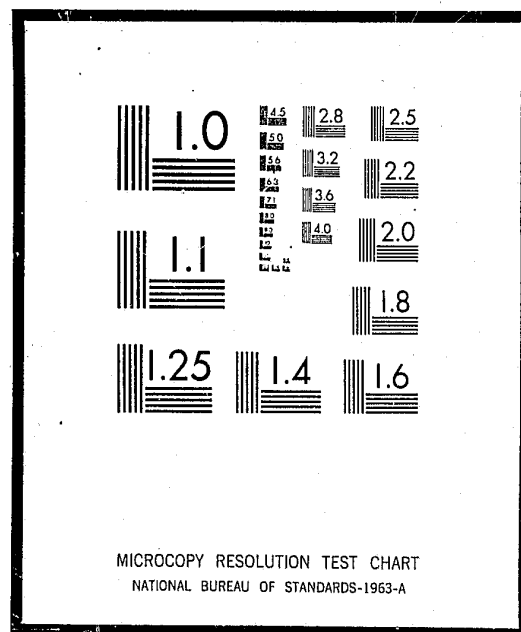


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COMPLEMENTARY MEASURES OF POLICE PERFORMANCE

by

Roger B. Parks

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COMPLEMENTARY MEASURES OF POLICE PERFORMANCE

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The provision of public goods and services is a multi-billion dollar industry in contemporary America. In fiscal 1971, local governments alone spent over \$100 billion in providing goods and services to their citizenry (Bureau of the Census, 1971: 21). The public nature of these goods and services poses very serious difficulties for the analyst who wishes to evaluate such industries or individual firms (local governments) within them.<sup>1</sup> Public goods and services are demanded and supplied in the context of a variety of institutional arrangements; arrangements which are designed to compensate for the weakness or failure of market decision-making arrangements when confronted with situations of joint supply and/or consumption (Bator, 1958; Buchanan, 1968; Ostrom, Tiebout and Warren, 1961). Problems are posed on the demand side, both to the provider and the analyst, by 1) possible distortions in the communication of demands to suppliers, 2) the necessity to aggregate disparate demands, and 3) potential incentives to falsify preferences for goods and services endemic to such arrangements (Bowen, 1943; Buchanan, 1968). On the supply side, to which this article is addressed, serious questions arise as to the identification of the product or products and the measurement of the quantity and quality of such products when identified (Hirsch, 1968; E. Ostrom, 1971; Ridley and Simon, 1938).

In the study of agencies providing a physical output (water supply for example) or performing an observable and quantifiable operation (refuse collection) one may apply many of the analytic tools of economics and management science directly to questions of how much output is produced, what quality of service is provided, and at what cost (Hirsch, 1968: 478-79; E. Ostrom, 1971; Blair and Schwartz, 1972). The *raison d'etre* of program budgeting systems has been to foster such application. (Joint Economic Committee, 1969). However, in dealing with more complex services such as police, one must obtain a series of indicators to identify the products and to deal with questions of the quantity, quality and cost of those products (Shoup and Mehay, 1971; Operations Research Task Force, 1972).

This article focuses upon multiple indicators of the quantity and quality of outputs of agencies providing neighborhood police services. "Policing" provides an excellent illustration of the problems of measurement in the public sector; it is a highly complex congeries of activities, with little agreement upon the identification of outputs, or upon measures of quantity and quality. The restriction to neighborhood police services--patrol, criminal investigation, response to service calls, and other activities of police in predominantly residential neighborhoods--provides a common perspective. This comparable unit of analysis enables one to analyze the activities of departments varying widely in scale of operation, degree of specialization, availability of resources, and other distinguishing characteristics. It is safe to say that most local police departments, regardless of other activities in which they engage, allocate a large portion of their efforts to providing police services to

residential neighborhoods.

In a recent study of police services provided to residential neighborhoods in the St. Louis, Missouri, metropolitan area (Ostrom, Parks and Smith, 1973), operational measures of police performance were obtained from a variety of sources, for a variety of indicators of police output.<sup>2</sup> Sources included central record-keeping systems, municipal police and budgetary files, published statistics, and interviews conducted with more than 700 police officers and almost 4,000 residents. Measures included 1) those directly related to crime (crime and clearance rates, rates of warrant issuance by prosecutors), 2) "style" measures with implied performance consequences (officers' training and education, specialization of department), 3) "input" measures often used as output proxies (full-time officers per 1,000 population, expenditures per capita), 4) direct measures of police activities (calls for service answered per 1,000 population, "density" of patrol provided, extent of follow-up to reported crimes), and 5) measures derived from citizen-consumer experiences with the police in their neighborhoods and their perceptions and evaluations of the services provided by those police.

These are not all indicators of a common product. If they were, they should be highly correlated and thus only one or two could be chosen for convenience. Rather they are indicators of different facets of policing, some closely related and others not so. This diversity of indicators can help to avoid the problem of goal distortion which arises from over-measurement of only a few aspects of organizational performance. As Etzioni (1964: 9-10) notes:

Curiously, the very effort--the desire to establish how we are doing and to find ways of improving if we are not doing as well as we ought to do--often has quite undesired effects from the point of view of organizational goals. Frequent measuring can distort the organizational efforts because, as a rule, some aspects of its outputs are more measureable than the others. Frequent measuring tends to encourage over-production of highly measureable items and the neglect of less measurable ones. . . . The distortion consequences of over-measuring are larger when it is impossible or impractical to quantify the more central, substantive output of an organization, and when at the same time some exterior aspects of the product, which are superficially related to its substance, are readily measurable.

Since the operational measures are gathered from a variety of independent sources, they can contribute to the avoidance of pathologies of goal displacement inherent in self-measurement (Likert, 1961; Etzioni, 1964; Skolnick, 1966; Hoffman, 1971; Ostrom, 1971). They can help to prevent an organization from turning inward upon activities of primarily internal relevance (Selznick, 1943). They will be somewhat less likely to encourage organization members to engage in activities which may improve their "score" on internal measures at some expense to organization output (Peter and Hull, 1969: 43-44; Hoffman, 1971: 11)

A final consideration supports the use of varied indicators, and principally of multiple measures within each type of indicator.

Public sector performance indicators are generally quite complex conceptually. Operational measures developed for such indicators will have various degrees and types of error, if not due to inherent biases, then to the vagaries of the measurement process itself. Faced with this, the analyst is forced to rely upon the simultaneous use of a series of such error-prone measures.

. . . the operational implication of the inevitable theoretical complexity of every measure . . . calls for multiple operationism, that is, for multiple measures which are hypothesized to share in the theoretically relevant components but have different patterns of irrelevant components. . . . If a proposition can survive the onslaught of a series of imperfect measures, with all their irrelevant error, confidence should be placed in it (Webb, et.al., 1966: 3).

In the pages to follow, a brief discussion of the research base for this analysis will be presented. This will be followed by a discussion of each of the types of indicators, the operational measures obtained for those indicators, and the relationships among those operational measures. This may contribute to an appreciation of the complexity of police output and will suggest where better operational measures are necessary (Clark, 1972).

#### RESEARCH BASE

In the Spring and Summer of 1972 a research group headed by Elinor Ostrom of Indiana University conducted an extensive study of police services provided to a number of neighborhoods in the

St. Louis Metropolitan Area.<sup>3</sup> That research and the underlying design has been described at length elsewhere (Ostrom, Parks and Smith, 1973). The discussion here is intended only to present the context in which the operational measures were obtained and to establish some boundaries for warrantable generalization of the findings.

Forty-five neighborhoods were included in the St. Louis study. These neighborhoods consisted of 1) separately incorporated municipalities providing their own police service or contracting for service, 2) census tracts within larger municipalities in St. Louis County, 3) Planning Areas within the City of St. Louis, and 4) urban places within unincorporated areas of St. Louis County. The neighborhoods were predominantly residential in character, of a lower-middle to middle income status. The forty-five neighborhoods were served by twenty-nine different primary police jurisdictions, ranging in size from a low of two part-time men to a high of more than 2,200 full-time officers. Their budgets ranged from \$14,000 to over \$30 million.

An immediate question is whether or not the wide range of variation among police departments allows valid comparison. While this range of variation is found when focusing upon the police departments, the neighborhoods themselves were carefully selected to ensure their comparability. The choice of neighborhoods within a single state and metropolitan area removed many possible sources of variation. Further restrictions were imposed upon the set of all potential sample neighborhoods. At least 60% of the dwelling units had to be owner occupied, median value of owner occupied housing had to be below \$25,000, and the resident population could not be highly skewed

toward either the old or the young.<sup>4</sup> Neighborhoods remaining after application of these criteria were then stratified into clusters of "similar systems" (Przeworski and Teune, 1970: Ch. 2) by considering factors of wealth, size of jurisdiction, and type of organizational arrangements for policing (whether the neighborhood contracted for police services or not). Variations within clusters were minimized with a single exception. We dichotomized neighborhoods within cells into those with greater than 30% black population in 1970 and those with less than that percentage. Sensitivity to this dichotomy in the choosing of sample neighborhoods ensured--to the extent allowed by the existence of appropriate neighborhoods--that we would include a significant sample of black respondents.

Having determined those neighborhoods which were of interest, we proceeded to choose among them on the basis of contiguity in clusters of neighborhoods. This was felt to have been a particular strength in previous research (Ostrom, et.al., 1973) and we wished to duplicate it in St. Louis. These considerations allowed the choice of 45 sample areas such that meaningful variations along the dimensions of size and organization for provision of police service, individual wealth within the community, and presence or absence of a sizeable black population could be obtained while maintaining the "most similar systems" research design.

Nearly 4,000 interviews were obtained from residents of the neighborhood sample areas. Seven hundred and twelve police officers in departments serving the neighborhoods were interviewed. Extensive budgetary, crime and calls for service data was obtained from these departments and from central record-keeping sources.<sup>5</sup> The data base

constructed from this research effort should prove most valuable in addressing issues of police performance in residential neighborhoods. The distribution of sample neighborhoods and the number of interviews obtained with residents of those neighborhoods is presented in Figure 1.

#### POLICE PERFORMANCE INDICATORS

The indicators and their operational measures are clustered into five groups. These are 1) the direct crime related measures, 2) "style" measures 3) input proxy measures, 4) direct activity measures, and 5) citizen-consumer measures. Throughout the discussions of the operational measures and their interrelationships, their relationship to size of jurisdiction measured in terms of population served will also be presented, providing a common reference for all measures.

#### DIRECT CRIME RELATED MEASURES

Traditionally, police activity has been measured in relation to crime. The most prevalent measure of this type is the crime "rate," the number of Part I or index crimes per 100,000 population (FBI, 1972). Other conventional measures are the clearance rate, the percentage of Part I crimes "cleared by arrest," and the arrest rate, defined either on a population or a per officer base. A succinct discussion of these three measures can be found in a recent LEAA publication, Evaluation of Crime Control Programs (Maltz, 1972: Ch. 6).

Figure I  
Distribution of Citizen Interviews

Median Housing Value	Independently Incorporated Communities				St. Louis	St. Louis County	
	5,000-14,999	15,000-24,999	25,000-34,999	35,000-66,000	Neighborhood Planning Areas	Unincorporated Neighborhoods	Contract Police Communities
20,900 to 24,999 and 15,000 to 19,999 with rent $\geq$ \$120	1.1 $N^a = 175$ $SA^b = 3$	1.2 $N = 594$ $SA = 6$	1.3 $N = 192$ $SA = 2$	1.4 $N = 578$ $SA = 4$	1.5 None in this cell	1.6 $N = 79$ $SA = 1$	1.7 $N = 81$ $SA = 1$
10,000 to 14,999 and 15,000 to 19,999 with rent $<$ \$120	2.1 $N = 178$ $SA = 2$	2.2 $N = 276$ $SA = 3$	2.3 $N = 409$ $SA = 4$	2.4 $N = 555$ $SA = 4$	2.5 $N = 589$ $SA = 7$	2.6 $N = 108$ $SA = 2$	2.7 $N = 309$ $SA = 4$
less than 10,000	3.1 None in this cell	3.2 $N = 115$ $SA = 2$	3.3 None in this cell	3.4 None in this cell	3.5 None in this cell	3.6 None in this cell	3.7 None in this cell

$N^a$  = number of respondents interviewed.  
 $SA^b$  = number of sample areas included.

There are serious problems with these measures; problems which have been documented at length (Sellin and Wolfgang, 1964; Biderman, 1966; E. Ostrom, 1971; Maltz, 1972; Richardson, 1973). With respect to the crime rate, inflation and increasing prosperity contribute to almost certain increases in the amount of property-related crime (Biderman, 1966; Task Force on Assessment, 1967; Jenkins, 1970). Many serious and prevalent crimes are excluded from the index and many that are included go unreported. This leads to biased interpretations of the incidence of both victimization and criminal activity among various social groupings (Wolfgang, 1968; Schur, 1969; E. Ostrom, 1971). The rates computed from the number of index crimes are computed on a population base rather than on a base of number of targets and potential offenders (Boggs, 1965; Maltz, 1972). Increases in the crime rate may reflect increased identification with the norms of society or increased belief in police efficacy rather than increases in the extent of crime (Biderman, 1966; Jenkins, 1970; E. Ostrom, 1971; Maltz, 1972). The rate has been shown to be very sensitive to procedural changes (Task Force on Assessment, 1967). Emphasis placed upon the crime rate may provide an incentive to record incidents in such a way as to score well on that measure, an incentive consistent with Etzioni's observation quoted above (Maltz, 1972; Seidman and Couzens, 1972). Use of clearance rate as a measure can lead to similar incentives to detectives to score well, resulting in their bargaining with suspected criminals, offering reduced sentences in return for confessions which result in multiple clearances (Skolnick, 1966: 174-76). This can produce an inverse relationship between amount of crime committed (or admitted) and

punishment received. The standard method of computing the clearance rate has been shown to be incorrect, rendering it of questionable usefulness in measuring the probability of apprehending offenders (Hoffman, 1971). Similar problems are found with the arrest rate (Maltz, 1972).

In spite of these difficulties, crime, clearance and arrest rates continue to be used to measure police activity and police performance (American Bar Association, 1972: 57). Police officials and others often point out that the police cannot be held solely responsible for all crimes that are committed (O. W. Wilson, 1963: 322; J. Q. Wilson, 1968: 59-60) yet the police are quick to claim credit for reductions (see as an example, St. Louis Board of Police Commissioners, 1972: 3 or any any other police department's reports in years of reductions in rate). The press contributes to the use of falling crime rate as a measure of police success as well as pointing to police failures when the rate increases (St. Louis Post-Dispatch, January 23, 1972 and August 13, 1972, for example). Detectives continue to be judged on their ability to clear cases. Patrolmen often find that a high arrest rate is an asset when seeking promotion.

In the St. Louis neighborhoods studied there were wide variations in two of the operational measures obtained, crime rate and clearance rate. The number of Part 1 crimes reported per 100,000 population in the neighborhoods varied from a low of less than 350 to a high of nearly 13,000. Clearance rates reported for Part 1 crimes ranged from zero to 47%. Obviously given the discussion above, some of this variation can be attributed to reporting differences



and other factors; the measures are imperfect.<sup>6</sup>

Examination of FBI Uniform Crime Reports has shown, generally speaking, that the larger the jurisdiction, the higher the reported crime rate (Wolfgang, 1968: 270; Ostrom and Parks, 1973: 377).

It has been suggested that these figures are misleading and that one should examine neighborhood crime rates rather than city-wide rates (Jacob, 1973: 24). Using the data from the St. Louis sample neighborhoods,<sup>7</sup> the positive relationship between size of jurisdiction and crime rate found when entire cities are compared is also found when neighborhood crime rates are examined. The positive relationship is only a moderate one ( $\gamma = +.36$ ),<sup>8</sup> but does provide some evidence that, even in comparable neighborhoods, the reported crime rate is higher in those which are part of larger jurisdictions.

When size is measured in terms of police manpower rather than population, the association is also moderately positive ( $\gamma = +.42$ ) and slightly stronger, which seems consistent with the common sense explanation that, other things held equal, jurisdictions with relatively more reported crime will hire relatively more police.

While the positive relationship between reported crime and size of jurisdiction found at the city level is also found when focusing upon neighborhood crime figures, these relationships do not necessarily imply any causal link between size of jurisdiction and the extent of crime. Many alternative explanations would need investigation before any such conclusion might be found warrantable. Yet it is important to note that many of those who argue that larger jurisdictions are needed to fight the growing crime wave in America (CED, 1972; MLEAC, 1972 for examples) use FBI crime rates to document this crime problem, neglecting to mention that these crime statistics

indicate that it is precisely in the larger jurisdictions that crime (reported) is most serious. The point here is not to debunk such advocates but rather to suggest further evidence of the need for multiple measures in complex situations.

Another aspect of "crime fighting" is measured by the clearance rate. Here the relationships are quite different. There is a moderate positive association between the clearance rate for Part 1 crimes and the size of the jurisdiction ( $\gamma = +.30$ ). Looking at clearance rate for property crimes only (burglary, larceny, and auto theft), the positive relationship to jurisdiction size is very strong ( $\gamma = +.84$ ). The same relationships hold when size is measured by number of officers.

These measures and their relationship to size of jurisdiction are consistent with a relationship found in an earlier study of police services in the Indianapolis area (Ostrom, et.al., 1973). There it was suggested that a department serving a large jurisdiction expended proportionately higher efforts on after-the-fact activities (Criminal Investigation) and departments serving smaller jurisdictions expended relatively more on preventive activities (Assigned Patrol). This was characterized as a difference in "production strategy," with the larger department utilizing a more specialized, task oriented strategy, and the smaller ones, a patrol oriented strategy. Of course most departments are heavily engaged in both, but the direction of emphasis in the St. Louis area seems to be similar to that found in Indianapolis. In St. Louis the association between size of jurisdiction and percent of manpower assigned to patrol activities is substantial ( $\gamma = -.65$ ).

Another operational measure in the direct crime related set was obtained by computing the number of warrant issuances by prosecutors' warrant offices as a percentage of the applications for such warrants made by officers serving the sample neighborhoods. This, too, is an imperfect measure. Two different warrant offices interact with the police departments studied, the St. Louis County Prosecutor's with the municipal and County Departments and the St. Louis Circuit Attorney's with the police serving the City neighborhoods. Discussions with representatives of these two offices, including the County Prosecutor and the Circuit Attorney themselves, indicate quite similar standards for issuance, yet differences may exist. Other factors, uncontrollable or only partially controllable by the police (the willingness of witnesses to testify is an example), also affect this measure (Smith and Ostrom, 1973). Yet as with other imperfect measures, it can be used to provide us with additional information about policing.

There is a moderate negative association ( $\gamma = -.32$ ) between number of full-time officers in a jurisdiction and percent of applications for which a warrant was issued. This holds true when population served is used to measure size ( $\gamma = -.30$ ). On this measure, as on the crime rate measure, large departments are scoring less well than the medium-sized departments. The smaller departments are scattered across the scale from low to high on these measures. Table 1 summarizes the relationships among the measures discussed so far and their relationships to size of jurisdiction measured in terms of population served.

TABLE 1

Direct Crime Related Measures and Size of Jurisdiction

	Neighborhood Clearance Rate	Neighborhood Warrants (% Issued)	Size of Jurisdiction (Population Served)
Neighborhood Crime Rate	-.26 <sup>a</sup> (37) <sup>b</sup>	-.05 (42)	+.36 (43)
Neighborhood Clearance Rate	--	-.10 (37)	+.30 (37)
Neighborhood Warrants	--	--	-.30 (44)

a. Relationship measured by gamma

b. Number of neighborhoods for which data was available.

The low or negligible relationships among the three direct crime related measures suggest that while all three can be thought of as measures of conventional police crime-related output, they are measures of different facets of that activity, providing different information about the quantity and quality of police output.

#### "STYLE" MEASURES

Measures of the style of police services are of two dominant types. One has to do with the size of the police jurisdiction and with the degree of specialization within the department serving that jurisdiction. Size is generally seen as a prerequisite to higher levels of specialization, which in turn are assumed to be positively related to police output<sup>9</sup> (CED, 1972; McCausland, 1972). Larger jurisdictions are assumed necessary to deal in particular with crime which is "no respecter of antique jurisdictional frontiers" (President's Task Force on Suburban Problems, 1968: 17-18; President's Commission on Law Enforcement and Administration of Justice, 1967). Size of jurisdiction is used as a common reference in this article and will be treated as such here.

The other style measures fall under the rubric of professionalization, principally that of the individual officers within a department. The term professionalization has a variety of meanings ranging from neatness of appearance to extensive training in police-specific skills (Smith, 1971 and forthcoming discusses the various meanings at length). Here it will be approached operationally by two measures which are generally presumed to be a significant factor in professionalization, extent of police-specific training and extent

of college education among police officers serving a jurisdiction (Saunders, 1970; Bittner, 1970; for a different view on college education for police see J. Q. Wilson, 1968b).

Size of jurisdiction and percent of officers with high police-specific training have a very strong positive relationship ( $\gamma = +.74$ ). This strong relationship is not surprising as it is only in the past two years that all new police officers in most of the departments in St. Louis County have been required to have at least 600 hours of police training (McNary, 1971: 55). Prior to that many officers in County municipalities attended two-week training sessions at the Missouri Highway Patrol Academy, while the City of St. Louis and St. Louis County maintained their own academies with longer periods of training. Officers who were employed in the municipalities at the time of institution of the 600 hour requirement have been permitted to remain under a "grandfather" clause.

The relationship between size of jurisdiction and percent of officers with high amounts of college education is negligible ( $\gamma = -.06$ ). Officers in virtually all of the departments encompassed by our study were encouraged to obtain some college education. The local colleges and junior colleges have been providing police-related college courses for these men and federal funding has been made available to help defray the cost of this education. No relationship exists between percent of officers with a high amount of police-specific training and percent of officers with a high level of college education.

Given the very strong association between size of jurisdiction and training noted here, it is not surprising that similar relations (although in two instances, weaker) are found between percent of

officers with high police-specific training and neighborhood crime rate ( $\gamma = +.27$ ), neighborhood clearance rate ( $\gamma = +.16$ ), and success in obtaining warrants ( $-.39$ ). Of perhaps more interest are the directions of the (admittedly low) associations between the percent of a given department's officers with a high level of college education, the crime rate in neighborhoods served by that department ( $\gamma = -.27$ ), and the clearance rate achieved in those neighborhoods ( $\gamma = +.15$ ). There is no association between this education measure and the department's success in obtaining warrants.

#### INPUT MEASURES

Level of expenditure and expenditures per capita have been employed extensively as measures of public agency output by political scientists and economists (see discussion and citations in Jacob and Lipsky, 1968; Hirsch, 1968; and Bahl, 1969). The ways in which higher expenditures are related to greater output are rarely made explicit in such arguments. Yet the implication is clearly present in many discussions of policing that higher expenditures (and the corollary, more manpower) represent higher output. To the extent that marginal returns do not become negative, this assertion is unimpeachable. But those who so argue rarely use this obvious argument. Rather they imply that marginal returns are positive throughout. A recent statement by the Missouri Law Enforcement Assistance Council, deploring lower expenditures and manpower in suburban areas, asserts that "in the final analysis, the taxpayer typically gets only what he pays for and this applies to police protection and law enforcement services as well. The compromises made by taxpayers in suburbia

have led to low levels of service. . ." (1972: 48). The President's Commission on Law Enforcement and the Administration of Justice claimed to have seen

. . .impressive evidence that in many cities there are too few policemen. . .it is apparent that more police are needed and that municipalities must face up to the urgency of that need and provide the resources required to meet it if crime is to be controlled (1967: 172)<sup>10</sup>

Expenditures and/or manpower figures are used in many cases because of a superficial comparability which they give to analyses across cities and across time. Their use is most often justified by referring to the inadequacies of any other measures of output for public services. Yet the problems inherent in the use of such fiscal indicators are highlighted by noting that "few citizens or leaders are interested in city expenditures per se; they are more concerned with the level and type of service which the funds can purchase," (Clark, 1972: 11) and that "as administrators sadly know, high expenditures may have little impact" (Jacob and Lipsky, 1968: 516). In order to use expenditures, manpower, or other input measures as reasonable proxies for output and/or performance, it would be necessary to know the production functions for various facets of police activity. These are not well known at present (Shoup and Mehay, 1971; Chapman and Sonenblum, 1972; Votey and Phillips, 1972).

Operational measures of input derived from the St. Louis study are 1) the number of full-time officers per 1000 residents serving the sample neighborhoods and 2) the per capita expenditures made in those neighborhoods by departments which serve them. In deriving

these measures from police budgets and manpower data, allocation formulae developed in earlier studies were used (Ostrom, et.al., 1973). These formulae are quite similar to formulae used in a recent study of manpower and expenditure allocation to sub-areas served by the Los Angeles' County Sheriff (Shoup and Rosett, 1969).

Total departmental expenditures are first allocated to categories of assigned patrol, criminal investigation, and supportive services. The assigned patrol expenditure allocated to a neighborhood is simply the sum of salaries paid to men patrolling that neighborhood. Criminal investigation expenditure is allocated to a neighborhood on the basis of the percentage of city-wide Part 1 crime reported in that neighborhood. Supportive services expenditures are first allocated to patrol and investigation forces city-wide in the proportion which expenditures for these latter items occupy in the budget and then are allocated to neighborhoods in the same manner as the direct patrol and investigation expenditures. This method of expenditure allocation generally yields estimates lying between those which would be made with either an allocation based strictly on percent of reported crime or one based strictly on percent of calls for service--at least in residential neighborhoods (Ostrom, et.al., 1973: 53-57).

Per capita expenditures ranged from a low of seven dollars to a high of \$53 in the sample neighborhoods. Full-time officers assigned to these neighborhoods varied between zero and 3.5 officers per thousand residents. The budget of most police departments is dominated by salary and wage expenditures and so it is not surprising to find a very strong association between these two measures

( $\gamma = +.72$ ). Per capita expenditure has a substantial positive association with size of the jurisdiction ( $\gamma = +.54$ ) while the positive relationship with manpower assigned is low ( $\gamma = +.29$ ). This would seem to indicate that as jurisdictions increase in size, proportionately less resources are devoted to manpower on the street (at least in residential neighborhoods), a finding consistent with the earlier discussion of production strategies.

Table 2 presents the relationships between those two measures of input and the crime related output measures discussed above. Both input measures have very strong or substantial positive associations with neighborhood crime rates, low positive relationships with clearance rates, and negligible negative associations with warrant issuance. An explanation consistent with these findings is that police departments allocate much of their resources on the basis of reported crimes (although many are now moving to much more complex allocation models, see Larson, 1972; Operations Research Task Force, 1972). Such allocation is seen to have only a minor or negligible effect on other measures of crime-related police activities.

#### DIRECT ACTIVITY MEASURES

Another approach to identification and measurement of output quantity and quality is to attempt to quantify the amounts of specific activities of various kinds in which a police department is observed to engage. These activities in one sense are the outputs of the department; the results obtained from such activities may then be conceptualized as outcomes (Clark, 1972). These outcomes are a function of both the activities and the environment in which

TABLE 2

Input Measures, Crime Measures, and Size of Jurisdiction

Neighborhood Inputs	Neighborhood Crime Rate	Neighborhood Clearance Rate	Neighborhood Warrants (% Issued)	Size of Jurisdiction (Population Served)
Full-time Officers per 1000 Residents	+ .79 <sup>a</sup> (43) <sup>b</sup>	+ .11 (37)	- .04 (44)	+ .29 (45)
Expenditures per capita	+ .66 (43)	+ .21 (37)	- .07 (44)	+ .54 (45)

a. Relationship measured by gamma

b. Number of neighborhoods for which data was available

they are performed (Bradford, Malt, and Oates, 1969), and are therefore only partially amenable to control by the police (Hoffman, 1971).

The two operational measures of direct activity are the average number of patrol officers on duty per thousand residents in the sample neighborhoods, a measure of the "density" of patrol activity, and the number of calls for service per thousand residents responded to by the police in the neighborhoods. Other direct measures not considered here include the level of traffic control provided and the level of investigative follow-up. Because the focus is on neighborhood level police services, traffic control is of relatively lesser importance. The level of investigative follow-up could not be easily determined from police records. In one sense the clearance rate is a measure of the level of follow-up provided, yet a moment's reflection will show that it is not a direct activity measure but rather the result of direct activities and other factors not subject to police control.

Patrol has been described as the most important activity of a police department (O. W. Wilson, 1963: 231). Patrolling is assumed to contribute significantly to "crime fighting" and to such other "goals" of policing as "order maintenance" and "public service."<sup>11</sup> Recently some questions have been raised as to the extent of patrol efficiency in "crime fighting" (American Bar Association, 1972; Larson, 1972: 34) with suggestions that this ought to be carefully researched in well-designed experiments. But there is no controversy over whether patrolling is an appropriate activity for police.

There are those who have argued that responding to most calls for service is not proper police activity, that this might better

be done by, for example, "Emergency Services, Inc." (J. Q. Wilson, 1968a: 5). Others have noted that response to general service calls represents a large percentage of the activities in which police engage (Bercal, 1970; Parks, 1971), that it would be very costly and on some grounds infeasible to separate out these general service responses from "real police work" (American Bar Association, 1972), and that the police response to general service calls can have positive spillovers into other areas of policing (O. W. Wilson, 1963: 228-89; Terris, 1967). Response to calls for service is viewed here objectively as a significant portion of police activity. For that reason the number of responses per 1,000 residents is taken to be a valid operational measure of police activity.

A key consideration in responding to service calls is response time. Many studies have indicated that very rapid response is a significant factor in police crime-fighting activities (Institute for Defense Analyses, 1967; Operations Research Task Force, 1972). Rapid response would seem equally desirable for other police activities. Unfortunately, in spite of the general agreement that rapid response is a very important aspect of police service, many departments, including large departments, have not kept response time records (Parks, 1971). Many of the St. Louis area departments do not maintain such records and thus it cannot be addressed at this point. Citizen perceptions of police response were obtained, however, and will be considered in the following section.

The association between the direct measures is low ( $\gamma = +.26$ ). Some departments (including the St. Louis City police) have taken steps to separate a part of the patrol force from the immediate

response force, assigning this part specifically to crime prevention (St. Louis Police Department, 1968). This results in a higher patrol density than that required to handle expected calls for service. Calls for service exceeding those for which an immediate response unit is available are queued awaiting such availability.

Table 3 summarizes associations between these direct activity measures, the crime related measures, and size of police jurisdiction. The very strong positive relationship between patrol density and crime rate can be read as the result of allocation formulae used by police departments. The substantial but weaker relation between response to calls and crime rate is consistent with the discussion of specific crime prevention patrol when viewed in light of the very strong association just noted. In high crime areas a portion of the high "density" patrol effort is devoted to crime prevention only, leaving less of the patrol force to respond to service calls.

The negative, low to moderate associations between the direct activity measures and the clearance rate initially appear to be a result of the choice of a more patrol-oriented strategy, with these direct measures merely reflecting that choice. This is found not to be the case for patrol density, however, which has a negligible association with percentage of manpower engaged in assigned patrol activities ( $\gamma = +.01$ ) and only partially so for response to calls for service, where a low but positive association is found ( $\gamma = +.20$ ).

Success in obtaining warrants is positively associated with the direct activity measures. From these data we can see that while departments scoring higher on direct measures of patrol "density" and response to calls are achieving somewhat lower rates of "clearance



TABLE 5

Direct Activity Measures, Crime Related Measures, and Size of Jurisdiction

Direct Activity Measures	Neighborhood Rate	Neighborhood Clearance Rate	Neighborhood Warrants (% Issued)	Size of Jurisdiction (Population Served)
Patrol "Density" Average Patrol Force per 1000 Residents in Neighborhood	+ .82 <sup>a</sup> (43) <sup>b</sup>	-.12 (37)	+.13 (44)	+.02 (45)
Calls for Service Answered per 1000 Residents in Neighborhood	+.51 (43)	-.34 (37)	+.17 (43)	-.22 (45)

a. Relationship measured by gamma

b. Number of neighborhoods for which data was available

by arrest," they appear able to have the relevant Warrant Office concur in the arrests which they do make with slightly more success.

Size of jurisdiction bears a negligible relation to one direct measure, patrol "density." The low negative relation found with response to service calls is consistent with the suggestion above that the latter is partially a measure of a more patrol-oriented strategy, found more frequently in departments serving smaller jurisdictions (Ostrom, et.al., 1973).

#### CITIZEN-CONSUMER MEASURES

Direct activity measures provide us with information about what police are doing; measures obtained from properly designed surveys of residents can help to determine what the effects of that "doing" are; in Clark's terms, what "outcomes" result from police "outputs" (1972). Researchers at the Urban Institute have found that

Many quality aspects of government services cannot be measured in any practical way other than through citizen surveys. For many local government services, citizen perceptions constitute a major aspect of service effectiveness (Webb and Hatry, 1973: 17).

Residents of neighborhoods are, in a very real way, an integral factor in the production of police services in those neighborhoods. For example, police officers are quick to report that without citizen cooperation in reporting suspicious circumstances, the likelihood of police patrols deterring criminal activity would drop significantly. The experiences, perceptions, and evaluations reported by citizen-consumers pertaining to the service which they receive from their

police departments (or other local government agencies for that matter), when gathered in well-designed surveys and properly analyzed, can provide information about the quantity and quality of the output of such agencies which is generally unobtainable from any of the measures previously discussed.

Citizen surveys have been utilized to determine the extent and distribution of criminal victimization in America. While there are problems involved in such surveys, (Biderman, 1967) it is clear that they provide a more accurate picture of victimization than do crime statistics (Ennis, 1967). Reports of experiences obtained from citizens can be used to determine the level of follow-up to reported crime provided by departments (Ostrom, et.al., 1973). Surveys can be used to determine the extent to which police are providing general, non-crime related services to citizens, services which are not accounted for by most departments (Bercal, 1970; Parks, 1971). Use of surveys allows one to gather information on the extent to which departments are stopping their own citizenry to enforce traffic and other laws, and to relate the evaluations of police services made by citizens to their having had the experience of being stopped by their own force. This allows one to approach the testing of the hypothesis that neighborhood police forces (particularly "community controlled" forces) may be lax in enforcing the law against local residents, thus accounting for higher evaluations by such residents. James Q. Wilson, for one, seems to fear that neighborhood control would result in such laxity (1968a: 288).

Citizen perceptions of police behavior can provide an important check on direct activity measures. For example, asking citizens how

often the police patrol their neighborhoods, or how rapidly the police respond when they are called in a neighborhood allow an independent assessment of level of patrol and response time measures.

Larson indicates that citizen perceptions of police responsiveness gathered in a recent survey "seemed to coincide quite closely with the judgments of experienced researchers of U.S. police" (1972: 35). Whether or not citizens perceive crime to be increasing in their neighborhoods, and the types of crime they worry about, can provide a check on crime rates and can guide the police in allocation of crime-fighting resources. Asking citizens whether they know of any mistreatment of individuals by their police may elicit information not available through formal complaint channels (Chevigny, 1969).

Given the necessity for citizen cooperation in the production of police services and the likely prerequisites to such cooperation, citizen perceptions of police honesty, courtesy, and the extent to which the police offer equal treatment to all citizens can be important measures. Citizens' general evaluations of the police services they receive, the confidence that they have in the ability of their police, and their assessment of the degree of professionalism of their police are also important. The necessity for such cooperation aside, measures of this nature are of vital importance to those with a normative commitment to citizen sovereignty.

Gathering police performance measures through the use of population surveys permits the analysis of the degree of equity in provision of police services to a variety of groups and areal units (C. Shoup, 1964). Surveys can provide much more representative

channels of feedback to government officials than are normally found in most communities (Webb and Harty, 1973). This feedback in turn can facilitate better matching of police output to citizen preferences, with attendant practical and normative benefits (E. Ostrom, 1971).

While surveys can provide valuable measures, there are limitations to the use of surveys and to the measures obtained. Surveys are often costly and time consuming to design and conduct (for techniques which can reduce field costs see Hochstim, 1967); the proper design and conduct of a probability sample survey requires skills not generally available in most police departments--or in many academic research operations (Kish, 1965; Lazerwitz, 1968); the analysis of responses is time-consuming, preventing the rapid supply of information often deemed necessary for police operations; and the valid conversion of survey responses into measures of activity or output is a particularly perplexing problem. In many cases, however, the benefits to be obtained will outweigh the costs of surveys and the analytic problems they may generate. This is particularly true for obtaining measures of police services, where many of the activities in which police engage do not appear to be amenable to valid measurement in any other fashion. Even in instances where specific activities can be otherwise measured, measures derived from surveys provide essential cross-checks.

The citizen appraisal measures presented here are of three types--first, citizen reported experiences; second, citizen perceptions; and third, citizen evaluations of their police.

Citizen Reported Experiences

Operationally, the experience measures are the percent of households in a neighborhood where the respondent answered that someone in their household had been the victim of criminal activity in that neighborhood within the past year, the percent of households where someone had been assisted by the neighborhood police, and the percent where someone had been stopped by those police.<sup>12</sup> Within the sample neighborhoods, reported victimization of at least one household member ranged from a low of only four percent of the households in one neighborhood to over 30 percent in another. Percentage reporting an assistance varied from three to 24 percent, and the percent stopped from zero to 23 percent. These measures are related to one another, to the crime related measures, and to size of jurisdiction as shown in Table 4.

The positive relationship between citizen reported victimization and crime rate in the neighborhoods is substantial, yet at first thought, not as strong as one might expect. It should be noted that while the neighborhoods were predominantly residential, some business activity was found in most of them. Since our household survey did not elicit any information about crimes against neighborhood business and the crime rate data include such crimes, the strength of the relationship is not surprising.<sup>13</sup> The substantial positive association between percentage assisted and percentage stopped by the police may be representative of higher police patrol-oriented activity. The associations with size indicate that smaller departments are stopping residents slightly more frequently and providing somewhat more

TABLE 4

Citizen Reported Experiences, Crime Related Measures,  
and Size of Jurisdiction

	<u>Experiences in Neighborhood</u>		
	<u>Victimization</u>	<u>Assisted by Own Police</u>	<u>Stopped by Own Police</u>
Assisted by Own Police	-.21 <sup>a</sup> (45) <sup>b</sup>	--	--
Stopped by Own Police	+.31 (45)	+.51 (45)	--
Neighborhood Crime Rate	+.59 (43)	-.28 (43)	+.18 (43)
Neighborhood Clearance Rate	+.14 (37)	+.18 (37)	+.38 (37)
Neighborhood Warrants (% Issued)	-.17 (44)	+.25 (44)	-.45 (44)
Size of Jurisdiction (Population Served)	+.13 (45)	-.33 (45)	-.19 (45)

- a. Relationship measured by gamma  
b. Number as neighborhoods for which data was available

assistance to those residents.

The moderate positive association between percentage stopped by their police and the clearance rate is perhaps reflecting routine checking for "warrants and wants" which many departments have adopted as a policy when stopping a motorist. This association is consistent with the intent of such policies. The negative relationships of crime rate and victimization to percent assisted are consistent with earlier discussion of the assignment of a substantial portion of the patrol force exclusively to prevention duties in higher crime areas. Officers so assigned are removed from the pool of manpower available to assist residents, whether at their own initiation or in response to a service call.

#### Citizen Perceptions

The citizen perception measures reported here are of the speed of police response (percentage reporting "very rapid"), and of the crime trend in their neighborhood (percent responding "increasing"). Their perceptions of frequency of police patrol cannot be examined at this time due to minor data inconsistencies. The lowest percentage of a neighborhood's respondents reporting "very rapid" police response was 13, the highest, 80 percent. Neighborhoods where the percent stopped by police is higher are somewhat more likely to have a higher percentage reporting "very rapid" ( $\gamma = +.22$ ). Percent reporting the crime trend as increasing ranged from seven to fifty-two. The association with percent stopped was low but positive ( $\gamma = +.10$ ). Table 5 presents the associations between these perception measures, the two remaining experience measures, the direct crime related measures and size of jurisdiction.

TABLE 5

#### Citizen Perceptions and Experiences, Crime Related Measures, and Size of Jurisdiction

	Perceptions of:	
	Police Response Rate in Neighborhood (% very rapid)	Neighborhood Crime Trend (% increasing)
Victimized in own Neighborhood	-.12 <sup>a</sup> (45) <sup>b</sup>	+.70 (45)
Assisted by own Police	+.54 (45)	-.26 (45)
Neighborhood Crime Rate	-.18 (43)	+.79 (43)
Neighborhood Clearance Rate	+.39 (37)	-.08 (37)
Neighborhood Warrants (% Issued)	+.46 (44)	0 (44)
Size of Jurisdiction (Population Served)	-.40 (45)	+.23 (45)

a. Relationship measured by gamma

b. Number of neighborhoods for which data was available

The moderate positive associations between the clearance rate and warrant success measures and the percentage reporting very rapid response are consistent with data from other sources indicating significantly higher arrest probabilities with faster responses (Operations Research Task Force, 1972). More rapid response when called has a low but negative association with crime rates and percentage victimized, further suggesting that rapid response is beneficial. Rapid response bears a substantial relationship to percentage reporting instances of police assistance.

As could be expected, the percentage reporting that crime is increasing in their neighborhood is very strongly related to the neighborhood crime rate and to the percentage reporting victimization. Preliminary analyses conducted at the individual respondent level indicate that this is substantially attributable to the experience of being victimized. That is, respondents reporting someone in their household victimized within the past year are considerably more likely to report that crime is increasing in their neighborhoods. This seems a natural response--analysis is currently underway to determine differential effects if any attributable to various police activities in the neighborhoods.

The Missouri Law Enforcement Assistance Council has called for a definition of "acceptable levels of professionalism and quality in the provision of (police) services" and argued that a "two-minute response time" must be included as a standard (1972: 3). In this same report "the provision of police services in the suburban fringe is somewhat compromised by the fragmentation of jurisdictions and responsibilities" (1972: 34). The association between reported response rate and size of jurisdiction indicates that, on the only

indicator of professionalism and quality specifically delineated by the Council, smaller departments are providing better service.

#### Citizen Evaluations

The operational measure of citizen evaluations used here is the percentage of respondents in a neighborhood stating "outstanding" when asked to rate the quality of police service provided to their neighborhood. This percentage ranged from a low of only two percent to a high of 59 percent. In the sample as a whole, 26 percent of those interviewed gave this response. This range of variation across neighborhoods that in many other respects were quite similar is an indication that citizens are able to discriminate the quality of service which they receive to a considerably greater extent than many scholars have been willing to admit.

The hypothesis that higher evaluations will be received by police who are lenient in enforcement against their own citizenry is not supported by the data. The association between the percentage who reported being stopped by their own police and the percentage reporting outstanding police service is negligible ( $\gamma = -.04$ ).

This operational measure of citizen-consumer evaluations bears a moderate negative relationship to percentage reporting victimization in their household ( $\gamma = -.40$ ) and to the percentage reporting crime increasing ( $\gamma = -.31$ ). It has a low negative association with neighborhood crime rate ( $-.29$ ). Higher citizen evaluation has a moderate positive association with the percentage reporting assistance in the neighborhood ( $\gamma = +.35$ ). A very strong positive association is found between percent of a neighborhood sample rating

their police outstanding and the percentage reporting that their police respond very rapidly when called ( $\gamma = +.80$ ). Response rate would seem to be an important determinant of citizen evaluations of their police service. Citizen ratings of the service provided by their police exhibit only low associations with the clearance rate ( $\gamma = +.16$ ) and with size of the jurisdiction providing service ( $\gamma = -.11$ ).

The citizen-consumer measures discussed here are an important source of information bearing upon police performance. As with all of the measures presented, they should not be employed alone.

Merely tabulating and publishing the responses [to surveys] is not sufficient to make fully productive use of survey information. . . . Pertinent information obtained from other regular sources of government information such as government records should be considered along with survey information. Only through such analysis can survey information be placed into proper perspective with other types of information to provide accurate and comprehensive guidance to government officials for their decision and policy making (Webb and Hatry, 1973: 4).

However, their use in conjunction with other indicators provides an independent cross-checking capability not found when reliance is placed solely upon agency records.

#### CONCLUSION

A variety of different indicators of the output of neighborhood police agencies have been discussed and operational measures of those

indicators presented. The relationships among these operational measures have been analyzed within, and to some degree, across indicator types. Citizen appraisals have been shown to be of importance, used in conjunction with police and other agency records. It is the author's hope that such appraisals will be made a regularly accepted tool in the analyst's bag of measuring devices, leading to a phasing out of the "what do they know, anyway?" reactions of some scholars and police officials when confronted with responses from citizen surveys.

Employment of multiple indicators, gathered from multiple sources, is necessary to match the complexity of what we simply call "police performance." Such employment has the additional benefits of improving the accuracy of individual measures through the availability of other measures with different imperfections. The synergistic combination of indicators bearing upon the same or different facets of policing will provide much deeper insight into police performance than is possible with single indicators, no matter how accurate they may be. Confronted as we are today with a wide range of suggestions for reforming local police service delivery, such insight is a necessary prerequisite to predicting the likely consequences of proposed reforms, and to evaluating the consequences of reforms which are adopted.

## NOTES

1. The classic statements on public goods and services are those of Bowen, 1943, and Samuelson, 1954 and 1955. More recent sources dealing with public goods and services in the context of local government are Ostrom, Tiebout and Warren, 1961; Williams, 1966; and Buchanan, 1968. The advantages of conceptualizing the production of public goods and services in terms of firms and industries are suggested by V. Ostrom and E. Ostrom, 1965, and V. Ostrom, 1969.

2. "Indicators" is used here to mean the way to classify variables, that is, input proxies, direct crime related, style, direct activity, and citizen-consumer measures. "Measures" is the term used for operational definitions of the indicators.

3. The success of this research effort was founded upon the excellent cooperation afforded us by police chiefs, police officers, and citizens in the St. Louis Area. Without that cooperation the study would have been impossible. A special debt is owed to our interview teams, comprised primarily of undergraduate and graduate students from Indiana University. These fine people demonstrated intelligence, dedication, and an active interest in research which, we believe, made them the equivalent of, and in many ways superior to, the best professional survey researchers in the United States.

4. The sixty percent owner occupied criteria was relaxed slightly to include one black and one racially-mixed neighborhood. Neighborhoods with median value of housing over \$25,000 were excluded to allow us to concentrate our research upon neighborhoods of more general interest, that is, facing resource constraints more typical

of most residential areas. Previous research had indicated age of individual respondent to be of some significance in determining attitudes towards the police (Ostrom, et.al., 1973). To reduce the confounding effect of this variable in our analyses, we excluded neighborhoods where more than 20% of the residents were over 65 years of age or where more than 45% were under 21.

5. In St. Louis County the Central Police Records Center, within the County government structure, collects and maintains crime statistics from all municipalities in the County. Mr. Orville Thiel of the St. Louis County Police Data Systems Bureau was kind enough to allow us access to these records for our sample areas in the County and to provide us with extensive calls for service data from those departments which contract with the County for radio dispatch. City clerks and police officials of all jurisdictions were equally helpful in providing these data.

6. The St. Louis Police Department has relied upon an independent auditing agency to validate their records of reported crime. The County Central Police Records Center and the municipalities which report to it have not adopted this procedure.

7. In the analysis presented here, the sample neighborhoods are used as the unit of analysis. The direction and strength of the relationships among the operational measures is the principal interest. For this purpose all measures have been trichotomized into low, medium, and high categories with the exception of per capita expenditures where a more natural four way division seemed appropriate. Goodman and Kruskal's gamma will be used as the measure of association here, due to the interpretability of this coefficient



(Goodman and Kruskal, 1954; Costner, 1965). As Wilson (1971) argues, the use of ordinal measures places serious limitations on the statements one can make about relationships. But he goes on to note that such measures can serve important heuristic functions, which make them appropriate for present purposes.

8. The phrasology used here to describe the strength of relationships is taken from that suggested by James A. Davis (1971: 49). A gamma with an absolute value over 0.7 will be said to indicate a very strong association; one from 0.5 to 0.69, a substantial association; 0.3 to 0.49, a moderate one; 0.1 to 0.29, a low one; 0.01 to 0.09, a negligible association; and zero, of course, no association. These are, as Davis notes, essentially arbitrary choices made for the sake of consistency.

9. Degree of specialization will not be addressed in this section. Consistent operationalization of this is a difficult task which has been postponed to later analyses.

10. On the same page, however, the Commission admitted that there appears to be no correlation between the differing concentrations of police and the amount of crime committed, or the percentage of known crimes solved, in the various cities (1967: 272).

11. The quotation marks at this point are indicative of the author's uncertainty over such "goals" as useful concepts. Bittner notes that

. . . we are often told that the role of the police is supposed to center around law enforcement, crime control, and peacekeeping. The principal import of such statements is not to inform, but to maintain the pretense of

understanding and agreement . . . such statements of function are abstract and do not restrict the interpretations which can be given to them . . . (1970:2).

These "roles" are often suggested as police "goals," "objectives," or "functions" (see J. Q. Wilson, 1968a, for example), similarly maintaining a pretense of agreement over what we wish the police to be doing, where operationally there may be none.

12. Many of the advantages of survey data can best be captured by analysis at the level of individual respondent. In further work, both individuals and neighborhoods as will be considered units of analysis. Questions of equity in non-geographic terms, for example, will require the direct use of individual responses.

13. The association between per capita retail sales in a neighborhood and percent of respondents reporting someone in their household victimized in the neighborhood is a negligible negative one ( $\gamma = -.09$ ). However, per capita retail sales and the neighborhood crime rate show a low positive association ( $\gamma = +.27$ ).

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