential in building the reader's confidence in the conclusions drawn by the writer as well as to stimulate and interest the reader--providing sufficient detail without cluttering the report. The common method for using data in a report is to integrate tables, charts, and graphs into the text. One guide to follow is to:

- describe the purpose for a particular table, chart, or graph in the text
- present it with complete labeling and source statement
- interpret it and highlight the informational content

In determining which data to present and which to not report, the planner should use two criteria: 1) the planner should provide sufficient detail for the decision-maker to reach an informed judgement on the crime problem being considered, and 2) should present sufficient data to permit the reader to understand how the conclusions were reached--the logic of how the planner moved from the data to the proposed action must be explicit.

MODULE 6--SELECTED BIBLIOGRAPHY

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Kate L. Turabian, A Manual for Writers (fourth edition), Chicago: University of Chicago Press, 1973.

N O T E S

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