ASSESSING THE INFLUENCE OF ORGANIZATION ON PERFORMANCE: A STUDY OF POLICE SERVICES IN RESIDENTIAL NEIGHBORHOODS

by

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CHAPTER ONE

HOW DOES ORGANIZATION INFLUENCE PERFORMANCE?

If you were to ask a proverbial "man in the street" whether the structure of an enterprise affects its performance, he would probably reply: "Of course it does." If you were to ask a social scientist the same question, particularly with reference to the structure of public enterprises, the response might be much less affirmative. Some social scientists would flatly declare that structure does not affect performance. Why this disjuncture between what "everyone" knows and the position of many academics? The answer lies in the academics' reading and interpretation of a number of research reports over the last three decades.

This study disputes the contentions of those who argue that structure is unimportant. Organizational structures, I will argue, provide opportunities, incentives, and constraints for actors within them. If structure influences performance through opportunities, incentives, and constraints, then analyses finding no structural effects are, in most cases, incorrectly specified. That is, organizational structure should not be conceived of simply as one more ingredient in a mixture yielding performance. Analyses of organizational structures as they influence performance must, instead, be based on a theoretical specification of how structure affects relationships among other variables as they, in turn, may influence performance. One does not add structure, resources, and environment together to

produce output. Rather, structure influences the ways that organizations transform resources into differing quantities, qualities, and mixes of outputs in diverse environments.

The distinction is important. Scholars who have posed the question, "Is organization important?," have often found little importance when they answered the question using simple, additive models. Those who have posed a different question, "How is organization important?," have often found substantial organizational effects by using more complex models in their analyses.[1]

Accepting the task of demonstrating how organization influences performance does not require denial of the importance of environmental factors. Social, economic, and other environmental elements can and often do constrain performance possibilities in important ways. Yet these elements are generally immutable, at least in the short run. Policy analysts are forced to accept these elements as given in any particular situation, and to ask what differences might result from alternative policy choices in that context. Organizational forms and procedures are more amenable to change than are underlying social, economic, psychological, or environmental factors. We can alter the size, internal structure, or operating procedures of a public organization more easily than we can alter the racial characteristics, income distribution, or extent of anomie among its clientele, or the weather conditions in its jurisdiction. Because of environmental constraints, performance differences due to organization may be modest and often the indirect result of policy choices. Thus the elaboration of organizational influences on performance is not simple. Careful analysis, informed by a theory of the processes at work, is required.

In this study I will offer a conceptual framework for exploring how organizational structure is important in influencing the performance of organizations involved in the supply of public services. I will then use the framework to guide an analysis of relationships in a particular area of public service delivery, policing in residential neighborhoods. This analysis will show the usefulness of theory-based research and will, I hope, contribute to an on-going public policy debate over how differences in organization affect the supply of this service.

First, however, I present a brief review of some important works that have been used to argue that structure is of little importance. I will then offer a summary critique of these efforts and review some recent works that have used approaches more consistent with what I propose. By presenting these materials first, I wish to ground my own work in a broad tradition of scholarship in political science, economics, and sociology.

Studies of the Determinants of Public Expenditures

Beginning with the work of Hawley (1951), empirical analyses of relationships between government expenditures and a variety of social and economic (and, somewhat later, political) variables have appeared in studies by sociologists, economists, and political scientists.[2] The first extended analysis of these relationships was that of Fabricant (1952), who found that a set of socioeconomic variables could be used to account for a large proportion of the variation in

expenditures among states and among municipalities in the United States. Other important contributions to these studies of "determinants," as they came to be known, were those by Bracer (1959), Fisher (1961, 1964), Sacks and Harris (1964), and Bahl (1969). Their findings, using increasing degrees of sophistication in statistical technique, were essentially the same. Variations in government expenditures from state to state, county to county, or municipality to municipality were quite closely related to variations in social and economic conditions among those units. Using multiple regression and related techniques, it was possible to account for 50, 60, or even more than 70 percent of the variation in government expenditures by employing social and economic variables as predictors. This held true whether governmental expenditures were measured in total or in specific functional categories.

Economists were generally content to pursue these analyses of the determinants of government expenditures qua expenditures. They pursued a positive theory of public expenditures that could be induced from the statistical results (Bahl, 1969). The development of theory generally followed, rather than preceded the analyses (in fact, if not always in presentation), with the result that these "theories" had an ad hoc flavor that has been the subject of a number of critiques.[3]

Political scientists often make greater claims for their analyses, often designating measures of expenditures as "policy outcomes" (e.g., Dye, 1966), and arguing that, by including a selection of political variables in their analyses, they were testing whether the political system made any difference for such outcomes. Contributors to this research include Dawson and Robinson (1963), Hofferbert (1966),

Lineberry and Fowler (1967), Fried (1974), and many more.[4] Given the findings of determinants studies that a large proportion of expenditure variation is accounted for by social and economic variables, it is not surprising that political "determinants" studies usually reported little or no influence for political variables once controls for social and economic conditions were imposed.[5] While the efforts of these political scientists were often couched in more theory-laden terms than the efforts of economists and sociologists engaging in similar research, their theories have been challenged as equally ad hoc or as unconnected with their empirical analyses.[6]

Studies of the Determinants of Public Outcomes

A different, yet related, line of scholarship focused on the outputs and outcomes of public service agencies as distinct from their expenditures. Studies of education and police services, for example, have many similarities in technique and in findings to the studies of determinants of public expenditures.

In the field of education the primary study was that of James Coleman and his colleagues, Equality of Educational Opportunity (1966, hereinafter referred to as the Coleman Report). The Report raised the question of how much variation in childrens' educational achievement could be accounted for by the characteristics of the schools they attended. The answer, after controls for a child's home and community characteristics were imposed, was not very much (see, in particular, pages 290-333 of the Report).

In the field of public safety, similar studies offered similar results. Using virtually identical reasoning and technique to the education analysis in the Coleman Report, Wellford reported that "crime rates are largely a function of demographic and social characteristics, and the clearance of index crimes is largely a function of the nature of the crime" (1974: 208). Once controls for social and demographic conditions were imposed, the characteristics of the police agencies serving an area accounted for very little variation in crime and clearance rates. Others reporting similar conclusions include Kobrin, et al. (1972), Jones (1973), Greenwood and Wadycki (1973), and Swimmer (1974).

The political scientists' versions of expenditure determinants studies asked the question, "Does politics make a difference?," and advanced the answer "It does not." These service outcome studies raised the question, "Does structure (or organization) make a difference?," and reported a similar answer, "Not much." The findings across a large number of studies exhibited a basic consistency. But, it may be that the similarity in question and in the techniques employed to provide an answer had more to do with the consistency of that answer than is apparent in reading these reports. This is the contention of a number of critics of such studies, one that I share with the critics.

Critiquing Studies of "Determinants"

The skeletal frameworks of determinants studies have a great deal in common, though the substantive flesh may be quite different. One

asks, "How important is X as an influence on Y?," and develops an answer in terms of the proportion of remaining variance in Y that can be accounted for by X (remaining after control for some set of Z's). If that proportion is small, particularly if it is small in relation to the proportion accounted for by the Z's, one asserts that X is not important. The Z's are variables that are claimed to be antecedent to Y and X, or to be a part of the environment where X must operate on Y.

Thus the studies of determinants of policy outputs (measured most often as levels of expenditure by governments), asked whether political variables (X's) accounted for any variance remaining in expenditures (Y) once social and economic characteristics (Z's) were controlled. Studies of the effects of school or police agency characteristics (X's) on levels of achievement by students, or crime in jurisdictions (Y's) similarly looked for remaining variance in the Y's after control for social and demographic characteristics (Z's). The particular techniques employed in these analyses were one of several variants on the general linear model in statistics (Bibby, 1977; Van de Geer, 1971), usually partial and multiple partial correlation or analysis of variance based on block regressions. But, as critic after critic has stated, these techniques cannot provide a sensible answer to the question at issue ("How important is X as an influence on Y?"), unless some very stringent assumptions are met. And, as critics have also argued, these assumptions are generally unmet in the analyses of determinants.

The single most important assumption underpinning any statistical model of influences from the perspective of this argument is that the

model is correct in specifying how X influences Y (as well as how the Z's influence Y). A statistical finding of no effect of X on Y can mean that: (a) there really is no relationship between them once the effects of the Z's are controlled, or (b) the model that is being tested by estimating the influence of X on Y is incorrect.[7] To have a correct model for statistical analysis, however, requires that one have a theoretical understanding of how X influences Y. To sensibly answer the question, "How important are political variables?," one must answer the prior theoretical question, "How are political variables important?" (Godwin and Shepard, 1976: 1,134).

This requirement of specifying how political variables are important, and the failure to satisfy it in determinants studies is where critics have focused sharp attacks. Jacob and Lipsky noted that "each investigator appends a theoretical framework to his study . . . (but) the theory . . . rarely guides the research" (1968: 514). Meltsner and Wildavsky note this phenomenon as well, characterizing determinants studies in a most unfavorable light as "mindless empiricism with relations established not on grounds of explanatory relevance but simply by the availability of census data" (1970: 318). Where a theory of political or structural influence on a variable of interest (e.g., expenditures or service outcomes) might require the consideration of complex interactive or contextual effects, most determinants studies have employed a linear additive model. In practice, if not in theory, such research suggests that a given expenditure by a public agency, for example, is brought about by adding together three cups of per capita income, one cup of percent nonwhite, a tablespoon of intergovernmental

revenues, and a smidgeon of party competition in the previous election. While the units and proportions are not generally stated in this way, the logic of analysis is the same. It is, therefore, unremarkable that little influence has been found for political or structural variables through the use of this type of analysis. While we may feel comfortable when these analyses usually indicate that wealthy states spend more, or that the children of better educated parents achieve more, our comfort should not increase our confidence in the findings with respect to the lack of political or structural influences.

The Necessity and Utility of Theory-Based Analysis

Statistical analyses that are based on an inadequate model of the underlying phenomena are fated to yield inadequate answers. In technical language, they are prone to "specification errors," which cause coefficient estimates to be biased and inferential statistics to be inaccurate (Johnston, 1972: 168-169; Hanushek and Jackson, 1977: 79-86). Of greater importance, however, is the substantive problems they engender. Sophisticated statistical techniques can lend an aura of respectability to an incorrect substantive statement of relationships. As Bibby argues, the translation of a substantive argument into a statistical analysis inevitably tends to narrow, trivialize, technicalize, obscure, and expertize a debate (1977: 77). He continues:

> while the original question could be stated, understood, and answered by the ordinary literate man in the street, the new "statistical" question is formulated in such a way that only a few experts can understand it, let alone express an opinion (ibid.).

It may well be that the statistical question as stated is only remotely connected to the substantive question. This does not mean that one

should refrain from sophisticated statistical analyses. It does mean that the first issue to be addressed in any analysis is the adequacy of the theoretical explanation that the statistical analysis implicitly or explicitly tests. When the theoretical explanation is accounted for satisfactorily, then the argument can turn to the technical aspects of the statistical analysis.

The relevance of this for the politics and policy outcomes studies and the structure and performance studies is that when such studies have used a theory of how politics might affect outcomes or how structure might affect performance, they have often found substantial influences for these variables. In studies of the effect of politics on policy outcomes, this has usually meant using a theory that specified ways in which politics operate to influence the relationship between socioeconomic conditions and public expenditures. Socioeconomic conditions are used as surrogate measures for the demand for public goods, while expenditures are surrogates for the supply. Political factors then are posited to condition the way that governments tailor supply to demand.[8]

In studies of the effects of structure on performance, those that have shown structural influences have usually included a theory of how structural constraints operate to condition the transformation of inputs to outputs. Some have also considered how structure affects an organization's capacity and incentives to tailor its supply to consumer demands. An important element shared by studies of political and of structural effects is their focus on differences in relationships among variables in the context of different political or

structural conditions. The political or structural contexts are conceptualized as systems in the usage of comparative scholars.

> Systems differ [that is, politics or structure makes a difference] not when the frequency of particular characteristics differ, but when the patterns of the relationships among variables differ (Przeworski and Teune, 1970, emphasis in original).[9]

Lineberry and Fowler, for example, examined the effects of political reforms in municipal governments on the linkages of supply and demand in their jurisdictions (1967). They hypothesized that outputs would be more responsive to social and economic conditions in cities that were less reformed and, thus, where the political system would be more open to social conflicts and cleavages. Their findings supported the hypothesis. Taxes and expenditures were more closely correlated with social and economic conditions in unreformed cities than in cities with city managers and nonpartisan elections. Political variables, in this case the presence or absence of reformed structures, acted to condition the relationships of socioeconomic conditions and government policies.

Carmines' (1974) analysis of the effect of legislative professionalism on the relationship between interparty competition and welfare policies offers another example. He hypothesized that professionalism would affect the strength of this relationship, with the strength likely to be greater in those states having well-organized state legislatures. His hypothesis was supported by the analysis, indicating that political institutions in the states significantly influenced the possibility of linkage between politics and policy outputs.

A comparison of recent analyses in a very different area shows again the value of theoretically adequate specification. Fried (1974), using partial correlation analysis along the lines of that employed earlier by Dye, reported that the party in power had little effect on policy outputs in German cities. Frey and Pommerehne (1978) on the other hand, report that party does make a difference in policy outputs in Germany if examined in an analysis that includes consideration of the party-in-power's re-election prospects and the proximity in time of the next election.[10] In the latter analysis, careful consideration of how politics might, in theory, affect policy outputs led to an empirical finding that it did so in the specified way.

In a recent article Summers and Wolfe, once again, raise the issue, "Do schools make a difference?" (1977). They use a theoretical and analytic approach that enables them to explore the effects of schools as they interact with socioeconomic characteristics of pupils and their peers, rather than treating them as simple additive factors.[11] They report that school variables do make a difference in pupils' gains in achievement, with some interesting interactive effects. Class size, for example, was found to have differential effects, depending upon the achievement level of students: a negative effect on low achieving students and a positive one on high achievers. Low achievers do better in smaller classes and high achievers do better in larger classes. School size also had differential effects. Smaller schools are more beneficial for all pupils, but particularly so for black pupils.

Some recent analyses of the relationships among socioeconomic conditions, the structure and activities of police forces, and

criminal activity, indicate that analyses based on theories of how the structure of police forces might affect the relationships of crime to socioeconomic conditions find effects where earlier studies did not (e.g., McPheters and Stronge, 1974; Phillips and Votey, 1972; Wilson and Boland, 1978). Accepting the premise that crime may be closely related to socioeconomic conditions, through their effect on opportunities for legitimate gainful employment among those who might engage in crime, these studies go on to postulate an interactive effect of crime and police activities, with more crime engendering more police who, in turn, may reduce crime through their presence and their aggressiveness. Here, as in education and in the politics/policy outputs literature, theory-based analyses find that structure affects performance -- and politics affects policy -- where nontheoretical analyses did not.

An important element in these theory-based analyses is their view of politics or structure as a variable acting to condition relationships among other variables. Politics is not simply one more ingredient in a socioeconomic batter. Rather, political variables, the structure of the electoral process for example, act like different cooking devices -- campfires, gas stoves, or microwave ovens. The use of different cooking devices often requires different mixes of ingredients for a batter, and may affect whether it rises or not. Likewise, different electoral systems may alter the transformations between socioeconomic variables and government expenditures or outcome measures, or specify whether desired outcomes are forthcoming at all. In multiple regression terms, the slopes of within-system relationships

linking environmental or antecedent conditions to outputs and outcomes would be expected to be different as one moved from one system of political or structural conditions to another.[12] This sort of analysis appears to offer the most promise for further understanding of structure and performance relationships.

Linking Organization and Performance Theoretically

The successes of recent efforts based on theories of how politics and structure might be expected to "make a difference" are encouraging for the present study. The key element in those successes has been an explanation of how structure could be expected to affect performance. In spite of the success of these efforts at linking structure and performance, however, most have shared the ad hoc nature of the determinants literature. This makes it most difficult to cumulate findings in any useful way. Analyses of the linkage of structure and performance would benefit substantially from grounding in a theoretical framework with broad application.[13] Analyses employing such a framework would need to be informed by specific information on structural elements and important environmental factors, but the framework should offer a common ordering for the array of these factors.

Scholars in the field of industrial organization have developed a promising framework. The framework, linking concepts of structure, conduct, and performance, has been used to guide studies of particular industries in the private sector (e.g., Bain, 1944-1947; Bain, 1959; Caves, 1977). The framework has been adapted to the study of at least

one public sector industry, that involved in the development and supply of water (Bain, Caves, and Margolis, 1966). This industrial organization framework may be adaptable, as Vincent Ostrom and his colleagues have argued, much more generally to studies of industries involved in the supply of public goods and services.[14]

Structure, Conduct, and Performance in Private Industries

Studies of industrial organization begin with the concept of an industry. A private sector industry consists of "a group of sellers of close-substitute outputs who supply a common group of buyers" (Bain, 1959: 6). The sellers in a given industry come together with the group of buyers to form a market. The key elements of the industrial organization framework, then, focus on questions of: (1) the structure of the market linking sellers and buyers, (2) the conduct of sellers and buyers in a market as they adapt to the structure of the market, and (3) the performance of the market as measured by the application of normative criteria bearing on the efficiency of allocating productive resources among and within firms, as well as other criteria.[15]

Market structure consists of the relatively stable relationships of sellers to other sellers, buyers to buyers, sellers to buyers, and sellers to potential sellers currently outside the industry in question. Important among these relationships are the concentrations of sellers and of buyers. On the seller side, concentration ranges from atomistic competition among very many sellers through various degrees of

concentration comprising oligopolies to complete concentration in a single monopolist. Buyers may be dispersed among many different enterprises or concentrated in one of a few monopsonies. Other important structural elements are the degree of product differentiation among sellers, the barriers to entry of new firms into the industry, and the growth in demand for outputs of the industry over time.

Market structure is seen to influence the conduct of participants in the market. Monopolists are predicted to behave differently than oligopolists who, in turn, exhibit different behavior than individual sellers or firms in a structure characterized by atomistic competition. The existence of competitors or the potential for competitors to enter a market encourages the choice of different pricing policies by firms in that market than those chosen when few competitors exist or entry costs are very high. Firms acting to capture portions of a rapidly expanding market should behave differently toward one another and toward buyers than those attempting to maintain their share in a static or declining market. The strategies and tactics of firms vary more or less predictably with the structure of the market they confront.

The structure of the market that links the seller firms in an industry to their buyers, together with the conduct of the sellers and the buyers, act to determine the performance of the firms, the industry, and the market. Two points are quite important here. First, performance is never solely determined by structure and conduct. Factors in the environment of an industry are likely to exert major influences on performance. With respect to influences

of structure and conduct on performance, Bain says, ". . . the most we can mean is that, given the character of all the other important and perhaps more basic determinants of performance, they 'make a difference' in how performance will emerge, or have some systematic influence on it" (1959: 44-45). Structure and conduct are important to study as they determine performance, however, because they are potentially manipulable for public policy purposes, where environmental influences are not.

> We isolate and emphasize . . . these particular determining variables because . . . if we wish to influence performance via public policy, these determinants are to a considerable extent mutable and subject to deliberate modification (ibid.: 45).

The second important point is the separability of performance from the products of the industry. The performance of an industry is measured through the application of diverse, normative criteria to the industry output and its distribution, and to aspects of industry conduct independent of its output. Scholars in the industrial organization tradition speak of the efficiency of an industry as a measure of its performance. They are simultaneously concerned with the extent to which the industry is progressive, contributing to technological advance and taking advantage of such advances made in other industries. Other criteria applied to industrial performance include the contribution of the industry to goals of full employment, price stability, equitable income distributions, and the absence of discrimination by race, sex, or other employee characteristics (Caves, 1977: 66-83). The range of criteria that might be brought to bear in discussing performance, the separation of these criteria and their

application from the activities and output of firms in the industry, and the explicit recognition that the criteria and their application are normative phenomena, are quite important aspects of the industrial organization framework as it might be applied to public sector organization. These aspects are consonant with a view of public sector performance that maintains that such performance can be viewed from the perspectives of multiple, diverse "constituencies." Multiple, but not necessarily commensurable criteria may be brought to bear on the activities and outputs of public sector organizations in developing normative assessments of how well those organizations perform (Connolly and Deutsch, 1978; E. Ostrom, 1979). I will return to this point in the latter portion of this chapter.

Elements of a Public Industry

The delivery of goods and services through public arrangements arises in response to inefficiencies or failures in their supply through private markets.[16] Private markets can be predicted to fail in supplying goods or services where potential consumers cannot be excluded if they will not pay for what they wish to consume (Olson, 1965; Head, 1962). Those who can consume without paying are unlikely to contribute voluntarily. If all potential consumers are in such a position with respect to a good or service, no one will pay for its production and, thus, none will be produced. Where a good or service is only partially excludable or where exclusion of nonpaying potential customers is costly, some of the good or service may be produced, but

the quantity is likely to be allocationally inefficient. Generally it will be less than what would be produced were full exclusion and, thus, full payment for benefits received possible.

A related source of market failure or gross inefficiency results from jointness in consumption of a good or service. Jointness in consumption occurs when consumption by one person does not subtract from the quantity available to others or, in cases of partial subtractibility, where the amount subtracted is less than the amount consumed (Samuelson, 1954; 1955; Head, 1962). If joint consumption goods or services are supplied as toll goods, i.e., through the exercise of exclusion and the charging of a price for their consumption, the price charged may be allocationally inefficient. That is, it will often be higher than the marginal cost for an additional user. If, on the other hand, the price for a toll good is set at the marginal cost, it may be well below average unit cost and, thus, require a subsidy if the good or service is to be supplied at all (Bator, 1958).

Joint consumption goods or services, when they are supplied, are typically subject to erosion through excess or unregulated use (Buchanan, 1970). Congestion problems arise when too many consumers are attracted to the good or service and their joint use degrades the quality of service available to each. Various means of regulating use to a level below the onset of congestion problems must be employed. Common means include tolls or entry fees and the use of queues (Wirt, 1971). Even without congestion, however, it may be necessary to regulate use patterns so that the behavior of some consumers does not prevent or degrade the enjoyment of the good or service by others (Buchanan, 1970; Oakerson, 1978).

Provision of goods and services through public arrangements, established to compensate for market inefficiencies or failure with respect to their supply or to regulate use once available, typically entail the divorce of purchase from consumption. There is no quid pro quo relationship between buyers and sellers as in private markets. Instead, consumers and producers of public goods and services are commonly linked through intermediaries. These intermediaries, conveniently called providers, arrangers, or collective consumption units, attend to the financing and regulation of production and the regulation of consumption or use (Ostrom, Tiebout, and Warren, 1961; Ostrom and Ostrom, 1965; 1978; Savas, 1976). Units of government are the most common collective consumption units, but many other entities are also providers within many public service industries.

The existence of providers as important elements for organizing the delivery of public goods and services requires that the criteria used to define industry membership be broadened for studies of public industries. There are additional reasons dictating this broadening as well. Public service products are commonly amorphous, multidimensional composites. Output components are usually produced jointly, so that a tight focus on "close substitutes" cannot be maintained. Moreover, very frequently consumers of public goods and services are intimately bound up in their production as well.

Bain, Caves, and Margolis went beyond the private, output-substitutability, industry definition in their study of the water industry in Northern California. They included "all public and private agencies that develop and manage water resources, use them

to generate electric power, and capture and distribute water for consumptive purposes" in their definition of that industry (1966: v). The industry was defined by reference to a common raw material (water) instead of substitutable outputs.

Robinson argued that any of several common bonds might be used to define an industry. He included: (1) a broad type of general product, (2) common use of a given raw material, (3) common use of a given type of machinery, and (4) common use of a given process of manufacture as possible criteria for setting bounds on an industry. He argued that industry definitions were best set out for the purposes of the study at hand, with the key consideration that the definition was useful for the study:

> Industries as such have no identity. They are simply a classification of firms which may for the moment be convenient (Robinson, 1958: 8).

Ostrom and Ostrom offered similar criteria to those proposed by Robinson. They argued that public industries could be bounded by "similarities in production methods, common knowledge, and similar technology among enterprises coordinating their activities in the provision of related services" (1965: 139). The similarities in technology, methods, and products would, they argued, be reflected in the organization of particular industries.

The Ostroms' reference to "related services" is a useful terminological device. The products of public service industries (e.g., public education, police protection, public health services) tend to be amorphous or, at least, highly multidimensional. Definitions based on "close-substitute outputs" may be much too restrictive.

What, for example, are the products of public education? Are they limited to skills in the three R's? Should socialization in community norms be included? Should skills useful for particular trades (e.g., auto mechanics, woodworking) be counted as products of the public education industry? Public police, for another example, produce many services in addition to those focused directly on crime-fighting. Some are closely related, as when intervention in family disturbances may prevent assaults. Others are less related, as, for example, getting cats out of treetops. By counting these and other examples as related services rather than close substitute outputs, industry boundaries may be drawn that fit more comfortably with ordinary notions of what enterprises are involved in producing education services, police services, or many other public services.[17]

Studies of private sector industries generally limit the concept of industry to the sellers or producers involved, bringing them together with buyers or consumers in a separable conceptual grouping, the market (Bain, 1959; Caves, 1977). But it is important to include providers and consumers within the boundaries of public service industries. In the public sector little or nothing might be produced without attention to the financing and regulatory functions that lie within the competence of providers. Furthermore, for many public services, little or nothing of value can be produced without the active cooperation of consumers as "coproducers" of the services in question.[18] It is hard to categorize, for example, what is produced in classrooms where students do not actively cooperate in the production of their own learning -- certainly it is not education. The role of

citizens as coproducers of police services has received increasing attention in recent years, with many willing to identify citizen input as the crucial element without which formal police efforts are of little value.[19] Consumer coproduction roles have been identified in such diverse public services as fire protection, solid waste collection and disposal, and recreational services as well (e.g., MacGillivray, et al., 1977; Savas and Stevens, 1977; Grodzins, 1966).

Given these considerations, I will define a public service industry as a group of producers, providers, and consumers of a set of related public services.[20] For any particular study, industry boundaries can be drawn by reference to the set of related services to be included and, for most studies, the geographic bounds of interest. In a recent study of police service delivery in metropolitan areas, for example, my colleagues and I listed 10 distinct services supplied by police agencies as comprising the related set (e.g., general area patrol, traffic accident investigation, radio communications), and used Standard Metropolitan Statistical Area (SMSA) boundaries established by the Census Bureau to delimit the geographic bounds of interest (Ostrom, Parks, and Whitaker, 1978). Application of these criteria enabled us to identify all of the producers and groups of consumers in the police service industries of 80 different metropolitan areas.[21]

Producers in a public industry may be agencies of local government, agencies of other governments (e.g., county, state, or federal) with concurrent or overlapping jurisdictions, agencies established under the aegis of special assessment districts, private firms, or consumers

themselves, acting individually or organized as a voluntary association. Providers, who arrange for service financing and attempt to regulate production and consumption or use, may be units of local government, units of other, overlapping governments, governing boards of special districts or voluntary associations, or individual consumers. Consumers may be individuals, households or other collectivities of individuals, private firms, or government agencies. Within an industry some entities may produce one of the defining services (e.g., general area patrol by police officers in radio dispatched automobiles) and be consumers of another service (e.g., radio communications). Whether or not production of services is vertically integrated in a single production unit is a question to be established when describing the structure of particular service delivery arrangements.

The Structure of Public Service Delivery Arrangements

The structure of relationships among the elements of a public service industry is inherently more complex than the structure of relationships among buyers and sellers in private markets. As in the private case, relationships of producer to producer, producer to potential producer, producer to consumer, and consumer to consumer must be considered. But, with the additional element of providers, relationships among providers and of providers to producers and to consumers must be considered as well. I will refer to the structure of these relationships as the structure of service delivery arrangements. Some arrangements in some public service industries may closely

resemble the market structures found in studies of private industries. Other structural arrangements for the delivery of public services are likely to be quite different.

Important aspects of public service delivery structure are analogous to considerations in studies of private market structure. The degree of producer concentration, for example, is important as it affects opportunities for the capture of economies and the avoidance of diseconomies-of-scale in production. Producer concentration also affects the opportunities for cooperation, competition, and conflict among producers in a public industry. Producer concentration in an industry is measured by the number and relative sizes of the producers of a given service. The proportion of industry production that flows from the largest producer, or from the N largest producers can also be used to index this concentration.

Consumer concentration is an important aspect of public industry structure also. Of particular interest, due to the geographic orientation of most public service delivery, is the extent to which consumers cluster together in relatively homogenous social, ethnic, and economic groupings (Cox, 1973). These homogenous clusters often have unique patterns of demand for given public services. Thus, the extent to which multiple and diverse clusters are grouped together in larger jurisdictions will affect the diversity of the demand schedule to which providers and producers attempt to respond.

Another relevant aspect of consumer concentration relates to the nature of the public service in question and the domain of its consumption effects. Consumer concentrations that are well matched to the

domain of effects of residential police patrol may, for example, be quite different from ones matched to the domain of effects of a service such as air pollution control. Where consumer concentrations are relatively similar in size to the domain of consumption effects for a given service, it may be easier to establish provision arrangements than in cases where sizes are very different. Differences in the domain of service effects may help to explain the presence of multiple special districts for the delivery of particular services in some areas and, perhaps, provide reasons to consider the establishment of similar districts in areas where they are lacking (Ostrom, Tiebout, and Warren, 1961; Bish and Ostrom, 1973).

Provider concentration is important as it affects the information requirements of the providers. A single provider, attempting to arrange the supply of services to all consumer groupings in an industry, must consider a diversity of demand schedules in most cases. Ascertaining and aggregating a large number of diverse schedules places a great information acquisition and processing load on a provider attempting to be responsive to demands. Various political mechanisms (e.g., ward or district election of council members) and administrative mechanisms (e.g., decentralized administrative centers such as "little city halls") can be viewed as attempts by concentrated providers to confront these information problems. Multiple, smaller scale providers may have greatly reduced information acquisition and processing requirements if their provision activities are intended to supply only one or a few diverse consumer groupings. The number and range of demand schedules to consider would be much reduced.

Another aspect of provider concentration is the number of distinct industries in which providers operate. Multipurpose governments, for example, commonly arrange the supply of several quite diverse public goods and services to their jurisdictions. This cross-industry concentration may facilitate some economies in operation for providers and, perhaps, also for consumers as they attempt to monitor provider activities. It may also facilitate cross-industry trade-off decisions, avoiding problems that might arise through suboptimization in each individual industry. Cross-industry concentration of providers may, however, make it very difficult for consumers to signal their dissatisfaction with provider activities in any individual industry. Where such signaling is accomplished by voting for candidates who will make provision decisions in several diverse industries, a consumer-voter is confronted with a "blue plate special" of potential provision activities. He cannot choose an a la carte selection of ones he favors, but must pick a mix that comes closest to his preferences from a limited number of offerings.

Barriers to entry in public service delivery arrangements must be considered for both producers and providers. Barriers to new producers may result from large-scale economies in production. Examples include services that require large, fixed cost facilities as a part of their production (e.g., water and sewer treatment plants) and, to a somewhat lesser extent, those that confront high peak demands, requiring substantial excess capacity during ordinary production periods (e.g., hospitals producing emergency services, fire protection services).

More common barriers to the entry of new producers or providers in public service industries are those established by law. Legal authorization to produce police services, where such services involve the use of arrest powers beyond those of an ordinary citizen, may be restricted to agencies of recognized units of local or state government (Kramer, Anechiarico, and Wagner, 1977). Creation of a new production unit in such cases is contingent on the right to create a new provision unit. Barriers to entry of new providers may result from historical developments as when all available territory lies within incorporated municipalities and their dissolution (through deannexation, for example) is not allowed. In some areas state legislation has given existing local providers a veto over the entry of any new providers that take the form of units of local government. Examples include St. Louis County, Missouri, where the county council must approve the formation of new municipalities and, more generally, throughout California, where Local Agency Formation Commissions composed of local government representatives can prevent establishment of new units of government (Martin and Wagner, 1976). Legal barriers to new producers also include minimum standards legislation that may mandate a production scale or startup costs beyond those that new producers could generally manage.

Relationships between providers and consumers, providers and producers, and producers and consumers are critical elements of the structure of service delivery arrangements. Private, competitive market structures are characterized by "arms length" relationships of buyers and sellers, but such relationships are the exception in public service delivery structures. Most public service delivery

arrangements link consumers, organized in a political jurisdiction, to a single provider, the local government, and to a set of producers which are agencies of that local government. The exemplar of this common structural pattern is a municipality with its own governing body and producing agencies that supply services exclusively within the boundaries of the municipality. This pattern of autonomous provision and production of multiple services, organized within individual municipal units, probably accounts for more than half of the local service delivery arrangements in the United States.[22] The very ubiquity of this pattern should not, however, detract attention from the existence and possible desireability of alternative relationships.

One common alternative structural arrangement is the organization of provision and, quite often, production of a single service through a special district. Independent school districts with elected boards are a frequent example. Special district arrangements are found for the delivery of water and sewer services, fire protection services, recreation, and even police services. For some services in some areas, special districts function as subunits of local governments having broader jurisdictions. In such cases they may allow for differentiation in service financing and supply that would not be permissible for the broader government under "equal protection" requirements (e.g., the separation of Davidson County, Tennessee, into an Urban Services District and a General Services District with differing service levels and tax rates). Special districts may often attend to the provision function only, contracting for service supply from one of several alternate producers of a given service.

Contracting for service supply may be done by local government and special district providers and, occasionally, by individual or small groups of consumers acting as their own providers (e.g., contracting for solid waste collection in many areas). Contracting quite often takes place within an oligopolistic structure at best. Only one or a very few viable producers bid for a given contract. However, the preparation and review of such bids is thought by contracting advocates to elicit considerably more information than that which is available to providers who negotiate with a single, local government based producer. One interesting feature of contracting for service production is that it opens the way in many cases for production by private firms. Such firms may exhibit quite different internal incentive structures than the more common, bureaucratic public producer.

Other relationships are possible as well. Individual consumers or small groups may organize themselves to provide and produce their own services. Housing cooperatives and homeowners' associations may, for example, call upon the labor of their own members for essential maintenance services with respect to their common areas. Neighborhood patrols by residents may supplement (or even replace) police patrols from a local government police agency. Multiple providers might band together to organize a single producing unit for the several consuming groups they represent. A number of states have passed variants of interlocal service acts, with the aim of fostering such cooperative ventures.[23] Producers and providers may become coterminous when, for example, agency heads (e.g., sheriffs) are directly elected by

consumers. These arrangements all represent variations in structural relationships linking producers, providers, and consumers. Such variations in structural relationships are important to a public service industry framework as they can be expected to determine variations in the conduct of their component parts and, ultimately, in the performance of the industry.

Conduct in Public Service Industries

The behaviors that comprise conduct in studies of public service industries are influenced by the structure of the service delivery arrangements in an industry and, in turn, influence the performance of the industry. The behaviors of interest are those of the several elements in the industry, producers, providers, and consumers, as they relate to one another and to the industry product.

It is possible to outline ideal conduct on the part of each element in a public service industry.[24] Consumers should have well-defined preferences for the industry product and be forthcoming with those preferences in the form of a demand schedule, indicating the amount preferred at various prices, which they display to providers. Providers should make themselves aware of the demand schedules of the consumers, and aggregate the individual schedules into a collective demand schedule. They should also develop a tax sharing scheme that apportions costs of service delivery among the consumers. Producers should seek out knowledge of production relationships and use that knowledge to develop supply schedules based on most efficient production

methods. They should make these schedules available to providers, indicating to the providers the amount of product they would be willing to supply for given prices. Providers should then select among potential producers to maximize the quantity of output obtained at prices consumers are willing to pay. Once a bargain is struck, producers should supply the quantity and quality of product agreed to. Consumers should pay their apportioned share in the cost of service delivery, and should use the product in ways that avoid needless degradation of the quality or quantity available to other consumers. Providers should arrange for and consumers should supply coproductive activities where they contribute to net benefits.

It is likely, however, that actual conduct in public service industries differs from these ideals. The extent of the differences is, at least in major part, attributable to the structure of service delivery arrangements. That structure offers incentives and provides constraints for the behavior of participants in an industry. These incentives and constraints may be more or less well-designed to induce participants to behave in ways consistent with their ideal behavior. If we postulate that human beings respond rationally to the incentives and constraints they confront, and if it is possible to understand how the structure of service delivery arrangements in an industry affects incentives and constraints, then to that degree it should be possible to predict the behaviors of individuals in the roles of producers, providers, and consumers and, subsequently, the performance of the public service industry (V. Ostrom, 1976).[25]

The nature of many services that are publicly produced may also work against the attainment of ideal conduct. Consumers, for example, may not be able to develop a meaningful demand schedule because of the amorphous or multidimensional nature of the service. Imagine trying to specify how much you would be willing to pay so that your child could read and write in English. How much more would you pay for additional languages? How much for arithmetic skills? How much for calculus? How much for integration into a community of his peers? Even the most conscientious parent would have substantial difficulties with these questions, yet they are only a minor part of what is wrapped in the bundle of services called education.

Assuming for the moment that a parent might be able to develop such a demand schedule, at least over small ranges of differences in quantity, quality, and price, what are the incentives and constraints that affect whether he will display the schedule to a provider? In a situation where the cost of provision was to be spread among consumers in proportion to their willingness to pay, a parent might be motivated to understate his preference, relying on other parents' payments and the joint consumption nature of public educational services to supply him with his desired amount. Where tax shares were fixed in advance, on the other hand, a parent might indicate a preference for more educational services than he would if strict proportioning were maintained.

Assume, even more heroically, that a parent could state his preference schedule and attempted to communicate it to providers with complete veracity. If the communication process were limited to electing members of a school board, the best the parent could do

would be to vote for those members who articulated their intent to offer a school program that came closest to the parent's preferred quantity, quality, and cost mix. Thus, even an omniscient parent, with the computational skills of a high speed computer and the honesty of George Washington, might be prevented from exercising ideal conduct.

This discussion of consumer conduct indicates some relevant dimensions of service delivery structure as it might affect differences between ideal and actual consumer conduct. The more services are bundled together in multiattribute or poorly defined packages, the more difficult it may be for the consumer to develop and articulate a preference schedule. The greater the divorce of finance from consumption, the greater the incentives for preference concealment and distortion. The more the consumer to provider communication process is limited to the election of members of a provider organization, the harder it will be for consumers to portray their preferences for public services accurately.

Providers' conduct may differ from the ideal for a variety of reasons related to service delivery structure as well. Where consumers hold very different preference orderings individually (e.g., as among the efforts to be expended attempting to teach reading, writing, or arithmetic), it may be technically impossible for providers to aggregate these into a collective demand schedule that is responsive to diverse interests (Arrow, 1963). Even where technical impossibility does not hold, the effort involved in learning and appropriately aggregating a wide range of preferences may be excessively burdensome to providers who are not constrained to do so. Such diversity on

consumer preferences, together with difficulties in developing a collective demand schedule, are more likely to be found in service delivery structures featuring high consumer or provider concentration.

Providers are commonly thought to be constrained by a desire to gain and remain in public office. Downs, for example, characterized politicians as,

> motivated by the desire for power, prestige, and income, and by the love of conflict, i.e., the 'thrill of the game' common to many actions involving risk. However, they can obtain none of these desiderata except the last unless their party is elected to office. Therefore, we do not distort the motives of party members by saying that their primary objective is to be elected (1957: 30).

Political representatives may, as providers, work for the good of their constituents (e.g., Pitkin's usage of "substantive acting for others" as the meaning of political representation, 1967). Working for the good of one's constituents may be the best means of maximizing political support, thus gaining and remaining in office. But it is incorrect to view provision arrangements simply as "users' cooperatives" that "act in ways most advantageous" to consumers (e.g., Bain, Caves, and Margolis, 1966: 9). At a minimum, the rules that constrain providers to act in those ways must be considered (Ostrom and Ostrom, 1978).

Election constraints cannot work perfectly, however. If providers can be elected by less than a majority, if elections are not exceedingly frequent, or if elected providers attend to more than a single, separable service, then providers can obtain some slack within which to pursue their own interests (Breton, 1974). They can ignore the preferences of some portion of the electorate. They can pursue their own interests somewhat vigorously in interelection periods. They can force voters

to choose a "full line supply," gaining flexibility by meeting some service preferences at the expense of others.

For many providers, elections may not supply any direct constraint. They may, for example, be tenured civil servants, able to act (or not act) without immediate fear of losing political support. Such actors, along with many elected officials in areas where competition for their positions is not intense, may be able to pursue their "desire for power, prestige, and income" in ways that are at odds with the good of their constituents. Negotiations with producers might, for example, be undertaken with an understanding that a job would be made available for the provider upon retirement. Ostensibly, unrelated business might be directed to a provider's brother-in-law. To recognize that these represent corruptions of the way things are "supposed" to work is not to deny that they occur with some frequency.

Without imputing corruption to provider actions, it is possible to point to a common deviation of provider motivation from acting "in ways most advantageous" to consumers. Actors in provider organizations, like other humans, may prefer a substantial amount of peace, quiet, and leisure. This entry in their utility functions may be increased by not working too hard at their jobs. They may not attempt to regulate use or monitor production of public services. A common example is the tendency for local political figures to declare that they have a "hands off" policy toward the local police agency. Whenever one hears that elected officials have turned public service decision making over to the "professionals" in a producer organization, a partial explanation may be their desire for peace, quiet, and leisure.

Assuming that providers were motivated and able to learn consumer preferences and aggregate them into a collective demand schedule, their capacity to obtain and choose among producer supply schedules may still be quite limited. Producers in public service industries typically offer a total output for a given budget, rather than individual units of output at a price for each. Precise definitions of output and accurate means to measure output are generally lacking as well. Producers may be in a strong monopoly position vis-a-vis providers. They may monopolize the legal authority to produce particular services for particular consumers and they may monopolize information about their own production relationships (Niskanen, 1971; Bish and Warren, 1972). Producers may have as good or better information about consumer demands as do providers, particularly for services requiring close producer-consumer interaction (e.g., police, education).

Where such conditions hold, producers may be able to appropriate all of the available consumer surplus in bargains struck with providers.[27] Niskanen argues that they are able to do so by producing substantially more output than fully knowledgeable consumers would prefer, extracting a maximum budget from providers, but producing at minimum cost (1971). Others argue, more realistically, that producers extract the available consumer surplus through higher than minimum production costs (Migue and Belanger, 1974; Breton, 1974). A number of scholars have suggested that bureaucratic producers, as well as private firms where ownership is separated from management, may exhibit a preference for higher than efficient labor usage (Maris, 1964; Williamson, 1964; Orzechowski, 1977). Large staffs lead to high administrative salaries through a

proliferation of ranks with salary differentials in a hierarchy. Excess personnel provide fat to be trimmed if organizational retrenchment is mandated. Bureaucratic producers may have additional preference for personnel inputs as these personnel may be friendly voters in elections for members of provider organizations (Borcherding, Bush, and Spann, 1977). Breton and Wintrobe suggest that either means of extracting surplus (i.e., oversupply or inefficiency) may be employed and that producer choices will be made in light of provider attempts at control which in turn depend on the cost of such control (1975: 201-202).[28]

Providers can reduce the monopoly of producers by obtaining information. If they are able to find out the producer's cost function, they may be able to counter the producer's all-or-nothing bid by commanding a given output amount and cost. If the production unit is an agency of the provider, a recalcitrant agency head can be removed and replaced with one who will attempt to carry out the command. If providers are able to determine production functions, they can go even farther with their commands. Again assuming the production unit as an agency of the provider, minimum cost combinations of inputs could be commanded along with output specifications. Given the possibilities for control entailed by knowledge of cost and production functions, it is not surprising that a tendency to conceal such information has been suggested as characteristic of bureaucratic producers (e.g., Stockfish, 1976).

What structures of service delivery arrangements are likely to produce information for providers to use vis-a-vis producers? Where

providers can exercise some degree of hierarchical control over producers, they may install their own cost monitors or purchase information from members of the producer organization (e.g., by offering to replace top administrators with those who supply useful information or the promise of more efficient operation). In instances where production is widely dispersed, even if each producer is tied to a single provider and group of consumers, information may be generated by comparison with arguably similar production and environmental conditions.[29] In instances where production is dispersed and competitive bids for service supply can be entertained by providers, information with respect to cost and production functions may be available from such a bidding process.

None of these alternatives may, in practice, produce a great deal of useful information. Production relationships may be inextricably tied up in the activities of low-level members of a producer hierarchy, the "street-level bureaucrats" to use Lipsky's term (1976). Top administrators may be unable to learn or to change these relationships. Attempts to do so may result in purposeful degradation of output designed to discredit them (e.g., the experiences of "reform-minded" police chiefs, see Kleinman, 1979).[30] Producers may band together in professional associations to set standards of good practice. Where this occurs, much of the information generating potential of a structure of dispersed production may be lost through reduced variance in methods and costs. Competitive bidding may take place in a highly oligopolistic or even monopolistic structure, where only one or a very few viable bidders come forward. Their bids may have the same all-or-nothing character as those of monopoly bureaus.

Once a bargain has been struck between provider and producer, whether by contract or budget negotiation, producers may fail to deliver as promised. In many cases the promise is so vague as to be undeliverable in detail (e.g., police the city, educate the children). The promise is likely to be in fact what Simon called an employment contract, rather than one for specific output (1951). That is, a producer will guarantee to employ X police officers and Y police cars, or W teachers and Z classrooms, often indicating that these will be used according to "standards of professional practice." If producers do not know the production relationships (e.g., how to deploy police officers and cars to maximize public safety, how to use teachers and classrooms to maximize education), then the promise may bear little relation to what consumers prefer. Even in cases where the bargain specifies "performance," the problem persists. Police producers may agree to patrol all streets at a frequency of N per 8-hour shift. Education producers may agree to offer K hours of student-teacher interaction in a classroom each week. Whether consumer preferences for safety or for literate children are met by these agreements is often unknown (Bradford, Malt, and Oates, 1969). In production monitoring, as in negotiations to reach provider-producer agreements, structures of service delivery that maximize the generation of information with respect to production relationships are desirable.

Finally, assume that all problems of demand articulation and aggregation have been met. Assume further that providers have reached agreements with producers that will, in fact, result in an efficient matching of supply to demand and the producers will abide by such

agreements. The problem of consumer conduct in consumption remains to be addressed. Goods and services that are publicly supplied tend to be viewed as the common property of a group of consumers. The group of consumers who view themselves as entitled to these goods and services may be large or small, with well-defined or ill-defined membership. The important point here is their perception of common entitlement. Aristotle spoke to the problem of this common entitlement when he observed: "that which is common to the greatest number has the least care bestowed upon it." More recently Buchanan has referred to the problem as the "erosion of public goods" (1970). Individuals who consume a publicly supplied good or service with attention to their own self-interests may seriously degrade the good or service for others who may be similarly entitled to its enjoyment. Anyone who has spent an evening in a public campground within earshot of blaring television sets from circled wagon trains of recreational vehicles will be familiar with this phenomenon. Public recreational facilities, housing facilities, highways, educational facilities, virtually anything that is commonly available to a large group of consumers may be subject to such erosion if individuals, acting in their own self-interest and taken in the aggregate, degrade the facility or service for others.

Buchanan noted that very little attention had been paid to the structures of service delivery arrangements (his term was "institutional arrangements") that would contribute to the maintenance of public goods and services once they were supplied. He suggested that substantial payoffs might accrue from such attention. "More effective usage of facilities" resulting from careful attention to rules designed to

prevent erosion would improve public service delivery more than "enlarging the quantities of the facilities themselves" (1970: 69).

Some suggestive material can be drawn from literature on the design of public facilities that bears on rules for use of public facilities and services as they impinge on joint consumption (see also Oakerson, 1978; Ostrom, 1973). Oscar Newman, in his book, Defensible Space, identifies architectural design procedures whereby a group of consumers can relate to a common area as an extension of their properties and, thus, can come to "set the norms of behavior and the nature of activity possible within a particular place" (1973: 2). He argues that design features can take advantage of the "latent territoriality and sense of community" of individuals in public housing projects such that they will take responsibility for maintaining the common good. Earlier, Jane Jacobs advanced a similar argument with respect to street patterns and land usage in city neighborhoods. She noted the necessity for "eyes upon the street, eyes belonging to those we might call the natural proprietors of the street" (1961: 35). These were essential if people were to be safe when using public streets and sidewalks.

The common ingredient in both Newman's and Jacobs' discussions is the need to foster a sense of proprietary interest among a group of consumers with respect to common property. They must be able to recognize their common interests in preventing the erosion of the common good and must feel empowered to take action to prevent such erosion.[31] They must feel individually that they should act to protect the common good and have the expectation that others in their group will support them in such actions.

Olson's discussion of small groups points out that as groups get larger, voluntary provision of public goods becomes less likely (1965). Similar dynamics with respect to maintenance could be expected. Important additional considerations include group homogeneity, frequency of interactions with respect to the common property, and, perhaps even more important, frequency of interactions with respect to things other than the common property. Oakerson refers to mutuality, reciprocity, and re-establishment of community as important elements preventing the erosion of public goods (1978).

With respect to the structure of service delivery arrangements as it affects the potential for erosion of a public facility or service, then, important considerations are the concentration of consumer groups and the composition of such groups, their homogeneity or heterogeneity. Also important is the spatial orientation of consumer concentrations with respect to the location of common facilities and services. It is useful in this regard to align users of a common facility or service into consuming units coterminous with the domain of the facility or service in question. This is important with respect to financing and provision of public goods and services (Olson, 1969; Ostrom, Tiebout, and Warren, 1961). It is probably equally important with respect to their maintenance (Oakerson, 1978).

The last consideration with respect to consumer conduct is whether consumers have incentives to engage in beneficial coproductive activities. Some relatively inexpensive consumer activities might have substantial cost or effectiveness payoffs for public service delivery. If drivers, for example, always removed their keys from their automobiles when

leaving it unattended, the incidence of auto theft and the cost of attempting to recover stolen vehicles would drop markedly. If citizens call police when they see something suspicious in their neighborhoods, police activities aimed at apprehending burglars may be much more effective. If consumers of waste disposal services are willing to separate some components of their wastes prior to disposal, they may greatly reduce disposal costs and make recycling efforts effective.

The structure of service delivery arrangements may discourage coproductive activities, however. If a person is not charged for efforts aimed at recovering his stolen vehicle, and is otherwise insured against its loss, he may take no cognizance of the societal costs of leaving a key in the ignition. If services are supplied by large, professional production units, citizen coproduction may be discouraged. Indeed, budget-maximizing producers have a direct incentive to discourage coproduction if it makes a noticeable change in their cost of production.[32] Police or educational professionals may, for example, characterize citizen coproductive acts as interference in their assigned missions. Or they may, at best, treat it as a mixed blessing, not really hurting anything, but certainly not affecting their costs or their output. By doing so they probably discourage a great deal of otherwise available coproductive effort.

Performance in Public Service Industries

Suppose two different structures of service delivery arrangements operate to supply one aspect of public safety, minimization of risk of

being mugged on the sidewalk, for example. Suppose further that these two structures operate in identical environments, identical in terms of all environmental factors relevant to muggings. Suppose finally that the incidence of muggings is one per year in the area supplied by one structure and 100 per year in the area served by the second. Which structure leads to better performance? Is it the one with the dramatically lower rate of muggings? Unequivocally so?

Add another supposition. In the area with a low rate of muggings, police engage in extremely aggressive patrol. Any youth or minority group member of any age encountered on the street is taken to police headquarters for extensive questioning. In the second area this is not common practice. The difference in conduct can, by assumption, be attributed directly to the difference in the structure of service delivery arrangements. Now which structure leads to better performance?

The example, I hope, illustrates several points. First, the performance of a given service delivery arrangement is not the same thing as the output of the service supplied. Second, it is necessary to specify criteria by which to measure performance. Third, criteria may be brought to bear on things other than service output. Finally, different persons might be expected to bring different criteria to bear when discussing performance.

In order to discuss intelligently whether one structure of service delivery arrangement is conducive to better performance than another structure, two things are needed. First, one needs an array of the consequences that are likely to result from the use of each structure. Second, one needs an array of criteria that are to be applied to those

consequences in the determination of which consequences are evaluated as "better" (McKean, 1958). Consequences that are relevant to discussions of performance are not limited to the intended outputs of any particular public service industry, but must include consideration of conduct and unintended outputs as well (Ostrom, 1979; Connolly and Deutsch, 1978).

In the example used at the beginning of this section, relevant outputs include the mugging rate in the two alternative structures, but, at a minimum, also include consumer attitudes toward the police. These attitudes might be valued as consequences in themselves or as precursors to more or less favorable consumer activity with respect to policing in the future. Conduct of the police in the two different structures is an important consequence to include if criteria bearing upon due process and protection from illegal detention are used.

Any consequence of the structure of a service delivery arrangement, including intended or unintended outputs and intended or unintended conduct, is relevant to a discussion of the performance of that structure if any individual or group of individuals, employing one or more performance criteria, would recognize a change in a measure of that consequence as indicating a change toward better or worse performance according to any of the criteria.[33] Attention to the likelihood that different individuals or groups may bring different criteria to bear on the same phenomena is important in avoiding sub-optimizations based on the consequences and criteria of one or a few participants. As V. Ostrom indicates, for example, "producer efficiency in the absence of consumer utility is without economic meaning" (1973: 62).

Criteria that might be brought to bear in assessing the performance of alternative structures of service delivery arrangements are legion. Campbell, et al., in a wide-ranging survey of literature on organizational effectiveness, identies some 26 distinct criteria that have been employed (1974). These include familiar criteria such as effectiveness, productivity, efficiency, and profit, but include others, such as absenteeism, conflict/cohesion, flexibility/adaptation, and internalization of organization goals, that may be less familiar. Even this extensive list does not include criteria that may be important in public industry studies. In such studies, criteria like equity of output distribution, compliance with legislative and constitutional mandates with respect to conduct, and responsiveness to consumer preferences can be coequal in the minds of many with concerns for effectiveness, efficiency, or productivity.

Performance assessment is inherently normative and is usually political. The choice of activities and consequences to measure and the specification of criteria to be applied to them in assessing performance are not independent of the values held by those choosing and specifying. Further, the criteria applied, even by the same individual, but especially by different individuals, may be incapable of being made commensurable. That is to say, for example, that a criterion such as fairness in trials cannot be mechanically traded-off against a criterion such as efficiency in disposing of a court's caseload (Reich, 1977). The values brought to bear in making any such trade-off are likely to be different as a function of one's current or anticipated future position in the delivery of court services. Moreover, those

who anticipate no direct contact with the delivery of court services may still hold diverse values with respect to court procedures and their consequences.

Despite the normative nature of specifying performance criteria, it may be possible to advance several on which common agreement would be found. I suggest as a minimum set that responsiveness, efficiency, and equity are important criteria to apply to the output and the conduct of any public service industry. Procedural regularity is an important additional criterion for assessing conduct.

The structure of service delivery arrangements for a public service industry should be such that the industry is responsive to consumer preferences. Consumers band together to form collective consumption units to secure goods and services via a public service industry where private market structures have failed to supply them or have supplied them inefficiently. If the industry does not deliver the preferred goods and services at prices the consumers are willing to pay or, at least, to come closer to their preferred quantities, qualities, and prices than market arrangements, the efforts involved would seem wasted. Responsiveness as a criteria of performance subsumes adaptability also, as consumers and their preferences change with time, and industry output ought to track these changes.

E. Ostrom defines the responsiveness of a given structure of service delivery arrangements as, "the capacity of those who are acting within the constraints of a set of decision rules to satisfy the preferences of other individuals who are dependent upon these institutional arrangements to gain something of value" (1975: 274). She refers to incentives

to satisfy preferences as well as capacity. This usage is consistent with my own and, I believe, with Pitkin's discussion of political representation in representative government. Pitkin emphasizes the requirement for "institutions that are designed to, and really do, secure a government responsive to public interest and opinion" (1967: 234). Responsiveness does not require that participants pursue the interests of consumers altruistically. Their motivation may be pure self-interest. But, the incentives and constraints should be such that their pursuit of self-interest results in activities and consequences that are closely related to the preferences of consumers.

Service delivery arrangements should be efficient also. Following Simon, "the efficiency of a behavior is the ratio of the results obtainable from that behavior to the maximum of results obtainable from the behaviors which are alternative to the given behavior" (1961: 179).[34] Efficient production requires accurate information about the transformation of inputs into services, the production function. It also requires information about the relative prices of inputs and the budgetary constraint under which a producer operates.[35] Inefficiency in public service delivery arrangements may result from information deficiencies in both areas. Production functions may be concealed to increase producer felixbility, thus fostering technical inefficiency. Monopsonistic purchase of inputs, or preferences for inputs that operate with partial independence of their relative prices, may lead to price inefficiency. Moran suggests an important additional information requirement, posing a third source of inefficiency in public service delivery arrangements. This is knowledge of the transformation between

services produced and their benefit to consumers (1977; see also Bradford, Malt, and Oates, 1969). In cases where consumers may have little option but to take as given whatever a producer supplies, it may be very difficult to obtain information to meet this latter re- `rement.[36]

Providers and consumers may also contribute to inefficiencies in public service delivery arrangements. Providers may fail to take advantage of low cost means for obtaining information on consumer preferences and valuation of output (e.g., user charges). They may not pursue information on input factor prices or supply and production relationships (e.g., through competitive bids or monitoring), relying instead on single source supply from their own bureau. Consumers may contribute to inefficiency by failing to supply coproductive activities or by the use of services in ways that degrade them for other users.

Service delivery structures should foster equitable distributions of activities and consequences. Equity has many differing meanings in contemporary use. It can refer to: (1) equality of inputs for service production; (2) proportioning of inputs to tax or other contributions; (3) equality of service outputs; (4) proportioning of outputs to tax or other contributions; (5) equality of outcomes or benefits received; (6) proportioning of outcomes to tax or other contributions; or (7) limitation of the allowable ranges for distributions of inputs, outputs, or outcomes. Any of these meanings might be applied at the level of individuals, or to groups of individuals aggregated by social, economic, geographic, or other criteria.[37]

If a choice among these several meanings of equity in service delivery were made by the average consumer, the plurality choice

might well be the third meaning, equality of service outputs. For many services that are publicly supplied, it may be just this preference for equality in the distribution of outputs or, at least, a strong preference for limiting the range of service outputs, that leads to the establishment of public provision arrangements (Margolis, 1968). Certainly one explanation for the ubiquity of public education delivery arrangements is a preference by a large majority that all potential students receive some specified minimum amount of educational outputs.

In a study of the performance of any given industry, however, it is preferable to apply multiple meanings of equity simultaneously. Miller demonstrates that use of any single meaning is biased from the perspective of other meanings (1977). Therefore, the use of multiple meanings of equity in a given analysis is more likely to be politically neutral. This use of multiple perspectives for viewing equity should offer valuable insight into internal operations of the industry as well (e.g., Levy, Meltsner, and Wildavsky, 1974; Lineberry, 1977; Jones, 1977).

Procedural regularity is a criterion that focuses on the extent to which the conduct of all elements in the industry respects the rules governing the service delivery arrangements. It is broader than legal compliance in that it includes attention to customary or traditional rules as well as laws. Procedural regularity does not require that participants act in accordance with rules out of their innate goodness. Rather, it measures the extent to which the incentives and constraints embedded in the structure of service delivery arrangements act to motivate participants to particular patterned behaviors, that is, those behaviors

consistent with the rules. Where gross deviations occur, it is likely to be a result of a poorly designed structure, and not the cupidity of participants.

Other criteria might be advanced as well. Aspects of effectiveness or productivity, for example, are embedded in the criterion of efficiency. That is, it would not be possible for a structure to be efficient in an economic sense without simultaneously being effective and productive. Fiscal compliance is simply one aspect of procedural regularity. Satisfaction, at least of consumers, is subsumed by responsiveness. It may be important for some purposes to include criteria that focus on attitudes and behaviors of participants, independent of their service delivery implications. Criteria such as morale, turnover, or absenteeism among producer employees, for example, are subsumed by efficiency and responsiveness as far as their implications for conduct and output. But they may be valued independently by some individuals and, thus, stand as additional criteria of performance. For purposes of the present study, however, I will focus particularly on responsiveness, efficiency, equity, and procedural regularity.

The Industry Approach Applied

The application of criteria in assessing performance requires the prior measurement of activities and consequences. While it is possible to discuss criteria without specifying the industry of interest, it is generally not possible to do so for activities and their consequences. Industry-specific procedures and time and place information provide the sources for the activities and consequences of interest.

In this study I attempt to use the framework of a public service industry to analyze the structure, conduct, and performance of one particular industry. First, however, in Chapter Two, I will elaborate a model of the production process of public industries. This process is sufficiently more complex than the production functions of private industries to warrant this additional attention. In Chapter Three, then, I will use the industry framework and this production process model to organize the theoretical arguments over the structure of one public industry, the delivery of police services, with particular focus on their delivery in residential neighborhoods. I will attempt to relate the recommendations of the many would-be reformers of American policing and the arguments of critics of reform to the industry framework, showing how they have argued that structural changes would affect conduct and, thus, performance. Chapter Four presents the data base for the empirical chapters. I discuss the difficulties in linking structure and performance empirically in studies of public industries. The requirements of studying a number of different organizational forms and of obtaining in-depth evidence for each may best be met by combining multiple data sets. In the chapter, I describe two sets that are used together for much of the analysis in the following chapters.

Chapters Five and Six present empirical evidence of structure to performance linkages. Chapter Five relates the structure of police service delivery arrangements to the conduct of police service producers, measured by their deployment patterns. Police deployment, then, is related to performance measured by patrol frequencies and by response capability. Differences in these are perceived by consumers and are

reflected in their assessments of police performance. Chapter Six explores several more linkages. Producer supply decisions are related to consequences for consumers in instances of criminal victimization. Measures of consumer concentration are then linked to consequences measured by spillovers of crime between jurisdictions and spillovers in police officer attitudes within jurisdictions. Consumer concentration is also related to consumer perceptions of the responsiveness of their service delivery arrangements.

Chapter Seven presents a summary of the evidence of Chapters Five and Six, showing that in the police industry, at least, structure does affect performance. Several directions for additional research using the public service industry approach for the study of policing are suggested. Suggestions for industry studies of additional public services are made also. An argument for the use of comparative research methods in such studies is presented, contrasting the possibility of gains using these methods to claims made for experimental or evaluative research.

FOOTNOTES FOR CHAPTER ONE

[1]Godwin and Shepard point out the important distinction between these questions in their article, "Political Processes and Public Expenditures" (1976).

[2]Two earlier studies of expenditure determinants are sometimes cited. These two, Beroltzheimer (1947) and Colm (1935), do not seem to have "caught on" as starting points for other students of expenditure determinants. Most of the latter trace their roots to Fabricant (1952).

[3]Prominent among those critiquing the ad hoc nature of expenditure determinants research are Miner (1963), Fisher (1964), Siegel (1966), Hirsch (1968), Melstner and Wildavsky (1970), Dajani (1973), and Scott (1976). As Scott notes, such criticism has become de rigeur (1976: 53).

[4]A good review of much of this research may be found in Hofferbert (1972).

[5]The quintessential statement of the findings of such research is by Dye, ". . . political variables do not count for much in shaping public policy" (1966: 297).

[6]Those who have critiqued the ad hoc nature of the work of political scientists in this area include Jacob and Lipsky (1968), Clark (1969), Fry and Winters (1970), Uslaner and Weber (1975), Godwin and Shepard (1976), Swant (1977), and Frey and Pommerehne (1978).

[7]Two other very important assumptions focus on measurement error and upon the intercorrelation of the influences. To compare the importance of two concepts in accounting for variance in a third, each concept must be measured with equivalent accuracy. In a situation where two concepts are, in reality, of equal importance, one more accurately measured will appear more important through the mathematics of the statistical calculation. This assumption applies to concepts, thus requiring accurate operationalization as well as accurate measurement. Hanushek and Kain, for example, fault the Coleman Report (Coleman, et al., 1966) for major operationalization errors with respect to the concept "schools." This, they argue, suggests that the no school effect finding in the Report was partially an artifact of poor operational indicators (1972).

Intercorrelations among measures of two (or more) influences make it impossible to separate their relative importance. This is obvious in a case of perfect correlation among two influences, one could easily

be substituted for the other in any statement of importance. It remains true for less than perfect intercorrelation. The fact that computation of presumed "importance" indicators, such as standardized regression coefficients or changes in variance, is possible in the absence of perfect correlation should not lead analysts to believe that the practice has any substantive meaning. Clear examples of the difficulties in such cases are available in Darlington (1968) or Duncan (1970).

[8]Godwin and Shepard (1976) provide a brief review of a number of studies adopting this point of view.

[9]Ashford (1978) critiques previous researchers for not using a definition of structural effects that is similar to Przeworski and Teune's statement of system effects.

[10]The data bases for these studies are quite different. Fried examines a cross-section of cities while Frey and Pommerehne examine national policy longitudinally. Direct comparison of findings is thus unwarranted for making substantive statements. It is done here to offer an example of the advantage of theory-based analyses in another setting than the American context of most such research. Frey and Pommerehne's analysis would have been even more germane to this discussion had they explicitly considered whether the relationship between the state of the economy and government expenditures changed as different parties were in power, using an interactive rather than an additive model.

[11]Summers and Wolfe's work is useful in that it draws upon data for the influence of school factors as received by individual students. They are able to avoid the (often implicit) assumption that all students in a given school or district receive equivalent school inputs.

[12]Recent methodological statements by several authors have made a similar point. See, for example, Wright (1976), Miller (1977), and Stonecash (1978).

[13]Political scientists studying policy determinants have often referred to David Easton's "systems analysis" as the framework underpinning their work (Easton, 1965). This underpinning is rarely developed, however.

[14]An early suggestion of the applicability of industrial organization concepts to the public sector can be found in Ostrom, Tiebout, and Warren (1961). More detailed discussions of this application include Ostrom and Ostrom (1965) and, most recently, Ostrom and Ostrom (1978).

[15]Broad overviews of the industrial organization framework may be found in Bain (1959: Chapter 1) and in Caves (1977: Chapter 1).

[16]Arguments over why markets may be inefficient or fail in the supply of particular goods and services have been common among economists and others. Bowen offered an early discussion in the American literature (1943). Samuelson (1954; 1955), Bator (1958), and Musgrave (1959) provide other early contributions. Many focus on the nature of particular goods and services as forcing market inefficiency or failure (Samuelson, 1954; 1955; Bator, 1958; Head, 1962; Olson, 1965; Ostrom and Ostrom, 1978). They focus, but not without disagreement, on attributes of appropriability, indivisibility, and jointness in consumption. Others have argued that considerations in addition to the nature of goods are required. Musgrave (1959) and later, Steiner (1969), discuss instances where goods or services might be efficiently supplied through market arrangements, but where a substantial number of consumers desire, and would be willing under appropriate rules to pay for a different distribution of output than the efficient market would supply. I do not believe a definitive statement is possible (or necessary) for the purposes of this study. I will use arguments based on the nature of goods and services to develop the case for public supply. But, recent attempts to estimate the "publicness" of goods and services that are typically supplied by public industries in the United States suggest that other important influences are at work as well (e.g., Borcherding and Deacon, 1972; Bergstrom and Goodman, 1973).

[17]Several recent studies funded by the National Science Foundation have focused on particular industries in the public sector. These include police (Ostrom, Parks, and Whitaker, 1978), fire protection (MacGillivray, et al., 1977), and solid waste collection (Savas, 1976). Each of these efforts involved the specification of industry boundaries in ways that facilitated the research objectives. Others who have characterized public service delivery systems as industries include Grodzins, discussing recreation (1966), and Froomkin, Jamison, and Radner for education (1976).

[18]Fuchs wrote of "the importance of the consumer as a cooperating agent in the production process" for service industries generally (1968: 194). Garn and his colleagues emphasize the importance of client/consumer roles in production also (1976). Coproduction, as it is labeled here, is an essential research interest of colleagues at the Workshop in Political Theory and Policy Analysis, Indiana University. Recent works in our development of this notion include Bish and Neubert (1977), Ostrom and Ostrom (1978), Whitaker (1978), and Percy (1978).

[19]It has become quite popular to emphasize the citizen's responsibility for crime control. Statements by the National Commission on the Causes and Prevention of Violence (1969: 278) and the National Advisory

Commission on Criminal Justice Standards and Goals (1973b: 1-2) emphasize citizen importance. The National Institute of Law Enforcement and Criminal Justice has recently identified citizens as the "linchpin of the crime control apparatus" (1977: 7). A cynic might note that these statements have become increasingly popular as heavily-funded professional actions to control crime have proved to be less successful than promised.

[20]My use of these terms derives from earlier developments by Ostrom, Tiebout, and Warren (1961); Ostrom and Ostrom (1965; 1978); and Savas (1976).

[21]The defining services were general area patrol, traffic patrol, traffic accident investigation, burglary investigation, homicide investigation, radio communications, narcotic and chemical laboratory analysis, entry-level training, and adult detention. The study was limited to small- and medium-sized Standard Metropolitan Statistical Areas by the original program solicitation, National Science Foundation 73-28. The intent of that limitation was to focus attention on less studied areas of the nation. Providers were not explicitly identified in the study, though their presence was implied by the definition of consumer service areas, requiring "some way of making collective decisions about police services in the area" (Ostrom, Parks, and Whitaker, 1978: 27).

[22]Autonomous provision and production of general area patrol and burglary investigations was found in more than half of the service areas identified in a recent study of police service delivery arrangements in metropolitan areas (Ostrom, Parks, and Whitaker, 1978: 171-172). Lesser amounts of autonomy were found for other direct services (e.g., traffic patrol, traffic accident investigation, or homicide investigation), or for any auxiliary services.

[23]Kramer (1977) provides a listing of state statutes governing such cooperative, interlocal agreements.

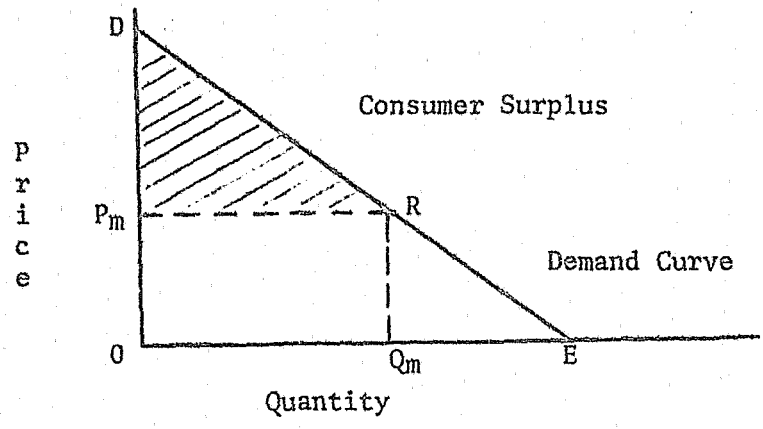
[24]"Ideal conduct" as used here means conduct that would maximize the responsiveness and efficiency of service delivery.

[25]I do not wish to appear overly cynical. It is true that many participants behave in ways that are not greatly at odds with what would be ideal. If a great many did not, probably no structure of service delivery arrangements would work very well. But, as the road to hell is paved with good intentions, so the road to institutional failures may be paved by the belief that all participants have a desire for ideal conduct as their sole or major motivation. Adam Smith warned us not to rely on the goodwill of the butcher for our meat, but rather to attend to his self-interest. We ought to be similarly attentive to the self-interest of participants in public service industries.

[26]To say that election constraints are imperfect does not mean we should not use them. Just as weak markets may be better than possible alternatives, so electoral constraints may be the best of an admittedly imperfect set of possiblities. Weakness in one alternative arrangement does not imply that there is necessarily a better one to be found (McKean, 1965).

[27]Consumer surplus is an economic concept that can be understood by reference to the simplified demand curve in Figure 1. This line, DE, shows the amount or quantity of a good that consumers would buy at each price. In a competitive market, price might be P_m and the quantity purchased Q_m. In that market all units of the good would sell for price P_m, even though, as the curve shows, consumers would have been willing to pay higher than P_m for some units. At price P_m, producers get a total revenue represented by the area OP_mRQ_m. Consumers would have been willing to pay as much as $ODRQ_m$. The difference, represented by the triangle P_mDR, is what is called consumer surplus (Mishan, 1973). Supposing that a public producer knew the collective demand curve, DE, he might offer an all-or-nothing package of output to a provider at a total cost equal to the triangle ODE, thus capturing every bit of value that consumers would be willing to exchange for the service in question, leaving no consumer surplus (Niskanen, 1971).

Figure 1. Demand Curve and Consumer Surplus



[28]Where the costs of controlling producer behavior (e.g., through monitoring) are very high, it may be in the provider's interest to put loyal followers into positions in the producer organization. If the fortunes of these loyalists are tied to those of the provider, they will be less likely to exploit the producer's advantage. This may result in some inefficiency, but the net loss to the provider (and, ultimately, to consumers) may be reduced (Breton and Wintrobe, 1975: 201). This logic may offer a compelling argument for the return of patronage systems to many reformed public bureaucracies.

[29]Publications of the International City Management Association such as The Municipal Yearbook or those available from the Census of Governments may be used for just such purposes. Critics point out that this usage tends to sanctify the "golden mean" and, often generates pressure for ever increasing public employment. Public managers who are able to show that their organization is below the average number of employees per capita, for example, may argue that this is prima facie evidence of the need to hire more. Since hiring is usually much easier than firing for most public producers, all producers may find themselves in constant pursuit of an ever-increasing average.

[30]A further source of inefficiency may be endemic to public producers. This is a conversion of the principle, "equal pay for equal work," to a pernicious variant, "equal pay for equal rank." In practice, then, a police officer working in a high demand beat assignment, perhaps involving substantial personal danger, must be paid the same as other officers in the same jurisdiction who patrol quiet, suburban beats. A teacher working in a difficult inner-city school can be paid no more than one in a quiet, neighborhood school. As a result, all salaries must be posted at a level that will secure personnel to work in the most difficult assignments. Moreover, as public employees gain skills associated with longer time on the job, their seniority may give them preference in selecting assignments. Perversely, this may lead to the assignment of the best personnel to the easier jobs, with the less skilled, junior personnel forced to handle the most difficult areas (Katzman, 1971; Reiss, 1971).

[31]A friend gave me an example from Sweden. Passers-by on a public street would not allow him to park in a space labeled with a "No Parking" sign. They insisted that it was illegal for him to do so and appeared to feel that he either could not read the sign or was mentally disturbed. This particular proprietary interest in a common property is not much in evidence in most American cities.

[32]Providers too may have incentives to discourage coproduction if it reduces the amount of funds available from extrajurisdictional sources. To the extent that such funds are tied to cash expenditures by local governments, coproductive efforts by citizens that reduce local expenditures cut into the base for determining the amount of external funds available.

[33]This attention to diverse constituencies for measures was suggested by Connolly and Deutsch (1978) and, earlier, by Whitaker (1974). The identification of diverse criteria to apply to activities and consequences in assessing performance has been a continuing concern of the author and colleagues (e.g., E. Ostrom, 1973; Ostrom, et al., 1978; 1979).

[34]One of Simon's many insights was that choices could always be made among equal cost alternatives. If one alternative was initially less costly than another, the former should be converted into a new alternative, incorporating the costs and results of the first, plus the difference in costs between the two original alternatives and the maximum results that could be obtained by applying that difference in any way. This supplies a common measure for at least half of a given comparison. Of course, value must be attached to diverse results so as to make them commensurable also before determination of the preferred alternative is possible (Simon, 1961).

[35]M. J. Farrell refers to the attainment of maximum outputs with given inputs as "technical efficiency," while the attainment of a given output with the least cost combination of inputs given their prices he calls "price efficiency" (1957). Farrell's article is an excellent discussion of efficiency, particularly of the empirical difficulties in measuring or comparing the efficiencies of diverse firms or industries.

[36]Moran argues that this third requirement, linking services to benefits for consumers has been virtually the sole focus of evaluation research as it is currently practiced. While recognizing the importance of this link, he argues that such research must consider two prior links as well, those that Farrell characterized as technical and as price efficiency (Moran, 1977; Farrell, 1957). Evaluation efforts that do not account for the costs of the evaluated alternatives, for example, are certainly less useful than those which are concerned with relative costs.

[37]Concern for the diverse meanings which may be appropriate for considerations of equity is evident in several recent works. Miller offers a set of meanings that is quite similar to my own (1977). Whitaker and Mastrofski offer an extended list ond operationalize the several meanings in a study of police services (1976). Others dealing with the meanings of equity in diverse situations include Lineberry (1977) and Levy, Meltsner, and Wildavsky (1974).

CHAPTER TWO

THE PUBLIC SERVICE PRODUCTION PROCESS

In studies of private sector production arrangements, it is common to speak of production functions and cost functions. The former states the relationship between units of output and quantities of inputs, indicating the combinations of inputs required to produce given amounts of output. The latter states the relationship between units of output and the cost of their production, taking into account the prices of input factors under the assumption that they are optimally combined. Production function information is necessary to discuss the technical efficiency of a firm or an industry. Technical efficiency is the degree to which inputs are combined so as to achieve the maximum output obtainable with a given array of inputs. Cost function information is necessary to consider price efficiency. The latter is the degree to which a firm or an industry chooses and combines inputs in proportions that reflect both their relative productivity for output and their relative prices in the market. Both technical and price efficiency and, thus, knowledge of production and cost functions, are necessary for productive efficiency in private industries.

In public service production, the picture is more complex. For one reason, knowledge of an additional functional relationship, linking service outputs to benefits that are received by consumers, is required for efficienct production. For another, consumers play an integral role in production itself in the public sector. They act, for many services,

as essential coproducers of an industry's results. Finally, service conditions, the environment in which services are produced, often play a much larger role in constraining industry production possibilities in the public sector than they do in the private. For these reasons, then, it may be more useful to speak of a production process when studying public service supply, rather than production and cost functions. The latter functions, then, are a part of this production process.

A Model of the Public Service Production Process

Viewing public service production as a process serves a heuristic function, drawing attention to a number of important elements in the process that might be overlooked in specifying production and cost functions. The essential elements of a model of public service production include the following:

- Organizational arrangements,
- Service conditions,
- Input factors,
- Production strategies,
- Producer activities,
- Consumer activities,
- Outputs, and
- Outcomes.[1]

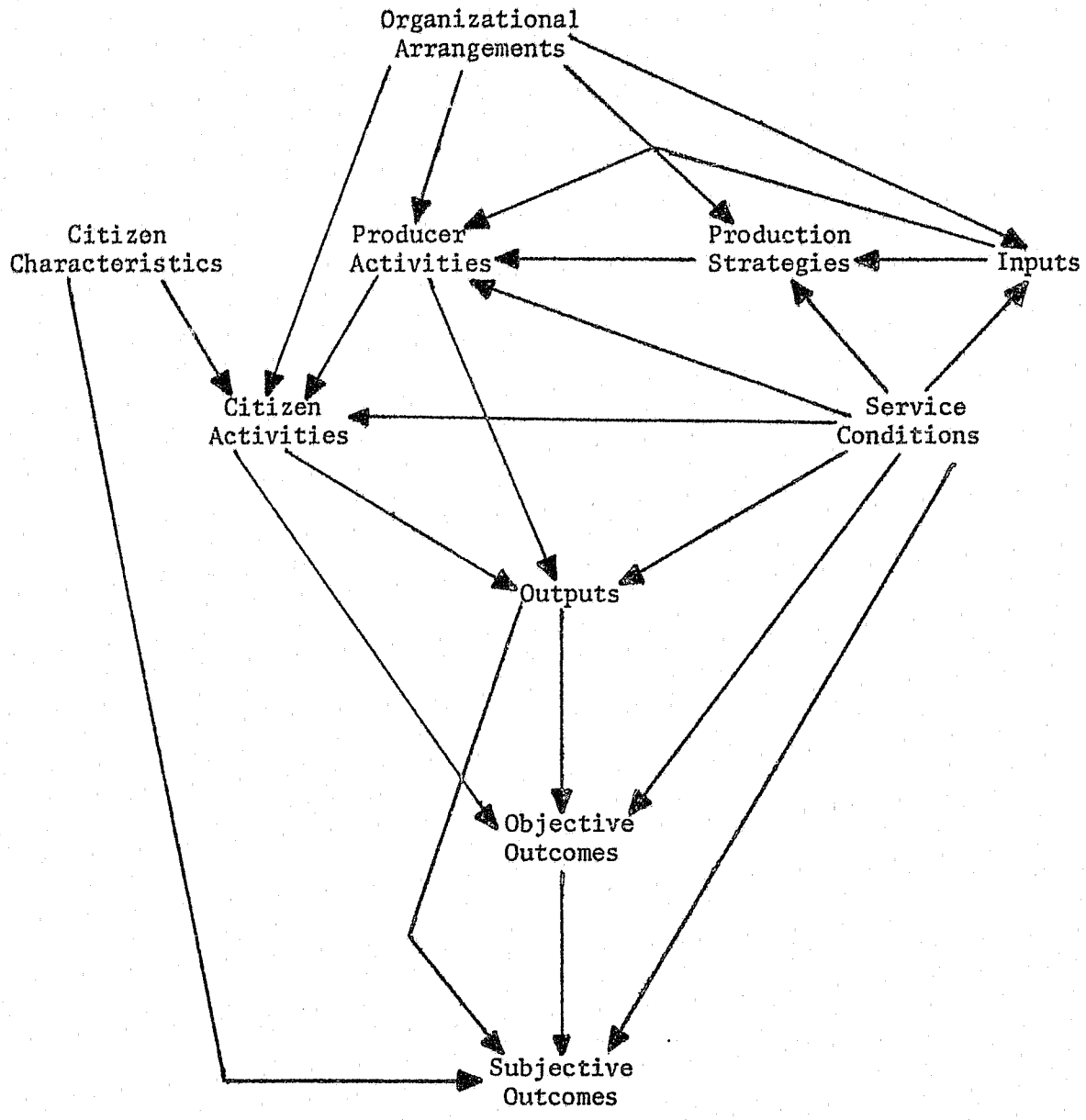
Putting the model that links these elements together in words, the organizational arrangements for production in a given area, together with the service conditions in which those arrangements must operate, act to influence the level and the types of inputs made available for production. They also influence the ways that inputs are employed, the production strategy that producers choose to follow. The choice of production strategies, in the context of given inputs and service conditions, influences

and constrains the activities of producer personnel. The activities of the citizens served by given arrangements, in their roles as consumers and as coproducers of the service, are influenced by their own characteristics, by the organizational arrangements, by the service conditions, and, perhaps most importantly, by the activities of producer personnel. Citizen and producer activities, in the context of the area's service conditions, lead to results that may be grouped as outputs and outcomes.

Figure 2.1 presents a pictorial view of these relationships. Each of the elements in the model consists of a cluster of variables. Thus, each of the linkages shown is actually a set of relationships. The arrows represent general directions in which influences are presumed to flow, not simple causal links. The heuristic function of the model is to draw attention to each of the multiple elements and to provide a systematic way of considering their relationships. The model is not one that might be operationalized and tested as such. Specific organization, environment, activity, and result measures, among others, are necessary to empirical investigations of the relationships among the elements. But attention to the complexity of the model as shown may help to avoid overlooking important relationships or drawing unwarranted generalizations from analyses of partial relationships.

In the remainder of this chapter, I will discuss each of the clusters in this process model. The discussion will focus on variables that are characteristic of each cluster across diverse public services and how they might be expected to be related across clusters. In the following chapter, I will focus more directly on variables appropriate to the study of police service production.

Figure 2.1. The Public Service Production Process



Organizational Arrangements

Organizational arrangements for production in an industry include the number and types of agencies producing one or more related service and the range of related services that each is authorized to produce. Other aspects of organizational arrangements include the ways through which producers are related to one another for purposes of service exchange or purchase, and how producers are related to consumers and to providers.

Organizational arrangements for service production might, for example, be such that a single production unit supplied all related services in the industry.[2] This unit would produce all of the services that were supplied directly to consumers and would produce its own auxiliary services, those necessary to the production of direct services. This model of organizational arrangements is often proposed by advocates of the reform of service delivery arrangements in American metropolitan areas (e.g., Committee for Economic Development, 1966; 1972). It would imply a single, consolidated police agency for a metropolitan area, for example, and a single school corporation, fire department, solid waste collection agency, and air pollution control department, among others.

As an alternative, service production might be vertically or horizontally differentiated. Vertical differentiation might exist for services using highly trained specialists or expensive, special purpose equipment for their production.[3] Separating the production of these services and assigning them to focused, single purpose producers could lead to improved production. Their separation would allow increased attention to the production and cost functions of these specialists.

Vertical differentiation of specialized services might, in turn, facilitate horizontal differentiation of industry production.[4] Separate producers for less specialized services could be established at scales below that of the entire industry, and could draw on services from the vertically differentiated specialists when needed. In such an organizational arrangement, local police agencies might produce patrol and immediate investigation services, but draw on specialists from separate agencies for laboratory analyses or recruit training. Local school districts might supply basic instruction in reading, writing, and arithmetic, but call on specialists from another producer for art instruction, music, or student counseling. Such arrangements are, in fact, common among many public service industries.

Where industry differentiation occurs, important considerations are the number and relative sizes of the multiple producers and the relationships among them. Many horizontally differentiated industries are simply collections of small, local monopolists, at least with respect to production of the bulk of their related services. Yet even these may have extensive agreements for cooperation and coordination of production for some services, especially in prespecified circumstances. Mutual-aid agreements, for example, are common among otherwise distinct producers of emergency services.

Competition among producers may exist too where industry differentiation is found. Production units may bid against one another with particular providers to supply part or all of their required services to their consumers. Where competition among producers is possible, private, for-profit firms may be led to enter the industry.

Organizational arrangements are important for service production in two ways. First, the horizontal and vertical differentiation of the producers in an industry and the resulting distribution of production unit sizes and functions determine the extent to which economies-of-scale can be captured and diseconomies avoided in the production of the related services that are supplied by the industry. Where the efficient production scales of several related services are quite different in a given industry, some vertical differentiation is required to match production units to those scales. Where the efficient scale of production of some services is less than the output of the entire industry, horizontal differentiation among parallel producers is necessary to avoid scale diseconomies.

Second, organizational arrangements are important as they provide incentives and constraints to individuals in the industry. As argued in Chapter One, the structure of an industry exercises important influences over the conduct of industry participants by affecting their strategic choices through the incentives and constraints presented by the structure. The organizational arrangements for production are a major part of any industry's structure. They can be expected to exercise substantial influence over the strategic choices of producers in particular.

Service Conditions

Service conditions include the social, economic, and demographic characteristics of consumers in an industry, the geographic and climatic characteristics of an industry's service area, and the activities and outputs of other industries where they affect demand for its products or its cost and production functions. Service conditions are variables that

are exogenous to an industry, but affect variables or relationships that are endogenous. To be a relevant service condition, a variable must appear as an argument in the industry's cost function, production function, demand function, or in the function specifying transformation of industry services into benefits to consumers. So, for example, geographic conditions such as terrain roughness and areal extent of the industry may affect the cost functions of many service industries through increased transportation requirements. Consumer income may affect the demand for an industry's output, with demand for industry products rising along with demands for all other goods and services as income rises. On the other hand, increased consumer income may reduce the demand for services of some industries if consumers have preferences to substitute services from extraindustry sources as their income rises (e.g., wealthier consumers may prefer to call on marriage counselors or psychiatrists to deal with family disputes, rather than calling police or welfare workers). Outputs of other industries can have major effects. For example, constraints on fire suppression production functions are imposed by the output of the local water industry. Where water lines have not been extended or are of insufficient capacity, a different technology relying on large tank trucks for water or for chemical fire suppressants must be substituted for conventional pumpers.

Without consideration of a specific industry, it is impossible to consider all of the types of influences that fall under the service condition rubric. These examples may give the flavor of what is meant. In Chapter Four the service conditions relevant for police services in residential neighborhoods will be explored in more detail. That exploration

may help to further illustrate the kinds of variables that comprise this cluster.

Input Factors

Public service industries may be partially divided among those that are very labor intensive: police, education, or welfare services, for example; and those that rely quite heavily on capital inputs: water development and supply or sewage disposal are examples. Some may be intermediate where technology dictates a substantial mixing of personnel and equipment for their production. Fire protection services and solid waste collection might fall in this range. Such differences in types of input factors employed in an industry may have important influences on producer strategies and conduct.

Those industries that employ large numbers of personnel in their production activities are typically those where face-to-face interaction with consumers is an important component of the production process. In these industries, consumer coproduction is much more important than it is, for example, in those industries where consumers can be viewed as essentially passive recipients. Without active consumer cooperation in the production process of these labor intensive industries, the efforts of producer personnel may be wasted.

Labor intensive service industries are problematic from another perspective as well. Typically their productive activities are very widely dispersed; examples include: police activities at the scene of a crime or call for service, teacher activities in individual classrooms, or welfare worker activities in the homes of consumers. Supervision by superiors in a producer hierarchy may be very costly and, often, impossible.

Those at the lowest level in the hierarchy, what Lipsky (1976) called the "street-level bureaucrats," thus may exercise the most control over the production process (see Prottas, 1979).

In labor-intensive industries with dispersed production, a great deal of attention may be paid to the quality of the personnel inputs, emphasizing extensive training in standards of "professional" conduct with the aim of regularizing production activities in the field. Of course, such training, if it is to have beneficial effects for service production, must be based on knowledge of how producer conducts of various sorts affect service outputs in diverse situations. That knowledge may be seriously lacking in many public service industries. Indeed, the very diversity of situations that producer agents confront may dictate that on-the-job training is the primary means of learning in practice, although not always acknowledged.[5] Where that is the case, service delivery arrangements that facilitate feedback from consumers to individual producer agents as to the efficacy of their activities may be very important for this training. If such feedback is short-circuited, even the best trained producer agents may become ineffective, engaging in activities that produce net costs rather than benefits.

Production Strategies

Production strategies are a key cluster in the production process model. They are the choices made by producers with respect to the employment, allocation, and deployment of input factors in light of service conditions. The choice of production strategies constrains the range of activities in which producer agents may engage. By choosing to emphasize production of particular types of services, other, related

services may suffer resource reductions. In the production of police services, for example, emphasis on the production of specialized investigative services may lead to the assignment of many officers to special squads that do not have regular, on-street duties. This may dramatically reduce the number available for patrol and immediate response activities (Ostrom, Parks, and Whitaker, 1973; 1978). Similar choices may be made by educational producers. They may choose to offer particular mixes of enrichment or skill training at the expense of some basic teaching of reading, writing, or arithmetic.

Production strategy choices are not made in a vacuum, however. They are responsive in varying degrees to service demands. They may be responsive to the availability of service spill-ins from other producers in an industry, or to requests for service spill-outs to other producers. Choices may be influenced by the availability of external funds for some subset of assignments or activities. They are also likely to be responsive to the internal demands of producer personnel and the preferences of top administrators in producer organizations.

Service conditions may pose demands that constrain the range of production strategy choices that can be made. Where, for example, high volumes of through traffic flow are present in a jurisdiction, the police producer for the jurisdiction will probably allocate a larger proportion of personnel to traffic control than would otherwise be the case. A school district with a large proportion of students whose primary language is not English will often assign extra teaching resources to bilingual classes. Welfare agencies serving a predominantly elderly clientele may adopt very different production strategies than ones with a younger, more mobile population.

Producers may take service spill-ins into account in choosing their production strategies. Small police agencies that assign the great majority of their officers to on-street patrol duties are sometimes said to exploit larger police producers in the same industry by relying upon them for specialized investigators, training, laboratory analyses, and the like. Where large producers make such services freely available to other, smaller producers, the latter are clearly less constrained in their allocation choices than might otherwise be the case. Larger producers, on the other hand, may use the service requests from these smaller producers to justify resource allocations that providers might otherwise question. They may be better able to respond to internal demands as a result of these service spill-out opportunities.

There may be attractive financial incentives for producers to adopt particular production strategies. Police agencies in recent years have been offered incentives in the form of additional patrol vehicles and at least partial reimbursement for the salaries of officers assigned to traffic control duties. At the postsecondary school level, educational producers have been offered substantial financial incentives to establish specialized programs in a number of academic areas. In fact most grant programs of a categorical nature are aimed at altering the production strategies of the producers who receive them, inducing them to emphasize particular activities that are different from what they would otherwise choose.

Finally, production strategy choices are likely to be influenced by demands from internal producer personnel. In many public producers, opportunities for differential reward systems are severely constrained

by civil service or similar regulations requiring equal pay for equal ranks. Proliferation of ranks through creation of specialized assignments, or the attachment of bonus payments to specialized assignments within ranks may be the only means for administrators to respond to the preferences of their personnel for differential rewards.

The ways in which producer administrators respond to various influences in choosing their production strategies should vary with the structure of service delivery arrangements. Where producers are constrained to attend closely to the preferences of consumers or providers, it may be that service conditions affecting demand are the most important influences. Where these constraints are weaker, internal demands may have more influence. The availability of service spill-ins and financial incentives may act to reinforce these patterns or, in some circumstances, to counteract them. Attention to these separate influences on the choice of production strategies under different service delivery arrangements is most important for examining how structure influences conduct.

Producer Activities

Producer activities are the processes involved in converting inputs to outputs. In the production of private goods, activities comprise the technology that is summarized by the production function. The essential nature of activities is that they are perceived to be instrumental to achieving some objective and, thus, are not, at least in theory, valued objectives in and of themselves.

Police officers drive about their assigned sector or beat and respond to dispatcher-assigned service calls. Teachers prepare lesson plans and draw up course syllabi for their students. Welfare workers interview

their clients and may contact potential employers for them. These are all activities of producer agents. Several aspects of these producer activities are particularly interesting in public service production.

For many producer activities, their instrumental nature is assumed, but often not proven. In policing, for example, recent research in Kansas City, Missouri, on the efficacy of police patrol activities has called into question the usefulness of conventional patrol practices (Kelling, et al., 1974). A RAND Corporation study of common police investigatory activities has questioned their utility also (Greenwood and Petersilia, 1975). Practices that are employed by most police agencies in the country and that have been prescribed by police administration experts over the years were argued by these researchers to be basically ineffective at producing their intended outputs. These research results have not been accepted uncritically, particularly by police practitioners (e.g., Davis and Knowles, 1975; Larson, 1975; Gates and Knowles, 1976). The interesting point about the research efforts, however, is that they represent perhaps the first efforts to examine empirically whether producer activities really were instrumental to outputs as assumed. Whether conclusive or not, they demonstrated that the relationships were not as clear-cut as proponents of particular activities had assumed. It is quite reasonable to assume that similar efforts in other service areas would raise similar questions as to the efficacy of many common producer activities. This observation may reflect the nature of producer and provider relationships in many public service industries where, as argued in Chapter One, producers have strong motives to conceal production function information so as to increase their

bargaining strength vis-a-vis providers.

Whether producer activities are instrumental or not, they often become valued for themselves, particularly as they come to be used to monitor producer employees' performance. Where use of internal activity measures for performance assessment is common, employees are motivated to engage in activities that may improve their scores, rather than those that might be more instrumental to preferred outputs. Such goal displacement, from outputs to often more measurable activities, is frequent enough to have received regular comment from students of bureaucracy over the years (e.g., Selznick, 1943; Etzioni, 1964; Peter and Hull, 1969). Its occurrence in police work, for example, has been detailed recently in Jonathan Rubinstein's vivid description of "activity" as the "internal product" of policing in Philadelphia (1973).

Finally, producer activities ought to be the focus for application of some performance criteria. Attention to procedural regularity in the conduct of activities may have important symbolic value as well as instrumental (e.g., Reich's discussion of trial procedures as symbolizing the importance attached to any possibility of removing an individual's liberty, 1977). Where activities are shown to be instrumental to the production of valued outputs, it is still possible to inquire as to their efficiency as compared with alternative activities aimed at producing similar outputs. Moreover, questions of the equity of service delivery may focus on the distributions of various producer activities, as well as on inputs, outputs, or outcomes (e.g., Mladenka and Hill, 1975; Lineberry and Welch, 1974).

Producer activities are dictated in part by the production strategies employed. The quality of activities may, for example, be enhanced if,

through specialization in one or a few routine activities, agency personnel become particularly proficient in them. Obviously, the availability of personnel to conduct particular activities will be constrained by the deployment strategies of a producer. Thus, specialization in one or a few activities, while perhaps beneficial for the conduct of those activities and the production of outputs to which they are instrumental, may be detrimental to the conduct of other activities of equal or greater importance to the production of outputs valued by consumers. Whether this occurs in particular industries is, in turn, partially attributable to the structure of those industries as it affects consumers' ability to constrain producers to preferred outputs.

Citizen Activities

Until recently the activities of citizens as consumers and, more important, as coproducers of public services have been substantially ignored. Fuchs (1968) noted the role of consumers in service economies generally, but few, if any, studies of the production of public services have included much attention to the contributions of citizens. Yet, for many services, particularly those which require face-to-face interaction of producer agent and consumer, virtually nothing of value might be produced without a good deal of citizen activity.[6]

Parents coproduce their children's education when they insist on hours devoted to study or review the children's lessons. Children co-produce their own education when they pay attention in class and read their assignments. Citizens coproduce their own safety from crimin activity when they call the police to report suspicious circumstances

in their neighborhood, patrol with neighborhood groups, and install home protection devices (Pennell, 1979; Percy, 1978). Reiss reported how the great majority of police activities were initiated by citizen requests (1971). In actual encounters between police and citizens, the activities of citizens may be as important determinants of outcomes as those of the police officers (e.g., J. Goldstein, 1960; Black, 1970). Coproduction by citizens is probably an important element in the delivery of most public services (Garn, et al., 1976; Whitaker, 1978).

The likelihood that citizens will engage in coproductive activities and the character of their activities is influenced by characteristics of citizens themselves. Wealthier persons may, for example, feel that they have more to protect and more to invest in self-protective devices such as watchdogs, dusk-to-dawn light, or burglar alarms. Older, retired persons, or those who are otherwise unemployed may have more time to devote to group coproductive activities. Clearly, parents of school-age children are more likely to serve as teacher's aides or to otherwise engage in educational coproductive activities than persons without children.

In addition to characteristics of citizens, however, the structure of service delivery arrangements and the activities of producer personnel are likely influences on citizen coproduction. Citizens confronting a large, impersonal bureaucracy may find themselves changed from consumers to clients in the eyes of producer agents (Prottas, 1979). As such they are viewed as raw material to be worked upon and not actors in the production process. Any coproductive acts are likely to be discouraged. On the other hand, a certain minimum producer activity may be required

before citizens will volunteer coproductive efforts of particular kinds. Citizens who perceive a high level of police patrol and, thus, the ready availability of patrol officers, are more likely to call the police to report suspicious circumstances than those who perceive a very low level of police activity.

Outputs

The activities of producer agents and citizens lead to consequences. Consequences may be separated conceptually into outputs and outcomes. This distinction involves two underlying dimensions. The first has to do with the degree of producer influence on the consequence. The more it may be attributed to the activities of producer agents, the more a consequence partakes of an output. Where producer activities are necessary, but substantial consumer activity is required, or where attributes of service conditions are strongly predetermining, the consequence becomes more of an outcome. The second, not necessarily orthogonal dimension has to do with whether the consequence is one to which consumers would attach value, or is one of primarily internal relevance for a producer.[7] Police outputs might include the number of arrests made or the distribution of response times to citizen calls for service. Outcomes paralleling these might include a jurisdiction's crime rate and the perception of their safety among jurisdiction residents. Outputs of a school might include the number of students receiving a specified amount of in-class instruction. Outcomes would include the achievement improvements of those students.

Outputs are not direct indicators of performance. As with all measures, they require the application of performance criteria by

interested constituencies to be so considered (see Chapter One). Many outputs of public service industries are characterized as workload measures (Urban Institute and International City Management Association, 1974). They constitute aggregations of the volume of activities and, as such are often criticized for their lack of evaluative content. The American Bar Association, for example, argued that the number of arrests made by police officers was analogous to the number of operations performed by doctors (1973: 279-280). Without accompanying measures of arrest quality and disposition, they argued, it was a meaningless figure.

In spite of these criticisms, outputs are important elements in the public service production process. Measures of output quantity, whether simple aggregations of activities or measures of the immediate consequences of those activities, are the substance of producer reports to providers (e.g., Parks, 1971). Producer outputs are those things that producers are ostensibly trying to accomplish with their activities. Often all participants in service delivery may agree that outputs are valuable only as they contribute to valued outcomes, but when pressed to demonstrate their productivity, producers are apt to supply lists of outputs. Just as it is often unclear whether producer activities actually contribute to the production of outputs, however, it may often be unclear how those outputs contribute to the outcomes of public service production.

Outcomes

Outcomes, to borrow a phrase from Levy, Meltsner, and Wildavsky, are the "so what" of public service production (1974: 1). They are the

consequences of primary interest to consumers. As such, they are the valued objectives that lead to the establishment of public service industries. They are rarely, if ever, the sole result of producer activities and outputs. Usually service conditions and consumer activities are important influences on them, more important influences than anything producers may do in some cases.

Because outcomes cannot be directly attributed to producer activities, some have argued that they should not be considered in assessing producer performance or, by extension, the performance of a public service industry. Levy, Meltsner, and Wildavsky (1974), for example wish to restrict the term "outcomes" to the distribution of outputs. They argued that the effects of such distribution on the lives of consumers (what they called "impacts") were essentially unknowable. However, by restricting attention to outcomes that are thought to be closely related to the activities and intended outputs of producers and consumers in an industry, those outcomes should be useful in assessing performance.

To argue that outcomes cannot be used in assessing performance is to miss the point of why public service industries are established. Consumers, who are often financing taxpayers as well, value the outcomes of such industries, not their outputs. Citizens want to purchase safety from criminal attack. They may believe, along with many police producers, that frequent patrols are important contributors to such safety. But the service they want is safety, not patrols. Likewise, they want to purchase education for their children, not hours of lectures by teachers. They want some quantity of relatively smooth streets, and not so many

miles of paving by road crews. Thus, given the use of the industry metaphor, it seems important to include the services as preferred by consumers, the outcomes, as well as those supplied by producers, the outputs, in this discussion of the production process.

Outcomes may be conveniently separated into objective and subjective categories. No valuation is intended by this split. Subjective outcomes are just as "real" as objective, though they may be less amenable to measurement. Objective outcomes are results of producer and consumer activities and outputs in particular service condition environments, where the results exist independent of consumer perceptions or evaluations of them. In policing, objective outcomes include crime or victimization rates, crime-related insurance costs, police warrant success and arrests that survive initial judicial screening, traffic flow rates and accident rates, the volume of family disturbances quieted (at least temporarily) by police intervention, and the number of general service requests where police officers are able to help with the problem at hand. In education, objective outcomes include student achievement improvements in a variety of subjects and improvements in their observed adaptation to their school and community environments. In welfare industries, objective outcomes include job placements that last for some period of time, increased family stability, and, perhaps, withdrawal of a family from welfare rolls.

Subjective outcomes involve consumer perceptions and evaluations of the content and results of the services they receive. In police, again, subjective outcomes include citizen perceptions of the likelihood of criminal attack in their neighborhood and, more generally, of the job

done by local police. The latter includes perceptions of officer courtesy and fairness and well as technical skill at their work. In education, subjective outcomes would include students' perceptions of their own competency in various skills and their feelings of integration into their school and community. Subjective outcomes in welfare may include consumers' perceptions of competency to handle their own affairs. The fact that subjective outcomes lie within the minds of consumers rather than existing as physical objects that might be counted should not obscure their importance for assessing industry performance. Fear of crime may, for example, be as costly and debilitating as actual criminal depredation. As such, it should have equal standing with crime or victimization rates in assessing performance.[8]

The Process Model Applied

The model of the public service production process that has been presented in this chapter is complicated. Yet any model such as this is a simplification; the real world is more complicated. A modeler confronts a tension between overly complex models that may be more isomorphic to the real world and overly simplified models that are too abstract for their implications to have real world applicability. By viewing public service production as a process as has been done here, I hope to move closer to a realistic representation of such production than would be possible by a focus solely on cost and production functions for industry outputs. At the same time, by including outcomes in the process, I wish to move beyond the claims of "strict constructionists" who might argue that, since influences beyond those of producers affect

outcomes, outcomes should not be considered in assessing industry performance. I hope that the added complexity will pay off in fruitful analyses based on this conception of the production process.

In the chapters to follow, operational indicators will be attached to variables in the clusters of this model. Relationships among these indicators will be specified and those relationships will be explored with empirical data from a single service area. The analyses of these relationships drawn from the model will be informed by the broader structure, conduct, and performance framework presented in the preceding chapter. As the proof of any pudding lies in the tasting, so the usefulness of these conceptions of public service industries and public service production processes may be demonstrated in those chapters.

FOOTNOTES FOR CHAPTER TWO

[1]This conception of a production process model is a modification of the model shown in Ostrom, et al. (1978). It derives from a series of increasingly complex conceptions of a production process that has been developed over several years. For an early statement of the model, for example, see Ostrom, Parks, and Smith (1973).

[2]Industry boundaries might, for example, be drawn to include all residents of a given metropolitan area. While boundaries, as argued in Chapter One, are somewhat arbitrary, this usage would be consistent with that of many would be reformers of metropolitan government and service delivery.

[3]Vertical differentiation (or vertical disintegration) in an industry is often found where a given part of the production process requires a scale of production larger than that offered by any of the production units in the industry in order to exhaust economies-of-scale. In such cases, a specialist production unit may come to be established to supply this particular part of the production process to all participating production units (Robinson, 1958). In the lawn mower industry, to supply a homely example, Briggs and Stratton may supply gasoline engines to a very large number of otherwise independent producers. In public services, a state division of cooperative education services or a state police force may supply some services to all of the independent school districts and police agencies in a state.

[4]Horizontal differentiation, as used here, means there are multiple units producing the same services in a given industry. As noted in the text, the most common pattern of horizontal differentiation in public service industries is a mutually exclusive set of local monopolists.

[5]The importance attached to on-the-job training, often as a relearning process following formal training in approved conducts, has been illustrated most often in accounts of policing. Rookie officers are most often assigned to experienced patrolmen for their on-street training and the first lesson they are given is, in effect, "forget all that crap they taught you in the academy." See, for example, the descriptions of this phenomenon by Rubinstein (1973) and the very similar account by Van Maanen (1974).

[6]Colleagues at the Workshop in Political Theory and Policy Analysis, Indiana University, and myself have been wrestling with defining coproduction in a rigorous sense. Our most recent view is that coproduction occurs when a functional relationship of the following kind represents the quantity of good or service j available to consumer i:

$$Q_{ji} = f(P_j, C_{ji}), \text{ where}$$

$$Q_{ji} = 0 \text{ if } P_j = 0 \underline{\text{ or }} C_{ji} = 0.$$

In this function, P_j represents the quantity of input supplied by the nominal producer of the good or service, and C_{ji} represents the quantity of input supplied by consumer i. Many common public services may require strong input of C_{ji}'s for much Q_{ji} to be forthcoming.

[7]This distinction between outputs and outcomes is similar to that of Jacob (1971) and of Clark (1972). Bradford, Malt, and Oates make the same distinction, but use somewhat different terminology (1969).

[8]Subjective outcomes are often rejected by producer agents as irrelevant. Where they view themselves as "professionals" in the production process, consumers' perceptions may be dismissed with a "what do they know, anyway" stance (e.g., the Chicago police referred to by Wilson, 1967). Some professionals have argued that citizen perceptions of poor or inadequate service are indicative of the need to educate consumers as to the truly good service that they receive (e.g., Mihanovich, 1967). This attitude on the part of producer agents is most likely where their view of consumers is as clients (Prottas, 1979).

CHAPTER THREE

ORGANIZATION AND PERFORMANCE IN POLICING: THEORETICAL ARGUMENTS ABOUT INDUSTRY STRUCTURE

Does the organization of agencies and systems of agencies for the delivery of public services affect the quantity and quality of services supplied? If so, in what ways? Do different forms of organization lead to differences in costs for the same quantity and quality of service? Can, for example, changes in the current structure of the police industry in metropolitan areas be expected to produce changes in police performance or the cost of policing? If so, in what directions?

These are important questions. The production of services by agencies of local government has been a major growth industry in twentieth century America. There is little reason to predict a reversal of this trend. At the same time, an increasing awareness of budget constraints in the presence of growing service demands has led to redoubled efforts to determine ways of supplying services more efficiently. Public sector productivity has become a major concern of national commissions, scholars, and public officials.

Many endeavors to improve service delivery or to reduce service delivery costs have focused on the organization of agencies that produce public services and on the patterns of interorganizational arrangements among such agencies. Many recommendations for the reform of organizational and interorganizational arrangements for the delivery of public services have been made. Advocates of structural change clearly believe that organization influences performance.

Policing as the Substantive Context

Policing, in particular policing in residential neighborhoods, provides the substantive focus of this study. Policing is an important public service. It deals in part with one of the major concerns of Americans over the past two decades, crime and disorder.[1] In fiscal year 1976, an estimated 11 billion dollars were spent for police protection, nearly 8 billion dollars by local governments (U.S. Department of Justice, 1978). The rapid rise in police salaries and pension benefits in recent years suggest that these expenditures will continue to increase at a steady pace. In 1977, more than 450,000 full-time personnel were employed in agencies supplying police services. This places policing second only to education as a public employer at the local level (U.S. Bureau of the Census, 1978: 9).

As one of the common services supplied by local governments, policing has been the subject of many studies and recommendations. Much of the debate surrounding the delivery of police services has focused on policy variables that concern the organizational and interorganizational structure of police service delivery. The size of police agencies and the number of -- and relations among -- agencies in any given area have been frequent subjects for debate. The large number and the diversity of police agencies in America offer a wide range of policy choices from which to draw empirical data relevant to this study.

For at least 50 years, critics of American police organization have believed they knew the answers to the questions posed at the start of this chapter. Their answers have been that organization does influence performance and costs, and does so in specific directions. Changes could be made to present structures of service delivery arrangements that would lead to improved performance and, often, to reduced costs. The recommended changes have usually been the same; eliminate small police agencies and fragmented policing through consolidation of departments, and reorganize the remaining large departments according to management principles emphasizing specialization of assignment and hierarchical control. Reformers believed that these changes in industry structure and producer agency organization would result in more effective police agencies, that costs would be reduced through the capture of economies-of-scale in production, and that consolidation would eliminate spillovers of crime from jurisdiction to jurisdiction that were seen as hampering law enforcement. Despite these remarkably uniform prescriptions, few changes consistent with their thrust have resulted.[2]

In recent years some scholars have come to question such prescriptions. Agreeing that organization is likely to influence performance, these scholars have argued that the direction of relationships is different from that advanced by earlier reformers. These scholars suggest that smaller public service jurisdictions organized in less concentrated service delivery arrangements might often be more effective than large, consolidated structures for the delivery of some services. They can be more responsive to citizen

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preferences, offering, through their numbers and diversity, a choice among service mixes and tax costs. Smaller producing agencies might be able to avoid some of the bureaucratic pathologies seen to plague large agencies. If structures of service delivery arrangements for police services were in need of reform, those reforms might better involve vertical and horizontal differentiation of the more concentrated industry structures. Large jurisdictions might be maintained or even increased for the production of some specialized services, but other services would benefit by the disaggregation of large production units.

Critiques of the American Police Industry

A continuing theme among critics of local police service in the United States has been concern over problems argued to result from the existence of small police departments. Small departments, it has been argued, produce inadequate services for residents of their jurisdictions. They are said to contribute to policing problems in metropolitan areas by fragmenting law enforcement efforts among a large number of departments.

Small police agencies are said to be inefficient, allocating an inordinate amount of their resources to administrative overhead. They are said to be unable to recruit, train, or retain competent personnel, particularly in their top management positions. It is claimed that they often do not produce many essential services, and that those that are produced are inferior to those of larger agencies. Fragmented police service industries are said to cause

competition and duplication of effort among uncoordinated police departments. Departmental jurisdictions are said to be overly complex and frequently overlapping, thus causing confusion for police officers and citizens and offering sanctuaries for criminals. Charges of this nature have been advanced for at least 50 years with respect to American police service delivery.

In 1931 the National Commission on Law Observance and Enforcement claimed that,

> The multitude of police forces in any state and the varying standards of organization and service have contributed immeasurably to the general low grade of police performance in this country (1931: 125).

Summarizing "American Police Administration at Mid-Century," Donal MacNamara argued that,

> We have in the United States a multiplicity of police agencies with a bewildering variety of organization patterns, competing, duplicating, and overlapping, differing greatly in size and jurisdiction, and totally lacking in machinery for the coordination of their efforts (1950: 189).

MacNamara found "substantial unanimity among specialists in police administration that the major trouble is the total disorganization resulting from the concept of local autonomy in police matters" (ibid.).

> The least efficient and therefore most expensive police agencies are the small ones. There are notable exceptions, but in general these miniscule units of five, fifteen, or fifty-odd officers cannot attract the most desirable recruits, cannot afford the services of top administrators, cannot provide adequate training facilities, and must allot so large a share of personnel to administrative and housekeeping tasks that they reduce effective police strength to the vanishing point (ibid.: 184).

In a discussion of "Recent Developments in Metropolitan Law Enforcement," published in 1960, Gordon Misner charged that,

> The total police resources of our metropolitan areas are dissipated by the very nature of their organization. . . . Police efficiency is impossible . . . under the presently confused pattern of metropolitan police organization (497-498).

The culprit was found, once again, to be the small department. Misner deplored,

> the existence of a large number of miniscule law enforcement agencies. Many of these smaller agencies are -- to put it rather bluntly -- incapable of rendering an adequat[illegible]el of law enforcement (ibid.: 499).

The President's Commission on Law Enforcement and Administration of Justice, in a report by its Task Force on Police, stated that,

> A fundamental problem confronting law enforcement today is that of fragmented crime repression efforts resulting from the large number of uncoordinated local governments and law enforcement agencies (1967b: 68).

In the report of the full Commission, The Challenge of Crime in a Free Society, American law enforcement is described as being "fragmented, complicated, and frequently overlapping." The Commission noted that,

> America is essentially a nation of small police forces, each operating independently within the limits of its jurisdiction. The boundaries which define and limit police operations do not hinder the movement of criminals, of course. They can and do take advantage of ancient political and geographic boundaries, which give them sanctuary from effective police activity. Nevertheless, coordination of activity among police agencies, even when the areas they work in are contiguous or overlapping, tends to be sporadic and informal, to the extent it exists at all (1967a: 301).

The Task Force Report included their finding that,

> Not every police department is capable of providing needed staff, auxiliary, and selected field services; nor is every local government capable of providing a desirable quality of police services generally. . . . Many jurisdictions, for one reason or another, cannot provide even basic patrol services (1967b: 72).

High among the implied reasons was that many departments were too small.

Following publication of the President's Commission reports, a rising tide of criticism of small departments and the alleged problems of law enforcement fragmentation resulting from their existence can be traced. In 1971 the Advisory Commission on Intergovernmental Relations issued a major report on State-Local Relations in the Criminal Justice System (ACIR, 1971). The report was quite critical of police departments employing fewer than 10 full-time personnel. Noting that "nearly 90 percent of all local governments have police forces of less than 10 full-time personnel," the Commission claimed that,

> These small police forces, in most instances, cannot provide full patrol and investigative services for their citizens. Essential police supporting services in these communities are virtually non-existent, or difficult to obtain (ibid.: 14).

The Commission also claimed that "the existence of these small agencies may work a hardship on nearby jurisdictions" through their requirements for aid or by providing a haven for criminals (ibid.: 17).

A staff member of the ACIR, writing in The Police Chief in 1973, claimed that,

> Surveys of the efficiency of small and undersized police forces indicate that their personnel are poorly trained, poorly organized, and overworked. Consequently, small police agencies frequently provide an extremely low quality of service.
>
> Small police departments also prevent more efficient police protection in metropolitan areas as a whole. Such forces, in their desire for self-sufficiency, duplicate police services, prevent the structuring of areawide police services, and contribute to jurisdictional complexities in American police protection (Callahan, 1973: 56).

In 1973 the National Advisory Commission on Criminal Justice Standards and Goals adopted standards that were directly compatible in many respects with the ACIR position. Specifically, in Standard,

5.2, entitled, "Combined Police Services," the Commission stated that "at a minimum, police agencies that employ fewer than 10 sworn employees should consolidate for improved efficiency and effectiveness" (110).

Coincident with these national statements regarding police agency and police industry organization have been similar charges at the state and local level. A number of states have issued planning documents containing recommendations consistent with (and, in many cases, verbatim copies of) those of the national commissions. Many metropolitan area good-government groups continue to press for police reorganization and consolidation, also laying claim to the recommendations of the commissions.[3] Given the volume and consistency of the charges against small police agencies and fragmented policing, together with the recommendations for their elimination, one remarkable aspect of American policing is the persistence of the small departments. Their persistence in the face of regular attack over the course of at least a half-century requires exploration and explanation.

Counter Arguments

In the last 20 years, a tradition of scholarship has arisen that has found some virtues in small jurisdictions and fragmented service delivery structures. Such arrangements, it is argued, might be better able to respond to the preferences of citizen-consumers than the larger, consolidated ones favored by administration experts. Scholars in this new tradition have pointed to potential diseconomies-of-scale in large agencies. As jurisdictions and/or the agencies

that supplied them with services became overlarge, services might deteriorate and costs rise.

Charles Tiebout recognized the difficulties of attempting to tailor the supply of services to the diversity of demand in a large jurisdiction. He suggested an alternative model, one where a large number of small jurisdictions offered a supply package (services and taxes) and "consumer-voters" chose the package most attractive to them. In a system characterized as "voting with his feet,"

> the consumer-voter moves to that community whose local government best satisfies his set of preferences. The greater the number of communities and the greater the variance among them, the closer the consumer will come to fully realizing his preference position (Tiebout, 1956: 516).

Tiebout was aware that all citizens were not equally mobile and thus some might be unable to take full advantage of the opportunities afforded by a fragmented local government system. He also recognized that there were likely to be aspects of service delivery that required consolidated provision or production. But, he argued, a fragmented solution with allowance for necessary service integration "is the best that can be obtained given (diverse) preferences and resource endowments" even though "institutional rigidities" made it less than perfect (Tiebout, 1956: 522-523).

Striking a similar note, Banfield and Grodzins argued that differentials in service levels among jurisdictions in fragmented systems enabled citizens to make choices as between public service levels and such things as homeownership. Some who were able to achieve the latter did so by virtue of lower cost public services in some jurisdictions (1958: 37-38).

Williams and his colleagues presented evidence that fragmentation served to preserve social, economic, and political values of residents in the Philadelphia metropolitan area. They found that urban differentiation through the presence of multiple small communities led to community specialization with respect to class or status, lifestyle, and economic function. The self-government powers of the incorporated suburbs enabled citizens in these communities to maintain their social, economic, and political values by "erect(ing) barriers to change" (Williams, et al., 1965: 297). Local control of the police power may be one of the most effective means of maintaining life-style values available to small communities, thus partially explaining their nearly uniform reluctance to give it up to consolidated police agencies.

Scholars of large bureaucracies, including those that characterize large police agencies, have noted a number of problems that are the concomitants of large scale. Schlesinger, for example, suggested that difficulties of information transmission, coordination among individuals and subunits, and provision of appropriate incentives to organization members increase geometrically with size. This phenomenon, he said, provided "a partial explanation of why large organizations are given to control by doctrines, which impress the outsider as rigid and arbitrary, and which inevitably grow stale before being abandoned" (1966: 3).

Bittner argued that channels for information flow in police departments almost uniformly allowed for only one-way communications -- downward. This direction of information flow was the opposite of that

required to provide useful feedback for management purposes. It tended to isolate department administrators from the loci of useful information, officers on the street, and citizens in the community (Bittner, 1970: 67-68). Others have noted this tendency for police administrators to be cut off from important information in large departments (e.g., J. Q. Wilson, 1968; Rubinstein, 1973; and Goldstein, 1977). A doctrine of large police agencies may partially account for this information loss. That doctrine, the "military model," emphasizes the importance of hierarchical control over officer behavior and characterizes many large departments. The proliferation of rules and regulations promulgated to exercise this hierarchical control "floods . . . all the channels to capacity" (Bittner, 1970: 67).

Other scholars have noted the distortion of information flow in large bureaucracies, and have found it to result from built-in incentives in such agencies. Subordinates do well by pleasing their superiors, and are able to do so in large agencies confronting uncertain conditions by supressing information that does not reflect favorably on their own performance (Tullock, 1965; Downs, 1967; E. Ostrom, 1971). The sheer volume of rules and regulations characteristic of most large police agencies requires officers to bias reports of their activities and conditions in their assigned areas so as to avoid conflict with the rules. This biasing occurs along with a tendency for officers to hoard information that might ultimately enable them to make an arrest, even to the detriment of their supposed "crime-fighting" role (Bittner, 1967; Rubinstein, 1973;

Silberman, 1978). As many have noted, officers are rewarded for making arrests, not for passing on information.

Size and Fragmentation in the Police Service Production Process

The size of agencies producing police services and the fragmentation or consolidation of service delivery structures are not usually valued in and of themselves.[4] Critics of small police agencies have not always argued simply that "bigger is better." Neither have those who have questioned the reform logic simply claimed that "small is beautiful." Instead, agency size and fragmentation of service delivery systems have been viewed as having consequences for the quality and quantity of police services made available. These consequences result from differences in organizational arrangements, in input choice, in production strategies, and in the activities of officers and citizens in differently sized police agencies located in more or less fragmented police service delivery systems. By placing various arguments with respect to agency size and fragmentation into the context of the police service production process model of Chapter Two, it may be possible to draw out the logics contained in those arguments.

The term, logic, as used here might be replaced by model, explanation, or theory. It refers to the linking of a series of propositions that enables one to work through an argument so as to understand how the proponent believes the world to operate. Any tenable argument must have such a logic, although most presentations

do not spell out all of the linkages involved. By tracing the flow of an argument through the process model, missing linkages can be identified and added as necessary.

Disagreements with respect to the consequences of police service delivery by small versus large police agencies or by fragmented versus consolidated police service delivery systems are of two varieties. One set of disagreements turns on the perceived differences in consequences, in the outputs and outcomes expected to result from differences in these organizational arrangements. Another set occurs where there is some degree of agreement with respect to many outputs and outcomes, but where different criteria are applied in evaluating these consequences.

In the following sections, I will attempt to develop the logics contained in several of the arguments surrounding police agency size and the fragmentation of police service delivery structures. These logics will be developed within the framework of the production process model as much as possible. The particular logics to be developed link the organizational arrangement variables of police agency size and service delivery fragmentation to: (1) police agency specialization and the predicted consequences of specialization, (2) the existence of inter- and intrajurisdictional spillovers, and (3) the responsiveness of police service delivery to citizen-consumers preferences.

There are, of course, many additional arguments that might be developed in this exploration. The ones that have been chosen encompass a large portion of the charges and countercharges with

respect to police organization in America, however. In particular they focus heavily upon disagreements with respect to outputs and outcomes of differently organized police service delivery structures. In subsequent chapters, the logics developed here will be applied to empirical data bearing upon police outputs and outcomes (and intervening variables as well). The consistency or inconsistency of the logics with empirical evidence is of immediate interest, and may add simultaneously to better understanding of how organization influences performance.

Fragmentation, Police Agency Size, and Specialization

Fragmented or less concentrated service delivery arrangements virtually by definition have smaller production units than consolidated arrangements.[5] The most immediate consequence of differences in the organizational arrangement, police agency size, is often claimed to be the choice of production strategy. In particular, agency size is seen to constrain the use of specialized assignments within police agencies, with larger agencies adopting "task-oriented" strategies emphasizing specialization, while smaller ones utilize "patrol-oriented" strategies with primarily generalist assignments (E. Ostrom, et al., 1973: 62-65). Specialization as a production strategy is said to have consequences for the skill levels of police officers and for the range of activities in which they engage. This leads to differences in the capacity of police agencies to produce particular outputs and, in the context of service conditions that affect the instrumentality of those outputs, is

thought to lead to differences in the outcomes of service delivery of different organizational configurations.

The reform critique is usually focused at the level of individual producing agencies. Small police agencies are said to be constrained from giving their officers specialized assignments by a lack of personnel. All officers are required for basic patrol work. This constraint is not the sole reason for the lack of specialization in smaller agencies, however. Their smaller jurisdictions do not provide sufficient incidents to warrant specialization in particular types of cases nor do they provide sufficient cases to keep specialists in practice were they to be so assigned. Thus, organizational arrangements and service conditions act together to specify the choice of production strategies.

Whether for reasons of resource constraint or lack of identifiable demand, small departments do not utilize specialized personnel assignments as do their larger counterparts. A recent study of law enforcement in the state of New Jersey by its County and Municipal Government Study Commission states the issue well:

> Departmental size . . . provides an indication of availability of personnel with specialized training to perform specialized functions. . . . Larger local agencies . . . can and do employ a range of specialists in the discharge of their responsibilities. . . . In smaller agencies, these functions may be carried out as part of the routine activities of agency staff or may be carried out by the staff of agencies from other jurisdictions. . . . Generally, the larger departments have a greater range of specialized skills, and greater opportunity for law enforcement officers to develop and utilize specialized skills (1976: 15-16).

But the issue as stated to this point is not controversial. Large departments <u>are</u> more likely than small to employ specialists in their

own ranks. Small agencies are more likely to draw upon specialists from other departments (for evidence on these points, see E. Ostrom, Parks, and Whitaker, 1977; 1978). The controversy arises with respect to the predicted consequences of this difference in production strategies among departments of differing size.

The logic of the reform critique is that employment of specialists within a given police agency enables better performance of activities that lead to valued outputs and outcomes than does employment of generalists together with reliance on specialists from extra-agency sources. An extreme reform position (though scarcely credible) is that the absence of internal specialists in a police agency denies residents of its jurisdiction access to these activities and thus the outputs and outcomes supplied in part by such specialists. The issue here is the availability of specialists. Large departments are said to have more specialists readily available and thus to avoid delays and coordination costs involved in obtaining specialists from other agencies. Because internal specialists are argued to be more accessible, large agencies using task-oriented strategies are said to benefit more from specialists skills in their activities. Smaller agencies with patrol-oriented strategies often must use generalists for these activities.

Carrying the argument to outputs and outcomes, specialists are presumed to be more qualified to engage in activities that lead to beneficial consequences. Investigative specialists are thought to be more able to investigate crimes, leading to higher arrest, clearance, and stolen property recovery rates, and thus, to lower crime rates through deterrent and incapacitation effects. Traffic specialists are thought more able to

direct the flow of traffic, thus avoiding accidents and increasing the volume of through traffic. Family crisis intervention specialists are better able to determine and deal with the underlying difficulties that spark such conflicts, and thus are able to defuse them before more serious problems arise. The skill of specialists in conducting such activities is thus an essential link in the argument.

Summarizing, then, larger police agencies are more likely to utilize a task-oriented production strategy, emphasizing the employment of specialist officers. Their jurisdictions are more likely to exhibit sufficient incidents where specialists skills are beneficial. The internal employment of specialists makes them more available in any given instance than obtaining such skills from an extra-agency source, thus increasing the likelihood that they will engage in the necessary activities. The application of specialist skills to activities in many situations results in better handling of those situations than possible from generalists. Aggregating across many incidents where specialists handled the problem at hand, the outputs and outcomes of service production by specialized agencies are better than those produced by nonspecialized agencies. As large size is a sine qua non for specialization, so large size leads to better outputs and outcomes.

Counter arguments focus on three aspects of size and specialization. First, while it is true that smaller police agencies are less likely to employ police specialists than are larger agencies, this does not preclude citizens of their jurisdictions from obtaining the services of specialists when they would be beneficial. The choice of production strategies is made by police agencies operating within the structure of service delivery arrangements in a local police service industry. Instead of each agency's

choice of production strategy alone determining the availability of specialist officers for the conduct of specialized activities in its jurisdiction, the combined choices of all producing agencies in the industry affect that availability. In some cases (establishment of an interjurisdictional major case squad or a multiagency communications and information center, for example) the choices of several producers are explicitly coordinated. In others, agencies may adjust their choices in light of what others do, but not necessarily require explicit mutual adjustment.

Virtually any police agency may call upon the services of skilled specialists from adjoining jurisdictions, from state or federal police agencies, or from interorganizational entities such as major case squads or multijurisdictional crime laboratories (for examples, see E. Ostrom, Parks, and Whitaker, 1977; 1978). It is an empirical question, for which virtually no evidence is available, as to whether obtaining specialists from extraorganizational sources results in lesser availability in circumstances where their skills would be beneficial than does internal assignment of officers to specialized units. It is also an empirical question, again with little evidence available, as to whether or to what extent some police service producers exploit others by relying on specialists from those others.[6] These questions must be addressed prior to making predictions linking organization to performance through the choice of production strategy.

A second argument counter to the claims of the would-be reformers is that internal specialization is not an unmixed blessing for police agencies. Prominent scholar-practitioners of police administration have warned that there could be serious problems resulting from specialization

as well as benefits (O. W. Wilson and McLaren, 1972: 82-86). Over-specialization can result in inefficient use of specially trained officers. They can become incapacitated with respect to activities other than those of their own speciality, thus reducing departmental flexibility. Non-specialist officers may cut back their activities in areas where specialized units are assigned (traffic control is a prime example), leaving all of the activity to be done by specialists even when nonspecialists' activities might be necessary as well. The multiplication of divisions, bureaus, offices, and ranks that often accompanies the choice of task-oriented production strategies may cause inordinate difficulties for coordination of activities within a specialized police department. Commenting on police reformers who advocated specialization, Fogelson notes that by the 1960s, "some reformers, who realized that many chiefs were having difficulty staying in touch with all these squads and coming up with the manpower to patrol the streets, started to wonder whether this process [specialization] had gone too far" (1977: 177).

The reduced availability of personnel for on-street patrol duties that results from specialization and accompanying growth in administrative assignments is referred to by Richardson as "the seemingly inexorable logic of Parkinson's law. Those unfamiliar with this phenomenon would be surprised, he says, by the "large gap between the number of men in a department and the number patrolling the streets at any given time" (1974: 121-122). This gap is substantially narrower in smaller, less specialized agencies (E. Ostrom, Parks, and Whitaker, 1978: 89). These smaller agencies are thus able to deploy more personnel (in relation to population served) for patrol and immediate response activities than are

large, specialized departments. This higher patrol presence should enable more rapid responses to service requests by the smaller agencies.

Another negative effect for the quality of police personnel in police agencies with task-oriented production strategies may occur if the assignments and activities of specialists are "glamorized" to the detriment of regular patrol officers. However specialized a department, the patrol division constitutes at least a plurality of its strength and carries out the bulk of the day-to-day activities of the department. If patrol officers become demoralized by an overemphasis on the attractiveness of specialized units or if the patrol force is deprived of the best officers through their assignment to such units, then the quality of these day-to-day activities must suffer.

In this view the choice of a task-oriented production strategy has a number of consequences for activities in a police agency that are unaccounted for in the reform argument. Specialization leads to a requirement for additional administrative activities and it may lead to a reduction in generalist patrol activities. The quality of the latter may decline as well if specialized assignments acquire extraordinary esteem. These additional activity effects in turn lead to additional consequences not included in the reform argument. These include the possibilities of reduced on-street patrol presence and longer response times, and as a result, poorer outcomes in terms of emergency assistances, crime and victimization rates, and citizen perceptions and evaluations of the services they receive.

A third counterpoint with respect to specialization focuses on the presumption that specialists are better able to deliver services than are generalists. The issue here is whether sufficient specialized knowledge

is available to warrant the training of many officers in the conduct of specialized activities. A number of years ago, Hayek made a distinction between knowledge of a generalized sort, such as that embodied in scientific principles, and "knowledge of the particular circumstances of time and place" (1945: 521). The former is the realm of the specialist. Those who are trained in a specialty may be led to overlook or to denigrate the importance of the latter, thinking that application of the procedures in which they have received training is sufficient for all circumstances. In the case of policing specifically, officers that have been assigned to specialized units may find themselves removed from the time and place information which is, in many instances, the prime stock in trade of the patrol officer. This may seriously hamper the capacity of specialist officers to contribute to the valued outputs of their agencies.

Recent studies of the ways in which criminal cases are actually solved (and not solved), for example, suggest that the need for investigative specialization may have been greatly overstated (Greenwood and Petersilia, 1975). The findings emphasize the importance of the activities of victims and witnesses as well as those of the immediately responding officer, and downplay the activities of follow-up investigators. To quote one of the "major findings -- on how cases are solved":

> The single most important determinant of whether or not a case will be solved is the information the victim supplies to the immediately responding patrol officer. If the information that uniquely identifies the perpetrator is not presented at the time the crime is reported, the perpetrator, by and large, will not be subsequently identified (xvii).

Observers have noted that most arrests for crimes are made by police department generalists, the patrol officers. The role of the citizen

as initiator of a complaint and supplier of identifying information as to the perpetrator is crucial (Reiss, 1971: 105; Greenwood and Petersilia, 1975). The success of specialized investigators in solving "mysteries," where little or no information is available from victims, is markedly low, suggesting that specialized knowledge is not available for dealing with such cases. Descriptions of how detectives conduct their activities are consistent with this view (Greenwood and Petersilia, 1975), as is the common observation that officers rarely receive much specialized training when appointed to detective rank. Indeed, such appointments often are the result of good work as a patrol generalist.

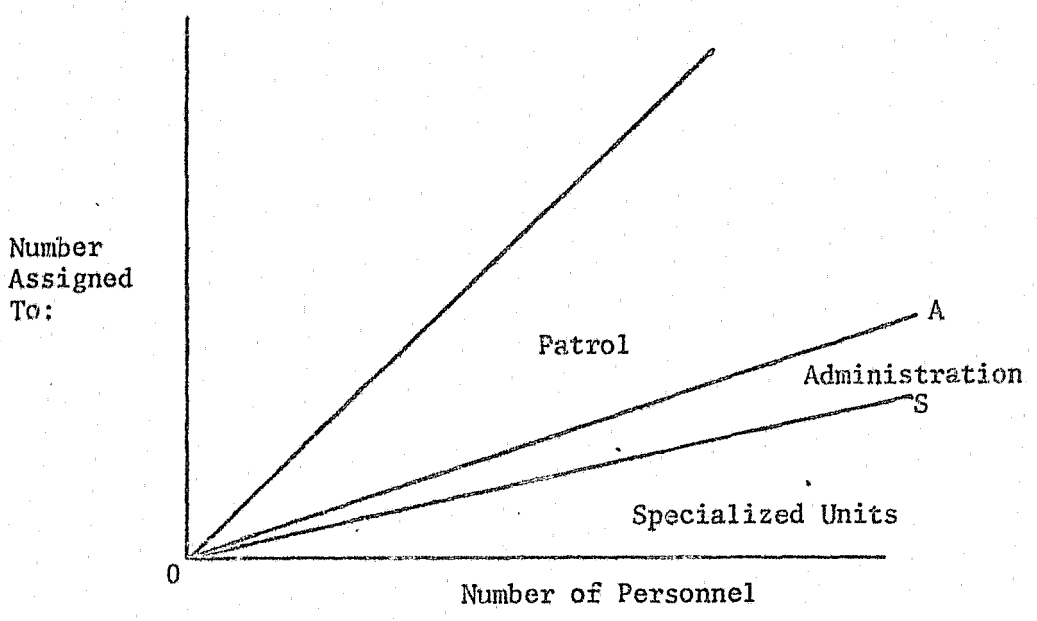
Similar arguments might be advanced with other varieties of specialized assignments in police agencies. Most traffic control activities seem easily within the capabilities of generalist officers, for example. Traffic specialization may be more the result of an attempt to control officer discretion than of the availability of specialized knowledge for dealing with traffic problems (Gardiner, 1968; J. Q. Wilson, 1968).

The need for the activities of specialists that are said to be more available in task-oriented police agencies may have been substantially overstated in this view. While admitting cases where specialized knowledge may be available and thus specialist assignment and training beneficial (ready examples are forensic laboratory analysts and experienced teachers for training academies), the activities of many officers with specialized assignments in larger agencies are not greatly different from those that a generalist might perform, nor are the skills of most specialists informed by a body of knowledge with respect to the conduct of these activities. The conduct of such activities by generalist officers might thus lead to equally beneficial outputs and outcomes in many (indeed most) cases.

Summarizing arguments contra specialization as a reason for desiring larger police agencies, they are as follows. Specialists may be available from extra-agency sources as well as those internal to larger agencies. Such arrangements are quite prevalent, although their relative costs are not well-known. Internal specialization results in substantial costs for larger agencies. Specialists are not generally available for regular patrol duties and this, together with added administrative requirements for the supervision of many diverse units, can lead to serious diminution of the on-street patrol and immediate response force. This may have negative effects on outputs such as frequency of surveillance and the distribution of response times. Finally, there is little evidence that warrantable specialized knowledge is available in many areas of policing that have been the subject of recommendations for specialization. What evidence there is suggests that many of the activities assigned to specialists in larger agencies might be done as well by generalist officers who would also be available for many other activities.

Given this discussion of fragmentation, agency size, and specialization, what sorts of evidence might be used to investigate the empirical validity of the arguments? First, one would want to examine the relationships of the organizational variable, size, to production strategy choice, and its effect on the number of specialists (and administrators) in police agencies of varying size. Hypothetical relationships might be those charted in Figure 3.1.

Figure 3.1. Hypothetical Size, Specialization, and Administration Relationships



As the number of officers in an agency increases, a task-oriented strategy is more likely, with increases in the number of specialists and the number of administrators employed. Part of the argument surrounding size and production strategy has to do with the shape of the curves O-S and O-A, representing respectively the number of specialists and the number of administrative personnel as the total number of personnel increases. The figure as drawn is neutral, showing a strictly proportionate increase in number of specialists and in number of administrators as size increases. Those who argue the added opportunities for specialization in larger agencies probably mean a greater than proportionate increase in number of specialists as size increases. If so, then empirically line O-S ought to curve upward as size increases. Those who suggest that a task-oriented strategy entails a substantial administrative overhead would expect to see

line O-A bend upward as size increases, and particularly as O-S increases. By examining the shapes of these lines among a sample of police agencies, it should be possible to shed light on choice of production strategies and administrative loads in departments of varying size.

In addition to examining the relationship of individual production unit size to the number of internal specialists and administrators, it would also be important to examine how these relationships might be different in differently structured service delivery arrangements. Thus, for example, the existence of a metropolitan-wide producer of specialized investigative services (e.g., a major case squad or a prosecutor's detective unit) or a specialized producer of traffic control services (e.g., state police or highway patrols) might reduce the assignment of officers to such services in all or most of the other producing agencies in the area. Such differences, if they could be demonstrated, would be an important argument for the value of the public service industry framework (for an early attempt to do so, see Parks, 1976).

The conduct of activities by specialists is valued for its presumed effects on outputs and outcomes. One way that specialization may be beneficial is through increased skills of criminal investigation personnel. If so, clearance and property recovery rates ought to be higher in more specialized agencies than in less specialized ones facing equal crime patterns. That is, the specialists ought to be more productive at converting crimes into clearances than are generalist officers. If, on the other hand, most crime clearances result from the activities of victims, witnesses, and generalist patrol officers, then the link between task-oriented production strategy and clearance rates ought to be weak or even negative.

As shown in Figure 3.1, a necessary consequence of an increase in the number of officers with specialized assignment, holding department size and number of administrators constant, is a reduction in the number of officers with on-street patrol assignments. Examination of the relationships between production strategy choice and patrol unit availability and response time distributions would provide evidence as to whether a task-oriented strategy leads to lower levels of these outputs than does a patrol-oriented one. Reports of experiences by citizens having contacts with officers in departments that choose more or less specialized strategies may provide evidence on the outcomes for citizens that result from such choices.

Evidence with respect to the links of service delivery structure and producer organization to the choice of production strategy and, through that choice, to activities, outputs, and outcomes in terms of patrol and immediate response to service requests will be examined in Chapter Five. In that chapter, the shapes of the lines in Figure 3.1 will be determined for a large sample of police agencies. The effects of choosing different production strategies for the availability of patrol units will be shown. Patrol unit availability will then be linked to patrol visibility and response time distributions and to citizen perceptions of police response.

The relationships of production strategy choice to activities, outputs, and outcomes in terms of crime and victimization rates will be explored in Chapter Six. Clearance rates in departments choosing different strategies will be examined as possible outputs that affect crime outcomes. The relationships of these variables to the proportion of agency personnel with specialized, criminal investigation assignments should indicate whether

and how a task-oriented production strategy leads to better crime-fighting outputs and outcomes.

Fragmentation, Police Agency Size, and Spillovers

"Crime knows no bounds" is an often heard criticism of fragmented police service delivery arrangements. The image suggested is one of criminals planning their capers in one jurisdiction, committing them in another, and escaping for sanctuary in a third. The witless police, seen as unable to cross the boundaries of their small jurisdictions, are left to ponder their ineffectiveness. The report of the President's Commission on Law Enforcement and Administration of Justice states the charge,

> America is essentially a nation of small police forces, each operating independently within the limits of its own jurisdiction. The boundaries which define and limit police operations do not hinder the movement of criminals, of course. They can and do take advantage of ancient political and geographic boundaries, which give them sanctuary from effective police activity (1967a: 301).

Similar reasoning informed the report of the Advisory Commission on Intergovernmental Relations in 1971 (17), and that of McCausland's report to the President's Task Force on Suburban Problems (1972: 63).

This question of crime spillovers and an inability to internalize them is potentially quite serious. There are actually two aspects to the charges. The first might be characterized as the "den of thieves" problem. This refers to a situation where lax enforcement in a given jurisdiction affords sanctuary to criminals who prey upon citizens of other, surrounding jurisdictions. The second aspect is that of the scale required to discern patterns of criminal behavior. Fragmented systems without good information exchange may result in an inability to recognize such patterns where they

extend across jurisdictional lines. As a result of either or both of these aspects, crime rates might be higher with fragmented organizational arrangements than with more consolidated ones.

On the other hand, both aspects of the problem could be dealt with through recourse to organizational arrangements that extend beyond those of single producer agencies. The den of thieves clearly requires the attention of police from overlapping jurisdictions such as county and state agencies. In some states (e.g., Missouri or New Jersey) county officials could go so far as to suspend the local police and move to supply all police services to the jurisdiction directly. Here the activities of officers from other agencies in the service delivery system may be available to supplant those of officers from the ineffective (or even corrupt) department. The second aspect, that of information availability, might be handled through informal or formal information exchanges among agencies (e.g., McDavid, 1974), or by the establishment of joint information collection, processing, and dissemination centers (e.g., the New Haven CIRRS system reported by Abt Associates, 1976). Since there are often said to be problems of information flow within large departments (e.g., Bittner, 1970; Goldstein, 1977) as well as between smaller ones, it becomes a question of comparing losses under varying forms of organizational arrangements.

Different forms of spillovers may be problems in the jurisdictions of large, particularly central city, police agencies. Citizens of the many quite safe portions of these jurisdictions may not distinguish between press reports of crimes in high crime portions of those jurisdictions and what occurs in their own neighborhoods. Newspaper or television reports

of a "crime wave" in Gotham City may not always make it clear that the crime wave is limited to one or a few precincts in the entire city, and that most neighborhoods are quite safe. Citizens of safe neighborhoods may restrict their activities (making their neighborhoods less safe by this very restriction -- see Jane Jacobs, 1961). They, together with citizens of surrounding jurisdictions may shun many safe business areas of the large city. Through a self-fulfilling prophecy, the safe portions of the large jurisdiction become unsafe due to their neglect by citizens.

Similar dynamics may affect police officer attitudes and behaviors. Officers who work in large central cities are constantly confronted with media reports of crime in their city. Regardless of the actual rate of crime, there is sufficient crime occurring in a large jurisdiction to provide a daily diet of crime stories. There is a danger that an uncritical reading of such reports, combined with officers' experiences in truly high crime portions of a city, may lead to an internal spillover in large police departments. This spillover occurs when officers working in relatively crime free neighborhoods of the city employ tactics that ought to be restricted to high crime areas, if used at all. Katz, for example, argues that suburban police,

> while they can never wholly relax their vigilance, . . . do not have to approach every transaction as though it promised violence. . . . It is one luxury which only small-town and suburban policemen can safely enjoy (Katz, 1974: 76-77, emphasis in original).

Campbell and Schuman (1968) also pointed out the difference in relations between police and citizens as reported in their surveys of central city and suburban residents. But there are many areas of central cities that are much more similar to "small-town and suburban" neighborhoods than

they are to high-crime skid-row or ghetto neighborhoods. Officers who "acquire an ethos or an ideology that dramatizes violence" (Katz, 1974: 83), may not be able to escape that ethos when change of assignment or a call for service takes them into less violent portions of their jurisdiction. One could hypothesize that "civility" between officers and citizens might suffer (Reiss, 1971; Katz, 1974).[7]

How can these spillover questions be examined? What evidence can be arrayed to determine the consistency of the arguments with real world phenomena? The question of crime spillovers is very difficult. Because most crimes are never solved, it is virtually impossible to know whether most crimes are committed by individuals in or near their own neighborhoods or whether criminals do, in fact, plan crimes in sanctuaries and commit them in other areas. What evidence there is suggests that this is not the most common pattern, that most criminals in fact operate quite close to home, but we have only a small, biased sample of criminal acts and criminals to examine. Detailed examinations of existing crime reports and, perhaps, interviews with offenders could provide additional information to that currently known, but the sample would remain a biased one. If it were possible to compare generally identical ones, one or more served by a single, large police agency, and one or more served by sets of smaller agencies, the crime patterns across such a comparison would provide further information. If the arguments with respect to spillovers and information losses in fragmented service delivery arrangements were correct, one would expect them to exhibit generally higher rates of crime and generally lower clearance rates. A major difficulty, of course, is finding sites that enable such comparisons to be made. A partial attempt at such a comparison is offered in Chapter Six.

Spillovers in terms of attitudes and behaviors can be examined through surveys and observations of citizens and police officers. If the fear of crime spills over in larger jurisdictions, then the relationship between crime or victimization rates in a neighborhood and neighborhood residents fear of crime ought to be weaker than in smaller jurisdictions. It should be biased toward more fear for given probabilities of victimization as well. Officers may be less prone to overestimate the danger of victimization in neighborhoods within larger jurisdictions, but their attitudes and behaviors may be shifted toward those of their colleagues who work in the most difficult areas. This should be evident in their attitudes toward the use of force as a means of dealing with problems. Attitudinal data from citizens and police officers living and working in neighborhoods served by differently sized police agencies will be examined in Chapter Six to see whether such spillover effects can be identified.

Fragmentation, Police Agency Size, and Responsiveness

A final way in which the structure of service delivery arrangements may influence performance to be explored in this chapter focuses upon the responsiveness of variously organized police service delivery systems. Critics of large, consolidated policing systems commonly claim them to be less responsive than smaller, fragmented systems. The difficulty of responsiveness for larger agencies is said to be twofold. First, they are likely to serve more heterogenous jurisdictions where it is difficult to ascertain and aggregate preferences and where a wide repertoire of activities would be necessary to match preferences if they were known. Second, larger agencies are said to be less responsive to citizen preferences

because citizens have less influence over the incentives and constraints for larger police agencies. One should note with respect to the latter point that there are many advocates of police "professionalism" who see this as beneficial, not detrimental, to police performance.

As discussed in Chapter One, it is difficult for consumers to develop and articulate preferences for public goods and services like police. The outputs and outcomes which they would prefer are likely to be amorphous and multidimensional. The mechanisms for communicating preferences to service providers may be cumbersome. Consumers may wish to conceal their true preferences, hoping to receive services without paying their full share. These problems, while present to some degree in public service jurisdictions of any size, may be exacerbated by the diversity of preferences held by citizens in large, heterogenous jurisdictions. It may be impossible for providers and, through them, for producers to arrive at a consensus that is responsive to such diverse preferences. Contrasting small and large jurisdictions, James Q. Wilson refers to the likelihood of "general agreement as to the norms that ought to govern public conduct" in the small jurisdictions, and argues that police serving large jurisdictions are forced to "choose . . . between competing standards of order held by different persons" (1968: 219). Whether the police can even know the competing standards so as to be able to choose in large, diverse jurisdictions is problematic.

In theory, if preferences were known, police in large jurisdictions could supply different configurations of activities in different portions of their jurisdiction, thus tailoring those activities to the preferences of their diverse clientele. In fact, this is commonly done to some degree

in police jurisdictions, though not always acknowledged. There are strong institutional norms against such tailoring, arguing that uniformity of justice requires uniformity in the delivery of police services (see, for example, the arguments against exercise of police discretion by Ronald Allen, 1976). Attempting to match diverse preferences in different portions of a large jurisdiction requires officers to learn a wider repertoire of activities and to learn when and where various activities are appropriate. Officers, on the other hand, are said to search for cues that enable them to reduce the information needs and calculations necessary to such matching (Rubinstein, 1973; J. Q. Wilson, 1968). Wilson argues that this is much easier in smaller jurisdictions where officers are likely to know more citizens individually rather than as members of variously defined groups. They are thus better able to choose appropriate activities in any given situation, with beneficial outputs and outcomes as the results:

> Because the inferences about "character" that the police must necessarily make are, in a small community, less dependent on easily discerned external attributes (race, age, and the like), the citizens in such communities should perceive such judgements as unfair less frequently than citizens in large cities where police judgements must be based more on empirical or quasi-statistical generalizations (1968: 219-220).

Difficulties in knowing and matching citizen preferences may lead police in larger jurisdictions to turn inward for the standards to be applied, or outward, to canons of good police practice developed in an attempt to professionalize police.[8] The fact that citizens in many large jurisdictions are far removed from the exercise of incentives or constraints on police behavior encourages such agency autonomy. Police agencies are arguably quite similar to large school systems in this regard.

> Many large center-city school systems are so structured that parents or pupils do not constitute important elements in a school's environment, i.e., they cannot influence resource flows or affect the legitimacy of the schools. On the other hand, some smaller suburban jurisdictions are so structured that parents and students can significantly influence these processes, with the result that decision makers require information on the concerns of parents and students (Garn, et al., 1976: 48).

To the extent that citizens in large jurisdictions cannot "influence resource flows or affect the legitimacy" of the police department, police decision makers have fewer incentives to require information with respect to their concerns.

The debate over the responsiveness of differently structured police service delivery systems is not limited to disagreements with respect to activities, outputs, and outcomes. Responsiveness as a criteria applied to these components of the production process is controversial by itself. A finding, for example, that smaller jurisdictions and fragmented delivery systems led to greater responsiveness to citizen preferences by local police might not be viewed as necessarily a plus for such systems. Responsiveness almost certainly entails variation in activities and outputs within and among jurisdictions. Critics of American police service delivery, however, have long argued that ". . . varying standards of . . . service have contributed immeasurably to the general low grade of police performance in this country" (National Commission on Law Observance and Enforcement, 1931: 125). Variations in activities and outputs that are part of any attempt to be responsive to diverse preferences are often said to constitute unequal law enforcement and, thus, unequal justice. Uniformity in police activities and outputs has commonly been cited as a benefit to be derived from consolidating police jurisdictions.

Indeed, the fear that police might be more responsive to local concerns has been used as an argument against recommendations for giving neighborhoods within large jurisdictions more control over the police serving there. Wilson states the concern well.

> Allowing them [the police] to be governed by neighborhoods [in central cities] . . . [would result in] putting the police at the mercy of the rawest emotions, the most demagogic spokesmen, and the most provincial concerns (1968: 289).

Other, less dramatic statements of this concern can readily be found. The issue, then, is whether the police ought to be organized so as to be more responsive and, if so, to whom they might be responsive in conducting their activities. This disagreement goes beyond activities, outputs, and outcomes to include questions about which criteria ought to be applied to them and what performance measurements of which constituencies ought to be taken into account.

Marshalling evidence with respect to the responsiveness of different organizational arrangements for police service delivery is not easy. First, one needs to demonstrate that there are patterned differences in activities, outputs, and outcomes from area to area, either between small jurisdictions or within larger ones. Second, one must demonstrate that the patterning is somehow consonant with preference variations from area to area, and not simply the result of differences in local service conditions. This requires measurement of citizen preferences, a thing that has been shown to be most difficult with respect to public services such as police (for attempts to measure citizen preferences for public goods, see Hoinville, 1971; McIver and Ostrom, 1976; and E. Ostrom and Parks, 1975). Ideally, one would then want to demonstrate mechanisms whereby differences in preferences led to

differences in outputs and outcomes, thus eliminating chance matchings from being considered responsive. This, finally, requires one to consider the organizational arrangements that characterize the system of local government in addition to those for the delivery of police services alone.

It may be possible to use citizen perceptions and evaluations of local police activities, outputs, and outcomes as crude approximations for responsiveness indicators (E. Ostrom, et al., 1978). This involves arguing that the closer the match between activities, outputs, and outcomes and citizen preferences for these, the better citizens will perceive their police to be performing. Low ratings of police performance then indicate that police activities, outputs, and outcomes are not responsive to the preferences of citizens. There is a logical fallacy in such an argument, it involves the error of affirming the consequent (Salmon, 1963: 27), and it requires imputing citizens' preferences for the measures used, but it may be the best obtainable under circumstances where the necessary measures of preferences and mechanisms for linking preferences to activities are unavailable.

Using the latter argument as a basis for exploration, several measures of police responsiveness will be arrayed as consequences of varying organizational arrangements in Chapter Six. These measures, including citizen perceptions of police honesty, courtesy, and equality of treatment of neighborhood residents, and citizen evaluations of the overall level of police services they receive, will be related to variations in the size of police jurisdictions. Controls for neighborhood and respondent characteristics will be included in these analyses.

Industry Fragmentation and Police Agency Size as Key Organization Variables

The arguments developed in this chapter have been based upon police agency size and the fragmentation of service delivery arrangements as key organizational variables. Size of police agency and industry fragmentation have been central elements of debates concerning police organization for many years. They have been linked to performance through several chains of logic in an attempt to understand why it is the case that small departments and fragmented policing have been so frequently damned by police reformers. The logics of counter arguments have been presented as well. Other logical chains could be derived, addressing, for example, charges with respect to the quality of personnel in agencies of varying size. But those presented here include a large percentage of the charges and offer the advantage of available data against which they may be arrayed. Other organizational variables than size or fragmentation might be argued to be important influences on performance as well. These may or may not be closely related to variations in size (although the patterning of police organizations along the lines of recommended forms that are size dependent suggests that other organizational variables should follow size quite closely). However, size and fragmentation, as the most frequently appearing organizational arrangements in discussions of police service delivery, deserve initial exploration.

FOOTNOTES FOR CHAPTER THREE

[1]Nehnevajsa conducted a secondary analysis of major survey-based studies of crime from 1960 to 1976. These studies, covering some 130,000 Americans showed that, "when specific questions are raised about the extent to which crime may be, or may not be, a major problem of the residential areas of the respondents, some 4 in 10 Americans consistently indicate that it is, indeed, a serious concern" (1977: 87).

[2]Although no hard data is available, it is likely that the number of police agencies has increased substantially during the years covered by the recommendations. Many new communities have incorporated and established local police agencies and many special purpose forces have been established.

[3]Recent state level documents include the New Jersey County and Municipal Government Study Commission's Aspects of Law Enforcement in New Jersey (1976); The New England Bureau for Criminal Justice Services' A Study of Police Services in the State of Maine (1975); and, in Canada, the report of the Task Force on Policing in Ontario, entitled The Police are the Public and the Public are the Police (1974). Recent local consolidation proposals have been advanced in Rochester, New York (see the Monroe County Legislature's "Alternative Plans for Improving Police Services in Monroe County, New York," December, 1978) and in the Ottawa-Carleton region of Ontario (see Mayo, 1976). The charges against small police agencies and fragmented policing from one to another of these reports, together with their recommendations for structural changes, are virtually identical.

[4]Frenkel, however, argues that the preference for simple, consolidated structures is, at least in part, a psychological reaction to the complexity of fragmented structures. He notes that "the world as it is, governments structures as they are, cannot be perceived in their entirety by any mind" (1977: 10). This, he says, produces a great incentive to reduce complexity to that which may be understood among scientists and others with a passion for neatness and comprehensibility.

[5]Terms such as fragmentation or multiplicity, often used to damn existing structures of service delivery arrangements, are rarely defined explicitly. For attempts to do so for these and other measures of service delivery structures, see Ostrom, Parks, and Whitaker (1974; 1978).

[6]The fact that small agencies use specialists from large agencies need not be prima facie exploitation. Small departments might compensate officers or their departments for time spent. Working on cases in other jurisdictions may sharpen the skills of loaned specialists. The existence

of extrajurisdictional demand may help to justify the employment of specialists in an agency that loans them out. Or, there may be intergovernmental grant funds available to pay for specialist officers in larger agencies, with the condition that they be made available to surrounding departments.

[7]Officers in larger jurisdictions can, of course, adjust their behaviors as they move from one neighborhood to another. Most probably do, most of the time. But some may not. Even for those who do, the costs of learning and using several different response sets is not inconsequential.

[8]Uslaner and Weber suggest the reasonable proposition that the preferences most likely to be taken into account by decision makers ". . . are those of the men and women actually charged with making the decisions" (1975: 133). Lineberry's recent examination of public service delivery in San Antonio emphasizes the importance of bureaucratic decision making (1977: 146). Administrators in large departments have told this author that one of their primary audiences when deciding departmental policy is that of administrators of other large police agencies. This is likely to be reinforced by the organization of professional groups such as the recently formed Police Executive Research Forum.

CHAPTER FOUR

LINKING STRUCTURE AND PERFORMANCE EMPIRICALLY -- I: Data Needs and Sources

Demonstrating that the structure of service delivery arrangements for the delivery of public services affects the performance of public service industries and the producing units within them poses empirical difficulties as well as theoretical. Even with a careful specification of the linkages of structure, conduct, and performance in an industry as they operate through a public service production process, it may be hard to collect and array data bearing upon those linkages. Two primary reasons for this empirical problem exist. First, the range of variation in service delivery arrangements, while broad, is much reduced from the theoretically possible set. Many structural and organizational variables exhibit substantial covariation. Second, the multidimensional nature of most public services and the possible reactivity of virtually any measure of performance dictate that a large number of measurements be taken for each service delivery arrangement under study. Together, these factors dictate a need for large, complex data bases for analysis of structural effects. The following discussion will rely on police service delivery as the primary example, but similar dynamics can be found for other public services (e.g., education, see Katzman, 1971).

Reduced Structural Variation

For a number of years, various individuals and groups have been involved in setting "standards" or presenting ideal types of organizational forms for police service producers and service delivery arrangements.

Publications from the International Association of Chiefs of Police, the International City Management Association, and a variety of police administration experts have all offered model organizational structures for individual police agencies.[1] As noted in Chapter Three, there have also been many recommendations for ideal structures of police service delivery arrangements, involving, in some instances, more than a single producer. To the extent that these prescriptions have been followed, police agencies and industries will have been molded toward one or a few models. This molding, while relatively limited in success at the industry level, appears to have been much more successful at the level of individual producing agencies for police services.

A second factor leading to reduced variation in service delivery structures and producer organization is what Campbell and Stanley called a "cumulation of selectively retained tentatives" (1966: 4). They argued that a process akin to evolution, while likely to be quite imperfect, may over time lead to the rejection of truly poor organizational arrangements.[2] To the extent that such evolution occurs, direct structure to performance links will tend to be embodied in existing organizational forms. The range of variation in service delivery structures and producer organizations will be truncated.

If we already knew how structure influenced performance, there would be no problem posed by this reduced variation. We could, as those prescribing organizational forms would argue, simply adopt the more efficient, responsive, and equitable forms and ignore other possibilities. Unfortunately, as the arguments reviewed in Chapter Three suggest, there is substantial disagreement on which forms are likely to be more efficient;

responsible, or equitable, and, thus, further research seems necessary to establish structure to performance links.

Reduced structural variation makes the job of the analyst more difficult, however. By providing a package of organizational characteristics for producers of a given size, prescriptions of presumed correct organizational forms lead to a great deal of covariation in organizational attributes. Thus, for example, the smallest police producers may operate with no divisional structure. The next largest may all have three divisions: patrol, detectives, and services. Moving up in size, producers may add one or two more divisions, e.g., administrative services, technical services, or inspections. The largest departments, then, may be organized with four or five bureaus, each of which is composed of several divisions.[3] If these guidelines are strictly adhered to by producers, it would not be possible to disentangle the effects of size and of divisional and bureau structure as they affect producer agency performance.

Many other organizational attributes may exhibit similar covariation. It is unlikely to be perfect covariation, however. Probably all producer agencies deviate from the guidelines in one or more ways. But the reduced variation does mean that data must be collected for a larger number of producer agencies where such covariation exists. By having a large number, it may be possible to ferret out the variations in structure that do exist and, thus, to assess their influences on performance.

Multiple Measurement Needs

Measurement of activities, outputs, and outcomes for entry into performance assessments has a number of difficulties associated with it as well. If the measures to be collected are those that administrators

employ in assessments of their agents' performances, then the agents may have strong incentives to manipulate the [illegible] in policing. For example, evidence has been advanced suggesting this to be a frequent occurence with respect to measures of arrests (Rubinstein, 1973) and clearance rates (Skolnik, 1966). Similar incentives may apply to police administrators whose political superiors demand reductions in reported crime (Seidman and Couzens, 1974). "If you can't be good, look good" is a maxim that may apply to actors in many types of organizations.

Extraorganizational actors may [illegible] to manipulate measures that might be used for performance assessments. Citizens in a neighborhood might understate the frequency with which they see police patrolling in their neighborhood, hoping thereby to influence officials to allocate more resources to the neighborhood. Citizens in some areas of cities are claimed to overstate the seriousness of the problem when calling for police services, hoping to receive a faster response, but also biasing measures of police call response (Rubinstein, 1973: 90). The value of property stolen is often assumed to be inflated by theft victims in hopes of receiving higher insurance payoffs. A similar assumption is sometimes made regarding police estimates of the value of property recovered. Until the Uniform Crime Report category for larceny crimes was revised to include all larcenies, police were also said to have a predisposition to value stolen property slightly below $50, thus excluding the crime from the FBI Index.

It seems safe to say that any single measure of police activity is subject to one or more forms of manipulation. Multiple measures, particularly measures that can be used to "triangulate" through collection from

diverse sources (Webb, et al., 1966), can help to illuminate such manipulation. So too can the embedding of measures in a model of the process. It is easier to manipulate a single measure than to manipulate relationships among measures in a process.

Multiple measures of activities, outputs, and outcomes are also necessary to attend to the multiple things that police do, the multiple constituencies who might apply different performance criteria to these measures, and the consideration of trade-offs among performance criteria and between the assessments of diverse constituencies. It will not be possible to give a single statement of police performance. Police performance assessments should be couched in terms of how well police are doing on which measures, according to which performance criteria, as applied by which constituency group. Abbreviated assessments, based on one or a few measures, criteria, or constituencies, implicitly weight those not included with a zero value. Such a weighting, although it may be warranted for many purposes, ought to be made explicitly so as to avoid the accumulation of unintended consequences through inattention, or the distortion of activities, outputs, and outcomes toward emphasis on those that are measured (Etzioni, 1964). Simultaneous consideration of a broad range of measures may help to avoid the tendency to turn attention inward toward activities of primarily internal relevance (Selznick, 1943). It may help reduce the tendency of organizational actors to engage in activities that improve their "scores" on internal measures, at some expense to outputs and outcomes valued by constituencies outside of the organization (Peter and Hull, 1969; Hoffman, 1971).

Data Needs

The attempt to wrestle with the difficulties discussed in this paper raises a final one. The problems posed by reduced variation in organizational forms, the existence of intervening variables and indirect linkages, and the simultaneous influence of a variety of [illegible] require study of a large number of organizations to yield sufficient information to statistically analyze complex and subtle relationships. The problems posed by multiple police activities, outputs, and outcomes, each requiring multiple measures to reduce error, require in-depth study of each organization to obtain the necessary data. While these needs are not theoretically incompatible, practically they force the researcher to make unhappy trade-offs given realistic time, money, and effort constraints. The need for many observations on each of many organizations results in more data elements than can be captured in any single data collection and analysis effort.

By pursuing empirical analyses in light of theoretical specifications of how structure is linked to performance, it may be possible to get some leverage on these empirical difficulties. Where theory predicts differences in performance that are consequences of differences in structure and resulting conducts, the available empirical evidence may be collected and arrayed most efficaciously. To borrow a notion from statistics, careful theoretical specification may increase the "power" of empirical analyses. This would reduce the number of observations needed for any given analysis. In earlier chapters, the rudiments of a theory of how structure influences performance have been detailed. Conflicting predictions with respect to police services have been illustrated. In Chapters

Five and Six several linkages that can be derived from these predictions will be examined empirically. The remainder of this chapter presents the data to be used for these examinations.

Data Sources

Data from two recent studies of police service delivery provide the base for analysis. The first, the Police Services Study, collected data on a large number of diverse organizational arrangements for police service delivery in American metropolitan areas. These data enable the tracing of linkages from service delivery structure and producer organization through the choice of production strategies by producers to some indicators of police activities. The second study is the 1972 St. Louis Study. Data there were collected on a much smaller number of organizational arrangements, but the data are much richer. With the St. Louis data, it is possible to trace linkages from producer organization through choice of production strategies to a number of activities and outputs, and, finally, to outcomes of police service delivery for consumers. Combining data from both the Police Services Study and the 1972 St. Louis Study will, I hope, enable more powerful analyses of structure to performance linkages than would be possible using either alone.

The Police Services Study[4]

The Police Services Study, conducted jointly by the Workshop in Political Theory and Policy Analysis at Indiana University and by the Center for Urban and Regional Studies at the University of North Carolina, had a number of research aims. Among those pertinent for the present

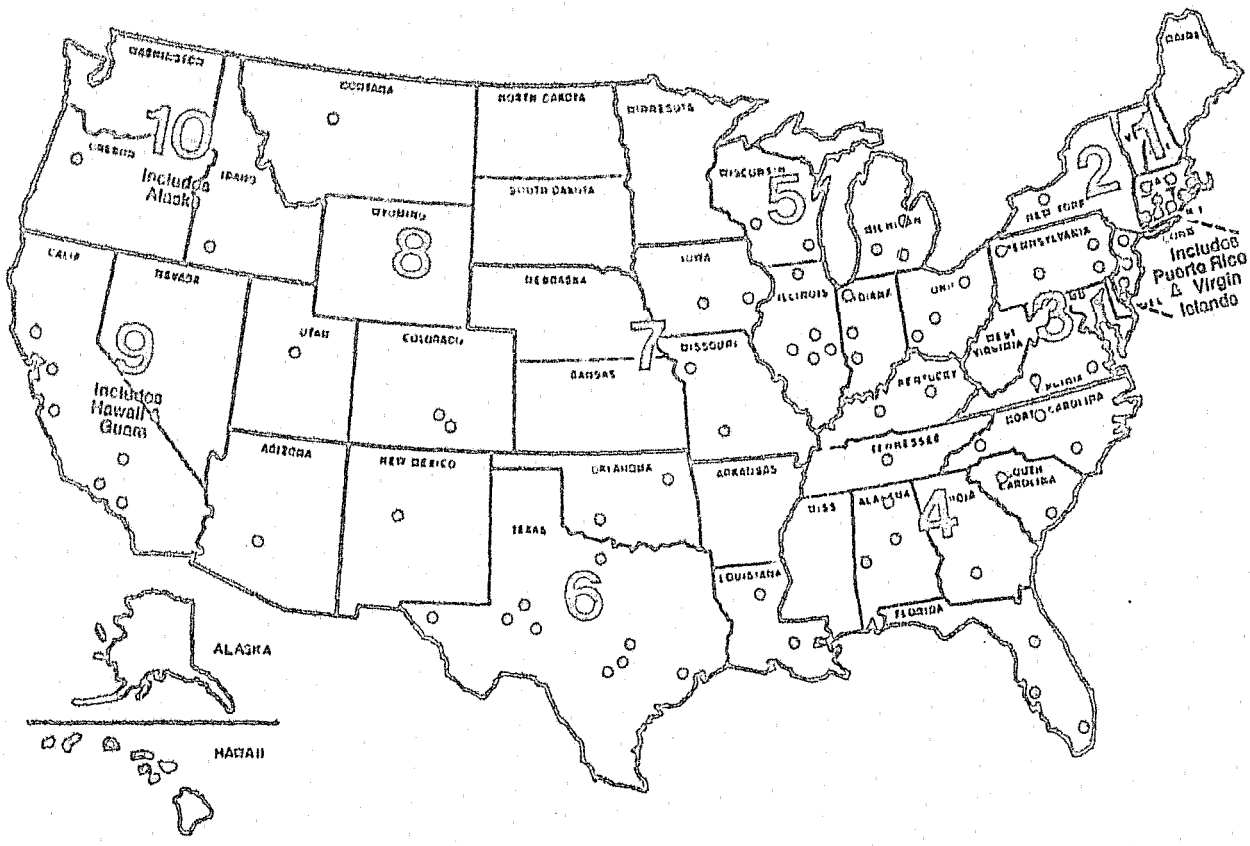
study was the attempt to describe the wide range of organizational arrangements for the delivery of police services found in small- and medium-sized metropolitan areas across the United States. This description of organizational arrangements included those linking agencies and consumers together in a structure of service delivery arrangements as well as those internal to the police agencies in the areas. In the course of data collection to meet this aim, additional information was obtained that enabled a description of the production strategies chosen by police agencies under differing organizational arrangements and a few of the activity implications of these choices.

Sample Frame for the Police Services Study

The universe of metropolitan areas to be studied in the Police Services Studies included 200 Standard Metropolitan Statistical Areas (SMSAs). These areas were a subset of all U.S. SMSAs, with the subset defined by two criteria. The first was a 1970 SMSA population less than or equal to 1.5 million persons. The second was that SMSA boundaries (as defined by the U.S. Bureau of the Census) did not cross state lines.[5]

From this universe of 200 areas, 80 SMSAs were chosen for study using a stratified random selection procedure. The 200 potential areas were stratified by location in 10 geographic regions used by many federal administrative agencies and a 40 percent sample of SMSAs in each region was selected randomly. This procedure ensured a wide geographic dispersion of SMSAs for data collection, enabling the capture of significant state and regional variations in organizational arrangements for police service delivery. Figure 4.1 shows the boundaries of the regions used for stratification and the geographic distribution of the SMSAs chosen.

Figure 4.1. Police Services Study: 80 Metropolitan Areas and 10 Federal Regions



Data Collection in the Police Services Study

Within each of the SMSAs in the sample, data were collected on all agencies producing any of the three police services supplied directly to citizens: patrol, traffic control, and criminal investigation. Data were also collected on agencies that supplied any of four auxiliary services to direct service producing agencies. These auxiliary services were entry-level training, radio communications, crime laboratory analysis, and adult pretrial detention.

For each agency producing any one of these services in the sample SMSAs, the following information was obtained:

- Which, if any, other services did the agency produce?;

- Who were the consumers of the services produced?;
- Did any other producers supply any of the same services to any of the same consumers?;
- If so, were there any production arrangements between the suppliers?;
- How was the producer formally organized?;
- How were its personnel allocated to services and deployed for the production of some of them?; and
- What, if any, formal interagency agreements was the producer a part of?

These data were collected during the period of June 1974 through September 1975 and were current at the time of collection.

A mixed data collection strategy was used for the study. Heavy reliance was placed on in-person interviews with representatives of the service-producing agencies. These in-person interviews were supplemented with mail and telephone interviews with the producers, interviews with other persons knowledgeable with respect to police service delivery arrangements in the SMSAs, and with data obtained from tabulations prepared for other purposes. Data collection was conducted so as to minimize the burdens placed upon informants. Wherever possible, pre-existing data sources were used for preliminary tabulations that were then verified in interviews with producer representatives. This may have helped to avoid contributing to the widely held perception among police officials that they are repeatedly surveyed for the same information.

The Police Services Study Data Base

Data on services produced and the consumers of those services were obtained for 1,827 producers of direct and auxiliary services in the 80 SMSAs. These data were coded in a manner that allowed the computation of

numerical scores for measures of the structure of organizational arrangements for police service delivery in each area (see E. Ostrom, Parks, and Whitaker, 1978, Ch. 3). These measures included multiplicity -- the number of producers of a particular service in a metropolitan area; relative multiplicity -- the number of producers relative to metropolitan area population; and dominance -- the proportion of metropolitan area population that receives a given service from the producer with the largest jurisdiction. Table 4.1 shows the distribution of these structural measures across the 80 metropolitan areas. Taken together, they provide a good indication of what many critics of American policing refer to as the fragmentation of the service delivery system (see Chapter Three).

Table 4.1. Structure of Police Patrol Service Delivery: Multiplicity, Relative Multiplicity, and Dominance in 80 SMSAs*

	Multiplicity (Number of producers)	Relative Multiplicity (Producers per 100,000 population)	Dominance (Proportion of population in largest jurisdiction)
Median SMSA	13	5.9	0.51
Low Value	1	1.3	0.11
High Value	91	19.0	1.00
Interquartile Range	7-20	3.9-7.3	0.38-0.70
Median for SMSAs with 500,000 or More Population	29	4.0	0.36

*Most of these data are from E. Ostrom, Parks, and Whitaker, 1978: 78-79.

In addition to these measures of service delivery structure, data on the internal organization and personnel deployment in most of the 1,454 producers of direct police services in the SMSAs were obtained. Table 4.2 presents data obtained from a subset of these direct service producers.

The subset consists of municipal police departments that produced general area patrol service at least a part of each day for citizens in their jurisdictions.[6] The data are the distribution of police agency sizes together with some indicators of personnel allocation and patrol deployment in agencies of differing sizes, and indicators for services produced beyond basic patrol.

These Police Services Study data will be used to explore linkages of service delivery structure and producer agency size to choice of production strategy, in particular the use of generalist, patrol-oriented strategies, and to examine how size and production strategy influence patrol activity and availability. These data will also be used to put the organizational data from the 1972 St. Louis Police Study into a broader context. By showing where the police departments included in the St. Louis study lie with respect to size, personnel allocation, and deployment distributions in the national sample, it will be possible to discuss the typicality of findings from analyses of the St. Louis data.

The 1972 St. Louis Study[7]

Investigation of the linkages of police activities to outputs and their outcomes in diverse service conditions and under different organizational arrangements requires a more microanalytic focus than that used for examining organization to production strategy and activity links. Activities, outputs, and outcomes are likely to vary considerably within the jurisdictions of large agencies as well as between those of smaller ones. Data collection and analyses at subjurisdictional, neighborhood levels is necessary to capture such variations.

Table 4.2. Personnel Assignments, Service Production, and Patrol Deployment in Municipal Police Agencies

Number of Full-Time Sworn Officers	Percent of Full-Time Sworn Officers Assigned to[a]:				Percent of Departments That Produce:			Percent of Full-Time Sworn on the Street at 10pm[a]
	Patrol	Criminal Investigation	Other Specialties	Administration	Burglary Investigation	Homicide Investigation	Radio Communications	
None--part-time only (76)	--	--	--	--	53	21	25	--
1 to 4 (212)	100	0	0	0	71	47	39	50
5 to 10 (217)	100	0	0	0	90	75	66	25
11 to 20 (124)	74	8	0	8	98	94	90	20
21 to 50 (122)	68	11	11	10	98	98	96	16
51 to 150 (78)	63	14	12	11	100	99	95	14
More than 150 (45)	56	14	17	13	100	100	93	12

[a]Value shown is for median department in the size range.

[b](N) = Number of departments in this size range.

Data for the examination of activity, output, and outcome linkages in this study were collected in 1972 in the St. Louis, Missouri metropolitan area. The St. Louis research focused on police service delivery in 44 residential neighborhoods. Police services in these neighborhoods were supplied by one or more of 29 separate police agencies. The agencies ranged in size from 2,200 full-time sworn officers down to one department employing only part-time officers. The research design for the study was intended to permit comparisons of the performance of quite differently organized police agencies as they delivered services to similar sets of neighborhoods.

The neighborhoods were predominantly residential. This focus enabled the elimination of many service condition variables as potential alternative explanations for findings. The types of demands placed upon police, for example, are likely to be quite different in residential areas than they are in central business districts or heavily industrial areas. While not all police jurisdictions contain the latter types of areas, virtually every police agency includes within its jurisdiction large proportions of neighborhoods similar to those selected in St. Louis. This restriction to comparable areas lends face validity to findings as well as reducing the number of extraneous influences that would otherwise require statistical control in analyses. It also limits the generality of any findings with respect to implications for policing non-residential areas. This was recognized at the time of the research and accepted as a reasonable cost to obtain service condition comparability.

Sample Frame for the St. Louis Study

The sample frame utilized for the 1972 St. Louis study was an extension of the "most similar systems" research design discussed by

Przeworski and Teune (1970: 31-46). In a most similar systems design, the researcher attempts to isolate a series of systems (in the case of this research, neighborhoods) that are as similar as possible in all relevant variables with the exception of the explanatory variables -- those variables among which the researcher wishes to find and measure relationships. To the extent that the choice of systems allows, extraneous variables are controlled through selection.

The level of analysis employed in the design was the neighborhood.[8] The choice of neighborhoods within a single metropolitan area and a single state removed many possible sources of variation. However, police performance may be related to many factors at the neighborhood level, for example the population density, heterogeneity, age, and the resource base of the neighborhood. Reducing the variation in types of neighborhood enabled a sharper focus on the effects of the size of communities and other factors related more specifically to police organization. The classic most similar systems design was extended by including more than a single type of neighborhood

The neighborhoods in the St. Louis study were lower middle- to middle-income residential areas.[9] They were chosen from a restricted set of areas such that at least 60 percent of the dwelling units were owner-occupied, the median value of owner-occupied housing was less than $25,000, and the percent of the neighborhood population over 65 years of age did not exceed 20, while the percent below 21 years of age did not exceed 45.[10]

The neighborhoods that remained after applying these criteria were stratified into logical categories along dimensions of jurisdiction size and/or organization for provision of police services, and neighborhood wealth.

On the size and organization dimensions, seven strata were used:

1. Independently incorporated communities with 500 to 4,999 population;

2. Independently incorporated communities with 5,000 to 15,999 population;

3. Independently incorporated communities with 16,000 to 28,900 population;

4. Census tracts within communities that ranged from 28,901 to 66,000 population;

5. Urban places within the unincorporated sections of St. Louis County served by St. Louis County Police;

6. Planning neighborhoods within the City of St. Louis; and

7. Independently incorporated communities that contracted with other police departments for service.

In the first six categories, police services were supplied to citizens by the jurisdiction in which they lived. In the seventh category, a separate jurisdiction supplied police services to the community under contract arrangements.

The wealth dimension contained three strata:

1. Those communities and neighborhoods in which median value of owner-occupied housing units was less than $10,000;

2. Those communities and neighborhoods in which median value of housing and between $10,000 and $14,999 plus those communities and neighborhoods in which median value of housing was between $15,000 and $19,999 and median contract rent per month was less than $120; and

3. Those communities and neighborhoods in which median value of housing was between $15,000 and $19,999 and median rental per month was greater than or equal to $120 plus those communities and neighborhoods in which median value of housing was between $20,000 and $24,999.

Stratification utilizing these organization and wealth factors in combination produced a seven by three matrix with 21 cells. Seven of

these logically possible cells had no empirical referents.

Potential neighborhoods in each cell were dichotomized into neighborhoods with greater than 30 percent black population in 1970 and those with less than or equal to 30 percent. Sensitivity to this dichotomy in selecting neighborhoods ensured inclusion -- to the extent allowed by the existence of appropriate neighborhoods -- of a significant black sample.

Having determined the neighborhoods that met the research criteria, choice among them was made on the basis of contiguity in clusters of neighborhoods. This was felt to have been a particular strength in an earlier study (E. Ostrom, et al., 1973), and was therefore duplicated in St. Louis. Forty-five sample neighborhoods were chosen to obtain variations along the dimensions of jurisdiction size and organization for provision of police service, wealth within the community, and presence or absence of a sizable black population.

Data Collection in St. Louis

For each of the neighborhoods in the sample frame, data were obtained from several sources. These included: (1) interviews with citizens residing in the neighborhoods; (2) interviews with police officers serving the neighborhoods; (3) internal and published police and other local agency records pertaining to the neighborhoods; and (4) published and unpublished data relating to the neighborhoods from agencies external to the communities studied.

A combination of in-person, mail, and telephone interviews was used to obtain interviews with citizens residing in the neighborhoods. Three types of neighborhoods were designated, each with a different

approach to citizen interviewing. In neighborhoods of high SES rank in the sample frame, mail questionnaires were used for initial contacts, followed by a second wave of mail questionnaires to nonrespondents, an attempt to contact second wave nonrespondents by telephone, and the possibility of an in-person contact for those without listed telephones.[11] In neighborhoods of middle SES rank, and in a few of the higher ranked neighborhoods to provide a control group, mail questionnaires were used for initial contact with one half of the neighborhood respondents and in-person interviews were used for the initial contact with the other one-half. The mail questionnaires were followed up as above. Several call-backs were attempted for respondents who were not home for the initial in-person contact. Telephone interviews were attempted with potential respondents who were not at home over several call-backs or who had refused an in-person interview. In the lowest SES rank neighborhoods in the sample frame, and in some middle rank, again for control, in-person interviews were used for initial contacts with all respondents, with call-backs and telephone follow-up where needed.

For the areas where initial mail interviews were used, a random sample of addresses in each neighborhood was drawn from land-use files maintained at the University of Missouri in St. Louis. In-person interview respondents were chosen by selecting census blocks at random from a list of all blocks in the neighborhood. All households on the chosen blocks were included in the sample.

The citizen interviews obtained data on characteristics of respondents and their households.[12] Data were also obtained on the activities of respondents and household members and their experiences with crime and

the police. The respondents perceptions of local police officers and activities and evaluation of the overall quality of police services delivered to his or her neighborhood were collected as well.

In police departments with 25 or fewer full-time officers, interviews were conducted with all officers. In those departments with more than 25 full-time officers, a sample was drawn by first stratifying the department roster into command and noncommand groups. A combined sample of 25 officers was then drawn at random from the two strata, choosing from each strata in proporation to its percent of the department.[13] For the St. Louis City and St. Louis County departments this sampling method was employed in each of the districts that served neighborhoods in the sample frame and at department headquarters. All interviews with police officers were conducted in person.

The police officer interviews obtained information on officers' backgrounds and training. They also probed for officers' assessments of their police agency and of the citizens to whom they supplied services. Officer attitudes toward various police procedures and several issues current in policing were solicited as well.

In addition to data obtained in interviews with citizen and police officers, data were obtained from police agency records and those of other agencies such as the County Prosecutor and the City Circuit Attorney. In-depth interviews were conducted with top departmental administrative personnel to gain an understanding of how their personnel were allocated to various assignments and how their patrol force was deployed.

The St. Louis Study Data Base

Using the interviewing strategies discussed in the previous section, more than 4,000 interviews were obtained with citizens living in 44 study

neighborhoods.[14] The interviews and the neighborhoods where they were obtained were distributed in the St. Louis design matrix as shown in Table 4.3. The citizen characteristics data can be aggregated to update neighborhood service condition data based on 1970 census figures. Citizen experiences and perceptions supply data for examining police activities and outputs in the neighborhoods and some of their outcomes. Citizens' perceptions of the frequency of police patrol in their neighborhoods, for example, provide an independent indicator of patrol activity. The number of citizens reporting assistance by the police, being stopped by police for various matters, or being the victim of crime in their neighborhood, provide additional activity, output, and outcome indicators. Citizen perceptions and evaluations of police service comprise important elements of subjective outcomes also.

Seven-hundred and twelve interviews with police officers were obtained in the St. Louis study. Officers were interviewed at all ranks in the 29 departments as described above. For purposes of the present study, however, only those interviews with those officers holding patrol assignments will be used. These officers generally held ranks of sergeant and below, although in some of the smaller departments, officers with higher ranks were regular members of the on-street patrol force. Limiting the interviews used to those with officers who had on-street patrol assignments left 428 interviews for consideration.

For purposes of this study, only limited data from the officer interviews will be used. Officer perceptions as to whether local citizens or persons from outside their jurisdictions commit most crimes locally will be used to examine crime spill-ins. Officer attitudes toward the

Table 4.3. Distribution of Citizen Interviews and Study Neighborhoods

	Independently Incorporated Communities with 1970 Populations of:			Census Tracts in Communities with with 1970 Populations of 28,901-66,000	Unincorporated Places in St. Louis County	Planning Neighborhoods in the City of St. Louis	Independently Incorporated Communities with Contract Police
	500-4,999	5,000-15,000	16,000-28,900				
Wealth Stratum 1[a]	N[b]=283 S[c]=3 P[d]=7	N=608 S=6 P=7	n=194 S=2 P=2	N=390 S=4 P=8	N=78 S=1 P=2	None in this cell	N=81 S=1 P=1
Wealth Stratum 2	N=184 S=2 P=7	N=289 S=3 P=7	N=429 S=4 P=4	N=360 S=4 P=6	N=81 S=1 P=2	N=607 S=7 P=12	N=332 S=4 P=5
Wealth Stratum 3	None in this cell	N=115 S=2 P=2	None in this cell	None in this cell	None in this cell	None in this cell	None in this cell

[a]Wealth strata defined in terms of median value of owner-occupied housing and median contract rent. Stratum 1 is highest. See text for operational definitions.

[b]N = Number of citizen interviews completed.

[c]S = Number of study neighborhoods in this cell.

[d]P = Number of potential study neighborhoods in this cell (see footnote 10).

use of force as a technique in difficult neighborhoods will be examined to see if any spill-outs of such attitudes to quieter neighborhoods can be found in large jurisdictions.

The data obtained in interviews with departmental administrators and from records maintained by the departments enable the characterization of, among other things, the production strategy chosen by each department. Personnel assignments to patrol, criminal investigation, and other support services were obtained for this purpose. These data also allow examination of the patrol deployment and resulting patrol activities in these departments. Data obtained from departmental records and from the Prosecuting and Circuit Attorneys provide several measures of police outputs -- warrant applications, clearances, service calls processed, for example. They also provide some outcome indicators -- percent of warrant applications where a warrant was issued and crime rates for various crimes.

Organizational Arrangements in St. Louis

The St. Louis metropolitan area was chosen as a research site in part because of the large number of police agencies operating in that area. Restricting attention to St. Louis City and adjoining St. Louis County, there were 67 police agencies producing patrol services in 1972.[15] This number is well above the median multiplicity for patrol service structures in even the largest SMSAs studied in the Police Services Study (see Table 4.1). With a combined City and County population of nearly 1.6 million persons, however, the multiplicity relative to population served, at 4.26 per 100,000 is only slightly above that found in

large metropolitan areas in the nationwide study. The St. Louis Metropolitan Police Department, serving the City of St. Louis, was the dominant producer in the area, serving slightly under 30 percent of the population of the City and County. This yields a dominance score of 0.29 for the St. Louis service delivery structure, just below the median dominance in large SMSAs found in the Police Services Study. Thus, in terms of service delivery structure, with the exception of the large number of producers there, St. Louis is not greatly different from other large metropolitan areas in the United States.

At the agency level, the producers in the 1972 St. Louis Study were not too different from those found in the nationwide study. The St. Louis Metropolitan Police Department, at 2,220 sworn officers, was larger than any of the agencies in the Police Services Study. The largest in that study was the Phoenix, Arizona Police Department, with a total sworn complement of 1,376 officers and a jurisdiction population of 637,121. The distribution of police agency size in the St. Louis study was slightly different from that in the Police Services Study. The sample of departments in St. Louis contained more agencies with between 30 and 80 sworn officers than is common in most metropolitan areas. This resulted from a conscious decision to oversample departments in this medium-size range and, correspondingly, to undersample the more common smaller departments.[16]

Excepting the differences noted in the preceding paragraph, the police agencies studied in St. Louis were similar to those in the nationwide study. Their characteristics, some of which are listed in Table 4.4, indicate numbers of officers per 1,000 population and percent

Table 4.4. Size Characteristics of the 1972 St. Louis Study Jurisdictions

Police Jurisdiction	Jurisdiction Population (1970)[a]	Full-Time Sworn Officers (1972)	Full-Time Patrol Officers (1972)	Percent Assigned to Patrol
Bella Villa	1,018	0	0	--
Calverton Park	2,025	4	4	100
Beverly Hills	2,025	5	5	100
St. George	2,033	2	2	100
Vinita Park	3,657	7	6	86
Riverview	3,741	3	3	100
Kinloch	5,629	11	8	73
Pinelawn	5,773	11	8	73
Northwoods	6,051	10	8	80
Rock Hill	6,815	10	8	80
Glendale	6,891	10	8	80
Wellston	7,050	25	17	68
Breckenridge Hills	7,613	11	9	82
Richmond Heights	13,802	27	18	67
Bellefontaine Neighbors	13,987	19	17	89
Hazelwood	14,082	30	18	60
Crestwood	15,123	26	21	81
St. Ann	18,215	27	22	81
Berkeley	19,743	36	24	67
Bridgeton	19,992	36	26	72
Jennings	20,368	43	30	70
Overland	24,949	35	24	68
Webster Groves	26,995	44	29	66
Ferguson	28,915	44	28	64
Kirkwood	31,769	49	33	67
University City	46,309	79	56	71
Florissant	65,908	63	38	60
St. Louis County	333,748	436	239	55
City of St. Louis	622,236	2,220	1,158	52

[a]Jurisdiction population includes areas served under contract where applicable. Jurisdiction population for the St. Louis County Police is taken as the population of the unincorporated portion of the County, plus the population of county municipalities served under a contract with the County Police.

of officers assigned to patrol duties that are quite like those found in the larger set (compare Ostrom, Parks, and Whitaker, 1978). Thus, any findings that are developed based on the St. Louis data may be said, with appropriate reservations, to have implications more generally for police service delivery structures in other metropolitan areas.

A Note on Service Conditions in the St. Louis Study

Variations in service conditions across the systems under study pose a serious threat to the logic of a most similar systems research design. Any factors that vary across systems (in this case, neighborhoods) in a similar pattern to variables that are part of the explanatory framework of interest, pose plausible alternative explanations for any relationships among those variables (Przeworski and Teune, 1970: 33-34). If, for example, the neighborhoods in the St. Louis study that were served by the larger police agencies contained service conditions that were more difficult than those found in the neighborhoods served by smaller police agencies, then any size to conduct and performance linkages found could, alternatively, be explained by the service condition differences. Note in this regard that there were no neighborhoods served by the largest department in the highest wealth stratum in the research design (see Table 4.3 -- there were none in the lowest stratum either). Thus, without control for neighborhood wealth variations, there might be a confounding of agency size and neighborhood wealth effects on police activities, outputs, and outcomes.

To guard against the confounding of service conditions and police agency characteristics as explanatory variables for conduct and performance differences, an extended analysis of the variations in service

conditions across the St. Louis study neighborhoods was performed. Eighteen distinct indicators of neighborhood service conditions were coded for each neighborhood. These included indicators of neighborhood wealth and housing conditions, the employment, educational, and racial characteristics of neighborhood residents, the stability of the neighborhood over time and among families, and the heterogeneity of racial and income characteristics of neighborhood populations.[17] The indicators were chosen to represent conditions that might affect the demand for police services in the neighborhoods, the cost of supplying services to the neighborhoods, or both. The pattern of intercorrelations among these service condition indicators was analyzed using principal components techniques to see if the number of indicators necessary to characterize each neighborhood might be less than the full 18.[18] The details of this analysis are available elsewhere (Parks, 1979), but a few relevant findings should be noted here.

It was discovered that nearly 90 percent of the variation in service conditions among the 44 study neighborhoods could be accounted for by six components. Six of the original service condition indicators were chosen to represent these components in subsequent analyses of the St. Louis data.[19] These six, together with some data on their distributions in the study neighborhoods, are listed in Table 4.5.

These representative variables do quite a satisfactory job of accounting for service condition effects on the demand for police services in the neighborhoods and on the cost of those services. More than 60 percent of the variance in victimization rates from neighborhood to neighborhood, for example, is accounted for by the six. Almost 50 percent of the variance in per capita expenditures for policing the study neighborhoods

Table 4.5. Representative Service Condition Variables for the St. Louis Study Neighborhoods

Variable	Mean Value for Neighborhoods in Design Matrix Row:			Coefficient of Variation in Design Matrix Row:			Percent of Variance (eta squared) Between Design Matrix:	
	1	2	3	1	2	3	Rows	Columns
Percent of families with income over $15,000 (1969)	36.0	21.3	7.6	0.27	0.33	0.18	52	12
Percent of housing units owner-occupied	81.1	72.8	52.2	0.17	0.13	0.11	26	10
Population density (1,000s per square mile)	5.8	8.3	7.1	0.46	0.41	0.26	14	32
Percent of persons over 65 years old	9.7	11.4	9.3	0.38	0.46	0.18	4	39
Percent of persons under 18 living with both parents	88.7	84.8	56.0	0.05	0.07	0.02	62	17
Racial heterogeneity of survey respondents (Lieberson index)[a]	0.09	0.16	0.26	1.73	1.26	1.20	6	18

[a] A Lieberson index of heterogeneity states the probability of obtaining unlike pairs on a given characteristic when two persons from a population are randomly paired (Lieberson, 1969). The characteristic categories for race are black and white.

is also accounted for by them. These amounts of variation that can be accounted for by variations in service conditions alone suggests that variations attributable to structural effects may be modest for many aspects of policing.

Only 2 of the 18 service condition indicators that were examined showed any significant variation across the columns in the St. Louis design matrix. These two, population density and percent of population over 65 years of age, are included in the set of representative variables. They pose the most serious threat to the logic of the design in the St. Louis study as they are patterned to a degree with the primary explanatory variables, the organizational arrangements for policing the neighborhoods. By controlling for these, along with the other four representative variables, much of the confounding effect of service condition variations will be removed.[20]

The Data Base for Analysis

The research designs, data collection procedures, and data bases for two recent studies of police service delivery have been reviewed in this chapter. These studies had very different levels of analytic focus, one examining the structure of service delivery arrangements broadly across a number of metropolitan areas, and the other examining the organizational arrangements for service delivery in individual neighborhoods in a single metropolitan area. Both studies, however, can be related to one another through their common focus on the structure, conduct, and performance of police service delivery arrangements.

In the next two chapters data from both of these studies will be employed to examine linkages of service delivery structure and organizational arrangements in individual producer agencies to the activities of agency personnel and the outputs and outcomes that result. Combining data from studies at two very different levels of analysis may help to overcome some of the empirical difficulties of analyzing structural effects that were discussed at the start of this chapter. The micro-level data from the St. Louis study may be used to provide activity, output, and outcome indicators not available with the Police Services Study data. The macro data from the latter study may be used to increase the generality of the St. Louis findings. This combination will, I hope, help to illuminate some of the ways that structure is important in affecting the performance of the police service industry.

FOOTNOTES FOR CHAPTER FOUR

[1]Examples include those given in the International Management Association's, "Green Books," entitled, Municipal Police Administration (e.g., ICMA, 1969) and those recommended by O. W. Wilson and the Field Operations Division of the International Association of Chiefs of Police (e.g., O. W. Wilson and McLaren, 1972).

[2]To the extent that producers are able to dominate bargaining with providers and consumers, this evolution may not work out as Campbell and Stanley suggest. Rather, the evolution might be toward organizational forms that maximize the producer's capacity to capture all of the available consumer surpluses. (See Footnote 27, Chapter One, and the discussion on pages 37-39.)

[3]O. W. Wilson, for example, suggests organizational structures similar to this. See O. W. Wilson and McLaren (1972: 99-107) for organization charts.

[4]The Police Services Study was conducted with a grant from the National Science Foundation (Grant No. GI-43949). The study was conducted in two phases. The first phase involved data collection for a descriptive overview of organizational arrangements for police service delivery, while the second involved more intensive focus on police activities, outputs, and outcomes in several areas with different organizational arrangements. The first phase, from which data for the present research is drawn, is described extensively in Patterns of Metropolitan Policing and in summary fashion in Policing Metropolitan America. Both of these reports were authored by Elinor Ostrom, Roger B. Parks, and Gordon P. Whitaker.

[5]These criteria were specified in the original National Science Foundation Program Solicitation for this research (No. 73-28). The first resulted from a wish to focus attention on less-studied areas of the nation rather than on the often studied very large SMSAs. The second resulted from a wish to explicitly consider state laws and policies as explanatory variables for organizational variations and a belief that this could be better done by eliminating SMSAs that were found in two or more states. There are now more than 200 SMSAs meeting these criteria. The 200 in the universe used for the Police Services Study were those in existence as of 1970.

[6]The present research will focus on these municipal departments and exclude many other producers. The excluded producers, sheriff's departments, state police, campus and military police, and the like, are quite important in many SMSAs. But most policing in residential areas is supplied by municipal police departments. They are the subject of most

concerns for the organization of police services. Most observers of policing are more familiar with the organization and activities of municipal departments than they are with those of other agencies. For these reasons, and to improve the comparability between the data from the Police Services Study and that to be drawn from the 1972 St. Louis Police Study, this restriction has been made.

[7]The 1972 St. Louis Police Study was conducted by a research team from the Center for Urban Affairs at Indiana University. Funding for the study was obtained from a grant by the Center for Studies of Metropolitan Problems of the National Institute of Mental Health (Grant No. 5 R01 MH 19911-01; 02; 03). The discussion of the St. Louis Sample Frame in this section is adapted from one in E. Ostrom, Parks, and Smith (1973).

[8]Przeworski and Teune, in their discussion of the "most similar systems" design, point out an essential theoretical assumption that this design requires.

> Similar systems designs . . . require an a priori assumption about the level of social systems at which the important factors operate. . . . The most similar systems design is based on a belief that a number of theoretically significant differences will be found among similar systems and that these differences can be used in explanation (ibid.: 36-39).

In designing the St. Louis research, it was hypothesized on theoretical grounds that variations in the size of police jurisdictions and the agencies that supplied them services would be significantly related to variations in the performance of such agencies at the neighborhood level.

[9]A "neighborhood" was defined for purposes of the St. Louis study as either: (1) an independently incorporated community in St. Louis County with a 1970 population less than or equal to 28,900 people; (2) a census tract within an independently incorporated community in St. Louis County where the community population exceeded 28,900 in 1970; (3) an urban place within the unincorporated portion of St. Louis County; or (4) a Planning Neighborhood within the City of St. Louis itself. The St. Louis Planning Commission divides the City geographically into 70 Planning Areas or Neighborhoods. The division is designed to take account of natural boundaries, such as highways or industrial concentrations; natural focii, such as parks and community centers; and existing neighborhood organizations (see St. Louis Planning Commission, 1971).

A minimum population of 500 persons was required in each of these cases. This set of definitions of "neighborhood" is admittedly ad hoc. Very little agreement on formal definitions of the term can be found. The set chosen seemed reasonable, and was useful for design purposes.

[10]The owner-occupied criterion was intended to ensure the residential character of the neighborhoods. It was relaxed in two cases to include predominantly black neighborhoods that would otherwise have been excluded. The median value of housing criterion was used to exclude the wealthiest tier of communities, where many alternatives to regular police service delivery might be available. The age criterion was used to screen out neighborhoods with highly skewed age distributions as earlier research led us to believe that attitudes toward police were strongly influenced by age of respondents (e.g., Ostrom, et al., 1973).

Applying these criteria to neighborhoods in St. Louis County, there were 42 independently incorporated communities, 14 census tracts within 5 larger communities, and 4 urban places to choose from, for a total of 60 neighborhoods out of slightly over 100 neighborhoods possible without exclusion by the criteria. (The largest portion of those excluded were eliminated as either too small -- less than 500 population, or as too wealthy -- greater than or equal to $25,000 median housing value.) Within the City of St. Louis, 12 of the 70 Planning Areas designated by the City Planning Commission fit the criteria. (Most of the 58 excluded Planning Areas were either not primarily residential or had too low a proportion of owner-occupied housing.) These 12 Planning Areas were the City neighborhoods most similar to those in the County. The similarity of the areas within the City to the County areas was both a strength and a limitation of the design. The strength lay in the capacity to compare City and County neighborhoods without a large number of other variables confounding the analysis. The weakness lay in the inability to make generalizations across all types of neighborhoods within the City.

[11]This strategy of data collection was suggested by Hochstim (1967) who found it to be quite cost effective.

[12]A single household respondent was used for each household in the sample. This respondent was the first person over 16 years of age contacted who resided at the household. A respondent randomization procedure was not employed due to the possibility of higher refusal rates using such procedures for interviews about potentially threatening subjects such as police. Rather, the time of day at which interviews were conducted was restricted to afternoons and early evenings in an attempt to get relatively equal samples of males and females.

[13]In two suburban depa ments that exceeded 25 full-time officers in size, interviews were conducted with all officers at the request of the police chiefs.

[14]The reader will note that only 44 study neighborhoods are shown in the table. This resulted from necessary field modifications to the research design as it was implemented. Virtually no large research project is ever completed without some deviations from the "final" research design. The 1972 St. Louis study was no exception.

One community, where a mixed strategy of mail and in-person interviews with citizens was planned, refused permission for the in-person interview portion. A smaller, mail only sample was obtained for that community. The same community had annexed an adjoining small community since the time of compilation of the data used for selection. This made it sufficiently large to move it to the adjacent cell in the design matrix. A community believed to provide its own police services with a resident marshall was reported in an early mail questionnaire to actually receive service from an adjacent municipality under a contract arrangement. Since the adjacent municipality was also included in the selected neighborhoods, the contracting jurisdiction was kept in the study, but moved to the appropriate cell of the design matrix. A third community, where a mail interview strategy was planned, was found to have no addresses listed in the St. Louis County land files. An in-person interview strategy was used instead. This neighborhood was also found to be much smaller than originally listed, having fewer than the 500 resident minimum. This was not revealed until receipt of revised census figures, well after interviews were completed, although field interviewers reported that it appeared much smaller than the listed figure. The completed interviews and the neighborhood were kept in the data base. In several other neighborhoods where mail or mixed strategies were planned, serious underlisting of addresses was found in the land files. This resulted, in a few of these neighborhoods, in significant reductions in sample size for the mail interview portion of the data collection. These were supplemented through telephone and in-person interviews to achieve respectable numbers of respondents. These unforseen deviations were dealt with within the context of the original research design.

A second type of deviation from design was planned in advance of fieldwork. While there was not a strict time constraint upon mail interviews, the in-person interviews had to be substantially completed within a single 8-day period for logistical reasons. To ensure that enough interviews were completed in a given neighborhood for statistical purposes, interview teams were scheduled so as to substantially complete interviews in one neighborhood prior to moving to the next. This resulted, in a very few of the neighborhoods, in a low number of interviews completed (i.e., those neighborhoods where interviews were conducted during the last of the 8-day period). The number of interviews was increased in most cases with additional ones obtained at a later date, but one study neighborhood where only 13 interviews were completed, was dropped.

[15]The entire St. Louis Metropolitan Area as defined by the U.S. Census Bureau, includes the independent city of St. Louis, St. Louis County (which does not contain the City), and three additional counties in Missouri, together with two counties located east of the Mississippi River in Illinois. The 1972 St. Louis study, however, was focused on the City and County of St. Louis only.

[16]Nearly 60 percent of the municipal police agencies found in 80 metropolitan areas by the Police Services Study, employed 10 or fewer full-time sworn officers. Only about 30 percent of the agencies studied in St. Louis in 1972 were this small.

[17]Variables indicative of neighborhood wealth included the median family income in 1969, the percent of families with incomes above $15,000 in 1969, and the percent of families with incomes below the poverty level in 1969. Housing conditions were indicated by the median value of owner-occupied housing, the percent of housing units that were owner-occupied, the percent of housing units with more than 1.01 persons per room, and the population density. Employment, education, and racial make-up indicators were the percent of males over 15 who were unemployed, the percent of those employed who held "white collar" jobs, the percent of persons over 25 with at least a high school education, and the percent of survey respondents who were black. Indicators of neighborhood stability were the percent of persons over 65 years of age, the percent of survey respondents living in the neighborhood 5 years or more, the percent of change in neighborhood population from 1960 to 1970, the percent of persons under 18 living with both parents, and, an inverse indicator, the percent of persons in the neighborhood who were male and between 15 and 19 years old. Finally, neighborhood heterogeneity was indexed by Lieberson indices of racial and income disparities. These indices state the probability that any two persons selected at random from the neighborhood will differ on their race or their family income (Lieberson, 1969).

[18]Principal components analysis is a technique suggested by Karl Pearson (1901) and developed by Hotelling (1933) and Kendall (1957). Using the notation and terminology of Kendall,

> Suppose we have p variates $x_1 \ldots x_p$, each observed on n individuals. We write x_{ij} for the jth observation on the ith variate. . . . The object of component analysis is to economize in the number of variates. To do this we shall seek linear transformations of the type
>
> $$\zeta_i = \sum_{j=1}^{h} a_{ij}x_j, \qquad i = 1, 2, \ldots p.$$

If all of the data can be summarized by less than p of the ζ's, then an unambiguous reduction in the number of variables is possible. As Kendall notes, this is an exceptional occurrence. He continues,

> Where it is not possible we shall try to carry out an approximate reduction in this sense: we shall choose the coefficient a so that the first of our new variates ζ_1 has as large a variance as possible; we shall then choose the second ζ_2 so as to be uncorrelated with the first and to have as large a variance as possible; and so on. . . . It may be that the first two or three of these variates account for "nearly" the whole of the variation, say 85 or 90 percent, and the contribution of the other p-2 or p-3 is small. We can then say that the variation is represented <u>approximately</u> by the first two or three variates and in favourable circumstances may be able to neglect the remainder (1957: 10-11).

The variates computed using this method are orthogonal, thus each one's influence may be separately identifiable. If the variates obtained by principal components can be identified with meaningful phenomena, then one can achieve, ". . . a meaningful reduction in the number of the model's parameters" (Farrar and Glauber, 1967: 97). If this identification is not possible, one eliminates independent rather than redundant information when less than p variates are used in subsequent analyses. The components identified using this technique with the service condition data for neighborhoods in St. Louis were rotated using a varimax criterion to ease their interpretation (for rotation, see Kim, 1975). Details of the principal component analysis of the service condition variables may be found in a technical report by the present author (Parks, 1979).

[19]Representative variables drawn from those with high correlations with each component identified were used in place of scores for each component. For discussions of the use of representative variables rather than scores, see Bwy (1968), Tantner (1966), and Hibbs (1977). The essence of the argument is that representative variables, since they are "real" and not statistical constructs, are more relevant and interpretable for policy purposes.

[20]Unfortunately, not all of the confounding can be removed by statistical controls. Unless the control variables are measured without error, a happenstance that is quite infrequent for such variables, common statistical controls may fail to adjust adequately for pre-existing differences among the neighborhoods. For an elegant demonstration, see Lord (1960).

CHAPTER FIVE

LINKING STRUCTURE AND PERFORMANCE EMPIRICALLY -- II: Production Strategy, Patrol Deployment, and Police Response Capability

One of the ways in which the structure of service delivery arrangements is likely to affect conduct and performance is through incentives and constraints for the choice of production strategies by producers in different service delivery structures. The choice of production strategies by producers in an industry, that is, the choice of input resource allocations, may constrain the activities in which their personnel engage. As activities of producer personnel are one set of important influences on the outputs and outcomes of a public service industry, so the performance of the industry is affected by those constraints and, ultimately, by the service delivery structures that contribute to them.

An area of policing where the choice of production strategies may have an immediate effect is the choice of how large a proportion of producer personnel to allocate to patrol duties. The number of officers on the street at one time in any given area, together with the distribution of service requests from that area, provide powerful technical determinants of the response capability of the police. When the number of officers on the street is too low, or the distribution of those officers is inappropriate, in relation to likely request locations, dramatic degradation in response capability may occur (Larson, 1972).

There are indications from earlier research that the choice of production strategies by police producers, at least the choice of the

proportion of officers to assign for on-street patrol duty, is a function of police organizational arrangements and the structure of police service delivery arrangements. Large police agencies have been found to allocate much lower proportions of their personnel for patrol duties (Ostrom, et al., 1973; Ostrom, Parks, and Whitaker, 1978). A similar reduction in the proportion of officers assigned to patrol duties has been found at the industry level in more concentrated service delivery structures (Parks, 1976a). If these differences in production strategies result in sufficient differences in patrol availability to degrade police response capabilities, then performance losses in immediate response activities that may result can be attributed back through the choice of production strategies to producer organization and the structure of service delivery arrangements.

Service Delivery Structures, Production Strategies, and Patrol Availability

Concentrated service delivery structures are those with one or a few large producers that supply most of the service in question. Two measures of service delivery structure in metropolitan areas can be used as indicators of concentration. These are relative multiplicity, the number of producers of a service per 100,000 inhabitants (an inverse measure of concentration), and dominance, the proportion of metropolitan residents served by the producer with the largest serviced population.[1] In the metropolitan areas studied for the Police Services Study, there was wide variation on each of these measures for patrol service delivery. Relative multiplicity for patrol ranged from slightly more than 1 producer

per 100,000 residents to a high of 19 producers per 100,000 residents. The median value was nearly 6. Dominance ranged from a low of 11 percent served by the largest producer to a high of 100 percent. Median dominance for patrol was 51 percent, or slightly more than one half of the metropolitan population receiving service from the largest patrol producer.

A simple look at whether these structural measures are associated with the choice of production strategies in metropolitan areas is afforded by the data in Table 5.1. In that table the average percent of full-time sworn officers assigned to patrol duties in each metropolitan area is arrayed by the relative multiplicity and dominance of patrol service structure, each dichotomized at the median value.

Table 5.1. Patrol Service Structure and Production Strategies in Metropolitan Areas

	Percent of Full-Time Sworn Officers Assigned to Patrol Duties in Metropolitan Areas With:		
	Low Dominance	High Dominance	All Metropolitan Areas
Low Relative Multiplicity	56 (17)[a]	51 (23)	53 (40)
High Relative Multiplicity	60 (23)	57 (17)	59 (40)
All Metropolitan Areas	58 (40)	54 (40)	56 (80)

[a]Number of metropolitan areas with this combination of relative multiplicity and dominance.

The data in Table 5.1 indicate a relationship between patrol service structure and choice of production strategy, with a direction anticipated

from earlier research. The metropolitan areas with the highest percent of sworn officers assigned to patrol duties are those with higher relative multiplicity and lower dominance. In these areas, the metropolitan population tends to be divided among a larger number of more similarly sized consumer groupings, each of which typically receives patrol service from a separate producing agency. Metropolitan areas with low multiplicity and high dominance have the lowest proportion of full-time sworn officers assigned to patrol duties of the four types. In these areas, most of the metropolitan population is concentrated within a single consumer grouping that receives service from a single, large producing agency. This service delivery structure is most similar to that advocated by those who wish to reform American policing (see Chapter Three). The metropolitan areas with low relative multiplicity and low dominance or high values on both measures are intermediate in percent of officers assigned to patrol duties.

These differences in the production strategies chosen by producers in differently structured metropolitan areas are reflected in the on-street deployment of police officers. In metropolitan areas with structures that are more favorable to patrol-oriented production strategies, fewer officers are employed per officer on the street patrolling at any point in time. Table 5.2 presents data to illustrate these differences in terms of patrol deployment at 10 pm, a time of day when many departments have their largest patrol force deployed. The data in the table are the number of full-time sworn officers in a metropolitan area per officer on patrol at 10 pm.

Table 5.2. Patrol Service Structure and Police Officer Deployment in Metropolitan Areas

Number of Full-Time Sworn Officers Employed Per Officer on Patrol at 10 pm in Metropolitan Areas With:

	Low Dominance	High Dominance	All Metropolitan Areas
Low Relative Multiplicity	7.4 (17)[a]	9.5 (23)	8.6 (40)
High Relative Multiplicity	6.8 (23)	7.1 (17)	6.9 (40)
All Metropolitan Areas	7.1 (40)	8.5 (40)	7.8 (80)

[a]Number of metropolitan areas with this combination of relative multiplicity and dominance.

These data indicate a markedly higher employment of police officers in relation to the number actually deployed for street duty at 10 pm in metropolitan areas with more concentrated patrol service delivery structures. Many police officers in the large producing agencies typical of these more concentrated service delivery structures must, obviously, have assignments that make them unavailable for on-street patrol activities. Larger producers also tend to put a lower proportion of officers with nominal patrol assignments actually on the street patrolling at a given time. This latter phenomenon may reflect a de-emphasis of the importance of patrol in such agencies that goes along with their choice of production strategies (Ostrom, Parks, and Whitaker, 1978).

The differences in choice of production strategy and patrol deployment within differently organized patrol service delivery structures have implications for the availability of patrol officers to citizens in

the metropolitan areas. A measure of this availability (an inverse measure) is the number of inhabitants of the metropolitan area per officer on patrol, again measured at 10 pm. Table 5.3 presents data for this measure in differently structured metropolitan areas. Each patrol officer on the street at 10 pm in the most concentrated areas must, on the average, attend to requests from approximately 700 more citizens than an officer on the street in the least concentrated areas. Again the main-diagonal structures are intermediate. The dominance of a given structure appears more important than relative multiplicity in affecting officer availability, albeit negatively. Structures exhibiting either high or low relative multiplicity are closer in terms of patrol officer availability than those that differ on dominance, and the less dominated structures exhibit better officer availability.

Table 5.3. Patrol Service Structure and Patrol Officer Availability in Metropolitan Areas

Number of Citizens Per Patrol Officer on the Street at 10 pm in Metropolitan Areas With:

	Low Dominance	High Dominance	All Metropolitan Areas
Low Relative Multiplicity	3,457 (17)[a]	4,135 (23)	3,847 (40)
High Relative Multiplicity	3,416 (23)	3,803 (17)	3,580 (40)
All Metropolitan Areas	3,434 (40)	3,994 (40)	3,714 (80)

[a]Number of metropolitan areas with this combination of relative multiplicity and dominance.

From the data presented in this section, it is clear that the structure of service delivery arrangements for patrol in a given area is related to the choice of production strategies made by producers in the area and, in turn, to the deployment and availability of patrol officers. Production strategy choices are, however, choices that are made by individual producers, and not by service delivery structures. Structures may offer incentives and constraints to producers operating within them, but to see how these incentives and constraints operate, it is necessary to focus on individual producing units.

Agency Organizational Arrangements, Production Strategies, and Patrol Availability

The organizational arrangement most closely associated with choice of production strategies by police patrol producers is the size of the producing agency. Table 5.4 shows that the allocation of sworn officers to patrol duties drops off markedly in police agencies of larger sizes. As police agency size increases, more sworn officers are employed per officer deployed for street duty at 10 pm, and each officer on the street at that time has more citizens to serve on the average. Small police departments tend to choose almost exclusively patrol-oriented production strategies, while medium-sized and, particularly, large departments place much less emphasis on patrol as measured by their allocation of personnel to patrol duties. These differences in production strategies chosen by departments of different sizes have clear effects on patrol deployment and availability. Patrol officers on the street in the average large department, to illustrate an extreme example, must attend

Table 5.4. Police Department Size, Production Strategy, and Patrol Deployment and Availability in Municipal Police Departments

Size of Police Department -- Number of Full-Time Sworn Officers	Average Percent of Full-Time Officers Assigned to Patrol Duties	Average Number of Full-Time Officers Assigned Per Officer on the Street -- 10 pm	Average Number of Citizens Per Officer on the Street -- 10 pm
1 to 4 (202)[a]	99	2.1	1,900
5 to 10 (209)	90	4.3	2,000
11 to 20 (122)	75	5.3	3,400
21 to 50 (121)	69	6.7	3,600
51 to 150 (76)	63	7.4	4,330
More than 150 (43)	57	9.8	4,900

[a]Number of police departments in this size range -- Police Services Study

to the service requests of approximately 3,000 more citizens than officers on the street in the smallest departments, more than 2.5 times as many. Differences of this magnitude should surely be reflected in the departments' response capabilities.

How can differences of these magnitudes be accounted for? In Chapter Two, several influences on a producer's choice of production strategy were suggested. These were: (1) service demands in the producer's jurisdiction, (2) service spill-ins from other producers or

spill-outs to others, (3) the availability of ear-marked external funds, and (4) internal dynamics in differently sized producer agencies. Taken together these influences may explain why differently organized police producers choose such very different production strategies.

Other than patrol, the most common assignment of sworn officers in police agencies is to investigative duties. Such assignments in small police agencies may consist of one or two detectives with general responsibilities for investigating most crimes in the producer's jurisdiction. In a large producing agency, on the other hand, a large number of officers may have quite specialized assignments focused on investigations of particular types of crimes. In order to allocate large numbers of officers to investigative specialites, however, a high volume of incidents appropriate to those specialties must be present. Such volumes are likely to be found only in the jurisdictions of the largest police agencies.

In 1973, the 490 cities with populations of 25,000 to 50,000 persons that reported crime data to the FBI listed a total of 1,358 murders and manslaughters of all types (Kelley, 1974: 98).[2] This represents an average of three such incidents per city for the year, hardly enough to warrant the establishment of specialized homicide units. In cities with 50,000 to 100,000 persons, the number of murders and manslaughters averaged slightly more than six per year, while violent personal crimes of all types (i.e., murder, rape, robbery, and aggravated assault) occurred less frequently than once per day. Large numbers of investigative specialists would appear unwarranted in these cities as well.

it is only in the largest jurisdictions where sufficient crimes of particular types occur to warrant establishment of highly specialized investigative units. The six cities with populations in excess of 1 million persons that were listed in the 1973 FBI Crime Report averaged in excess of two homicides per day throughout the year and more than 100 violent personal crimes each day. These figures illustrate the concentration of violent crime in these largest cities and suggest that officers assigned to investigative specialties in those cities may have ample incidents in their specialized areas to work with. While it is not possible to estimate precisely the extent to which specialized officer assignments are the result of demand factors such as these variations in crime occurrences, it seems safe to assert that they are at least a partial incentive toward specialization in agencies serving large jurisdictions.

A disincentive for specialization in particular services for many producers may be the availability of those specialties from other producers in a given industry. Table 5.5 presents data bearing on this explanation for municipal police agencies of different sizes. These data show that where a producer is able to obtain homicide investigation services or radio communications from extra-agency sources, the producer is likely to allocate substantially more personnel to patrol duties. The data are, unfortunately, based on a limited number of observations for larger departments receiving services from others. But they do suggest that vertical differentiation of service delivery structures, with agencies specializing in homicide investigations or radio communications, might be beneficial with respect to the allocation of officers to patrol duties in metropolitan areas.[3]

Table 5.5. Service Spill-Ins and Production Strategies -- Municipal Police Departments

Size of Police Department -- Number of Full-Time Sworn Officers	Average Percent of Full-Time Sworn Officers Assigned to Patrol Duties in Departments That:			
	Produce Own Homicide Investigations	Receive Homicide Investigations From Others	Produce Own Radio Communications	Receive Radio Communications From Others
1 to 4	99 (83)[a]	99 (109)	98 (80)	99 (122)
5 to 10	89 (160)	95 (49)	90 (140)	92 (69)
11 to 20	74 (115)	83 (7)	74 (109)	84 (13)
21 to 50	68 (119)	86 (2)	69 (117)	65 (4)
51 to 150	63 (75)	63 (1)	63 (72)	67 (4)
More than 150	57 (43)	-- (0)	56 (40)	63 (3)

[a]Number of police departments in this size range -- Police Services Study.

If some producers benefit from service spill-ins, are those who produce for more than their own jurisdiction exploited by these arrangements? No clear answer to this can be given with the data available from the Police Services Study. As shown in Table 5.6, the assignment of higher or lower proportions of sworn officers to patrol duties varies quite a bit among departments that produce homicide investigations or radio communications for others as well as for their own jurisdictions. Tendencies to employ more or fewer sworn officers for each one actually deployed to street duty, as service production for others occurs, are mixed also. No simple pattern of exploitation can be seen, however.

Table 5.6. Service Spill-Outs, Production Strategies, and Patrol Deployment -- Municipal Police Departments

Size of Police Department -- Number of Full-Time Sworn Officers	Average Percent of Full-Time Sworn Officers Assigned to Patrol Duties in Departments That:			
	Produce Homicide Investigations For:		Produce Radio Communications For:	
	Themselves Only	Other Producers Also	Themselves Only	Other Producers Also
1 to 4	99 (91)[a]	100 (3)	98 (77)	100 (3)
5 to 10	89 (156)	90 (7)	89 (123)	92 (14)
11 to 20	74 (108)	80 (7)	74 (92)	72 (13)
21 to 50	68 (113)	68 (6)	69 (110)	67 (7)
51 to 150	64 (66)	59 (9)	62 (62)	66 (10)
More than 150	58 (27)	54 (16)	56 (34)	59 (6)

	Average Number of Full-Time Sworn Officers Employed Per Officer on the Street at 10 pm in Departments That:			
	Produce Homicide Investigations For:		Produce Radio Communications For:	
	Themselves Only	Other Producers Also	Themselves Only	Other Producers Also
1 to 4	2.5	3.5	2.2	3.7
5 to 10	4.2	4.6	4.2	4.0
11 to 20	5.2	5.2	6.3	6.3
21 to 50	6.3	6.3	6.2	6.6
51 to 150	7.4	8.2	7.4	7.8
More than 150	10.0	8.6	9.7	9.6

[a]Number of police departments in this size range producing homicide investigations (or radio communications) -- Police Services Study. Numbers of departments are the same in lower half of the table and, thus, not repeated there.

No data are presently available to estimate the extent of influence over production strategy choices from the availability of ear-marked external funds. Anecdotally, it seems clear that such funds have effects. Many local police departments have beefed up their traffic assignments, for example, in response to funds for additional officers and vehicles from the National Highway Traffic Safety Administration. Their production strategies are thus shifted toward increased specialization in that service. The frequency and magnitude of such shifts is unknown, however.

Additional incentives toward specialization and, thus, away from patrol-oriented production strategies may result from dynamics internal to producer organizations. Any organization must offer differential rewards for differential performance by its members. A structure of rewards is necessary to encourage the performance of certain kinds of activities and to discourage the performance of others. Establishing a structure of differential rewards is difficult, however, in public bureaucratic organizations such as most police agencies, that were molded by the governmental reforms of the 1930s onward. In the laudable attempt to remove unsavory influences such as friendly relations with local political bosses from the allocation of rewards, many departments found themselves with no criterion to apply other than time in grade (for an excellent discussion of the reforms, see Fogelson, 1977). The only justification for paying one patrol officer more than another patrol officer was thus the amount of time that they had each held patrol rank. Similar strictures applied at all other ranks in these departments.

Promotion to a higher rank as an alternative reward was also limited. Because of a desire to limit the potentially corruptible exercise of discretion by senior officers with respect to promotions, promotions were awarded on the basis of performance on written examinations together with time in grade restrictions rather than on performance of job-related activities.

One remaining option was available in many departments. Police managers were left the power of assigning officers to particular duties. With other avenues for rewarding performance closed, this assignment power became the basis of the reward system in many departments. Rubinstein describes its usage by sergeants as a means of rewarding control over, and rewarding the performance of, patrol officers (1973). Niederhoffer points out the power of this option in his discussion of the desire of patrol officers to "get out of the bag." Assignment to a specialized unit generally means that an officer can shed his or her uniform and work in ordinary street clothes, a thing of great value to most officers (Niederhoffer, 1967). Assignment to a specialized unit often yields a small salary differential. Working hours are often the usual 9 am to 5 pm enjoyed by most nonpolice workers. There is the prestige of being a specialist in a technical area of policing. Perhaps most important, there is often a less authoritarian style of working relationship among officers of different ranks within specialized units (Niederhoffer, 1967: 83).

Another internal factor affecting specialization in large agencies may be top administrators' wishes to attain smooth running internal operations, including control over the discretion exercised by subordinates.

Assigning large numbers of officers to specialized units may enable increased control over their activities. Specialists can be expected, at a minimum, to conduct activities appropriate to their specialty. Establishment of traffic units has, for example, been argued to increase administrators' abilities to ensure the production of traffic arrests. Officers in such units can be constrained to do little else than make traffic arrests. A lack of such arrests then highlights poor performance immediately (J. Q. Wilson, 1968; Gardiner, 1968).

Finally, administrators in large departments may place a high value on conforming their departmental organization to professional norms that emphasize the need for specialization. This would ensure that their peers in the police profession (who may be an important constituency to administrators of large departments) would not find them lacking in organizational sophistication. Given the much higher visibility of larger departments and their administrators in the police profession, this may be a quite important incentive toward increasing specialization.

Production Strategies, Patrol Availability, and Response Capabilities

Differences in police production strategies and the availability of patrol officers are important as they affect the capacity of officers to respond to citizens' requests for police service. Response capability is a key intervening variable in linking police organization to some aspects of police performance. An indicator of response capability, the distribution of response times (measured from initial citizen request for service to the arrival of a patrol unit at the scene of the request),

has held a central position in efforts to improve police performance in recent years. Millions of dollars have been spent to reduce the amount of time that police require to process and respond to a citizen's call for service. Hundreds of police agencies have installed new communication systems to improve their response capabilities, often with substantial investments of federal grant funds. Some departments have gone beyond communication improvements, installing sophisticated computer systems designed to reduce response times by tracking patrol units, thus enabling dispatchers to determine the closest available unit to respond to calls. Police response time has been posed as a summary measure of overall police performance (Missouri Law Enforcement Assistance Council, 1972). It has been argued to be the one contribution to police crime-fighting effectiveness over which the police have much control (Lind and Lipsky, 1971).

Response capability is also important because of demonstrated links to broader measures of citizen evaluation of the police services they receive. A number of studies of factors associated with these evaluations have pointed out the strong relationships between citizen perceptions of the speed of police response and their overall evaluations of police service.[4] This association has been shown for citizen perceptions and evaluations of police in specific encounters, and for more general perceptions and evaluations of conditions in citizens' neighborhoods (Furstenberg and Wellford, 1973; Parks, 1975; 1976; Pate, et al., 1976; Percy, 1979). Recently it has been shown that citizen expectations regarding the immediacy of police response, act to temper the link between response time and satisfaction (Pate, et al., 1976; KCPD, 1977;

Percy, 1978), suggesting that agencies would do well to inform citizens as to their actual response capabilities when a service request is received. While such a policy is commendable and could certainly act to weaken a direct response time to satisfaction linkage, it is reasonable to assume that the link would not be eliminated by such a policy. Very slow responses would continue to aggravate citizens, while very rapid responses should lead to more favorable evaluations.

Conceptually, police response capability (the expected distribution of police response times) is a technically determined variable. Given the distribution of incoming calls for service, the geography of the jurisdiction in question, and the choice of a deployment strategy by the agency serving the jurisdiction, one should be able to compute the expected distribution of police response times (see Larson, 1972, for the best discussion of how this can be accomplished). To the extent that such a technical explanation holds, it should be possible to demonstrate that police agencies achieve more rapid responses because: (a) they choose more efficacious deployment strategies, (b) they serve jurisdictions with a more favorable pattern of incoming calls, or, most likely, a combination of these factors. Once deployment strategies that are associated with faster responses in given conditions are identified, it is possible to ask whether particular organizational arrangements are more likely to lead to such deployment. If so, it will be possible to link organizational arrangements through the choice of production strategies and the resulting deployment of officers to performance indicators for at least one aspect of policing, the immediate response to citizen requests for service.

Using data from the 1972 St. Louis Study, it is possible to explore the effects of production strategies on police patrol availability and response capabilities in comparable neighborhoods. The production strategy chosen by each of the departments in that study was coded from agency records and interviews with administrators. The availability of patrol units, measured (inversely) by dividing the number of citizens in a neighborhood by the number of patrol officers on the street in that neighborhood, was computed for all of the study areas. As a check on that figure, citizen reports of the frequency at which they sighted patrol units in their neighborhoods were averaged for each neighborhood. Neighborhood service demands were computed from citizen reports of their calls to the police for assistance in instances of victimization or other problems.[5] The average time required for police to respond to a call for assistance in each neighborhood was computed from the reports of citizens who indicated that they had called for police assistance and who were able to give an estimate of the response time.[6]

Table 5.7 presents the results of a regression analysis using production strategy, service demands, and patrol availability measures to predict the frequency at which citizens see patrol units in their neighborhoods. The lower half of that table presents a second regression analysis, showing the effects of production strategy, service demands, and patrol availability on the average response time to a call for service in the study neighborhoods. In both regression equations adjustments for neighborhood service conditions have been made.[7] The effects estimated by these two regression analyses are consistent with prior expectation with respect to the signs of the coefficients.

Table 5.7. Production Strategies, Patrol Availability, and Response Time

Effects[a] on Average Perceived Patrol Frequencies in the Study Neighborhoods (number per shift).

	b	s.e.	beta
Production Strategy:			
Percent of Officers Assigned to Patrol	.042	.014	.624
Patrol Availability (inverse):			
Number of Citizens Per Officer on Patrol -- 1,000's	-.068	.101	-.110
Service Demands:			
Number of Calls Per 100 Residents Per Year	-3.34	4.85	-.114
R Squared		.66	
Number of Cases		44	

Effects[a] on Average Perceived Response Times in the Study Neighborhoods (minutes).

	b	s.e.	beta
Production Strategy:			
Percent of Officers Assigned to Patrol	-.215	.111	-.479
Patrol Availability:			
Average Perceived Patrol Frequency	-2.73	1.23	-.408
Only One Patrol Unit on the Street	13.4	3.39	.748
Service Demands:			
Number of Calls Per 100 Residents Per Year	.198	.348	.101
R Squared		0.55	
Number of Cases		44	

[a]Effects are computed with adjustment for service conditions in the study neighborhoods. See Footnote 7.

Citizens' perceptions of police patrol frequency are positively related to the choice of more patrol-oriented production strategies and negatively related to reduced patrol availability. Perceptions of patrol frequency are negatively related to neighborhood service demands, also.

Citizens, on the average, perceive faster police response when they call the police in neighborhoods where more patrol-oriented production strategies are employed and where police patrols are seen more frequently. The fact that only one patrol unit is available to respond to citizen calls in a neighborhood is predicted to increase response time quite a bit. Higher service demands, too, are predicted to increase response times. The choice of production strategies by patrol producers is shown by these data to be an important influence on patrol presence and police response capability in the St. Louis neighborhoods.

With the coefficients shown in Table 5.7 and some calculations based on typical values for departments of differing size, it is possible to compute average patrol frequencies and response times for variously organized departments. These computations, shown in Table 5.8, provide some interesting results. Patrol presence, measured by the frequency at which neighborhood residents report seeing patrol units, is predicted to be the highest in neighborhoods served by very small departments.[8] In those neighborhoods, residents sight patrol units on the average of 5 times per 8-hour shift. That frequency drops off somewhat in neighborhoods served by medium-sized patrol agencies, those with 11 to 100 sworn officers, and even further in the neighborhoods served by departments with more than 100 sworn officers. In the latter areas, patrol units are seen an average of 3 times per 8-hour shift.

Table 5.8. Predicted Average Patrol Frequencies and Average Response Times -- Typical Municipal Police Departments

Predictor Variable	Coefficient	Typical Value in: Small Department (1 to 10)	Medium Department (11 to 100)	Large Department (over 100)
Production Strategy: Percent of Officers Assigned to Patrol	.042	95	70	60
Patrol Availability: Thousands of Citizens Per Officer on the Street	-.068	2.5	3.6	4.8
Service Demands: Number of Calls Per 100 Residents Per Year	-.033	8	12	12
Constant Term[a]	1.32	1	1	1
Predicted Average Patrol Frequency (number per shift)		4.87	3.62	2.90
Production Strategy: Percent of Officers Assigned to Patrol	-2.15	95	70	60
Patrol Availability: Average Patrol Frequency	-2.73	4.87	3.62	2.90
Only One Patrol Unit on the Street	13.14	1	0	0
Service Demands: Number of Calls Per 100 Residents Per Year	.198	8	12	12
Constant Term[a]	33.86	1	1	1
Predicted Average Response Time (minutes)		15.1	11.3	15.4

[a]The constant term includes the regression intercept term and adjustments for average service conditions in the second row of the St. Louis Study design matrix. See Footnote 8.

CONTINUED

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The predicted average response time in neighborhoods served by differently organized police agencies exhibits a curvilinear relationship with producer agency size. The smallest agencies, while adopting a very patrol-oriented strategy that should lead to rapid response, are limited by having only one response unit available. When that unit is otherwise engaged, a caller might have to wait some time for a police response.[9] Large agencies, on the other hand, tend to use more task-oriented strategies with less emphasis on patrol. Thus, though they are not limited by too few response units in absolute numbers, they may have too few in relation to their volume of service requests. Their predicted average response time, 15 minutes, is thus no better than that of the very small police patrol producers. Medium-sized police patrol producers are found to be in the happy circumstance of choosing production strategies that lead to enhanced response capabilities, and of having sufficient resources to obtain the benefits of such a choice.

Production Strategies, Police Response Capabilities, and Subjective Outcomes

To this point linkages of the structure of service delivery for police patrol, the organization of police patrol producers, the deployment and aviilability of police patrol officers, and the response capabilities of police patrol producers have been shown. It remains to be shown that the differences in response times found among producers using different production strategies are sufficient to register with consumers of police patrol services. Data collected from individual

respondents in the 1972 St. Louis Study can be used to establish this linkage.

Each citizen interviewed in the St. Louis Study was asked, "When police are called in your neighborhood, in your opinion how fast do they come? Very rapidly, quickly enough, slowly, or very slowly?" If the perceptions of citizens obtained in response to this question are related to average response times in their neighborhoods and, possibly, to other indicators of patrol availability, then it can be shown that the influence of police organization extends all the way through the patrol service production process to these subjective outcomes.

How might citizens develop their perceptions of how fast the police respond when called to their neighborhood? For citizens who had a recent experience with local police response, their perception of the response time in that experience is likely to weigh heavily on their overall perception of the speed of police response. They are likely to generalize from their own experience to that of any citizen who might call the police in their neighborhood.

Two additional clusters of variables may influence the accuracy of citizens' perceptions of response time in their experiences or the generalization of those experiences to an overall rating of police response in the neighborhood. These are the characteristics of the citizens who have experiences with the police and the activities of the responding police officers following their arrival at the scene of the experience. Different persons may respond differently to the same phenomenon. To the extent that these differences are patterned

along the lines of objective citizen characteristics (e.g., age, education, race), one can adjust for these perception differences by controlling the citizen characteristics. With respect to officer activities after arrival at the scene, favorable activities may act to lower the perceived response time (or its magnitude in the citizen's memory) or lead the citizen to believe that a long response time in his experience was atypical of the usual, faster response provided by the helpful officers. Unfavorable activities may, of course, have an opposite effect.

If recent experiences are likely to affect the perceptions of citizens having had them, what of citizens without recent experience? How might they develop perceptions of the speed of police response in their neighborhoods? These citizens must draw upon other sources of information.

One source of information for citizens without recent personal experience might be the experiences of friends and neighbors whom the citizen observed to have such an experience, or who might have told the citizen about it. The average response time in all recent experiences in a respondent's neighborhood provides an indicator for this information. Just as with a citizen's own experience, police actions at the scene of encounters in the neighborhood may act to modify perceptions of police response drawn from those encounters. The distribution of unfavorable experiences in the respondent's neighborhood can be used to account for this.

Many citizens may have had no recent experience with local police, may not have had an opportunity to observe response to calls made by

friends or neighbors, and may not have been told about any such recent experiences. These citizens are forced to rely on proxy measures to develop their perception of the speed of police response in the neighborhood. One likely proxy is the frequency with which they sight a patrol car in their neighborhood. Those who see patrol units cruising up and down their street frequently are more likely to perceive that the police would respond rapidly when called than are those who see patrol units infrequently. Another proxy measure that might influence the perceptions of citizens in very small jurisdictions is the presence of only one patrol unit on the street to respond to citizen calls. To the extent that citizens are aware of this, they may perceive that their police respond more slowly due to the possibility that the one unit will be busy when a call is received. Of course, these proxy measures and the experiences of others may influence the perceptions of those having had a recent experience as well.

These speculations are spelled out in an arrow diagram in Figure 5.1. The influences to the right of the dotted line in that figure have been discussed to this point. Those to the left are more remote influences, included to show linkages back to organizational arrangements and service conditions. The speculated direction of effects is shown for these linkages.

Table 5.9 presents data to explore these speculations. These data are the regression coefficients for an equation predicting the answer that each citizen gave to the question, "(w)hen police are called in your neighborhood, in your opinion how fast do they come? Very rapidly, quickly enough, slowly, or very slowly?"[10] The independent

Figure 5.1. Influences on Citizen Perceptions of the Speed of Police Response in Their Neighborhood

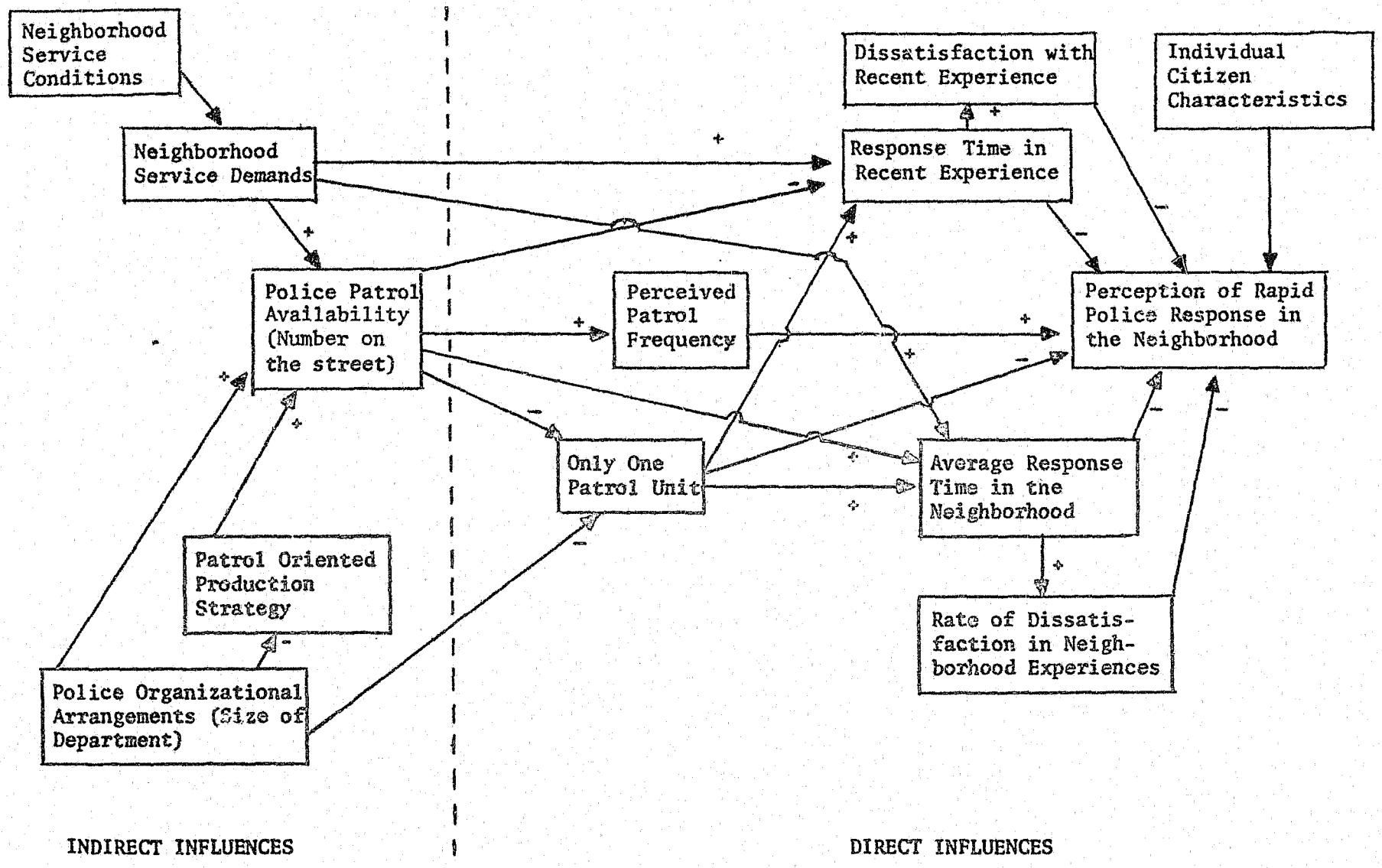

Table 5.9. Influences on Citizens Perceptions of the Speed of Police Response in Their Neighborhoods

	Citizens Having Recent Experience with Police Response Time			Citizens Not Having Recent Experience with Police Response Time		
Independent variable	b	s.e.	beta	b	s.e.	beta
Response time in respondent's own experience:						
0 to 1 min. (29)[a]	.591	.175	.133	---[b]	---	---
2 to 4 min. (113)	.413	.142	.173	---	---	---
5 to 10 min. (256)	.341	.135	.192	---	---	---
11 to 20 min. (98)	.092	.144	.036	---	---	---
21 to 60 min. (53)	-.402	.157	-.121	---	---	---
61 to 120 min. (8)	-.391	.266	-.047	---	---	---
over 2 hours (4)	.884	.346	.075	---	---	---
"rapidly, quickly" (155)	.243	.137	.116	---	---	---
"soon enough"[c] (26)	0	---	---	---	---	---
"slowly" (8)	-.362	.271	-.032	---	---	---
"didn't come" (49)	-.109	.159	-.032	---	---	---
Average response time in neighborhood (minutes)	-.010	.005	-.073	-.011	.003	-.093
Respondent experiences:						
Unsatisfactory victimization (107/5)[a]	-.497	.076	-.204	-.675	.301	-.039
Unsatisfactory assistance (37/4)	-.408	.113	-.103	-.940	.336	-.049
Unsatisfactory stop (14/36)	-.328	.176	-.054	-.247	.116	-.038

Table 5.9 (continued). Influences on Citizen Perceptions of the Speed of Police Response in Three Neighborhoods

Independent variable	Citizens Having Recent Experience with Police Response Time			Citizens Not Having Recent Experience with Police Response Time		
	b	s.e.	beta	b	s.e.	beta
Know someone mistreated (45/105)	-.096	.107	-.026	-.367	.070	-.096
Neighborhood experiences:						
Unsatisfactory victimizations (%)	-.058	.014	-.199	-.045	.088	-.154
Unsatisfactory assistances (%)	-.042	.029	-.068	-.047	.017	-.075
Unsatisfactory stops (%)	-.005	.019	-.011	-.043	.011	-.092
Respondent characteristics:						
Race (black)	.023	.072	.010	-.141	.046	-.062
Age (decades)[d]	.063	.016	.115	.046	.008	.103
Education[d,e]	.054	.024	.068	.010	.013	.014
Patrol availability:						
Citizens per on-street patrol officer (000)	.041	.024	.064	.006	.012	.012
Perceived patrol[d] frequency (number per 8 hour shift)	.034	.011	.092	.050	.007	.130
Only one patrol unit on the street	-.235	.119	-.093	-.169	.065	-.004
Agency production strategy:						
Percent of sworn officers assigned to patrol duty	.008	.003	.134	.005	.002	.107

Table 5.9 (continued). Influences on Citizen Perceptions of the Speed of Police Response in Their Neighborhood

Independent variable	Citizens Having Recent Experience with Police Response Time			Citizens Not Having Recent Experience with Police Response Time		
	b	s.e.	beta	b	s.e.	beta
Neighborhood service demand (calls per 100 residents per year)	.048	.012	.194	.049	.007	.208
Missing data indicators:						
Age[d] (8/33)[f]	-.337	.232	-.040	-.174	.118	-.026
Education[d] (8/68)	-.445	.229	-.053	-.072	.084	-.015
Patrol frequency[d] (402/1,751)	-.008	.052	-.005	-.143	.029	-.095
Constant term	-1.127	.567	---	-.408	.184	---
R squared		.432			.162	
Number of cases		799			2,775	

a. (N) = number of respondents reporting this experience. (N_1/N_2) = number with response time experience/number without response time experience.

b. Not applicable.

c. Reference value for response time in experience. See text.

d. Missing values for these variables were replaced with neighborhood or cell averages. See footnote 12.

e. See footnote 13 for education categories.

f. (N_1/N_2) = number of substitutions for missing values, experienced/inexperienced.

variables include measures of the average response time in all encounters that citizens told our interviewers had occurred in their neighborhood, and response times in specific encounters for those respondents having had one.[11]

Police actions at the scene of encounters in the citizen's neighborhood and in specific experiences which he or she might have had are summarized through the use of experience satisfaction measures. For neighborhood experiences these are the percent of neighborhood respondents who told our interviewers about an unsatisfactory victimization experience, an unsatisfactory assistance experience, or an unsatisfactory stop by the local police. Indicators for whether any of these unsatisfactory experiences occurred to the individual respondent are also included, as well as an indicator for whether he or she knew of anyone mistreated by the local police.[14] Other independent variables in the analysis include perceived patrol frequency, the presence of a single patrol unit on the street in the respondent's neighborhood, characteristics of the individual respondent, production strategy, and service demand in the respondent's neighborhood.

The data are basically supportive of the speculations on possible influences. It is possible to develop a much better prediction of the perception of speed of police response held by someone who has had a recent experience than it is for one who has not. The R squared coefficient is 0.432 for experienced and 0.162 for inexperienced respondents. This means the variables in the equation account for 43 percent of the variance in perception among experienced respondents, and 16 percent among the inexperienced.[15]

The relative effects of clusters of variables, such as those shown in Figure 5.1, can be compared by computing a composite measure for each cluster and entering those composites in a regression equation. The composite measures are weighted sums of the variables from each cluster, where the weights are the unstandardized regression coefficients (the "b's") shown in Table 5.9 (Coleman, 1976).[16] To the extent that the effect of each cluster is independent of that of each other cluster (i.e., they are uncorrelated), one can compare the standardized regression coefficients for these composite measures to examine their relative influence. This comparison is shown in Table 5.10.

Table 5.10. Relative Influence of Variable Clusters on Perceived Speed of Response in the Study Neighborhoods

	Experienced Respondents	Inexperienced Respondents
Variable Cluster	beta	beta
Response Time in Individual Experience	.296	---
Other Individual Experience Aspects	.249	.128
Aggregate Neighborhood Experiences	.285	.304
Individual Characteristics	.125	128
Neighborhood Patrol Availability	.115	.136
Agency Production Strategy	.134	.107
Neighborhood Service Demand	.194	.208
Missing Data	.067	.099

These data show that, in terms of explaining variance in perceptions of speed of response, the three most important influences for experienced respondents are the response time in their own experience, other aspects of personal experience, and aggregate experiences in their own neighborhood, including the average neighborhood response time. Intermediate in importance is the level of demand in their neighborhood, with individual characteristics, neighborhood patrol availability, and production strategy of secondary importance. Among inexperienced respondents, the aggregated experiences of their neighbors are the most important influence on their perceptions, followed by the level of service demand in their neighborhood and, at a lower level of importance, individual experiences other than with response time, individual characteristics, and patrol deployment in the neighborhood.[17] The fact that neighborhood level experiences, including average response times, and measures of patrol availability and agency production strategies have influences on individual citizens' perceptions of police response in their neighborhoods establishes the last link in the production process model.

How Is Structure Important - A Partial Answer

In this chapter I have shown that the structure of service delivery arrangements for the supply of police patrol services in metropolitan areas affects overall industry production strategies. Producers in less concentrated structures allocate higher proportions of their officers to patrol duties and require fewer officers for each one deployed for on-street activities, and each of their on-street officers

must serve fewer citizens. At the level of individual producers, the size of the producer organization is closely related to choice of production strategies. Larger producers allocate proportionately fewer officers to patrol and require more officers for each one on the street, and each on-street officer must serve many more citizens than his or her counterpart in smaller agencies. Individual agency production strategies and patrol deployment were shown to be related to the structure of service delivery arrangements for related police services, i.e., homicide investigations and radio communications, as well. Producers that can obtain these services from others place a higher emphasis on patrol. There is no clear pattern, however, that would indicate that producers supplying those services to others are exploited by such arrangements.

The choices of production strategies with respect to patrol and the resulting patrol availability were shown to affect patrol visibility and response times in a sample of residential neighborhoods. As one would expect, citizens in neighborhoods that are served by departments that emphasize patrol and, thus, attain a higher patrol availability report seeing patrol units more frequently and report that the police responded more rapidly in their individual experiences with neighborhood police. These same relationships are found with respect to the perceptions of all citizens queried in the sample neighborhoods, whether they had a recent experience with the local police or not.[18]

The structure of police patrol service delivery arrangements and the organization of individual police service producers are important for performance, therefore, in that they affect police agencies'

capacities to respond rapidly to citizens' requests for police service. While this is only a part of the police job, it is important to note that citizens tend to equate the presence of patrol units and rapid police response with better police service. There is certainly something comforting to many citizens in knowing that the police pass by their home frequently and will be there quickly if called. Many incidents require the rapid intervention of officers to prevent them from escalating into more serious problems.[19] Rapid response is thus an important aspect of police performance, and one that can be affected by the ways in which police service delivery is organized.

FOOTNOTES FOR CHAPTER FIVE

[1]These measures are two of a number of measures of metropolitan service delivery structures that were developed as a part of the Police Services Study. The first exposition of these structural measures appeared in Ostrom, Parks, and Whitaker (1974) and they have been further refined to include additional aspects of service delivery arrangements including those among producers in Ostrom, Parks, and Whitaker (1978).

[2]We know from the work of many scholars that it is necsssary to exercise substantial caution when comparing police jurisdictions on the basis of reported crime statistics. Many crimes are under-reported by citizens (Ennis, 1967), and their recording by police may be manipulated in some jurisdictions (e.g., Seidman and Couzens, 1974). For the purposes of this chapter, however, the comparison is warranted. The crime rates reported to the FBI are the official statistics upon which agency decisions are made and are, thus, the relevant base for discussing the volume of particular crimes as it influences agency decisions regarding specializing in dealing with those crimes.

[3]Neubert provides a comparison of several interagency "major case squads" that might serve as models for establishing specialized homicide investigation producers in other metropolitan areas (1975). She includes data on very large squads that operate in the Kansas City and St. Louis, Missouri metropolitan areas as well as smaller ones found in Topeka, Kansas, and Des Moines, Iowa metropolitan areas. McDonnell offers an example of specialized radio communications production (1977). His description of the Muskegon, Michigan Central Police Dispatch system provides some data on economies that can be captured with such arrangements.

[4]The relationship between citizens' perceptions of rapid police response and their higher overall evaluation of police is no doubt partially attributable to the fact that police have been telling them for several years that a rapid response was the mark of good police service.

[5]The measure of neighborhood service demands was estimated by summing all instances where respondents indicated that they or a family member had called the local police to report a victimization or to request assistance, where these calls pertained to an incident in the respondent's neighborhood. This sum was scaled for each neighborhood by the proportion of households where interviews were conducted to get a neighborhood estimate. Estimates were also obtained from police records of calls, in many cases these were

scaled down from district- or department-wide data. The two estimates correlate quite well (Pearson r = 0.81). A regression analysis including department size indicators to account for differences in scaling requirements indicates that the survey estimates average about 12 percent of the estimates based on department records (R squared = 0.77).

The estimates from the survey were used in place of those from departmental records for three reasons. First, these estimates are more closely grounded in the actual neighborhoods we studied. Second, they are a better predictor of citizen's perceived speed of police response in their neighborhood than are the estimates from departmental records. Third, the estimated call volumes drawn from survey responses can be better predicted using indicators of service conditions in the study neighborhoods than can the estimates based on departmental records.

[6]Citizens who reported calling the police for assistance were asked how long it took for the police to respond. The answers of all respondents in a neighborhood who gave a response time estimate in minutes were averaged to compute a neighborhood response time figure. Many of the police agencies studied in St. Louis had no recorded data on the speed of their responses to citizen requests. Thus it was necessary to rely on citizen reports to obtain comparable estimates. Larson indicates that citizen estimates of police response "coincide quite closely with the judgements of experienced researchers of U.S. police" (1972: 35).

[7]The neighborhood service condition variables used for adjustment are the six identified in Chapter Four as representing the variation of conditions in the 44 study neighborhoods (see Table 4.5). The variables are percent of families with incomes over $15,000 in 1969, percent of housing units that were owner occupied in 1970, population density, percent of persons over 65 years old, and percent of persons under 18 living with both parents, all measured in 1970, and the racial heterogeneity of respondents to the citizen survey.

[8]Average neighborhood service conditions from the second row of the St. Louis Study Design Matrix were used to develop these predictions (see Tables 4.3 and 4.5). These average values were multiplied by their respective coefficients in the regression equation estimated for Table 5.7 and added to the constant term for those equations to give the constants shown in Table 5.8. Using average values from other rows of the design matrix would involve adding or subtracting a constant value to the times estimated for each size department. Values from the second row of the design matrix were used as the majority of study neighborhoods in St. Louis (including those in the City) fell in that row.

[9]Service systems with only a single producing unit are likely to be more seriously affected by queueing problems than systems with multiple units, even when the average demand on each of the multiple units is the same as the demand on the single server. This results from the dynamics of queueing processes which dictate that the single server is more likely, on the average, to be busy when an additional request comes in than are all of the multiple units (see Sasieni, Yaspan, and Friedman, 1959).

[10]For purposes of this regression analysis, the responses were coded as follows:

Very rapidly	1
Quickly enough	0
Slowly	-1
Very slowly	-2
Not at all	-3

The last response, "not at all," was available as a code for interviewers to use, but was not read to respondents. Seventeen respondents to the survey volunteered this response.

Substantial debate surrounds the acceptability of coding a variable of this nature as if it were a true interval scale and then using it in multiple regression analyses (Abelson and Tukey, 1959; Labovitz, 1970; T. Wilson, 1971). The author sides with those who argue that such a coding and analysis is warranted if: (1) it is possible to show that the relationships of the independent variables to the coded dependent variable remain relatively similar under reasonable transformations of the codes used for the dependent variables (Abelson and Tukey, 1959), and (2) it is possible to interpret the coefficients computed with such a coding in a reasonable way (Duncan, 1975).

With respect to the first criterion, coefficients obtained under several different transformations (involving different assumptions about the relative differences between, for example, very rapidly and quickly enough, or quickly enough and slowly) all tend to produce similar coefficients for the independent variables, taking into account the different scale factors necessitated by these transformations. With respect to the second criterion, the direction and relative magnitudes of the coefficients are of interest here, and not the "true" meaning of "very rapidly," for example. For this purpose the coefficients are interpretable.

Several coefficients are shown in the table. The first, labelled "b," is the unstandardized regression coefficient. It is the weight computed for each independent variable in an equation that best predicts the dependent variable. The standard

error of the regression coefficient (labelled "s.e.") is a measure of how much confidence one can have that the coefficient is actually the same as estimated. Given certain assumptions on the distribution of the error items in the computation process (see any standard regression text, Draper and Smith, 1966, is a good source), one can say that there is a 0.68 probability that the true value of the coefficient lies between ± one standard error of the estimated coefficient and a 0.95 probability that it lies between ± two standard errors of the estimate. Unstandardized regression coefficients that do not exceed their standard errors in magnitude by a substantial amount are generally considered "insignificant" on statistical grounds.

The beta coefficient is the standardized regression coefficient, computed by multiplying the unstandardized coefficient by the standard deviation to the independent variable and dividing by the standard deviation of the dependent variable. It is often used as a measure of the "importance" of a particular variable (but see Darlington, 1968, for the error of such an interpretation). It is particularly dangerous to use it as such a measure where dummy variables are concerned, as the standard deviation of a dummy variable is a function of the frequency of its occurrence in the sample. Thus, two independent dummy variables that are predicted to have the same effect on the dependent variable (in terms of b coefficients) may appear to be very different in their "importance" if one represents an event that occurs more frequently than the other.

The discussion of this section will focus on the unstandardized regression coefficients, the "b's." The other coefficients are included to give a measure of the confidence that one may place in those estimates, and for the benefit of scholars who may feel more comfortable comparing beta coefficients.

[11]Respondents to in-person interviews who had had an experience with police response time in their neighborhood were pressed to give an estimate in minutes of that time. In some instances they were unable or unwilling to do so, forcing interviewers to accept a qualitative answer. Respondents to mail questionnaires also used qualitative responses occasionally. Given the mix of quantitative and qualitative responses to questions about actual police response time in a respondent's experience, and the possibility that the relationship between incident specific response times and perceived speed of response in the neighborhood might be nonlinear, dummy variables for each of the possible response categories of incident specific response time were created. The base category used for experienced respondents was "soon enough," thus, the coefficients for each of the other categories represent the difference in perceived speed of response in the neighborhood between a citizen who said they came "soon enough" in his experience and a citizen who said they came in a different time category.

[12]Missing values for these variables have been replaced by the neighborhood or cell mean value. A dummy variable set to 1.0 when this replacement was made has also been included in the regression equation to test whether those individuals for which these data were missing differed to any large degree from those where the data were not missing (Cohen, 1968). In most cases, they did not. The largest differences were found among experienced respondents, where those missing on either age or education (in each case only eight respondents) were predicted to perceive quite a bit slower speed of response in their neighborhoods.

[13]Respondents education was coded on a 4-point scale, where 1 indicated less than a high school education, 2 indicated a high school education, 3 indicated some college education, and 4 indicated the completion of a bachelor's degree or more education.

[14]For each of these individual experiences a dummy variable was created, coded 1.0 if the respondent indicated that an unsatisfactory experience had occurred and zero otherwise. There is some amount of confounding in the "unsatisfactory experience" indicators, in that speed of response in the particular incident influences the satisfaction level of the respondent (Parks, 1976). The confounding effect is somewhat reduced by the inclusion of measures of the actual response time for those having had an experience of this nature.

[15]Models of individual behavior (as opposed to aggregate level models) typically yield R squared coefficients of around 0.20, indicating 20 percent of the variance in individual behaviors can be explained by the model. The model shown here for experienced respondents does better than twice that well at explaining their responses, while the model for inexperienced respondents does slightly less well. Obviously, much variation remains unexplained in either model. But, as Duncan so nicely put it, "(t)he sociologist who despairs of his low R^2 would do well to ask himself if he would want it otherwise -- would he care to live in the society so structured that his particular collection of variables accounts for 90% . . . of the variance. . . ?" (1975: 166-167).

[16]Computing composite measures for a block of variables in this fashion has two advantages. First, it helps to bring some order to the analysis by reducing the number of coefficients that must be compared simultaneously. Second, it allows some comparisons of the magnitude of effects from each block of variables although, as the composite measures are in general not orthogonal, these comparisons must be carefully qualified. The disadvantage of using these composite measures, as with all constructed scales, is the loss of any natural metric for comparisons. One is forced to fall back on standardized regression coefficients,

for example, and speak of changes of x standard deviation units in the dependent variable in response to a change of [illegible] standard deviation units in an independent composite measure. Standard deviations not being a common medium of exchange, this makes policy relevant interpretations risky. For more details on the computation of these composite measures and examples of their use, the reader is referred to Coleman, 1970.

[17]The highest correlation among the composite measures for inexperienced respondents is a -0.61 between the measures for neighborhood service demand and the measure for neighborhood experiences. The remaining correlations among composite measures for this group of respondents are 0.32 or less in magnitude. For experienced respondents the demand-neighborhood experience correlation is -0.64 and there are two other correlations of substantial magnitude. These are the correlations between patrol strategy and neighborhood experiences (0.53) and between patrol strategy and neighborhood demand (-0.48). Intercorrelations of this magnitude make it necessary to read statements of relative influence with great caution (Darlington, 1968).

[18]The reader is cautioned that these findings apply only to areas similar to those studied in St. Louis. These are predominantly residential in character and are not representative of the full-range of service conditions found in all jurisdictions. In particular, they are atypical of central business districts or extensive slum areas. Most police jurisdictions do, however, contain large proportions of areas similar to those studied here, and thus these response time estimates should be applicable to much of the work of policing in America.

[19]Egon Bittner characterizes this handling of incidents which require rapid intervention as the essence of police work. He refers to them as incidents that involve "something-that-ought-not-to-be-happening-and-about-which-someone-had-better-do-something-now!" (1974: 30, emphasis in original). Once a situation has reached sufficient gravity for a citizen to call upon the police for assistance, it is very often of sufficient seriousness to warrant a rapid response.

CHAPTER SIX

LINKING STRUCTURE AND PERFORMANCE EMPIRICALLY -- III
Specialization, Spillovers, and Responsiveness

The choice of a patrol-oriented production strategy, as shown in the preceding chapter, leads to enhanced police response capabilities and, thus, to improved performance for those police services where rapid response is beneficial. A concomitant of this emphasis on patrol, however, may be a lesser emphasis on specialized assignments. The extent of this reduced specialization and whether it leads to lowered performance for some police services will be explored in this chapter.

The less concentrated police service delivery structures that tend to exhibit more patrol-oriented production strategies may be prone to crime spillovers from jurisdiction to jurisdiction. This, as noted in Chapter Three, has been a charge of critics of American policing. The presence of such spillovers will also be explored in this chapter. So, too, will be possible spillovers of police officer and citizen attitudes and perceptions from one neighborhood to another within the jurisdictions of large police service producers.

The responsiveness of different service delivery structures will be examined also. Some have argued that responsiveness may be achieved more easily in the smaller jurisdictions of fragmented service delivery structures. If, on the other hand, these smaller jurisdictions lead to ineffective policing as critics have argued, then responsiveness there may be less than in more concentrated structures.

By exploring these additional relationships of structure and performance, I hope to develop further evidence of how organization is important for police service delivery.

Service Delivery Structures, Production Strategies, and Specialization

In Chapter Five the structure of service delivery arrangements was shown to be related to production strategy choices in metropolitan areas. In less concentrated service delivery structures, a higher proportion of full-time sworn officers were allocated to patrol duties. This might mean that specialists in various police activities were less available in those areas, possibly lowering the performance of some activities. If this were to be true, then less concentrated structures would have clear costs as well as the benefits shown in the preceding chapter.

Table 6.1 shows the average allocations of sworn personnel to traffic, criminal investigation, and juvenile assignments in the 80 SMSAs of the Police Services Study. These data are arrayed by indicators of the structure of patrol service delivery arrangements in the areas, the relative multiplicity of producers and the extent to which that structure is dominated by a single, large producer. There is little difference in the assignment of sworn officers to criminal investigation or to juvenile duties between the least concentrated SMSAs (those with high multiplicity and low dominance) and the most concentrated ones (those with low multiplicity and high dominance). There is more of a difference in traffic assignments in differently structured SMSAs. Three percent more sworn officers are assigned to traffic duties in the

Table 6.1. Patrol Service Structure and Specialist Assignments in Metropolitan Areas

Percent of Full-Time Sworn Officers Assigned to Criminal Investigation in Metropolitan Areas With:

	Low Patrol Dominance	High Patrol Dominance	All Metropolitan Areas
Low Patrol Relative Multiplicity	13 (17)[a]	12 (23)	12 (40)
High Patrol Relative Multiplicity	11 (23)	12 (17)	11 (40)
All Metropolitan Areas	12 (40)	12 (40)	12 (80)

Percent of Full-Time Sworn Officers Assigned to Juvenile Duties in Metropolitan Areas With:

	Low Patrol Dominance	High Patrol Dominance	All Metropolitan Areas
Low Patrol Relative Multiplicity	2	1	2
High Patrol Relative Multiplicity	2	2	2
All Metropolitan Areas	2	2	2

Percent of Full-Time Sworn Officers Assigned to Traffic Duties in Metropolitan Areas With:

	Low Patrol Dominance	High Patrol Dominance	All Metropolitan Areas
Low Patrol Relative Multiplicity	7	10	9
High Patrol Relative Multiplicity	7	9	8
All Metropolitan Areas	7	10	8

[a]Number of metropolitan areas with this combination for relative multiplicity and dominance for patrol service.

more concentrated areas than in the least concentrated.

The difference in assignment of sworn officers to patrol in less concentrated versus more concentrated areas was a full 9 percent on average (see Table 5.1, page 163). That difference cannot be totally accounted for by more specialist assignments in the more concentrated areas, however, at least not by assignments to criminal investigation, juvenile, or traffic duties. There is less than a 4 percent difference in such assignments between the least concentrated and most concentrated areas, with most of that difference found in traffic assignments. Criminal investigation and juvenile specialists are likely to be equally available (in proportionate terms) in SMSAs having either structure for patrol, or structures that are intermediate to them.

Agency Organizational Arrangements, Production Strategies, and Specialization

Specialists in criminal investigation and juvenile duties and, to a somewhat lesser extent, traffic duties are equally present within the total police industry of differently structured metropolitan areas. But, the highly patrol-oriented strategies of smaller producers ensures that this equality will not be found across producing agencies of differing size. As the data in Table 6.2 make clear, the assignment of full-time sworn officers to criminal investigation, juvenile, and traffic specialties is much more common among larger producers. Specialized traffic assignments are particularly restricted to the larger producers, thus explaining their higher frequency in the more concentrated metropolitan areas that are dominated by large producers.

The percent of sworn officers assigned to administrative duties in the different-sized producers and the percent assigned to auxiliary services such as radio communications, training, and laboratory analysis are also shown in Table 6.2.

Table 6.2. Police Department Size and Nonpatrol Assignments--Municipal Police Departments

Size of Police Department -- Number of Full-Time Sworn Officers	Average Percent of Full-Time Sworn Officers That Are Assigned To:				
	Criminal Investigation	Juvenile Duty	Traffic Duty	Auxiliary Services	Administrative Duty
1 to 4 (181)[a]	1	0	0	0	1
5 to 10 (204)	4	0	0	1	4
11 to 20 (111)	9	1	1	7	9
21 to 50 (90)	11	2	2	8	9
51 to 150 (69)	14	3	6	4	10
More Than 150 (39)	15	3	8	5	13

[a]The number of police departments in each size range varies slightly from service to service due to missing values. The minimum numbers for each are shown.

The slight bulge in assignments to auxiliary services found in departments in the 11 to 20 officer and the 21 to 50 officer ranges result from their production of their own radio communications services (see Table 4.2, page 138), and the usual assignment of sworn officers to such work in these departments. Larger departments that also produce

their own radio communications are able to do so with proportionately fewer sworn officers due to some economies-of-scale for that service and the increased likelihood of using civilians for such duties in large departments (Ostrom, Parks, and Whitaker, 1978: 198-200).

The data of Table 6.2 indicate that one charge of the critics of small police departments has ample empirical support. Officers with specialized assignments are much less likely to be found in their ranks. Earlier in this chapter, however, the presence of officers with specialized assignments was shown to be fairly equivalent across metropolitan areas with many smaller producers and those with one or a few large producers. The key remaining question, then, is whether specialist availability within a given department is necessary to obtain the presumed benefits of the activities of specialists.

Internal Specialization and Police Outputs -- Criminal Investigation as an Example

It is possible to investigate the relationship between the availability of specialists within a police agency and the success of that agency at producing valued outputs with data from the 1972 St. Louis Study. The example here is the police response to instances of criminal victimization that were reported to them by citizen respondents in the 44 study neighborhoods. Citizens who told our interviewers that they or a household member had been the victim of criminal activity in their neighborhood in the previous year were asked whether the police were called or otherwise became aware of the victimization. Where this occurred, the respondents were asked what the police did in response to the victimization. The respondents' descriptions of what the police

did in these incidents can be related to the availability of specialists in the police departments serving the neighborhoods.

The two largest police agencies in the St. Louis Study, the St. Louis Metropolitan Police Department and the St. Louis County Police Department, both employed highly task-oriented strategies at the time of the study. The police response to incidents of victimization in the neighborhoods served by either of these two producers should, therefore, be somewhat representative of that available from large producing agencies with many specialists available. The other suburban police departments were divided according to the proportion of full-time sworn officers they allocated to criminal investigation duties. Thirteen of the study neighborhoods received police service from departments with little or no specialization. Twenty more received service from departments with increasing amounts of specialization in criminal investigation, but still less than that found in the large departments. These 20 neighborhoods were split into two groups according to the proportion of officers assigned to criminal investigation in the departments serving them, yielding a total of four different categories for department specialization in criminal investigation.[1] Not surprisingly, the split of departments among the specialization categories was patterned along lines of department size. The smallest suburban departments had virtually no officers with criminal investigation assignments as their primary responsibilities. The medium-sized suburban departments fell in the two mid-range categories on specialized assignments.

If the availability of criminal investigation specialists within a police department results in consistently better police activities

and outputs, then victims in the St. Louis Study who resided in neighborhoods served by more specialized departments ought to have reported a more favorable distribution of police responses when questioned about what the police did with respect to their victimization. Victims in neighborhoods served by less specialized neighborhoods, according to the logic of those advocating internal specialization, would be expected to report less favorable police responses to their victimizations.

Examining the distribution of police responses to incidents of victimization in the study neighborhoods, it is hard to find any patterning with respect to the extent of internal specialization. Table 6.3 presents the percent of victimizations where the police response as reported by survey respondents involved one of several different possibilities.[2] These percentages show very little difference from the least to the most specialized departments for the responses. A very crude indicator of the quality of police response is the percent of cases where the police recovered stolen property, checked around the victim's premises for clues (and to reassure the victim), and where they arrested or at least questioned a suspect. The data show somewhat higher quality responses using this indicator in neighborhoods served by departments in the medium range of specialization (see Footnote 1 for the category definitions).

A great deal of what police are able to do in response to a citizen's victimization depends upon the type of victimization. The victim's cooperation is of obvious importance also. It may be that the data in Table 6.3 are artifacts of the types of crimes occurring in neighborhoods

Table 6.3. Criminal Investigation Specialization and Response to Victimizations in the St. Louis Study Neighborhoods

What the Police Did in Response to a Citizen's Victimization	Assignment of Sworn Officers to Criminal Investigation by the Police Department Serving the Neighborhood			
	None	Low	Medium	High
Recovered Stolen Property	6[a]	5	6	7
Checked Premises	26	26	35	23
Questioned or Arrested Suspect	9	4	12	5
Took a Report	36	46	29	43
Questioned Complainant	13	9	12	8
Did "Nothing"	10	10	8	14
Number of Cases	(112)	(93)	(147)	(131)

[a]Percent of cases where respondent indicated the most significant police action to be that shown. See Footnote 2.

served by departments of differing degrees of specialization or of the propensity of citizens to volunteer coproductive activities in those neighborhoods. To check whether this might be true, a regression model to predict response quality was estimated using several clusters of variables. These clusters were: (1) the type of victimization -- burglary, other break-ins, larceny, car theft, assault, vandalism, prowler, and other; (2) respondent characteristics -- age, education, and race; (3) neighborhood service conditions; (4) speed of the initial police response to the scene of the victimization; and (5) extent of internal specialization in the responding department. Respondent and neighborhood characteristics may serve as surrogate measures for the propensity of citizens to coproduce in the neighborhoods.

The results of the estimation are interesting. In total the variable clusters account for about 28 percent of the variance in the response quality measure (data not shown). Important influences include speed of response, with faster responses more likely to result in recovered property and arrest or at least questioning of a suspect. Another important influence is the type of crime. Burglaries, break-ins, and assaults are predicted to receive higher quality responses than vandalisms, prowlers, and particularly, larcenies. Car thefts are the crimes most likely to result in property recovery. One of the neighborhood service condition variables used to index coproduction has a significant influence on police response quality. This is the percent of housing units that are owner-occupied. It seems reasonable that home-owners might be more prone to work with police in their neighborhoods than renters and so this influence is not unexpected. Other neighborhood and citizen characteristics have little or no influence on response quality.

After adjustments for all of these other influences on the quality of police responses to victimizations in the study neighborhoods have been made, response quality is still predicted to be somewhat higher in neighborhoods served by departments in the medium specialization range. Responses from departments with no specialization, those with low specialization, and those with the highest amount of specialization are predicted to be of about equal quality after adjustment for speed of response, type of crime, and likelihood of coproduction. But the advantage shown in Table 6.3 for the departments with medium specialization remains after these adjustments.

The departments in the St. Louis Study that chose criminal investigation assignments in the medium range varied in size from 11 to 79 full-time sworn officers. Their average size was 42 officers. This size falls close to the mid-range of the size of departments shown to have the best response time distributions in the preceding chapter (see Table 5.8, page 181). As speed of response is one important influence on response quality, this should not be surprising. These departments also achieve a relatively high patrol presence in the neighborhoods they serve. Wilson and Boland have recently shown a positive relationship between patrol presence (and aggressiveness) and arrest rates for the crime of robbery in 35 large city departments (1978), a finding consistent with the present results. Thus, it may well be, for both rapidity of response to incidents in their jurisdictions and the quality of the response overall, that medium-sized departments in the range of 11 to 100 officers are the best choice for residential areas.[3]

Consumer Concentration and Spillovers

A primary concern of those who find American policing overly fragmented is the issue of spillovers from jurisdiction to jurisdiction. Police agencies serving small jurisdictions in particular are seen as unable to confront crime spillovers, suffering as criminals from outside their jurisdiction enter to commit crimes and then flee across "ancient political and geographical boundaries, which give them sanctuary from police activity" (President's Commission on Law Enforcement and Administration of Justice, 1967a: 301). Other forms of spillovers may

be perceptual and attitudinal. Citizens residing in large jurisdictions, particularly those containing high crime, central city areas, may come to exaggerate their likelihood of being the victim of crime due to regular confrontation with reports of crime within the jurisdiction. Police officers may come to overestimate the extent of criminality in their particular section of a large jurisdiction, or may come to adopt the attitudes and tactics of officers serving high crime and violence areas, even if those tactics may not be appropriate in the areas of their own assignment.

Spillovers of Criminal Activity

The extent to which criminal activity spills over from one police jurisdiction to another is difficult to determine. Only a small percentage of crimes are solved and, of those solved, the largest proportion are those where victims are able to identify the perpetrator(s), often as persons who are neighbors or close acquaintances. Thus, the sample of crimes that is most accessible to determine whether criminals in fact plan their crimes in one jurisdiction, commit them in a second, and make good their escape to yet a third, is biased toward crimes committed by persons in areas near their own homes.

An indirect way of approaching this issue is to examine rates of crime in similar areas served by police agencies with different-sized jurisdictions. By the logic of spillover contentions, neighborhoods served by police agencies with smaller jurisdictions ought to suffer more crime than those served by agencies with larger jurisdictions, assuming that service conditions affecting crime were similar. The logic of this argument is shown in Figure 6.1. It will be examined

with data from the 1972 St. Louis Study.

In Chapter Four, six variables that represented neighborhood service conditions in the study neighborhoods of the 1972 St. Louis Study were presented.[4] Taken together, those six representative variables accounted for more than 60 percent of the variance in victimization rates across the 44 study neighborhoods. If crime spillovers are a contributor to the rate of victimization in the study neighborhoods, then the addition of indicators of jurisdiction size to this analysis should increase that percent. The signs of the coefficients for jurisdiction size indicators and the magnitudes of those coefficients will help to identify where spill-ins are a problem.

The results of regression equations including the six representative service condition variables and indicators of jurisdiction size for the St. Louis study neighborhoods are arrayed in Table 6.4. If crime spillovers were a problem for smaller jurisdictions, then the predicted percentage of respondents who indicated that they or a household member had been the victim of criminal activity in their neighborhood in the previous year should be higher in the smaller jurisdictions after adjustment for neighborhood service conditions.

Figure 6.1. Crime "Spill-In" and Neighborhood Crime

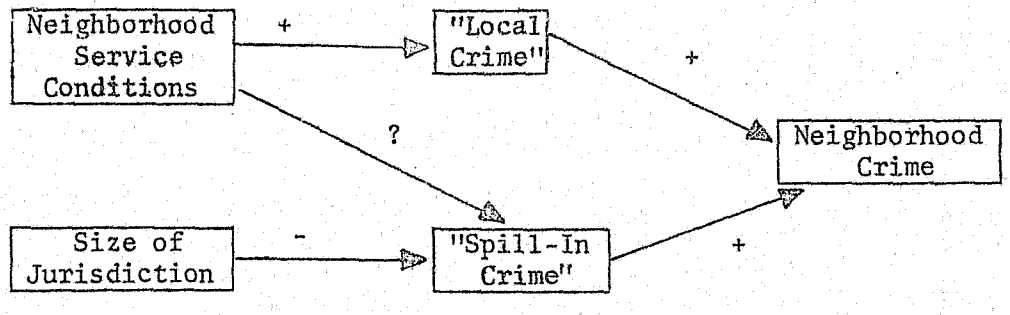

Table 6.4. Percent of Respondents Victimized in Jurisdictions of Differing Size -- An Examination of Spillover Effects

Neighborhood Service Conditions	All 44 Neighborhoods in 1972 St. Louis Study			Neighborhoods in Middle-Wealth Range Only		
	b	s.e.	beta	b	s.e.	beta
NPAR18[a]	-.24	.11	-.27	.03	.22	.03
NUPMID	-.21	.09	-.30	-.45	.15	-.41
NBLKHET	11.1	4.38	.28	16.8	6.44	.46
NOVER65	-.26	.17	-.16	-.47	.19	-.33
NOCC	-.02	.06	-.02	-.00	.12	-.00
NDENS (000)	.10	.24	.04	.08	.28	.04
Size of Police Jurisdiction (population 1970)						
1,000 to 4,999	-10.8	2.78	-.50	-14.7	3.28	-.64
5,000 to 15,999	-8.8	2.52	-.53	-10.5	2.83	-.52
16,000 to 28,900	-7.0	2.72	-.34	-9.3	2.53	-.50
28,901 to 65,908	-2.4	2.78	-.13	-1.2	3.23	-.06
333,748	-7.5	2.82	-.29	-8.1	3.07	-.30
622,236[b]	0	-	-	0	-	-
Constant	48.4	9.10	-	32.0	18.20	-
R Squared:						
Neighborhood Conditions Only		0.63			0.60	
With Jurisdiction Size Added		0.80			0.90	
Number of Cases		44			25	

[a] See Footnote 4 for neighborhood service condition variable definitions.

[b] Baseline for comparison.

From the data in the table, crime spill-ins do not appear to be a problem for smaller jurisdictions, at least as indirectly estimated in this fashion. Neighborhoods in jurisdictions smaller than that of the St. Louis Metropolitan Police Department (used as a baseline category for the analysis) are predicted to have lower rates of victimization after adjustment for service conditions affecting crime.[5] This finding holds true whether comparing all 44 study neighborhoods or restricting the comparison to the 25 neighborhoods that fell within the same neighborhood wealth range as those in the jurisdiction of the city police (see Table 4.3, page 146). The finding of higher victimization rates in the largest jurisdiction also holds when neighborhoods in the City of St. Louis are grouped according to their police district location. The only neighborhoods predicted to have similar rates of victimization to those in the largest jurisdiction are neighborhoods within the relatively larger suburban jurisdictions in the sample. This set of findings indicates that if crime spillovers are occuring in the St. Louis jurisdictions, they are not spill-ins of crime into the smaller jurisdictions. Rather, they may involve movement of crime from high crime areas of larger jurisdictions into other neighborhoods that are otherwise similar to the lower crime portions of surrounding jurisdictions.

A different way of approaching the question of crime spill-ins in jurisdictions of differing size is to examine the perceptions of police officers who work in neighborhoods in those jurisdictions. In the St. Louis Study, officers were asked several questions about who committed crimes in their community. Among these questions was, "Are most crimes committed by people who live here or by outsiders?"

Unfortunately the referent "here" was not limited to study neighborhoods or their immediate surroundings. But the responses may offer some insight into the spillover issue in any case.

Table 6.5 arrays officer responses against the size of the police jurisdiction where they worked. The perceptions of police officers working in smaller jurisdictions appear to be consistent with the argument of the critics of fragmented policing with respect to crime spill-ins. That is, officers that work in smaller jurisdictions are quite a bit more likely to indicate that outsiders commit crimes in their area than are officers serving in larger jurisdictions. It is interesting to note, however, that a substantial minority of officers in the St. Louis Metropolitan Police Department and in the larger suburban police agencies also indicate that outsiders commit most crimes there.[6]

Table 6.5. Patrol Officers' Perceptions of Who Commits Most Crimes in Their Jurisdictions

Size of Police Jurisdiction (Population - 1970)	Percent of Officers Who Believe Outsiders Commit Most Crimes	Number of Officers Responding
1,000 to 4,999	79	14
5,000 to 15,999	62	110
16,000 to 28,900	64	93
28,901 to 65,908	38	105
333,748 (St. Louis County)	16	25
622,236 (City of St. Louis)	37	67

The evidence with respect to crime spilling in to smaller jurisdictions is thus mixed. The rates of victimization in neighborhoods within jurisdictions of differing size (adjusted for crime-related neighborhood service conditions) are not consistent with the charges that smaller jurisdictions are plagued by crime committed by criminals from areas outside those jurisdictions. Officer perceptions, on the other hand, indicate that officers serving in smaller police jurisdictions believe that most crimes in those jurisdictions are committed by people from outside those jurisdictions. Neither set of data directly address the issue of crime spillovers in a manner that would allow resolution of this issue unambiguously, however.

Perception and Attitude Spillovers in Larger Jurisdictions

Whether or not criminal acts spill over from one jurisdiction to the next, or from one part of a large jurisdiction to another, the perceptions and attitudes toward crime and crime-related matters held by citizens and police officers may do so. Citizens may generalize reports of crime in parts of their jurisdiction into a crime problem that extends throughout the jurisdiction. Officers may adopt attitudes based on experiences in some parts of large jurisdictions, particularly high crime parts, that they carry with them wherever else they may be assigned. These perceptual and attitudinal spillovers may be as serious in their implications for police organizational arrangements as any actual crime spillovers.

A common perception is that large, central cities are hotbeds of criminal activity, particularly violent criminal activity. It is true that a large portion of the crime (and particularly violent crime) in

America takes place within large, central city police jurisdictions. In the year 1973, the FBI reported that 35 percent of the Index crimes and 54 percent of the violent Index crimes took place within the jurisdictions of the 54 U.S. cities that had more than 250,000 population.[7] These 54 cities included 24 percent of the populations for which crimes were reported in 1973. Six cities whose populations exceeded 1 million persons accounted for 30 percent of the violent crimes reported to the FBI. Their combined population was only 11 percent of the total for which reports were made (see Kelley, 1974: 98, for these data).

Reports of the extent of criminal activity in large, central city jurisdictions often do not make distinctions as to where crime occurs in those jurisdictions. Neither do many newspaper accounts dealing with crime problems. Citizens who read about "crime in Gotham City" may not make distinctions between crime occuring in areas which they themselves might frequent, and crime that occurs in other parts of the city. Indeed, the sheer volume of crime accounts available to the reader of virtually any large city newspaper tends to be overwhelming, generally suppressing any attempt by a reader to form a reasoned assessment of the danger confronting him or her personally. This bombardment with stories of crimes occuring in central city jurisdictions may lead people to overlook the fact that many parts of most cities are not any more dangerous than similar parts of surrounding jurisdictions.[8]

But many parts of large cities are not crime-ridden. Two of the St. Louis Metropolitan Police Districts containing neighborhoods surveyed in the 1972 St. Louis Study had reported crime rates that were lower than those reported by the FBI for all suburban jurisdictions (compare

Board of Police Commissioners, 1972, and Kelley, 1974). Even though the analysis of crime spill-ins indicated that neighborhoods in those districts were likely to have higher rates of victimization than comparable suburban neighborhoods (after adjustment for crime-related service conditions), their rates are far below rates in the high crime portions of the City of St. Louis.

If perceptions of the extent of crime spill over from high crime to lower crime portions of large jurisdictions, one would expect to find a greater disjuncture between citizen perceptions of the crime problem in their neighborhood and the actual occurrence of crime in that neighborhood in larger jurisdictions than in smaller. Citizens in neighborhoods within the larger jurisdictions would perceive crime to be disproportionately more serious than its actual levels.

Citizen respondents in the 1972 St. Louis Police Study were asked for their perception of the trend in their neighborhood. Perceptions of crime trend are, of course, different from perceptions of the extent of crime in a given area. However, as citizens were not asked for their perceptions of the amount of crime in their neighborhoods, their perceptions of the trend of crime must serve as a proxy.

A citizen's perception of the trend of crime in his or her neighborhood is likely to be affected by whether the citizen or a household member was a recent victim of crime in the neighborhood. The rate of victimization among neighbors should also affect this perception. The level of police activity in the neighborhood may also have an effect. Individual respondent attributes and those of the neighborhood itself may also be influences. If, after adjusting for all of these influences,

jurisdiction size can be shown to be an influence, then perception spillovers may be present. These spillovers might appear in one of two ways. First, the coefficients for jurisdiction size in an analysis of influences should be nonzero. Second, the influences of household and neighborhood victimizations on perceptions should be weaker in those areas where spillovers are present.

Table 6.6 presents the results of the perception spillover analysis for citizens. To the extent that spillovers of fear of crime are measured by a weak relationship between victimization rates and citizens perceptions of the crime trend in their neighborhood, such spillovers appear to exist in all jurisdictions except the very smallest and the large jurisdiction served by the St. Louis County Police. Citizens from all jurisdictions except the smallest and that of the County Police are predicted to perceive increasing crime at low levels of neighborhood victimization rates, (indicated by the b coefficients for the jurisdiction size variables), and to have only slightly higher perceptions of increasing trends as victimization increases (indicated by the b coefficients for "percent victimized"). Residents of neighborhoods within the smallest jurisdictions, and those neighborhoods within the jurisdiction of the County Police, on the other hand, are predicted to have perceptions of crime trends in their neighborhoods that are much more closely related to the percent of neighborhood residents who were victimized within the past year.[9]

These data on citizen perceptions of crime trends are somewhat different than expected, yet not necessarily inconsistent with an explanation that suggests citizens are influenced by media accounts of

Table 6.6. Influences[a] on Citizens' Perceptions of the Crime Trend in Their Neighborhoods

Variable	b	s.e.	beta
Jurisdiction size and Victimization Rate			
1,000 to 4,999[b]	0	--	--
Percent Victimized	.034	.009	.165
5,000 to 15,999	.485	.131	.256
Percent Victimized	.008	.006	.054
16,000 to 28,900	.652	.188	.302
Percent Victimized	.001	.012	.006
28,901 to 65,908	.422	.163	.196
Percent Victimized	.006	.006	.054
333,748 (St. Louis County)	.048	.162	.015
Percent Victimized	.039	.012	.126
622,236 (City of St. Louis)	.556	.242	.237
Percent Victimized	.006	.009	.061
R Squared		.090	
Number of Cases		3,655	

[a]Other variables in the equation are individual race, age, and education, neighborhood service conditions (6 representative variables - see Footnote 4), a dummy variable for whether the respondent or his household was the victim of crime within the previous year, and the respondent's perceptions of police response speed and patrol frequency. These additional variables are not shown in the table to focus attention on those of immediate interest.

[b]Base category for jurisdiction size comparisons.

crime in their jurisdictions. The areas least likely to be the subject of media crime accounts, the small jurisdictions and neighborhoods served by the county police, are the areas where the link between victimization rates and perceptions of crime trend are strong. Most of these areas are too small to have enough crime to attract significant media attention (the small jurisdictions and the two small communities served by the county under a contract). The two larger neighborhoods that are a portion of the unincorporated county are located in the southern portion of the very large county jurisdiction, a region of the county that is frequently described as the safest portion.

The results for all jurisdictional sizes do not explain a large portion of the variance in citizen perceptions of the trend of crime in their neighborhoods. This indicates that most of the influences on these perceptions are not included in the model. To obtain a more accurate picture of whether crime fear spillovers are a problem in larger jurisdictions would require a focused study that attempted to pinpoint what factors lead to citizen perceptions of crime in their environment.[10]

A different kind of spillover that might be found in larger jurisdictions concerns possible effects on police officer attitudes toward violence and the use of force. In Chapter Three, an argument of Katz was put forward as posing a possible problem for larger, particularly central city jurisdictions (1974). Katz wrote that officers serving in smaller, suburban jurisdictions were able to approach citizens with less anticipation that violence might occur than were officers in larger jurisdictions. He argued that officers in suburban jurisdictions are

less likely to "acquire an ethos or ideology that dramatizes violence" (Katz, 1974: 83). If officers serving in large jurisdictions are more likely to view violence as a part of their everyday work, they may adopt tactics that involve precautions to prevent citizen violence aimed at them (Rubinstein, 1973). These tactics may be the source of substantial friction between police and citizens, particularly if they come to be employed in relatively quieter portions of large jurisdictions that are similar to the suburban areas that Katz studied.

Officers attitudes toward the use of force can be explored using data from the police officer interviews that were a part of the 1972 St. Louis Study. Police respondents were asked whether they strongly agreed, agreed, disagreed, or strongly disagreed with the statement:

> If a patrolman in tough neighborhoods had fewer restrictions on his use of force, many of the serious crime problems in those neighborhoods would be greatly reduced.

While an officer's response to this question does not directly measure whether he or she is likely to use force, an affirmative response is consistent with the notion of an ethos favoring violence. If spillovers of such an ethos are a problem in relatively quiet areas of large jurisdictions, then officers serving in the First and Second Districts in the City of St. Louis (relatively quiet areas) ought to have held attitudes toward force that were more similar to those of officers serving in the Sixth District (a higher crime area) than they are to those of officers serving in suburban jurisdictions.

Table 6.7 presents data to address this question. Looking at the simple percentages of officers responding affirmatively to the statement regarding use of force, it appears that officers serving in the

Table 6.7. Police Officers' Attitudes Toward the Use of Force in "Tough" Neighborhoods

Jurisdiction Size and District	Percent of Officers Agreeing that Force is Efficacious	Estimated Effect[a] of Jurisdiction on Officer Agreement
1,000 to 4,999	40 (15)	[b] ( )[d]
5,000 to 15,999	42 (109)	.131 ( )
16,000 to 28,900	41 (94)	.052 ( )
28,901 to 65,908	36 (111)	.039 ( )
333,748 (St. Louis County)	43 (28)	-.019 ( )
622,236 (City of St. Louis)		
District 1	40 (20)	-.278 ( )
District 2	54 (22)	-.091 ( )
District 6	75 (28)	.164 ( )

[a]Other variables in the regression equation are officer training, years of experience, and education, neighborhood service conditions (averaged for officers serving more than one neighborhood), and percent of neighborhood respondents victimized in the neighborhood (also averaged). The equation accounts for only 7 percent of the variance in officer attitudes toward force.

[b]Base category for size comparison.

[c]Number of officers responding.

[d]Standard error of coefficient.

Sixth District of the St. Louis Police were much more favorably oriented toward the use of force than were officers in other districts in the city or in the suburban jurisdictions. Officers serving in the Second District of the City of St. Louis were somewhat more likely to believe that force would be efficacious in tough neighborhoods than were officers serving in suburban jurisdictions, while officers serving in the First District were about the same as suburban officers in terms of percent agreeing with the statement.

In an attempt to adjust for the service conditions that officers in the various jurisdictions confronted and for the education, training, and experience of the officers themselves, a regression model was estimated for the effect of jurisdiction size (and police district) on officer attitude toward use of force. Officer characteristics, neighborhood service conditions, and the rate of victimization of respondents in neighborhoods served by the officers were controlled in the equation. The estimated effects, uniformly quite weak, indicate that officers serving in the Second District are no more likely to think force efficacious than officers serving in suburban jurisdictions once the conditions in which they work are controlled. Officers serving in the First District are somewhat less likely than suburban officers to think force would be effective than are suburban officers. If any group of officers are more likely to have an ethos favoring violence, it is those serving in the Sixth District and in relatively small suburban jurisdictions (those from 5,000 to 15,999 population). The effects are so uniformly weak and the variance accounted for so small that it seems safe to say that jurisdiction size has no effect on officer attitude toward the use of force.

Summarizing the data presented with respect to spillovers in jurisdictions of various sizes is quite easy. [illegible] spill-ins were found in the small jurisdictions where they might have been expected by critics of fragmented policing. If spill-ins are a problem, they appear to be so in neighborhoods within larger suburban and central city jurisdictions rather than in the smaller ones. Spillovers in terms of citizen perceptions of crime in their neighborhood were found to be characteristics of all but the smallest jurisdictions and that of the county police. The effects here were quite small in terms of accounting for variance. Spillovers in terms of an "ethos or an ideology that dramatizes violence" were not found in the quieter neighborhoods served by officers from the First and Second Districts of St. Louis. This ethos, to the extent that it existed at all, was found to be more likely in the Sixth District of the city and in relatively small suburban jurisdictions. In total the effects of jurisdiction size on the likelihood of spill-ins or spillovers that have been shown here are so small as to suggest that their existence has been somewhat exaggerated by those concerned with this issue.

Consumer Concentration and Responsiveness

The last area of concern in this chapter is also related to jurisdiction size. In Chapter Three it was argued that it may be more difficult for police in larger jurisdictions to be responsive to citizen preferences than it is for police serving smaller areas. Large jurisdictions tend to be heterogenous, presenting a diversity of preferences to which police must tailor a diversity of activities and outputs if

they are to be responsive. Citizens may have difficulty articulating their preferences for services, and may conceal them if the amount they must pay for services is related to the amount and type of service they prefer. These factors make it difficult for police to know and to match citizen service preferences.

There are additional factors at work that may lead to lesser responsiveness even where preferences might be known. There are institutional norms in policing that argue for uniformity in service from neighborhood to neighborhood within jurisdictions. Often these are articulated as requiring uniformity in service delivery across multiple jurisdictions as well as within each. Related to these norms is the image of police as magisterial agents, whose duties are to enforce laws as they are written by legislative bodies, not to adapt the enforcement of laws to varying circumstances (Allen, 1976).

Finally there is the question of "Responsiveness to whom?" Individuals tend to be responsive, at least in part, to those who control the distribution of incentives for valued performance. If, as some have argued, citizens tend to be quite distant from the control of incentives for public service employees in large jurisdictions, those employees may view responsiveness to citizens as unnecessary.

Whether police are responsive to citizens or not, the measurement of responsiveness is a difficult problem. It requires at a minimum, knowledge of citizen preferences, knowledge of officials' perceptions of those citizen preferences, measurement of the extent to which actual service delivery matches citizen preferences or, at least, officials' perceptions of them, and demonstration that officials are actually attempting to match service delivery to preferences. Rather than wrestle

with these difficulties in the present analysis, however, a proxy measure approach will be employed that imputes responsiveness where certain other indicators are found.

The proxy indicators of performance to be used are measures of citizen perceptions of local police and their overall evaluation of the police services they receive. The argument is the following:

> Citizens prefer their police to be honest and courteous, and to be fair in their treatment of all citizens.
>
> Citizens evaluate police services, at least partially, on the extent to which the services are responsive to their preferences.
>
> Therefore, where police are responsive to citizen preferences, citizens will be more likely to perceive the local police as honest, courteous, and fair, and to evaluate the services they provide more highly.

Responsiveness of police serving jurisdictions of differing size will therefore be represented by measures of citizen perceptions of their honesty, their courtesy, the fairness with which they treat all citizens, and by the overall rating which citizens give the police services they receive.[11]

When comparing the responsiveness of police in jurisdictions of different sizes, the characteristics of the neighborhoods and the citizen respondents in those neighborhoods will be considered as well. It may be more difficult for police to be responsive to particular kinds of neighborhoods or to some types of citizens, and adjustments for these variables may make the comparison more valid. The particular method of comparison to be employed is to estimate regression equations predicting citizen perceptions of police honesty, courtesy, and fairness, as well as citizens' overall rating of police service. The predictors are neighborhood and individual characteristics and dummy variables representing jurisdiction size.[12]

Indicators for police agency organization, inputs, production strategy, activities, outputs, and objective outcomes are explicitly not included in these equations. These variables are all indicators of the process whereby police are (or are not) responsive to citizen preferences. As many of them may be concomitants of jurisdiction size, their inclusion would weaken any size to responsiveness relationships. For this particular analysis, the question to be addressed is, "Does size affect responsiveness?," and not how does it do so. This section thus differs from the main thrust of earlier analyses in this study.

Table 6.8 presents the estimated effects of jurisdiction size on the proxy responsiveness measures. The base category for all comparisons is the size of the smallest jurisdictions, ranging in the present case from about 1,000 to just under 5,000 population. Looking at the citizen perception indicators, it appears that these very small jurisdictions tend to be equally or more responsive than the larger jurisdictions. This is not true on the overall evaluation indicator, however. For this measure of responsiveness, medium-sized jurisdictions appear to be somewhat better, particularly those in the 16,000 to 28,900 and 28,901 to 65,908 population ranges. In no case are the large jurisdictions shown to be more responsive than the medium and smaller sized ones.

The responsiveness proxy measures might be taken as summary indicators for many of the linkages of organization to performance. That is, citizen perceptions and evaluations of their local police are likely to have been shaped by their perceptions of police activities and their experiences with local police. These, in turn, are affected by the production strategy choices made by differently organized police

Table 6.8. Jurisdiction Size Effects on Citizens' Perceptions of Police Honesty, Courtesy, and Fairness, and Overall Evaluations of Police Service.[a]

Jurisdiction Size (1970 Population)	Citizen Perception of Police: Honesty	Courtesy	Fairness	Citizen Overall Evaluation
1,000 to 4,999[b]	0[c] (--)[d]	0 (--)	0 (--)	0 (--)
5,000 to 15,999	-.125 (.047)	-.160 (.043)	-.049 (.063)	.117 (.049)
16,000 to 28,900	.071 (.047)	-.058 (.044)	-.013 (.064)	.210 (.050)
28,901 to 65,908	-.038 (.054)	-.093 (.049)	.017 (.073)	.264 (.056)
333,748 (St. Louis County)	-.122 (.067)	-.125 (.062)	.075 (.092)	-.248 (.065)
622,236 (City of St. Louis)	-.177 (.063)	-.130 (.058)	-.113 (.086)	-.250 (.065)
R Squared	.122	.098	.109	.153
Number of Cases	3,186	3,317	3,114	3,843

[a]See Footnote 12 for coding of perception and evaluation measures and list of other variables in the equation.

[b]Base category for size comparison.

[c]Unstandardized regression coefficient - b.

[d]Standard error of b.

agencies serving jurisdictions of various sizes. Because such summary indicators merge together effects that operate along a number of linkage paths, the estimates of jurisdiction size to responsiveness relationships are not overly large, nor do they account for a great deal of the variance in the responsiveness measures. They are, however, consistent with the findings of the more focused analyses presented to this point, showing the same general curvilinearity of effects as size (either jurisdictional or organizational) increases. Thus, they provide support for the findings of those more detailed investigations.

How is Structure Important -- More Partial Answers

The evidence presented in this chapter offers more explanations of the ways in which the structure of police service delivery arrangements and the organization of individual police departments may affect police performance. The less concentrated structures shown in the preceding chapter to be associated with higher emphasis on patrol and, thus, increased patrol presence, were not found to suffer from lack of specialists for criminal investigation and juvenile duties. Individual departments that emphasized patrol, particularly the smaller departments, were found to have much lower proportions of their officers assigned to criminal investigation or other specialized duties, however. Those police agencies with very low proportions of specialists, or no specialists, were somewhat less likely to provide victims with favorable responses than were those agencies with medium amounts of specialization. The most specialized agencies, however, were no more successful than the least specialized, and were less successful than those with a medium amount.

Spillovers in volume or perceptions of crime were not found to be major problems in neighborhoods within jurisdictions of any size. Neither were spillovers in officer attitudes from neighborhood to neighborhood within larger jurisdictions. Neighborhoods of approximately 1,000 to 16,000 population such as those studied in St. Louis may, therefore, be sufficiently large to internalize any crime or attitude spillovers.

Finally, responsiveness was shown to be weakly related to jurisdiction size. Small- and medium-sized jurisdictions, as expected, were found to be rated as more responsive by citizen-consumers than were the larger jurisdictions.

None of the linkages shown in this chapter are of great strength. None of them can be pointed to as the explanation of why police with certain kinds of organizational arrangements perform better than those with other forms. Taken together with the findings of the previous chapter, however, they begin to provide a cumulative explanation for how service delivery structure and police organization influence performance. This cumulation of evidence will be the focus of the final chapter.

FOOTNOTES FOR CHAPTER SIX

[1]The personnel allocation data collected in St. Louis in 1972 are not directly comparable with the data from the Police Services Study. Collection procedures for these data were less sophisticated in St. Louis, where the primary emphasis was on determining the number of officers assigned to patrol without tbo much attention to other allocations. In attempting to categorize the departments in St. Louis by percent of officers assigned to criminal investigation duties, I found that the available data indicated quite a bit higher percentage allocations than were found in the Police Services Study. One reason was the lumping of juvenile officers in with criminal investigation in St. Louis data collection. There are probably other reasons as well. Because of this, the percents assigned to criminal investigation in St. Louis and, thus, the categories in which departments have been included cannot be compared with data in Table 6.2, for example. The categories for the St. Louis allocations are: (1) none, including here those small departments listed as having one criminal investigation specialist; (2) low, those departments with 10 to 15 percent of their officers assigned to criminal investigation; (3) medium, those departments with 16 to 20 percent assigned to investigation; and (4) high, the two largest departments, with more than 20 percent of their officers assigned to criminal investigation by the 1972 counts. I suspect, but cannot document at this point, that these percentage figures should be discounted by approximately 5 to 10 percent to account for differences in data collection for comparability with Police Services Study data.

[2]Respondents were asked, "What did the police do?" Their open-ended responses to this question were later collapsed into the six categories shown (responses other than these or "don't know" have been excluded for this analysis). The coders were instructed to choose the category that indicated the most complete police response, thus, "took a report" would be coded if both questioning of a complainant and report-writing occurred, and "checked around the premises" took precedence over simply writing a report.

[3]The reader is once again reminded that these data apply to residential neighborhoods. They are not meant to, nor can they, be interpreted as applicable to the full range of conditions found in the largest American cities. They can be read to suggest that residential portions of those cities might be better served by smaller, local police forces. But they provide no information on the appropriate organization of police in central business areas, other commercial or industrial areas, or the very wealthiest and the poorest portions of those cities.

[4]The neighborhood service condition variables are:

NPAR18 - Percent of persons under 18 years of age living with both parents

NUPMID - Percent of families with incomes over $15,000 in 1969

NBLKHET - Racial heterogeneity -- Lieberson index

NOVER65 - Percent of persons over 65 years of age

NOCC - Percent of housing units that are owner-occupied

NDENS - Population density -- persons per square mile

[5]Several of the study neighborhoods outside of the city had victimization rates that were higher than any of the city neighborhoods before adjustment for service conditions.

[6]The jurisdiction of the St. Louis County Police Department, the second largest shown in the table, includes those of all the other departments except the city police. This broad jurisdiction is likely the referent for county officers, thus explaining their very high propensity to respond that local people commit the crimes in their jurisdiction.

[7]Index crimes are those used by the Federal Bureau of Investigation in its annual reporting of Crime in the United States. There are seven such crimes: homicide, rape, robbery, assault, burglary, larceny, and auto theft. The first four of these comprise the category of violent Index crimes used in this discussion.

[8]The Chief of the Washington, D.C. Police Department for a number of years, Jerry Wilson, has recently reflected on his experiences in a monograph published by the National Institute of Law Enforcement and Criminal Justice (1978). One of his major themes is the consistent overestimating of the dangerousness of the District by many persons. Focusing on the years 1955-75, Wilson says, "through most of the period . . . , public fear and concern over crime in the District of Columbia far exceeded any reasonable relationship to the danger of crime" (1978: 4). He cites several reasons for this overestimate, some of which are idiosyncratic to the District, but others of which would be found in any large, central city. Among the latter are police reporting and statements about the crime problem, presence of substantial proportions of black residents, and the influence of the media in reporting crimes. Media influence may be the major factor. Garofalo reports that nearly 90 percent of those interviewed in eight large cities during 1972 thought that crime was as serious or even more serious than it was portrayed in the media (1977: 16).

[9]The predicted effect of personal or household victimization on a respondent's perception of neighborhood crime trend is approximately the same across neighborhoods in jurisdictions of differing size. The average b coefficient for this variable is 0.30.

[10]Garofalo reports that, "only about half as many respondents believed that crime in their neighborhood had increased within the past year or two as believed that national crime had increased during the same period" (1978: 15). This may suggest that spillovers in fear of crime are not particularly serious in most neighborhoods

[11]This argument, as noted in Chapter Three, involves the logical fallacy of "affirming the consequent" (Salmon, 1963). That is, there are many possible explanations for the citizen perceptions and evaluations used here, only some of which involve responsiveness.

[12]Citizen perceptions of police honesty, courtesy, and fairness were tapped with the following three statements, to which citizens were asked to strongly agree, agree, disagree, or strongly disagree:

- Policemen in this neighborhood are basically honest.
- The police in this neighborhood are generally courteous.
- The police in your neighborhood treat all citizens equally according to the law.

Citizen valuations of police service were obtained from a question asking them to rate police services as outstanding, good, adequate, inadequate, or very poor. For purposes of the analysis in this section, these ordinal scales have been treated as if they were interval and used as dependent variables in regression equations. The issues involved in doing so are discussed in Chapter [illegible] at Footnote 10. Key references for such usage are Abelson and Tukey (1959) and Duncan (1975).

The six variables representative of neighborhood service conditions are included in the equations predicting these perceptions and evaluations (see Footnote 4 above). So too are individual respondent characteristics of age, education, and race. Adjusting for these neighborhood and individual characteristics helps to clarify the jurisdiction size to responsiveness linkage (but see Lord, 1960, for limitations of these adjustments).

CHAPTER SEVEN

STRUCTURE, CONDUCT, AND PERFORMANCE: A Summation and Suggestions for Further Work

This study began by posing the question, "How does organization influence performance?" A framework for organizing inquiry into this question was offered, drawing upon the conceptual apparatus of scholars in the economic tradition of industrial organization. I argued that the delivery of public services in a given area could be conceptualized as occurring through the medium of an industry, where that industry was composed of the public service producers, the providers that linked them to consumers, and the consumers themselves. I argued further that the structure of the service delivery arrangements among the elements in such industries ought to affect the conduct of actors in the industry and the performance of the service delivery arrangements.

I then presented a conceptual ordering of the production process for public services, arguing it to be more complex than the production and cost functions used to describe conduct in private industries. A key element in the public service production process was argued to be the choice of strategies by which producers allocated their input resources to activities aimed at generating valued outputs. The choice of a production strategy was argued to be a function of demand conditions in a producer's service area and the availability of external inducements for the choice of particular strategies. More importantly for the present study, it was argued to be a function of the structure of service delivery arrangements and of internal incentives that were related to producer organizational arrangements.

The structure of service delivery for police services was chosen as the subject for empirical examination. The structure of police service delivery arrangements and the organization of police service producers have been the subject of many critiques and proposals for improvement over the years. Several of these critiques and proposals were reviewed in the context of the service structure and production process frameworks. One focal point for criticism by many has been the choice of production strategies by differently organized police agencies. It has been argued that small police agencies and fragmented service delivery systems lead to a reduced availability of trained specialists who, it is also argued, are essential for effective police work. Other critiques and arguments surrounding possible spillovers of crime and of attitudes and perceptions were reviewed. So, too, were concerns with the responsiveness of differently structured police systems.

Data from two recent studies of police service delivery were used to operationalize and examine some of the linkages of structure, conduct, and performance in police service delivery. One of these studies appplied data on service delivery structures, organizational arrangements, production strategies, and some police activities in 80 metropolitan areas across the United States. The second supplied data on organizational arrangements and production strategies among a sample of police departments in a single metropolitan area. This second study also supplied data on the activities of officers from those departments in a set of matched residential neighborhoods, and on how those activities resulted in valued outputs and outcomes in the neighborhoods.

Analyses using these data to examine structure, conduct, and performance linkages focused on several key areas. Service delivery structures and organizational arrangements were related to production strategies and to the availability of patrol and specialized officers in police jurisdictions. Patrol officer availability was related to patrol presence, to police response capabilities, and to citizens' perceptions of police capabilities to respond when called. Specialist availability was related to a measure of the quality of police responses to incidents where citizens were the victims of criminal activity in their neighborhoods. Both response time distributions and the distributions of police responses to victimizations other than immediate response were shown to be related to the production strategies of police departments.

Other linkages examined were those of the concentration of consumers in an industry as it affected possible crime, attitude, and perception spillovers, and as it affected the responsiveness of the service delivery arrangements to consumer preferences. Very little evidence of spillovers of any kind was found. Responsiveness was, however, related to the organizational arrangements for policing in a neighborhood.

This chapter provides a brief review of the findings of the study. Following the review, I suggest some areas where further research using the industrial organization and production process frameworks might be quite fruitful. Evaluative and comparative research designs are contrasted for their applicability to this research, and I conclude that comparative ones may be more useful given our current understanding of the processes at work in public service delivery.

Structure and Conduct in Police Service Delivery

The structure of police service delivery arrangements has been shown in this study to be related to the choice of production strategies by individual police agencies in a metropolitan industry. In less concentrated structures, a greater emphasis upon police patrol is evident. That is, the agencies in less concentrated structures choose patrol-oriented strategies, placing more officers on the street as a proportion of their total complement, with the result that each of those officers has fewer citizens to serve on average.

In part this relationship of service delivery structure to choice of production strategies is compositional. Less concentrated metropolitan areas are those that are served by larger numbers of smaller and medium-sized police agencies than are the concentrated areas. Small- and medium-sized agencies are much more likely to emphasize patrol duties in their choice of production strategies than are large police departments. Thus the aggregation of these small- and medium-sized agencies in less concentrated areas naturally exhibits a higher emphasis on patrol.

Of equal or more interest, however, is the finding that the structure of service delivery arrangements, particularly as it reflects the availability of specialized producers of some services, affects the choice of production strategies by individual producers in an industry. Where vertical differentiation is found, for example, involving specialized producers of homicide investigations or of radio communications, individual police agencies are more likely to

emphasize patrol assignments than are equivalently sized agencies in less differentiated areas.

Somewhat surprisingly, the extent of patrol emphasis in more or less concentrated service delivery structures is not reflected in the presence of criminal investigation or juvenile specialists in metropolitan areas. Approximately the same proportion of sworn police officers are assigned to criminal investigation and to juvenile duties in less concentrated areas that are more patrol-oriented as in more concentrated, task-oriented service delivery structures. There is a tendency, however, for more officers to have traffic assignments in more concentrated service delivery structures.

At the level of individual producing agencies, size is a good predictor of internal specialization. Only the largest police departments are likely to have large complements of criminal investigation, juvenile, or traffic specialists. As noted above, such specialists, particularly in criminal investigation or juvenile duties are available in the police industries where many small- and medium-sized agencies are present. Whether this external availability is adequate or whether better performance results with specialists internal to a department will be addressed below.

Structure, Conduct, and Performance in Police Service Delivery

One of the most common activities of police officers is responding to the service requests of citizens in their jurisdiction. It has been estimated that at least 80 percent of police work is initiated by these

requests (Reiss, 1971). One of the foci of this study was whether differences in police organization, by leading to differences in police conduct, would affect the consequences for citizens who called upon their local police for help. The answer to this question was found to be yes. Differently organized police agencies chose to place differing emphases on patrol- versus task-oriented production strategies. Differences in production strategies affected the availability of patrol officers and their capacities to respond rapidly. Differences in internal specialist availability were also found to be related to activities and outputs of police following immediate response.

The choice of a patrol-oriented production strategy was found to be a monotonically decreasing function of police agency size. In the smallest police service producers virtually every officer received a patrol assignment. In the very largest, only slightly more than 50 percent were assigned to patrol duties. This made a significant difference in the number of citizens each patrol officer on the street served. Citizens served by the smallest agencies, thus, reported seeing patrol units in their neighborhoods much more frequently than did citizens served by the largest. Medium-sized agencies provided patrol frequencies intermediate to those of the smallest and largest producers.

Response time was found to exhibit a curvilinear relationship with production strategy and, thus, with police agency size. The smallest agencies, while adopting strategies that emphasized patrol virtually to the exclusion of other assignments, were found to be

hampered by the fact that they typically were able to place only a single unit on the street to respond to requests. The largest producers, by de-emphasizing patrol assignments, were unable to deploy sufficient patrol units to provide as rapid a response as that provided by medium-sized producers. The medium-sized police agencies, by choosing a production strategy with substantial emphasis on patrol, yet with some specialization as well, were able to deploy sufficient patrol units to achieve the fastest responses on average.

The amount of internal specialization in criminal investigation assignments within a police department was also found to exhibit a curvilinear relationship with valued outputs. Victimization incidents where the police were able to recover stolen property, arrest or question a suspect, or where they checked around the victim's premises to reassure the victim, were categorized as receiving a higher quality response than those where the police simply took a report, questioned the complainant, or did "nothing" in the victim's eyes. With this categorization, it was found that police agencies in the mid-range of a scale measuring assignment of officers to criminal investigation specialties were able to outperform those with no or very few specialists and those with a high percentage of their officers assigned to internal specialties. This performance advantage remained following adjustment for the types of crimes and the individual and neighborhood characteristics that might affect coproduction in the jurisdictions of these police agencies.

Turning to responsiveness, it was found that medium-sized jurisdictions were rated most responsive by consumers using their

overall evaluation of their police service as a proxy measure. This responsiveness finding, together with findings of response time advantages and performance advantages for activities and outputs following immediate response, suggest that medium-sized police agencies, perhaps in the range of 11 to 100 sworn officers, may be the best choice for police service delivery in residential areas. Where those areas could be organized into police jurisdictions appropriate to this size of force, in the range of 5,000 to perhaps 80,000 consumers, depending upon their service demands, local police might be best able to respond to specific citizen service requests and to be responsive overall to citizen preferences for police service. The wide ranges of these agency and jurisdiction sizes, and the fact that many of the police agencies and jurisdictions in American metropolitan areas fall within these ranges, suggest that current police service delivery structures in many of those areas are not inappropriate. The reluctance of most citizen-consumers to agree to major structural changes in the police industry supplying them is, thus, likely to reflect their correct views that such changes could well make things worse and not better.

Directions for Future Research

The findings presented in the present study suggest some immediate areas for research in the organization of police service delivery. One such area is further exploration of reasons why police agencies adopt particular production strategies, especially reasons why large

agencies are so prone to adopt task-oriented, specialized strategies. Arraying evidence with respect to the incentives and constraints that mold production strategy choices in such agencies would be useful for assessing the likely consequences of attempting to introduce more patrol-oriented strategies in large departments (for example, the recent "team policing" innovations -- see Wasson, 1975; Gay, et al., 1977; and Schwartz and Clarren, 1977, for descriptions). If the incentives toward specialization are strong, and constraints on this strategy choice are weak in large departments, one might predict the failure (or subversion) of these efforts (Schwartz and Clarren, 1977, provide evidence of this in Cincinnati experiment).

Complementary research to that on incentives in individual police agencies would focus on the availability and organization of various specialized service producers within different structures of service delivery arrangements. If the presence of specialized producers enables a greater patrol orientation among more conventional producers, then the development of means to organize and encourage the use of such specialists may offer substantial payoffs. Many metropolitan areas have, in fact, moved toward establishment of specialized producers for some services (e.g., Neubert, 1975; McDonnel, 1977), and study of their organizational arrangements should be quite useful.

Research using the industrial organization and production process frameworks could be pursued in studies of other public service industries also. Once attention has been drawn to a conception of service delivery structures that transcend the organization of any single producer, then many additional organizational possibilities can be

considered. In fire services, for example, the roles of state fire marshalls, police arson investigators, and private insurance investigators and adjustors surely ought to be included within the structure of fire service delivery arrangements. So, too, should the presence of barriers or incentives to interagency cooperative arrangements for meeting peak demands. In education services, some states have moved toward the establishment of specialized producers of services at the state or multi-district level. This vertical differentiation ought to be considered as it influences the incentives and constraints placed before local districts and schools. Efforts in some areas to involve parents more explicitly in the education production process (e.g., as teachers' aides) ought to be researched using a service delivery structure framework.

These agency and industry level studies should be complemented with analyses focusing on incentives, constraints, and activities within organizations. If, for example, police officer activities at the scene of an encounter with citizens are important predictors of citizens' perceptions and evaluations of police service, we ought to find out much more about what sorts of actions are related to what sorts of perceptions and evaluations. Some work of this nature is becoming available now in policing (e.g., Parks, 1976b; Dean, 1979; Percy, 1979), and more should be available within the next year (e.g., Allen, 1979). Similar micro-level analyses would be quite useful in studies of other public sector agencies as well. Such studies would have value as they illuminated the operation of incentives and constraints resulting from the organization of these agencies,

and would have some immediate prescriptive value in terms of identifying clearly inferior or superior sets of activities for service suppliers.

Designs for Future Research

In his 1960 Presidential Address to the American Statistical Association, Renis Likert made a fundamental distinction between two functions of statistics (1960). Likert argued that we needed two kinds of information in order to address problems; first, information about the nature of the problem, and second, information about the state of the problem.

> By information as to the state of the system let us mean the statistical measurements which reveal the current situation of the nation or the economy. . . . By information as to the nature of the system let us mean the basic conceptual model or understanding which serves as a guide to tell what dimensions of the nation, or society, or economy should be measured and how these measurements should be interpreted in making decisions. This information as to the nature of the system includes, of course, both the conceptualizations themselves and the extensive, quantitative measurements which are required for valid conceptualizations (ibid.).

Clearly, information about the nature of a system is prior to useful information about the state of a system. Likert found, however, that,

> we are doing a far better job of collecting information about the state of our nation than we are of [conceptualizing] the nature of our nation and developing valid generalizations and theories based on these [concepts].[1]

I believe that Likert's contentions are quite applicable to our present understanding of public service delivery. Many recent efforts aimed at "evaluating" service delivery agencies and structures or some changes in those structures have been focused on measurement of what he called "state" variables.

The Need for Prior Theory

Evaluative research is fundamentally applied research. Applied research thrives in an environment where basic underlying theory is well-developed. Evaluating police programs, for example, as a form of applied research, requires that we develop a theory of policing. In the area of organizational arrangements and police performance, we require a theory that explains how differences in police organization might be expected to effect differences in police performance.

Without an understanding of the nature of a problem, what influences bear upon it and how it influences other aspects of a system, measures of the state of a problem (or measures of a change in the state of a problem) are most difficult to interpret. Comparative research efforts aimed at developing and empirically testing theories or models of the nature of structure and performance relationships offer more promise of illuminating these linkages than do evaluative research efforts focused on individual changes in structure. Theories that are developed in these comparative efforts may then be employed to guide the design of critical evaluations of organizational change, but these theories are a necessary precondition for successful evaluations.

Comparison Versus Evaluation

The research reported here and that contained in the many studies discussed in this volume was, in general, comparative research. Using various selection and matching procedures in data collection and various statistical procedures to adjust for extraneous influences resulting from pre-existing differences among groups they studied, the researchers

attempted to estimate relationships among the variables of prime interest.[2] In reviewing research by others on the question of whether structure affects performance, no reference was made to research that used an experimental or quasi-experimental design for addressing the question. The reason for this omission is simple, I have been unable to find any such studies. In a recent review of evaluation results in the field of police organization, for example, I could find no instance where an organizational change was evaluated in such a way as to yield warrantable evidence of the effects of organization on performance (Parks, 1979).

I do not believe that the consistent failure to evaluate structural change so as to yield such evidence is coincidental, nor is it the result always of inadequate research teams, designs, or funds (though these are often offered as reasons why evaluation efforts were unsuccessful). Rather, I believe, the reasons for failure in evaluation efforts and the possibliity of useful comparative studies lie in the incentives they place before organizational participants and in the level of prior theory development each requires.

In evaluation research, one focuses upon the implementation of a specific new program and asks whether or not it is successful in accomplishing a more or less articulated set of objectives. This forces one to openly entertain the possibility that the program may not be successful. Comparative research allows a different thrust. Here the focus is upon a number of different, existing programs aimed at dealing with a similar set of problems. One could argue that most existing programs are dealing with the problems to some degree

(evidenced by the fact that they have been in existence for a period of time), and examine the extent to which some operate more effectively or efficiently than others. This may appear to be only a semantic difference. But in practice it may explain why comparative studies of the performance of differently organized public agencies have been undertaken, but evaluations of major organizational changes have not occurred.

Why Evaluation Doesn't Happen

The prototypical evaluation model is the true experiment. While it is tempting to social scientists to view reforms as experiments, it is safe to assume that virtually no participants in organizational changes view them as such. The chemist does not need to worry about how his reagents feel toward an experiment, but the attitudes of participants in organizational changes are crucial. Participants may act to prevent or drastically alter a given change program, or may act to prevent or to predetermine the results of any evaluative effort. While reagents cannot be said to have motives that would lead them to take such actions, human participants clearly do.

Organizational changes involve shifts in power relationships among participants. In a consolidation of police agencies, for example, some level of local control must be relinquished. It is likely that a consolidated agency will allocate resources differently than had been the case among the agencies entering into the consolidation. Although it is often presented as a technical matter subject to decision making by rational police administrators, this allocation of "who gets what, when, and how" is the essence of politics (Lasswell, 1958).

The political nature of organizational changes is illustrated by the extensive political campaigns preceding successful consolidations. To quote Mayor Briley with respect to the 1962 consolidation of Nashville, Tennessee, with surrounding Davidson County:

> ours was a very heavy program . . . a matter of making hundreds of speeches by different people at civic clubs, the men's clubs, in the schools, at the PTAs, the League of Women Voters, every group we could get to. . . . I think that to really sell consolidation you have got to have a really hard sell campaign.[3]

Campbell spoke directly to this issue and its impact on the conduct of evaluative research.

> In the present political climate, reformers and administrators achieve their precarious permission to innovate by overpromising the certain efficacy of their new programs. This traps them so that they cannot afford to risk learning that the programs were not effective (1969).

Those who have recently engaged in a hard-sell campaign for an organizational change cannot then be expected to assist an objective evaluation of the effects of the change. We might wish for men to fit an objective, scientific model of behavior, but intuition tells us this is unlikely.

A second reason for the failure to evaluate organizational change is the difficulty in untangling what changes occurred so as to examine their effects. Thus, government consolidation in Nashville or police consolidation in Jacksonville, Florida, involved a large number of changes in the structure of the agencies involved and massive media campaigns arguing the benefits of consolidation. Hawthorne-like effects seem most likely in these environments. A very careful research program, based on a well-developed theory of police organization and performance, would be required to successfully disaggregate the multiple

causes and multiple effects in such a situation. Certainly we have nothing resembling the required theoretical understanding at present.

Why Comparison May Work

Comparative research does not necessarily pose a direct test of a particular program. The comparative researcher usually seeks to compare alternative programs that have been in existence for sufficient time to have reached a "steady state" level of performance. Innovative programs (or any other transient-producing inputs) that occur during the course of data collection can have disruptive effects on the research. Comparative data collection often includes measures bearing upon a number of different outputs and/or outcomes and the activities believed relevant to their production, rather than on a more narrowly defined set of objectives for a single program. In this way, comparative research appears more useful for studying "broad-aim" programs, such as policing, than experimental research designs focused on particular innovations and their immediate effects.

Comparative research may be able to avoid some of the deliberate attempts to affect (or obscure) findings commonly cited in evaluation studies. Comparative studies can focus upon organizations that have been successful at surviving over time, where organizational representatives may be more relaxed about the research. The findings are unlikely to directly affect their tenure or that of their agency. Thus, one might expect greater openness and cooperation in the production of necessary data for a comparative study of existing organizations than for an evaluative study of a new one.[4]

Comparative research offers additional advantages over evaluation studies by providing substantially more cases for examination and, usually, more variation in variables of theoretical interest. In policing, for example, it might be possible to find instances where the colinearity between agency size and other organizational variables is much less, by examining the structural characteristics of police forces in other nations. The British police system is an example where substantial reliance is placed upon central supply of specialists, with local resources primarily allocated to patrol activities (see Central Office of Information, 1975). Thus, the strong correlation between size and specialization characteristic of American departments is weaker there. The Japanese "Koban" system of fixed police posts, similar in many respects to the British "police shops," offers a system for decentralization of large police forces that may capture many of the responsiveness advantages found for small- and medium-sized American agencies. Cross-national comparison along the lines of the recent work of Bayley (1976) suggest the value of these comparisons.

Improving Public Performance

The successes of recent analytic efforts based on theories of how politics and structure might be expected to "make a difference" augur well for further work of this nature. A growing realization among the electorate that "more of the same" does not seem to offer improvement in our capacity to resolve social difficulties or to supply

proportionately more public goods, suggests that a major focus of such research will be on the relationships of structure to performance.

I hope that the conceptual framework provided in this study will prove useful to others who study the organization and performance of public service delivery systems. As a political scientist I believe that a framework drawing close attention to the structure of political and organizational arrangements and how those structures in turn influence conduct and performance is essential to differentiate our discipline from those of sociologists, psychologists, anthropologists, and others who seek to explain patterned human behavior. It is this focus on institutions that distinguishes us as political scientists. As a student of policy analysis, I believe that the knowledge which we may obtain using such a structural framework is essential to improvements in public performance. Until we can predict with some accuracy how the structure of service delivery arrangements offer incentives and provide constraints for participants in those arrangements, we will be hard pressed to offer any prescriptions for improvement of these structures. Yet, structural modifications may be the only handle available to alter our responses to problems in our society. We must strive to improve the likelihood that such modifications will, when implemented, really make things better rather than worse.

FOOTNOTES FOR CHAPTER SEVEN

[1]Likert's phrasing was, "we are doing a far better job of collecting information about the state of our nation than we are of obtaining data dealing with the nature of our nation and developing valid generalizations and theories based on these data." My substitution of concepts for data in the quotation seems, however, more consistent with the thrust of his argument.

[2]In spite of the fact that such adjustments can never be perfect where pre-existing differences among groups are present (Lord, 1960), they may be the best we can do in much social science research. Multiple research efforts, involving different combinations of pre-existing differences and multiple measurements aimed at determining and minimizing errors in these adjustments may help alleviate this difficulty.

[3]Mayor Briley's remarks are quoted from a seminar discussion reported in The American County for February 1972.

[4]This advantage of comparative research is, of course, one of degree only. Comparisons among agencies can be made explicitly for the purposes underpinning many evaluation studies, including determining the life expectancy of programs or the tenure of program participants. But, the difference is so frequently present as to make it quite important for the possibility of either form of research.

BIBLIOGRAPHY

Abelson, Robert P. and John W. Tukey (1959) "Efficient Conversion of Non-Metric Information into Metric Information." Proceedings of the Social Statistics Section of the American Statistical Association, 226-230.

Abt Associates (1976) Case Incident Regional Reporting System. Cambridge Massachusetts: Abt Associates.

Advisory Commission on Intergovernmental Relations (1971) State-Local Relations in the Criminal Justice System. Washington, D.C.: U.S. Government Printing Office.

Allen, David Noel (1979) "Street-Level Police Supervision: The Effect of Supervision on Police Officer Activities and Agency Outputs." Ph.D. Dissertation. Bloomington, Indiana: Indiana University, Department of Political Science.

Allen, Ronald (1976) "The Police and Substantive Rulemaking: Reconciling Principle and Expediency." University of Pennsylvania Law Review, Vol. 125 (November), 62-118.

American Bar Association, Advisory Committee on the Police Function (1973) Standards Relating to the Urban Police Function. New York, New York: American Bar Association.

Arrow, Kenneth (1963) Social Choice and Individual Values. Second Edition. New Haven, Connecticut: Yale University Press.

Ashford, Douglas E. (1978) "The Structural Analysis of Policy or Institutions Really Do Matter." In Douglas E. Ashford, ed. Comparing Public Policies: New Concepts and Methods, Vol. 4, Sage Yearbooks in Politics and Public Policy. Beverly Hills, California: Sage Publications, 81-98.

Bahl, Roy A. (1969) Metropolitan City Expenditures. Lexington, Kentucky: University of Kentucky Press.

Bain, Joe S. (1944-47) The Economics of the Pacific Coast Petroleum Industry. 3 Volumes. Berkeley, California: University of California Press.

_____ (1959) Industrial Organization. New York, New York: John Wiley & Sons, Inc.

_____, Richard E. Caves, and Julius Margolis (1966) Northern California's Water Industry. Baltimore, Maryland: The Johns Hopkins Press.

Banfield, Edward and Martin Grodzins (1958) Government and Housing in Metropolitan Areas. New York, New York: McGraw-Hill, Inc.

Bator, Francis M. (1958) "The Anatomy of Market Failure." Quarterly Journal of Economics, Vol. 72 (August), 351-379.

Bayley, David H. (1976) Forces of Order. Berkeley, California: University of California Press.

Bergstrom, Theodore C. and Robert P. Goodman (1973) "Private Demands for Public Goods." American Economic Review, Vol. 63 (June) 280-296.

Beroltzheimer, Josef (1947) "Influences Shaping Expenditure for Operation of State and Local Governments." Bulletin of the National Tax Association, Vol. 32 (March-May), 170-171; 213-219; 237-244.

Bibby, John (1977) "The General Linear Model-A Cautionary Tale." In C. A. O'Muircheartaigh and C. Payne, eds. The Analysis of Survey Data. Vol. 2, Model Fitting. New York, New York: John Wiley and Sons, 35-79.

Biderman, Albert D. (1966) "Social Indicators and Goals." In Raymond A. Bauer, ed. Social Indicators. Cambridge, Massachusetts: The M.I.T. Press, 68-153.

Bish, Frances P. and Nancy M. Neubert (1977) "Citizen Contributions to the Production of Community Safety and Security." In Mark S. Rosentraub, ed. Financing Local Government: New Approaches to Old Problems. Fort Collins, Colorado: Western Social Science Association.

Bish, Robert L. (1972) The Public Economy of Metropolitan Areas. Chicago, Illinois: Markham Publishing Co.

_____ and Vincent Ostrom (1973) Understanding Urban Government. Washington, D.C.: American Enterprise Institute for Public Policy Research.

_____ and Robert Warren (1972) "Scale and Monopoly Problems in Urban Government Services." Urban Affairs Quarterly (September), 97-122.

Bittner, Egon (1970) The Functions of the Police in Modern Society. DHEW Publication No. (HSM) 72-9103. Washington, D.C.: U.S. Government Printing Office.

_____ (1974) "Florence Nightingale in Pursuit of Willie Sutton: A Theory of the Police." In Herbert Jacob, ed. The Potential for Reform of Criminal Justice, Vol. 3, Sage Criminal Justice System Annuals. Beverly Hills, California: Sage Publications, 17-49.

Black, Donald J. (1970) "Production of Crime Rates." American Sociological Review, Vol. 35 (August), 733-748.

Board of Police Commissioners (1972) St. Louis Metropolitan Police Department Annual Report 69-70-71-72. St. Louis, Missouri: St. Louis Metropolitan Police Department.

Bodily, Samuel E. (1978) "Merging the Preferences of Interest Groups of Efficiency and Equality in the Design of Police Sectors." In Richard C. Larson, ed. Police Deployment: New Tools for Planners. Lexington, Massachusetts: Lexington Books, 103-122.

Borcherding, T. E., W. C. Bush, and R. M. Spann (1977) "The Effects on Public Spending of the Divisibility of Public Outputs in Consumption, Bureaucratic Power, and the Size of the Tax-Sharing Group." In T. E. Borcherding, ed. Budgets and Bureaucrats: The Sources of Government Growth. Durham, North Carolina: Duke University Press, 211-228.

_____ and Robert T. Deacon (1972) "The Demand for Services of Non-Federal Governments." American Economic Review, Vol. 62 (December), 891-901.

Bordua, David J. and Larry L. Tifft (1971) "Citizen Interviews, Organizational Feedback and Police-Community Relations Decisions." Law and Society Review, Vol. 6 (November), 155-182.

Bowen, Howard R. (1943) "The Interpretation of Voting in the Allocation of Economic Resources." Quarterly Journal of Economics, Vol. 58 (November), 27-48.

Bradford, D. F., R. A. Malt, and W. E. Oates (1969) "The Rising Cost of Local Public Services: Some Evidence and Reflections." National Tax Journal, Vol. 22 (June), 185-207.

Brady, Conor (1974) "Garda Siochana: Social Change and Policing in Ireland 1960-1973." In Donal E. J. MacNamara and Marc Riedel, eds. Police: Perspectives, Problems, Prospects. New York, New York: Praeger Publishers, 152-158.

Brazer, Harvey E. (1959) City Expenditures in the United States. NBER Occasional Paper No. 66. New York, New York: National Bureau of Economic Research.

Breton, Albert (1974) The Economic Theory of Representative Government. Chicago, Illinois: Aldine Publishing Company.

_____ and Ronald Wintrobe (1975) "The Equilibrium Size of a Budget-Maximizing Bureau: A Note on Niskanen's Theory of Bureaucracy." Journal of Political Economy, Vol. 83 (February), 195-207.

Buchanan, James M. (1970) "Public Goods and Public Bads." In John P. Crecine, ed. Financing the Metropolis, Vol. 4, Urban Affairs Annual Reviews. Beverly Hills, California: Sage Publications, 51-71

Bwy, Douglas P. (1968) "Dimensions of Social Conflict in Latin America." American Behavioral Scientist, Vol. 11 (March-April), 39-50.

Callahan, John J. (1973) "Viability of the Small Police Force." The Police Chief, Vol. 40 (March), 56-59.

Campbell, Angus and Howard Schuman (1968) Racial Attitudes in Fifteen American Cities. Supplemental Studies for The National Advisory Commission on Civil Disorders. Washington, D.C.: U.S. Government Printing Office.

Campbell, Donald T. (1969) "Reforms as Experiments." The American Psychologist, Vol. 24 (April), 409-429.

_____ and Albert Erlebacher (1970) "How Regression Artifacts In Quasi-Experimental Evaluations Can Mistakenly Make Compensatory Education Look Harmful." In Jerome Hellmuth, ed. The Disadvantaged Child, Vol. 3, Compensatory Education. New York, New York: Brunner/Mazel.

_____ and Julian C. Stanley (1966) Experimental and Quasi-Experimental Designs for Research. Chicago, Illinois: Rand McNally.

Campbell, John P., David A. Bownas, Norman G. Peterson, and Marvin D. Dunnette (1974) The Measurement of Organizational Effectiveness: A Review of Relevant Research and Opinion. Minneapolis, Minnesota: Personnel Decisions, Inc.

Caputo, David A. (1973) "The Citizen Component of Policy Evaluation." Policy Studies Journal, Vol. 2 (Winter), 92-97.

Carmines, Edward G. (1974) "The Mediating Influence of State Legislatures on the Linkage Between Interparty Competition and Welfare Policies." American Political Science Review, Vol. 68 (September), 1,118-1,124.

Caves, Richard (1977) American Industry: Structure, Conduct, Performance. Fourth Edition. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

Central Office of Information (1975) Criminal Justice in Britain. Reference Pamphlet 129. London, England: Her Majesty's Stationery Office.

Child, John (1973) "Parkinson's Progress: Accounting for the Number of Specialists in Organizations." Administrative Science Quarterly, Vol. 18 (September), 328-348.

Clark, Terry N. (1969) "A Comparative Study of Community Structures and Leadership." A paper presented at the annual meeting of the American Political Science Association (September).

_____ (1972) "Community Social Indicators: From Analytical Models to Policy Applications." Working Paper W2-26. New Haven, Connecticut: Yale University, Center for the Study of the City and Its Problems.

Cohen, Jacob (1968) "Multiple Regression as a General Data-Analytic System." Psychological Bulletin, Vol. 70 (December),426-443.

Coleman, James S. (1972) "The Evaluation of Equality of Educational Opportunity." In Frederick Mosteller and Daniel P. Moynihan, eds. On Equality of Educational Opportunity. New York, New York: Random House, 146-167.

_____ (1975) "Problems of Conceptualization and Measurement in Studying Policy Impacts." In Kenneth M. Dolbeare, ed. Public Policy Evaluation, Vol. 3, Sage Yearbooks in Politics and Public Policy. Beverly Hills, California: Sage Publications, Inc., 19-40.

_____ (1976) "Regression Analysis for the Comparison of School and Home Effects." Social Science Research, Vol. 5 (March), 1-20.

_____, Ernest Q. Campbell, Carol J. Hobson, James McPartland, Alexander M. Mood, Frederic D. Weinfeld, and Robert L. York (1966) Equality of Educational Opportunity. Washington, D.C.: U.S. Government Printing Office.

Colm, Gerhard, et al. (1935) "Public Expenditures and Economic Structure in the United States." Social Research, Vol. 3 (March), 75-85.

Committee for Economic Development (1966) Modernizing Local Government. New York, New York: Committee for Economic Development.

_____ (1972) Reducing Crime and Assuring Justice. New York, New York: Committee for Economic Development.

Connolly, Terence and Stuart J. Deutsch (1978) "Performance Measurement: Approaches to the Development." ISYE Report J-78-28. Atlanta, Georgia: Georgia Institute of Technology.

Cook, Thomas J. and Frank P. Scioli, Jr. (1972) "A Research Strategy for Analyzing the Impacts of Public Policy." Administrative Science Quarterly, Vol. 17 (September), 328-339.

County and Municipal Government Study Commission (1976) Aspects of Law Enforcement in New Jersey. Trenton, New Jersey: County and Municipal Government Study Commission, State of New Jersey.

Cox, Kevin R. (1973) Conflict, Power and Politics in the City: A Geographic View. New York, New York: McGraw-Hill Book Company.

Dajani, J. S. (1973) "Cost Studies of Urban Public Services." Land Economics, Vol. 49, No. 4 (November), 479-483.

Darlington, Richard B. (1968) "Multiple Regression in Psychological Research and Practice." Psychological Bulletin, Vol. 69 (March), 161-182.

Davis, Edward M. and Lyle Knowles (1975) "An Evaluation of the Kansas City Preventive Patrol Experiment." The Police Chief, Vol. 42 (June), 22; 24-27.

Dawson, Richard E. and James A. Robinson (1963) "Interparty Competition, Economic Variables and Welfare Policies in the American States." Journal of Politics, Vol. 25 (May), 265-289.

Deacon, Robert T. (1977) "A Review of the Literature on the Demand for Public Services." A paper presented at the National Conference on Nonmetropolitan Community Services Research, Ohio State University, January 11-13, 1977 and reprinted in the U.S. Senate Committee on Agriculture, Nutrition, and Forestry, 95th Congress.

Dean, Deby (1979) "Citizen Ratings of the Police: The Difference Contact Makes." Law and Policy Quarterly (Forthcoming).

Downs, Anthony (1957) An Economic Theory of Democracy. New York, New York: Harper & Row Publishers, Inc.

_____ (1967) Inside Bureaucracy. Boston, Massachusetts: Little, Brown, and Company.

Draper, N. R. and H. Smith (1966) Applied Regression Analysis. New York, New York: John Wiley & Sons.

Duncan, Otis Dudley (1970) "Partials, Partitions, and Paths." In E. F. Borgatta and G. W. Bohrnstedt, eds. Sociological Methodology 1970. San Francisco, California: Jossey-Bass, 38-47.

_____ (1975) Introduction to Structural Equation Models. New York, New York: Academic Press.

Dye, Thomas R. (1966) Politics, Economics, and the Public. Chicago, Illinois: Rand McNally & Co.

Easton, David (1965) A Framework for Political Analysis. Englewood Cliffs, New Jersey: Prentice-Hall.

Ennis, Philip H. (1967) Criminal Victimization in the United States: A Report of a National Survey. Field Surveys II. Washington, D.C.: U.S. Government Printing Office.

Etzioni, Amitai (1964) Modern Organizations. Englewood Cliffs, New Jersey: Prentice-Hall.

Fabricant, Solomon (1952) The Trend of Government Activity in the United States Since 1900. New York, New York: National Bureau of Economic Research.

Farrar, Donald E. and Robert R. Glauber (1967) "Multicollinearity in Regression Analysis: The Problem Revisited." The Review of Economics and Statistics, Vol. 49 (February), 92-107.

Farrell, M. J. (1957) "The Measurement of Productive Efficiency." Journal of the Royal Statistical Society, Series A, 120, Part 3, 253-281.

Fisher, Glenn W. (1961) "Determinants of State and Local Government Expenditures: A Preliminary Analysis." National Tax Journal, Vol. 14 (December), 349-355.

_____ (1964) "Interstate Variation in State and Local Government Expenditures." National Tax Journal, Vol. 17 (March), 55-74.

Fogelson, Robert M. (1977) Big-City Police. Cambridge, Massachusetts: Harvard University Press.

Frenkel, Max (1977) "Optimizing What? Some Considerations on Federalism, Comparative Research, and Optimal Size of Federal Units." A paper presented at the annual meeting of the American Political Science Association, Washington, D.C., September 1-4.

Frey, Bruno S. and Werner W. Pommerehne (1978) "Toward a More Theoretical Foundation for Empirical Policy Analysis." Comparative Political Studies, Vol. 11 (October), 341-356.

Fried, Robert (1974) "Politics, Economics, and Federalism: Aspects of Urban Government in Austria, Germany, and Switzerland." In Terry N. Clark, ed. Comparative Community Politics. New York, New York: John Wiley & Sons.

Froomkin, Joseph T., Dean T. Jamison, and Roy Radner, eds (1976) Education as an Industry. Cambridge, Massachusetts: Ballinger Publising Company.

Fry, Brian R. and Richard R. Winters (1970) "The Politics of Redistribution." American Political Science Review, Vol. 64 (June), 508-522.

Fuchs, Victor R. (1968) The Service Economy. New York, New York: National Bureau of Economic Research.

Furstenburg, Frank F., Jr. and Charles F. Wellford (1973) "Calling the Police: The Evaluation of Police Service." Law and Society Review, Vol. 7 (Spring), 393-406.

Gardiner, John A. (1968) "Police Enforcement of Traffic Laws: A Comparative Analysis." In James Q. Wilson, ed. City Politics and Public Policy. New York, New York: John Wiley and Sons.

Garn, H. A., M. J. Flax, M. Springer, and J. B. Taylor (1976) "Models for Indicator Development: A Framework for Policy Analysis." Urban Institute Paper 1206-17. Washington, D.C.: The Urban Institute.

Garofalo, James (1977) Public Opinion About Crime: The Attitudes of Victims and Nonvictims in Selected Cities. Washington, D.C.: U.S. Government Printing Office.

Gates, Daryl F. and Lyle Knowles (1970) "An Evaluation of the RAND Corporation's Analysis of the Criminal Investigation Process." The Police Chief, Vol. 43 (July), 19-24; 74-75; 77-78.

Gay, William G., H. Talmage Day, and Jane P. Woodward (1977) Neighborhood Team Policing. Washington, D.C.: U.S. Government Printing Office.

Godwin, R. Kenneth and W. Bruce Shepard (1976) "Political Processes and Public Expenditures: A Re-examination Based on Theories of Representative Government." American Political Science Review, Vol. 70 (December), 1,127-1,135.

Goldstein, Herman (1977) Policing a Free Society. Cambridge, Massachusetts: Ballinger Publishing Co.

Goldstein, Joseph (1960) "Police Discretion Not To Invoke the Criminal Process: Low-Visibility Decisions in the Administration of Justice." Yale Law Journal, Vol. 69 (March), 543-594.

Greenwood, Michael J. and Walter J. Wadycki (1973) "Crime Rates and Public Expenditures for Police Protection: Their Interaction." Review of Social Economy, Vol. 31 (October), 138-151.

Greenwood, Peter and Joan Petersilia (1975) The Criminal Investigation Process. Volume I: Summary and Policy Implications, RAND R-1776-DOJ. Santa Monica, California: The RAND Corporation.

Gregg, Phillip M. (1974) "Units and Levels of Analysis: A Problem of Policy Analysis in Federal Systems." Publius, Vol. 4 (Fall), 59-86.

Grodzins, Morton (1966) "The Many American Governments and Outdoor Recreation." In Robert T. Golembiewski, Frank Gibson, and Geoffrey Y. Cornog, eds. Public Administration. Chicago, Illinois: Rand McNally & Co., 210-225.

Hansen, Susan B. (1975) "Participation, Political Structure, and Concurrence." American Political Science Review, Vol. 69 (December), 1,181-1,199.

Hanushek, Eric A. and John E. Jackson (1977) Statistical Methods for Social Scientists. New York, New York: Academic Press.

_____ and John F. Kain (1972) "On the Value of Equality of Educational Opportunity as a Guide to Public Policy." In Frederick Mosteller and Daniel P. Moynihan, eds. On Equality of Educational Opportunity. New York, New York: Random House, 116-145.

Hawley, Amos (1951) "Metropolitan Population and Municipal Government Expenditures in Central Cities." Journal of Social Issues, Vol. 7 (Winter/Spring), 101-106.

Hayek, F. A. (1945) "The Use of Knowledge in Society." American Economic Review, Vol. 35 (September), 519-530.

Head, J. G. (1962) "Public Goods and Public Policy." Public Finance, Vol. 17, No. 3, 197-219.

Henig, Jeff (1977) "Copping a Cop: Neighborhood Organizations and Police Patrol Allocation." Prepared for Delivery at the annual meeting of the Association of Voluntary Action Scholars, San Diego, California, October 13-15, 1977.

Hibbs, Douglas (1973) Mass Political Violence. New York, New York: John Wiley and Sons.

Hirsch, Werner Z. (1968) "The Supply of Urban Public Services." In Harvey S. Perloff and Lowden Wingo, Jr., eds. Issues in Urban Economics. Baltimore, Maryland: Johns Hopkins Press, 477-525.

Hirschman, Albert O. (1970) Exit, Voice, and Loyalty. Cambridge, Massachusetts: Harvard University Press.

Hochstim, Joseph R. (1967) "A Critical Comparison of Three Strategies of Collecting Data from Households." Journal of the American Statistical Association, Vol. 62 (September), 976-989.

Hofferbert, Richard I. (1966) "The Relation Between Public Policy and Some Structural and Economic Variables in the American States." American Political Science Review, Vol. 60 (March), 73-82.

_____ (1972) "State and Community Policy Studies: A Review of Comparative Input-Output Analyses." In J. A. Robinson, ed. Political Science Annual, Vol. 3. Indianapolis, Indiana: Bobbs-Merrill.

Hoffman, Richard B. (1971) "Performance Measurements in Crime Control." Journal of Research in Crime and Delinquency, Vol. 8 (July), 161-174.

Hoinville, S. (1971) "Evaluating Community Preferences." Environment and Planning, Vol. 3 (Spring), 33-50.

Hotelling, H. (1933) "Analysis of a Complex of Statistical Variables into Principal Components." Journal of Educational Psychology, Vol. 24 (September), 417-441; 498-520.

International City Management Association (1969) Municipal Police Administration. Washington, D.C.: International City Management Association.

Jacob, Herbert (1971) "Black and White Perceptions of Justice in the City." Law and Society Review, Vol. 6 (August), 69-89.

____________ and Michael Lipsky (1968) "Outputs, Structure, and Power: An Assessment of Changes in the Study of State and Local Politics." Journal of Politics, Vol. 30 (May), 510-538.

Jacobs, Jane (1961) The Death and Life of Great American Cities. New York, New York: Vintage Books.

Johnston, J. (1972) Econometric Methods. Second Edition. New York, New York: McGraw-Hill Book Company.

Jones, Bryan D. (1977) "Distributional Considerations in Models of Government Service Provision." Urban Affairs Quarterly, Vol. 12 (March), 291-312.

Jones, E. Terrence (1973) "Evaluating Everyday Policies: Police Activity and Crime Incidence." Urban Affairs Quarterly, Vol. 8 (March), 267-279.

Kansas City Police Department (1977) Response Time Analysis: Executive Summary. Washington, D.C.: U.S. Government Printing Office.

Katz, Michael (1974) "Violence and Cruelty in a Suburban Milieu." In Donal E. J. MacNamara and Marc Riedel, eds. Police: Perspectives, Problems, Prospects. New York, New York: Praeger Publishers, 75-88.

Katzman, Martin T. (1971) The Political Economy of Urban Schools. Cambridge, Massachusetts: Harvard University Press.

Kelley, Clarence M. (1974) Uniform Crime Reports for the United States, 1973. Washington, D.C.: U.S. Government Printing Office.

Kelling, George, Pate, T., Kieckman, D. and C. E. Brown (1974) The Kansas City Preventive Patrol Experiment -- A Summary Report. Washington, D.C.: The Police Foundation.

Kendall, M. G. (1957) A Course in Multivariate Analysis. New York, New York: Hafner Publishing Company.

Kerlinger, Fred N. and Elazar J. Pedhazur (1973) Multiple Regression in Behavioral Research. New York, New York: Rinehart and Winston, Inc.

Kim, Jae-On (1975) "Factor Analysis." In Norman H. Nie, C. Hadlai Hull, Jean G. Jenkins, Karin Steinbrenner, and Dale H. Bent, eds. SPSS Statistical Package for the Social Sciences. New York, New York: McGraw-Hill Book Company, 468-514.

Kimberly, John R. (1976) "Organizational Size and the Structuralist Perspective: A Review, Critique, and Proposal." Administrative Science Quarterly, Vol. 21 (December), 571-597.

Kish, Leslie (1959) "Some Statistical Problems in Research Design." American Sociological Review, Vol. 24 (June), 328-338.

Kleinman, David Marc (1979) "Zinging it to the Chief." Police, Vol. 12 (May), 39-44.

Kobrin, Solomon, Steven G. Lubeck, E. W. Hansen, and R. K. Yeaman (1972) The Deterrent Effectiveness of Criminal Justice Sanction Strategies. Los Angeles, California: University of Southern California, Social Science Research Institute.

Kramer, Thomas (1977) "A Review of State Laws Relating to Interagency Cooperation." Police Services Study Technical Report T-21. Bloomington, Indiana: Indiana University, Workshop in Political Theory and Policy Analysis.

_____, Frank Anechiarico, and Larry Wagner (1977) "State Statutory Authorization of the Law Enforcement Functions of State, County, and Municipal Agencies." Police Services Study Technical Report T-6. Bloomington, Indiana: Indiana University, Workshop in Political Theory and Policy Analysis.

Labovitz, Sanford (1967) "Some Observations on Measurement and Statistics." Social Forces, Vol. 46 (December), 151-160.

_____ (1970) "The Assignment of Numbers to Rank Order Categories." American Sociological Review, Vol. 35 (June), 515-524.

Larson, Richard C. (1972) Urban Police Patrol Analysis. Cambridge, Massachusetts: MIT Press.

_____ (1975) "What Happened to Patrol Operations in Kansas City? A Review of the Kansas City Preventive Patrol Experiment." Journal of Criminal Justice, Vol. 3 (Winter), 267-297.

Lasswell, Harold (1958) Politics: Who Gets What, When, How. New York, New York: Meridian Press.

Leibenstein, Harvey (1966) "Allocative Efficiency vs. 'X-Efficiency'." American Economic Review, Vol. 56 (June), 392-415.

Levy, Frank, Arnold J. Meltsner, and Aaron Wildavsky (1974) Urban Outcomes: Schools, Streets, and Libraries. Berkeley, California: University of California Press.

Lieberson, Stanley (1969) "Measuring Population Diversity." American Sociological Review, Vol. 34 (August), 850-862.

Likert, Rensis (1960) "The Dual Function of Statistics." Journal of the American Statistical Association, Vol. 55 (March), 1-7.

Lind, Robert C. and John P. Lipsky (1971) "The Measurement of Police Output: Conceptual Issues and Alternative Approaches." Law and Contemporary Problems, Vol. 36 (Autumn), 249-281.

Lineberry, Robert L. (1977) Equality and Urban Policy, SAGE Library of Social Research, Vol. 39. Beverly Hills, California: Sage Publications, Inc.

_____, and Edmund P. Fowler (1967) "Reformism and Public Policies in American Cities." American Political Science Review, Vol. 61 (September), 701-716.

_____ and Robert E. Welch, Jr. (1971) "Who Gets What: Measuring the Distribution of Urban Public Services." Social Science Quarterly, Vol. 54 (March), 700-712.

Lipsky, Michael (1976) "Toward a Theory of Street-Level Bureaucracy," In Willis D. Hawley, Michael Lipsky, and others, eds. Theoretical Perspectives on Urban Politics. Englewood Cliffs, New Jersey: Prentice-Hall, 196-213.

Lord, Frederic M. (1960) "Large-Sample Covariance Analysis When the Control Variable is Fallible." Journal of the American Statistical Association, Vol. 55 (June), 307-320.

McCausland, J. L. (1972) "Crime in the Suburbs." In C. H. Haar, ed. The End of Innocence: A Suburban Reader. Glenview, Illinois: Scott, Foresman, 61-64.

McDavid, James C. (1974) "Interjurisdictional Cooperation Among Police Departments in the St. Louis Metropolitan Area." Publius, Vol. 1 (Fall), 35-58.

McDonnell, John J. (1977) An Exemplary Project: Central Police Dispatch. Washington, D.C.: U.S. Government Printing Office.

MacGillivray, Lois, et al. (1977) Evaluating the Organization of Service Delivery: Fire -- Technical Report of Phases I and IIa. Durham, North Carolina: Research Triangle Institute, Center for Population and Urban-Rural Studies.

McGinnis, Robert (1958) "Randomization and Inference in Sociological Research." American Sociological Review, Vol. 23 (August), 408-414.

McIver, John P. and Elinor Ostrom (1976) "Using Budget Pies to Reveal Preferences: Validation of a Survey Instrument." Policy and Politics, Vol. 4 (June), 87-110.

McKean, Roland (1958) Efficiency in Government Through Systems Analysis. New York, New York: John Wiley & Sons, Inc.

_____ (1965) "The Unseen Hand in Government." American Economic Review, Vol. 55 (June), 496-506.

McPheters, Lee R. and William B. Stronge (1974) "Law Enforcement Expenditures and Urban Crime." National Tax Journal, Vol. 27 (December), 633-644.

MacNamara, Donal E. J. (1950) "American Police Administration at Mid-Century." Public Administration Review, Vol. 10 (Summer), 181-190.

Maltz, Michael D. (1972) Evaluation of Crime Control Programs. Washington, D.C.: U.S. Government Printing Office.

Margolis, Julius (1968) "The Demand for Urban Public Services." In Harvey S. Perloff and Lowden Wingo, Jr., eds. Issues in Urban Economics. Baltimore, Maryland: Johns Hopkins Press, 527-565.

Maris, Robin (1964) The Economic Theory of Managerial Capitalism. New York, New York: The Free Press.

Martin, Dolores T. and Richard E. Wagner (1975) "The Institutional Framework for Municipal Incorporation: An Economics Analysis of Local Agency Formation Commissions in California." A paper presented at the annual meeting of the Public Choice Society, Roanoke, Virginia.

Mayo, Henry B. (1976) Report of the Ottawa-Carleton Review Commission. Toronto, Ontario: Ontario Government Bookstore.

Melichar, Emanuel (1965) "Least-Squares Analysis of Economic Survey Data." In Proceedings of the Business and Economics Section, American Statistical Association, 373-385.

Meltsner, Arnold J. and Aaron Wildavsky (1970) "Leave City Budgeting Alone: A Survey, Case Study, and Recommendations for Reform." In John P. Crecine, ed. Financing the Metropolis: Public Policy in Urban Economics, Vol. 4, Urban Affairs Annual Reviews. Beverly Hills, California: Sage Publications, 311-358.

Migue, J. L. and G. Belanger (1974) "Toward a General Theory of Managerial Discretion." Public Choice, Vol. 17 (Spring), 27-43.

Mihanovich, Clement S. (1967) "Management Measurements of Public Attitude Toward the Police." The Police Chief, Vol. 34 (May), 28-30.

Miller, Trudi C. (1977) "Conceptualizing Inequality." In Marcia Guttentag with Shalom Saar, eds. Evaluation Studies Review Annual, Vol. 2. Beverly Hills, California: Sage Publications, 334-350.

Miner, Jerry (1963) Social and Economic Factors in Spending for Public Education. Syracuse, New York: Syracuse University Press.

Mishan, E. J. (1973) Economics for Social Decisions. Elements of Cost-Benefit Analysis. New York, New York: Praeger Publishers.

Misner, Gordon E. (1960) "Recent Developments in Metropolitan Law Enforcement." Journal of Criminal Law, Criminology, and Police Science, 50-51;(January-February), 497-505 and (July-August), 265-272.

Missouri Law Enforcement Assistance Council, Region 5 (1973) Criminal Justice System Description 1973. St. Louis, Missouri: Missouri Law Enforcement Assistance Council.

Mladenka, K. and K. Q. Hill (1978) "The Distribution of Urban Police Services." A paper presented at the annual meeting of the Midwest Political Science Association, Chicago, Illinois, May 1-3.

Monroe County (NY) Legislature (1978) Alternative Plans for Improving Police Services in Monroe County, New York. Rochester, New York: Monroe County Legislature, Public Safety Committee.

Moran, R. Allen (1977) "The Importance of Economic Criteria to Agency Administrators." Evaluation Quarterly, Vol. 1 (February), 173-182.

Musgrave, Richard A. (1959) The Theory of Public Finance. New York, New York: McGraw-Hill Book Company.

Musheno, M., D. Palumbo, and J. Levine (1976) "Evaluating Alternatives in Criminal Justice. A Policy Impact Model." Crime and Delinquency, Vol. 22 (July), 265-283.

National Advisory Commission on Criminal Justice Standards and Goals (1973) Community Crime Prevention. Washington, D.C.: U.S. Government Printing Office.

(1973) Report on Police. Washington, D.C.: U.S. Government Printing Office.

National Commission on Law Observance and Enforcement (1931) Report on Police. Washington, D.C.: U.S. Government Printing Office.

National Institute of Law Enforcement and Criminal Justice (1977) "Community Crime Prevention." Research Brief (Fall).

Nehnevajsa, Jiri (1977) Crime in the Neighborhood. Pittsburgh, Pennsylvania: University of Pittsburgh, University Center for Urban Research.

Neubert, Nancy M. (1975) "A Comparison of Major Case Squads in Four Metropolitan Areas." Police Services Study Fact Sheet F-4. Bloomington, Indiana: Indiana University, Workshop in Political Theory and Policy Analysis.

New England Bureau for Criminal Justice Services (1974) A Study of Police Services in the State of Maine: Executive Summary. Dedham, Massachusetts: The New England Bureau for Criminal Justice Services.

Newman, Oscar (1973) Defensible Space. New York, New York: The Macmillan Company.

Niederhoffer, Arthur (1967) Behind the Shield: The Police in Urban Society. Garden City, New York: Anchor Books.

Niskanen, William A. (1971) Bureaucracy and Representative Government. Chicago, Illinois: Aldine-Atherton.

Norrgard, D. L. (1969) Regional Law Enforcement - A Study of Intergovernmental Cooperation and Coordination. Chicago, Illinois: Public Administration Service.

Oakerson, Ronald J. (1978) The Erosion of Public Highways: A Policy Analysis of the Eastern Kentucky Coal-Haul Road Problem. Ph.D. Dissertation. Bloomington, Indiana: Indiana University, Department of Political Science.

Olson, Mancur, Jr. (1965) The Logic of Collective Action. New York, New York: Harvard University Press.

_____ (1969) "The Principle of 'Fiscal Equivalence': The Division of Responsibilities Among Different Levels of Government." American Economic Review, Vol. 59 (May), 479-487.

Orzechowski, William (1977) "Economic Models of Bureaucracy: Survey, Extensions, and Evidence." In Thomas E. Borcherding, ed. Budgets and Bureaucrats: The Sources of Government Growth. Durham, North Carolina: Duke University Press, 229-259.

Ostrom, Elinor (1971) "Institutional Arrangements and the Measurement of Policy Consequences." Urban Affairs Quarterly, Vol. 6 (June), 447-475.

_____ (1973) "On the Meaning and Measurement of Output and Efficiency in the Provision of Urban Police Services." Journal of Criminal Justice, Vol. 1 (June), 93-112.

_____ (1975) "The Design of Institutional Arrangements and the Responsiveness of the Police." In Leroy N. Rieselbach, ed. People vs Government: The Responsiveness of American Institutions. Bloomington, Indiana: Indiana University Press, 274-299.

_____ (1976) "Size and Performance in a Federal System." Publius, Vol. 6 (Spring), 33-73.

_____ (1979) "Purposes, Performance Measurement, and Policing." A paper presented at the TIMS/ORSA Meetings in New Orleans, Louisiana, on May 1, 1979 (Session TPB20).

_____, William H. Baugh, Richard Guarasci, Roger B. Parks, and Gordon P. Whitaker (1973) Community Organization and the Provision of Police Services. Sage Professional Papers in Administrative and Policy Studies 03-001. Beverly Hills, California: Sage Publications.

Ostrom, Elinor and Roger B. Parks (1973) "Suburban Police Departments: Too Many and Too Small?" In Louis H. Masotti and Jeffrey K. Hadden, eds. The Urbanization of the Suburbs, Vol. 7, Urban Affairs Annual Reviews. Beverly Hills, California: Sage Publications, 367-402.

_____ (1975) Measuring Urban Services: A Multi-Mode Approach. Bloomington, Indiana: Indiana University. Workshop in Political Theory and Policy Analysis.

_____, and Dennis C. Smith (1973) "A Multi-Strata, Similar Systems Design for Measuring Police Performance." Paper presented at 21st annual meeting of the Midwest Political Science Association.

_____, and Gordon P. Whitaker (1973) "Do We Really Want to Consolidate Urban Police Forces?" Public Administration Review, Vol. 33 (September/October), 423-432.

_____ (1974) "Defining and Measuring Structural Variations in Interorganizational Arrangements." Publius, Vol. 4 (Fall), 87-108.

_____ (1977) Policing Metropolitan America. Washington, D.C.: U.S. Government Printing Office.

_____ (1978) Patterns of Metropolitan Policing. Cambridge, Massachusetts: Ballinger Publishing Co.

_____, and Stephen L. Percy (1978) "The Public Services Production Process: A Framework for Analysis of Police Services." Policy Studies Journal, Vol. 7 (Special Issue), 381-389.

_____ (1979) "Evaluating Police Organization." Public Productivity Review, Vol. 3 (Winter), 3-27.

Ostrom, Vincent (1973) The Intellectual Crisis in American Public Administration. University, Alabama: The University of Alabama Press.

_____ (1976) "John R. Commons's Foundations for Policy Analysis." Journal of Economic Issues, Vol. 10 (December), 839-857.

_____ and Elinor Ostrom (1965) "A Behavioral Approach to the Study of Intergovernmental Relations." The Annals, Vol. 359 (May), 137-146.

Ostrom, Vincent and Elinor Ostrom (1978) "Public Goods and Public Choices." In E. S. Savas, ed. Alternatives for Delivering Public Services. Toward Improved Performance. Boulder, Colorado: Westview Press, 7-49.

_____, Charles M. Tiebout, and Robert Warren (1961) "The Organization of Governments in Metropolitan Areas." American Political Science Review, Vol. 55 (December), 831-842.

Parks, Roger B. (1971) Measurement of Performance in the Public Sector: A Case Study of the Indianapolis Police Department. Bloomington, Indiana: Workshop in Political Theory and Policy Analysis.

_____ (1975) "Complementary Measures of Police Performance." In Kenneth M. Dolbeare, ed. Public Policy Evaluation, Vol. 2, Sage Yearbooks in Politics and Public Policy. Beverly Hills, California: Sage Publications, 185-218.

_____ (1976) "Police Patrol in Metropolitan Areas-Implications for Restructuring the Police." In Elinor Ostrom, ed. The Delivery of Urban Services: Outcomes of Change, Vol. 10, Urban Affairs Annual Reviews. Beverly Hills, California: Sage Publications, Inc.

_____ (1976) "Police Response to Victimization: Effects on Citizen Attitudes and Perceptions." In Wesley G. Skogan, ed. Sample Surveys of the Victims of Crime. Cambridge, Massachusetts: Ballinger Publishing Company, 89-104.

_____ (1979) "A Review of Evaluation Research with Respect to Organizational and Interorganizational Arrangements." In Review of Criminal Justice Evaluation Results, 1978. Washington, D.C.: National Criminal Justice Reference Service (forthcoming).

_____ (1979) Service Conditions in the St. Louis Study Neighborhoods - 1972. Police Services Study Technical Report. Bloomington, Indiana: Indiana University, Workshop in Political Theory and Policy Analysis.

Pate, Tony, Amy Ferrara, Robert A. Bowers, and Jon Lorence (1976) Police Response Time: Its Determinants and Effects. Washington, D.C.: The Police Foundation.

Pearson, Karl (1901) "On Lines and Planes of Closest Fit to Systems of Points in Space." Philosophical Magazine, Series 6, Vol. 2 (November), 559-572.

Pennell, Frances E. (1978) "Collective vs. Private Strategies for Coping With Crime." Journal of Voluntary Action Research, Vol. 7 (January-June), 59-74.

Percy, Stephen L. (1978) "Conceptualizing and Measuring Citizen Coproduction of Safety and Security." Policy Studies Journal, Vol. 7 (Special Issue), 486-492.

Percy, Stephen L. (1979) "Response Time and Citizen Evaluations of Police." Journal of Police Science and Administration. (forthcoming).

Peter, Laurence J. and Raymond Hull (1969) The Peter Principle. New York, New York: William Morrow and Company, Inc.

Peterson, Virgil W. (1957) "Issues and Problems in Metropolitan Area Police Services." Journal of Criminal Law, Criminology, and Police Science, Vol. 48 (July-August), 127-138.

Phillips, Llad and Harold L. Votey, Jr. (1972) "An Economic Analysis of the Deterrent Effect of Law Enforcement on Criminal Activity." Journal of Criminal Law, Criminology, and Police Science, Vol. 63 (September), 330-342.

Pitkin, Hanna Fenichel (1972) The Concept of Representation. Berkeley, California. University of California Press.

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

(1967) Task Force Report: The Police. Washington, D.C.: U.S. Government Printing Office.

Prottas, Jeffrey Mandich (1979) People-Processing. Lexington, Massachusetts: Lexington Books.

Przeworski, Adam and Henry Teune (1970) The Logic of Comparative Social Inquiry. New York, New York: John Wiley & Sons.

Reich, Robert B. (1977) "Can Justice Be Optimized?" In Stuart S. Nagel, ed. Modeling the Criminal Justice System, Vol. 7, Sage Criminal Justice System Annuals. Beverly Hills, California: Sage Publications, 57-70.

Reiss, Albert J., Jr. (1971) The Police and the Public. New Haven, Connecticut: Yale University Press.

Reppetto, Thomas A. (1975) "The Influence of Police Organizational Style on Crime Control Effectiveness." Journal of Police Science and Administration, Vol. 3 (September), 274-279.

Rich, Richard C. (1977) "Equity and Institutional Design in Urban Service Delivery." Urban Affairs Quarterly, Vol. 12 (March), 383-410.

Richardson, James F. (1974) Urban Police in the United States. Port Washington, New York: Kennikat Press.

Robinson, E. A. G. (1958) The Structure of Competitive Industry. Chicago, Illinois: The University of Chicago Press.

Rubinstein, Jonathan (1973) City Police. New York, New York: Ballantine Books.

Rutman, Leonard, ed (1977) Evaluation Research Methods. Beverly, Hills, California: Sage Publications.

Sacks, Seymour and Robert Harris (1964) "The Determinants of State and Local Government Expenditures and Intergovernmental Flows of Funds." National Tax Journal, Vol. 17 (March), 75-85.

Salmon, Wesley C. (1963) Logic. Englewood Cliffs, New Jersey: Prentice-Hall.

Samuelson, Paul (1954) "The Pure Theory of Public Expenditures." Review of Economics and Statistics, Vol. 36 (November), 387-389.

_____ (1955) "Diagrammatic Exposition of a Theory of Public Expenditures." Review of Economics and Statistics, Vol. 37 (November), 350-356.

Sasieni, Maurice, Arthur Yaspan, and Lawrence Friedman (1959) Operations Research. New York, New York: John Wiley and Sons, Inc.

Savas, E. S. (1976) "Solid Waste Collection in Metropolitan Areas." In Elinor Ostrom, ed. The Delivery of Urban Services: Outcomes of Change, Vol. 10, Urban Affairs Annual Reviews. Beverly Hills, California: Sage Publications, 201-229.

_____ and Barbara J. Stevens (1976) Evaluating the Organization of Service Delivery: Solid Waste Collection and Disposal. New York, New York: Columbia University, Center for Governmental Studies.

Schlesinger, James R. (1966) "Organizational Structures and Planning." RAND P-3316. Santa Monica, California: The RAND Corporation.

Schwartz, Alfred I. and Sumner N. Clarren (1977) The Cincinnati Team Policing Experiment. A Summary Report. Washington, D.C.: The Urban Institute and The Police Foundation.

Scott, Eric J. (1976) "Determinants of Municipal Police Expenditures: A Review Essay." Police Services Study Technical Report T-14. Bloomington, Indiana: Indiana University, Workshop in Political Theory and Policy Analysis.

Seidman, David and Michael Couzens (1974) "Getting the Crime Rate Down: Political Pressure and Crime Reporting." Law and Society Review, Vol. 8 (Spring), 457-493.

Selznick, Philip (1943) "An Approach to a Theory of Bureaucracy." American Sociological Review, Vol. 8 (December), 785-791.

Shoup, Carl S. (1964) "Standards for Distributing a Free Governmental Service: Crime Prevention." Public Finance, Vol. 19 (Winter), 383-392.

Siegel, Barry N. (1966) "On the Positive Theory of State and Local Expenditures." In Paul Kleinsorge, ed. Public Finance and Welfare. Eugene, Oregon: University of Oregon Books.

Silberman, Charles E. (1978) Criminal Violence, Criminal Justice. New York, New York: Random House.

Simon, Herbert A. (1951) "A Formal Theory of the Employment Relationship." Econometrica, Vol. 19 (July), 293-305.

_____ (1961) Administrative Behavior. Second Edition. New York, New York: The Macmillan Co.

Skolnick, Jerome H. (1966) Justice Without Trial. New York, New York: John Wiley & Sons, Inc.

Smith, Dennis C. and Elinor Ostrom (1974) "The Effects of Training and Education on Police Attitudes and Performance: A Preliminary Analysis." In Herbert Jacob, ed. The Potential for Reform of Criminal Justice, Vol. 3, Sage Criminal Justice System Annuals. Beverly Hills, California: Sage Publications, Inc., 45-81.

St. Louis Planning Commission (1971) Description of Program Areas. St. Louis, Missouri: St. Louis Planning Commission.

Steiner, Peter O. (1969) "The Public Sector and the Public Interest." In The Analysis and Evaluation of Public Expenditures: The PPB System. A Compendium of papers submitted to the Subcommittee on Economy in Government of the Joint Economic Committee, Congress of the United States, 13-45.

Stockfish, J. A. (1976) Analysis of Bureaucratic Behavior: The Ill-Defined Production Process. RAND P-5591. Santa Monica, California: The RAND Corporation.

Stone, Donald C. (1930) "Can Police Effectiveness Be Measured?" Public Management, Vol. 12 (September), 465-471.

Stonecash, Jeff (1978) "Local Policy Analysis and Autonomy: On Intergovernmental Relations and Theory Specification." Comparative Urban Research, Vol. 5, No. 2-3, 5-23.

Suits, Daniel B. (1957) "Use of Dummy Variables in Regression Equations." Journal of the American Statistical Association, Vol. 52 (December), 548-551.

Sullivan, John L. (1972) "A Note on Redistributive Politics." American Political Science Review, Vol. 66 (December), 1,301-1,305.

Summers, Anita A. and Barbara L. Wolfe (1977) "Do Schools Make a Difference?" American Economic Review, Vol. 67 (September), 639-652.

Swant, Frank (1977) "Linking Theory and Method In Urban Policy Analysis: Problems of Test Interpretation." Political Methodology, Vol. 4 (Summer), 333-346.

Swimmer, Gene (1974) "The Relationship of Police and Crime." Criminology, Vol. 12 (November), 293-314.

Tantner, Raymond (1966) "Dimensions of Conflict Behavior Within and Between Nations, 1958-60." Journal of Conflict Resolution, Vol. 10 (March), 41-64.

Task Force on Policing in Ontario (1974) The Police are the Public and the Public are the Police. Toronto, Ontario: The Task Force on Policing in Ontario.

Terris, Bruce J. (1967) "The Role of the Police." The Annals, Vol. 374 (November), 58-69.

Thurow, Lester C. (1970) "Equity Versus Efficiency in Law Enforcement." Public Policy, Vol. 18 (Summer), 451-462.

Tiebout, Charles M. (1956) "A Pure Theory of Local Expenditures." Journal of Political Economy, Vol. 64 (October), 416-424.

Tullock, Gordon (1965) The Politics of Bureaucracy. Washington, D.C.: Public Affairs Press.

U.S. Bureau of the Census (1978) Public Employment in 1977, Series GE77-No. 1. Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Justice (1978) Trends in Expenditure and Employment Data for the Criminal Justice System 1971-1976. SD-EE No. 12. Washington, D.C.: U.S. Government Printing Office.

The Urban Institute and International City Management Association (1974) Measuring the Effectiveness of Basic Municipal Services. Washington, D.C.: The Urban Institute.

Uslaner, Eric M. and Ronald E. Weber (1975) "The 'Politics' of Redistribution: Toward a Model of the Policy-Making Process in the American States." American Politics Quarterly, Vol. 3 (April), 130-170.

Van de Geer, John P. (1971) Introduction to Multivariate Analysis for the Social Sciences. San Francisco, California: W. H. Freeman and Co.

Van Maanen, John (1974) "Working the Street: A Developmental View of Police Behavior." In Herbert Jacob, ed. The Potential for Reform of Criminal Justice, Vol. 3, Sage Criminal Justice System Annuals. Beverly Hills, California: Sage Publications, 83-130.

Vernez, Georges (1976) "Delivery of Urban Public Services: Production, Cost and Demand Functions, and Determinants of Public Expenditures for Fire, Police, and Sanitation Services. [illegible] P-5660. Santa Monica, California: The RAND Corporation.

Wasson, David K. (1975) Community-Based Preventive Policing: A Review. Toronto, Canada: John D. Crawford & Co., Ltd.

Webb, Eugene J., Donald T. Campbell, Richard D. Schwartz, and Lee Sechrest (1966) Unobtrusive Measures. Chicago, Illinois: Rand McNally & Co.

Wellford, Charles (1974) "Crime, Society and the Police." In Donal E. J. MacNamara and Marc Riedel, eds. Police: Perspectives, Problems, Prospects. New York, New York: Praeger Publishers, 115-131.

Whitaker, Gordon P. (1974) "Who Puts the Value In Evaluation?" Social Science Quarterly, Vol. 54 (March), 738-761.

_____ (1978) "Coproduction: Citizen Participation in Service Delivery." A paper presented at the 1978 Conference on Participation and Politics, Tutzing Academy, Tutzing, Germany, June 5-9.

_____ and Stephen D. Mastrofski (1976) "Equity in the Delivery of Police Services." Police Services Study Technical Report T-29. Bloomington, Indiana: Indiana University, Workshop in Political Theory and Policy Analysis.

_____, Elinor Ostrom, and Roger B. Parks (1977) "Using Citizen Surveys to Evaluate the Organization of Policing." A paper presented at the National Conference on Criminal Justice Evaluation, Washington, D.C.

Williams, Oliver P., Harold Herman, Charles S. Liebman, and Thomas R. Dye (1965) Suburban Differences and Metropolitan Policies: A Philadelphia Story. Philadelphia, Pennsylvania: University of Pennsylvania Press.

Williamson, Oliver E. (1964) The Economics of Discretionary Behavior: Managerial Objectives in a Theory of the Firm. Englewood Cliffs, New Jersey: Prentice-Hall.

_____ (1974) "Markets and Hierarchies: Some Elementary Considerations." American Economic Review, Vol. 63 (May), 316-325.

Wilson, James Q. (1967) "Police Morale, Reform, and Citizen Respect: The Chicago Case." In David J. Bordua, ed. The Police: Six Sociological Essays. New York, New York: John Wiley & Sons, 137-162.

_____ (1968) Varieties of Police Behavior. Cambridge, Massachusetts: Harvard University Press.

Wilson, James Q. and Barbara Boland (1978) "The Effect of the Police on Crime." Law and Society Review, Vol. 12 (Spring), 367-390.

Wilson, Jerry V. (1978) The War on Crime in the District of Columbia 1955-1975. Washington, D.C.: U.S. Goverment Printing Office.

Wilson, O. W. and Roy Clinton McLaren (1972) Police Administration. Third Edition. New York, New York: McGraw-Hill Book Company.

Wilson, T. P. (1971) "Critique of Ordinal Variables." Social Forces, Vol. 49 (March), 432-444.

Wirt, John G. (1971) Optimization of Price and Quality in Service Systems. RAND P-4590. Santa Monica, California: Sage Publications, 51-71.

Wright, Gerald C., Jr. (1976) "Linear Models for Evaluating Conditional Relationships." American Journal of Political Science, Vol. 20 (May), 349-373.

Zeckhauser, Richard (1973) "Voting Systems, Honest Preferences, and Pareto Optimality." American Political Science Review, Vol. 67 (September), 934-946.