

Police Officer Staffing: Analyzing the Commonly Held Belief that More Cops Equals Less Crime¹

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Police officer staffing levels are believed to relate directly to the crime rate in metropolitan areas; however, the studies on this relationship to date are contradictory and inconclusive. This study compares crime rates in 24 metropolitan areas with the police officer staffing levels over a 12-year time series study. Data for this study are derived from the Bureau of Justice Statistics' Law Enforcement Management and Administrative Statistics surveys in 1999 and 2003 and the FBI's Uniform Crime Reports for the period 1996–2008. The data show some but not overwhelming support for the position that there is a negative correlation between police officer staffing and crime rates.

Key Words: Police officers • staffing • crime rate • crime prevention

A commonly held belief among law enforcement officials, law enforcement pundits, and citizens of the U.S. is that more police officers on the streets or investigating crimes results in less crime and safer communities. Intuitively, this belief is logical; however, no solid data support this claim. One method of partially and indirectly supporting this claim is to conduct a study of selected cities and counties that compares the number of sworn police officers with the crime rate for given jurisdictions to see whether an inverse relationship exists. Does hiring more police officers result in lower crimes rates?

This paper examines the relationship between police officer staffing and the resulting crime rates in a longitudinal study. It addresses the following research questions:

- (1) Is there a correlation between sworn police officer staffing and a city's or county's crime rate?
- (2) Is there support for the intuitive concept that more police officers on the street conducting preventive patrol reduces the crime rate?

The purpose of this paper is to examine the number of full-time police officers employed by selected police and sheriff's departments over a 12-year period and compare these staffing levels with the reported crime rate for these cities and counties in the

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Uniform Crime Report (UCR). Intuitively, one would posit that more police officers on patrol equals less crime for any particular city or county; however, many researchers assert that their research contradicts this position (see Bayley, 1994; Benson et al., 1994; Blumstein et al., 1978; Cameron, 1988; Gottfredson & Hirschi, 1990; Kelling et al., 1974; Sherman, 1992; and Sparrow et al., 1990). Other researchers (see Correa, 2005; Levitt, 1998; and Marvel & Moody, 1996) have shown a correlation between police officer staffing levels and crime rates for U.S. cities and metropolitan areas. This study analyzes this polemic once again.

Study Overview

Rationale for the Study

The period 2007–2009 witnessed one of the most severe recessions in the U.S. since the Great Depression of 1929–1932. Unemployment rose to 10.2%, and police officers in many U.S. cities were laid off in numbers that have not been seen in decades. Layoffs occurred in large part due to: (a) severe drops in general city and county funds resulting from reduced revenue because of decreased property taxes from the housing crisis, and (b) fewer state dollars going to cities and towns as states also found themselves in financial trouble during the recession. But can cities and counties afford to lay off law enforcement officers? Do greater numbers of police officers actually reduce crime in a city or county? Does an economic crisis that results in a reduction in police officers subsequently result in an increase in the crime rate? The foregoing are questions this study addresses. Such questions underscore the need for more studies in the areas of police staffing, efficient use of police person-power, and innovative use of police officers such as community-oriented policing and problem-oriented policing. More comprehensive studies of police officer-to-citizen ratios could also determine more precisely the ideal staffing level for any city in the U.S.

Limitations of the Study

The authors conducted a time series study covering 12 years (1996–2008) in which we compared the police officer or sheriff staffing levels with the crime rate for each year to determine whether there was an inverse correlation: Do crime rates decrease over time with the increase in full-time sworn police officers or sheriffs and vice versa? We selected the 18 cities and 8 counties based on their greater fluctuation of officers over time. Specifically, the authors scanned all the reporting cities and counties in the Law Enforcement Management and Administrative Statistics for the period 1994–2003 to find the cities and counties with the most variance in the percentage change of police officer staffing—both percentage increase and percentage decrease. This was the only discriminator that

we used and thus the non-random sample. In addition, we did not attempt to control for any possible intervening variables—other than police and sheriff staffing levels—including socioeconomic, cultural, and environmental factors such as community education levels and employment rates, multiculturalism, or availability of drugs and handguns. We also did not consider the many theories of crime causation in the literature, such as biological and sociological factors. Therefore, it is possible that the findings of this study could be spurious or tainted by not having controlled for other variables; however, the authors believe that the combination of the time series design and the selection of cities and counties that vary considerably in police officer staffing size and traditional crime levels has resulted in accurate data and findings.

Research Hypothesis

The null hypothesis for this study is that there is a negative correlation between police officer staffing and the crime rates, but the correlation is not infinite. Stated in hypothesis format: If cities and counties hire and maintain a prescribed number of peace officers, referred to as the officer-to-citizen ratio, and increase this number based on population increases, then crime rates will remain the same or decrease.

Literature Review

Logic suggests that there must certainly be a relationship between the number of police officers a city or county employs and the crime rate in that city or county, and the relationship is an inverse one: More police officers equals a lower crime rate and fewer police officers equals an increase in the crime rate. This belief is supported logically by the general deterrence theory as espoused two and one-half centuries ago by Cesare Beccaria and Jeremy Bentham in what is now known as the Classical theory of criminology. It is also supported by the concept of incapacitation, i.e., more police officers making more arrests results in more convictions and prison time and thus fewer criminals on the streets to ply their criminal trade. However, a significant number of studies fail to show a negative relationship between the size of a police force and crime (see Bayley, 1994; Benson et al., 1994; Blumstein et al., 1978; Cameron, 1988; Kelling et al., 1974; Gottfredson & Hirschi, 1990; Sherman, 1992; Sparrow et al., 1990).

In summary, the studies offer the following explanations for this finding:

- (1) Most police work is not devoted to crime reduction. Policing is primarily reactive to crime that has already occurred.
- (2) Only large increases in police levels can produce enough police presence on the streets to deter crime. Police departments generally hire to replace existing vacancies. Large increases occur,

for example, when the federal government passes legislation that funds a significant increase in local police and sheriff staffing. As an example of a significant increase in police staffing, the 1994 Omnibus Crime Bill infused cities and counties with 100,000 new police officers serving in the capacity of community policing for about 10 years. During this period, the U.S. experienced significant reductions in both property and violent crime.

- (3) The most common police strategies are poor crime-prevention strategies. Police officers conduct "preventive-patrol," but the time devoted to preventive-patrol can be limited by calls for service.

Police Cost-Efficiency

Determining the optimal number of police officers or sheriffs for any given city or county is mostly "guesstimation." Cities and counties use what is referred to as a police officer-to-citizen ratio, and this ratio is identified for each reporting city and county in all of the Law Enforcement Management and Administrative Statistics (LEMAS) reports. This ratio is expressed as "x" officers per 10,000 citizens residing in the city or county.

In his study titled, "Assessing the Cost-Benefit of Police Officer Staffing: Do Cities with Higher Police Officer-to-Citizen Ratios Have Less Crime?", co-author Guffey (2009) found that this ratio varied considerably. In a study of 29 police and sheriff departments, Guffey found that ratios of 20 or fewer police officers per 10,000 citizens spread officers too thin and resulted in higher crime rates, and ratios above 40 per 10,000 citizens appeared to be greater than needed and possibly resulted in inefficiency. Specifically, crime rates did not decrease in comparison with the lower officer-to-citizen ratio cities and counties and, in fact, increased in some cases. Ratios in excess of 50+ officers per 10,000 citizens showed clear inefficiency; in other words, crime rates in these cities were particularly high based on the number of sworn police officers. Ratios in the 30–40 per 10,000 citizen range seemed to be ideal (p. 8).

Correa (2004) also explored this concept of the optimum number of police officers for any given agency. He examined the total cost of damages due to crime plus the cost of police protection in a community. By using UCR data on property and violent crime, Correa converted crime to a monetary cost and compared this with expenditures for police protection. He found, "A preliminary analysis of the data from all [50] states showed a weak positive correlation between expenditures on police protection and cost of crime" (p. 222). He also explains that at some point the expenditures for police protection maximize the reduction in the cost of crime, and no further significant reductions in crime will be realized by continued increases in police officer staffing. Determining the point at which these two intersect determines the maximum police staffing for any given agency.

Correa also reviewed the existing methods of determining the optimal size of police departments; for example, the Commission on Accreditation for Law Enforcement Agencies (CALEA) proposes a formula that uses the number of complaints or incidents reported to a department and the population served. Other researchers recommend similar methods (see Bahl et al., 1980; Hirsch, 1977).

Levitt (1988, 1997) has conducted extensive research in the area of police staffing and crime rates. His results generally contradict those of other researchers, for example Blumstein et al, 1978 and Cameron, 1988, who maintain there is no reliable statistical data to support the contention that increases in police officer staffing levels result in a decrease in a city's crime rate. Levitt contends that,

If the size of the police force systematically affects the willingness of victims to report crime or a police department's propensity officially to record victim crime reports, then UCR data will understate the true effectiveness of police in reducing crime (1988, p. 62).

Levitt identifies what he refers to as reporting bias. He asserts that, "[i]f reporting bias . . . is present, reported crime rates may increase with the size of the police force, even if the true victimization rate is falling"(p. 63). He states that his data suggest some reporting bias exists, even though the evidence is not overwhelming. He estimates that each additional officer hired leads to the reporting of roughly five Index crimes that otherwise would have gone unreported (p. 64). Consequently, Levitt suggests that resultant decrease in crime rates when police officer staffing increases may be a distortion because more police officers are available to on-view and report crimes that might not have been reported otherwise. In addition, citizens may read or hear about more police officers available to respond to calls for service and report crime that they may not have reported otherwise.

In a subsequent article, Levitt (1997) looked at the timing of mayoral and gubernatorial elections as a causal effect of policing on crime rates. Not surprisingly, Levitt found that increases in the size of police forces are shown to be disproportionately concentrated in mayoral and gubernatorial election years. He found that the mean percentage change in sworn police officers for the 59 cities in the sample was 2.1 percent in gubernatorial election years, 2.0 percent in mayoral election years, and 0.0 percent in nonelection years (p. 2). In addition to looking at election cycles, Levitt also used UCR data of the 59 cities to compare with the increased staffing levels derived from the election years. He found that increases in the number of police reduce violent crime substantially but have a smaller influence on property crime (p. 1).

Marvell and Moody (1996) also examined the relationship between police numbers and crime. They used the Granger test, which accounts for lags between changes in police staffing levels and crime rates to avoid the problem of simultaneity. Because there is a significant lag between the time a police officer is hired, trained, and assigned to patrol and any possible reduction in crime, the Granger test seems to be the best method of determining this correlation. By using the data from Levitt's 59 cities, Marvel and Moody determined that for each additional officer at the city level, approximately 24 fewer crimes occur: .02 homicides, .1 rapes, 1.8 robberies, 5.3 burglaries, 12.5 larcenies, and 4.5 auto thefts (p. 632). Marvel and Moody caution that the estimates are averages across the cities and states, and the figures might be higher or lower in individual localities due to, for example, differences in policing practices and differences in other criminal justice features with which the police interact.

Like Correa above, Marvel and Moody examined the cost of crime and the number of police officers that would be required in their study. They estimate "that the per-officer savings to victims of UCR index crime are roughly \$100,000 per additional officer, which are approximately twice the nationwide costs per officer (Lindgren, 1992, as cited in Marvel & Moody, 1996, p. 633). This figure may be spurious, however, because the crime-reducing effect of adding police requires more than just police expenditures. The effect may be due largely to the deterrent and incapacitative effects of additional arrests and more incarceration.

In their conclusion, Marvel and Moody emphasize that greater police staffing at the city level reduces most types of crimes, and the effect is often substantial.

Anecdotal evidence suggests a correlation between police officer staffing and city crime rates. In May, 2008, Cleveland, Ohio, mayor Frank Jackson proposed a redistricting plan for the police department that eliminated the city's Third District and increased the number of officers moving back into patrol duty. In reporting on the proposal, Walker states: "According to Jackson, because of the changes, the city will be able to increase the number of police officers on the street from 914 to 944 as well as the number of patrol cars from 199 to 210" (2008, p. 2). Redistricting, such as in Mayor Frank Jackson's proposal, allows for more police officers on the street because it takes police officers out of "desk" positions that existed in the District and returns them to patrol assignments where they can have more effect on the crime rate. This is an example of more efficient police officer resources. Crime data are not currently available on the success or non-success of Cleveland's Third Police District elimination.

Based on the extant literature, with regard to police officer staffing levels and crime rates, there is some degree of support for the commonly held belief that increased police

staffing levels for a city can have at least a delayed effect on reducing the city's overall crime rate.

Methods

This study is a time series design. It compares crime rates for selected police agencies with the actual staffing numbers of full-time police officers and sheriffs to determine whether there is negative correlation. The negative correlation can be either *declining numbers of police officers and increasing crime rates*, or *increasing numbers of police officers and declining crime rates*. The time series period for which data were obtained is 1996 to 2008—12 years. The data were then entered into SPSS to (1) obtain time series graphs for each of the agencies, and (2) obtain correlation coefficients (Pearson r). The *null hypothesis* is there is a negative correlation between crime rate and police officer staffing in metropolitan police and sheriff departments.

The data for our study were taken from two sources: Law Enforcement Management and Administrative Statistics (LEMAS) published by the Bureau of Justice Statistics (BJS) and the Uniform Crime Report (UCR) published by the Federal Bureau of Investigation (FBI). BJS conducts the LEMAS survey every four to five years, while the FBI compiles and publishes the UCR every year. The most recently published LEMAS survey was conducted in 2003, and the previous survey was conducted in 1999. BJS conducted a LEMAS survey in 2008, but the data have not yet been published.

By using the LEMAS data, the authors selected 18 city police departments and 8 county sheriff agencies to examine. Two agencies, the Suffolk County Police Department and the Palm Beach County Sheriff's Department, fit the criteria and were surveyed but were dropped from the study due to incomplete crime data for the study time period. The final 24 total agencies studied follow:

Police Departments:

Bakersfield, California PD
 Boise, Idaho PD
 Downey, California PD
 Fresno, California PD
 Garden Grove, California PD
 Honolulu, Hawaii PD
 Las Vegas, Nevada Metropolitan PD
 Memphis, Tennessee PD

Mobile, Alabama PD
 Newark, New Jersey PD
 New York City PD
 Oakland, California PD
 Philadelphia, Pennsylvania PD
 Pittsburgh, Pennsylvania PD
 Pomona, California PD
 San Jose, California PD
 San Francisco, California PD

Sheriff Departments:

Alameda County, California SD

Bexar County, Texas SD

Orange County, California SD

San Diego County, California SD

San Joaquin County, California SD

Santa Barbara County, California SD

Travis County, Texas SD

The selection of these agencies was not done randomly because the authors wanted agencies that showed significant fluctuations in their staffing over the 12 years of the study. Selection was done based on scanning the LEMAS data for agencies that showed the most significant fluctuations of police officer staffing for the period identified. These agencies were then surveyed to obtain the staffing levels for the years 2004 through 2008, the years that will appear in the 2008 LEMAS survey that BJS has not yet published. All agencies responded, which resulted in accurate staffing levels for the years 1996 to 2008. The staffing data were then correlated with the crime index figures for the same years, 1996–2008. Raw figures for both the staffing numbers and the crime index totals were converted to percentage increase or percentage decrease figures to allow for the creation of 24 graphs and 24 Pearson correlation results for each agency by using SPSS. The 1999 LEMAS displayed the percentage increase/decrease of police officer strength for a four-year period (1996–1999) for each of the selected agencies, and the 2003 LEMAS also displayed the percentage increase/decrease for a four-year period (2000–2003). The authors used the 2004–2008 data they obtained by contacting each agency to calculate the percentage increase/decrease for single years for a total of four more years.

Space does not permit reproduction of the 24 SPSS line graphs, which display the relationship of crime rate to officer staffing over the 12-year period of the study. These graphs were used to determine the data in the fourth column of Table 1, Direction of Correlation from SPSS Time Series Graphs.

Results

Table 1 reveals that 12 of the 24 agencies (50%) showed a negative correlation between police officer staffing and crime rate. Seven of these agencies fall into the category of large police agencies, defined as agencies serving a population of 300,000 or more: Oakland PD, Fresno PD, Orange County Sheriff Department, Alameda County Sheriff Department, Pittsburgh PD, San Diego Sheriff Department, and Honolulu PD. Five agencies fall into the category of medium to small agencies, defined as serving a population of fewer than 300,000: Boise PD, Garden Grove PD, San Joaquin Sheriff Department, Santa Barbara Sheriff Department, and Pomona PD.

Table 1. *Results of Agencies With Negative Pearson Correlations*

Agency	Pearson Correlation (<i>r</i>)	Significance	Direction of Correlation From SPSS Time Series Graphs
Alameda County, California Sheriff Department	-.445	.377	1996–2004: PO ▼ CR ▲
			2006–2007: PO ▲ CR ▼
			2007–2008: PO ▼ CR ▲
Boise, Idaho PD	-.764	.077	2004–2005: PO ▼ CR ▲
			2005–2008: PO ▲ CR ▼
Fresno, California PD	-.519	.292	2004–2007: PO ▲ CR ▼
Garden Grove, California PD	-.931	.01	2004–2008: PO ▲ CR ▼
Honolulu, Hawaii PD	-.311	.549	1996–2004: PO ▼ CR ▲
			2004–2008: PO ▲ CR ▼
Oakland, California PD	-.074	.890	1996–2004: PO ▲ CR ▼
			2004–2005: PO ▼ CR ▲
			2006–2008: PO ▲ CR ▼
Orange County, California Sheriff Department	-.989	.01	1996–2004: PO ▲ CR ▼
			2006–2008: PO ▲ CR ▼
Pittsburgh, Pennsylvania PD	-.074	.899	2004–2008: PO ▲ CR ▼
Pomona, California PD	-.576	.231	1996–2004: PO ▲ CR ▼
			2005–2008: PO ▲ CR ▼
San Diego, California Sheriff Department	-.562	.245	1996–2005: PO ▼ CR ▲
			2006–2008: PO ▲ CR ▼
San Joaquin, California Sheriff Department	-.515	.296	1996–2004: PO ▼ CR ▲
			2006–2007: PO ▲ CR ▼
Santa Barbara, California Sheriff Department	-.294	.571	2005–2007: PO ▲ CR ▼
			2007–2008: PO ▼ CR ▲

The negative correlations ranged from -.989 and -.931 for the Orange County Sheriff Department and Garden Grove PD, respectively, to -.074 for the Pittsburgh PD. Particularly interesting is the Direction of Correlation based on the Time Series Graphs developed with SPSS, colored coded blue for years in which police officer staffing decreased and the

crime rate increased, and red for the years in which police officer staffing increased and the crime rate decreased. Among the 12 agencies, there were 8 periods in which police officer staffing decreased and the crime rate increased and 15 periods in which police officer staffing increased and the crime rate decreased. Represented in years, police officer staffing decreased and the crime rate increased in 37 combined years, and police officer staffing increased and the crime rate decreased in 55 combined years. This represents 32.7% negative correlation—police officer strength decreased while crime increased in 37 combined years and 67.3% negative correlation—police officer strength increased while crime decreased in 55 combined years, or approximately one-third and two-thirds.

Table 2. *Results of Agencies With Positive Correlations*

Agency	Pearson Correlation (<i>r</i>)	Significance
Bakersfield, California PD	+.975	.01
Bexar, Texas Sheriff Department	+.923	.01
Downey, California PD	+.743	.090
Las Vegas, Nevada Metro PD	+.540	.268
Memphis, Tennessee PD	+.684	.134
Mobile, Alabama PD	+.084	.874
Newark, New Jersey PD	+.745	.090
NYPD	+.961	.01
Philadelphia, Pennsylvania PD	+.299	.565
San Jose, California PD	+.917	.01
San Francisco, California PD	+.291	.567
Travis, Texas County Sheriff	+.793	.060

Table 2 displays the results of the 12 cities and counties of the 24 surveyed in which there was no correlation between police officer staffing and crime rate. In other words, while police officer strength increased crime rates also increased, and vice versa. These 12 cities and counties are Bakersfield, California PD; Bexar, Texas Sheriff Department; Downey, California PD; Las Vegas, Nevada Metro PD; Memphis, Tennessee PD; Mobile, Alabama PD; Newark, New Jersey PD; NYPD; Philadelphia, Pennsylvania PD; San Jose, California PD; San Francisco, California PD; and Travis, Texas Sheriff Department. The range of the Pearson correlations are from +.975 in Bakersfield, California, to +.084 in Mobile, Alabama. A positive Pearson correlation indicates either that crime rates increased when

police officer staffing increased or crime rates fell when police officer staffing decreased. Four of the agencies indicate a significant correlation at the .01 level: Bakersfield PD, Bexar, Texas Sheriff Department, NYPD, and San Jose PD.

Conclusions and Recommendations

The data indicate support for the *null hypothesis*: there is a negative correlation between police officer staffing and the crime rates. Clearly the *null hypothesis* cannot be rejected. Fifty percent of the agencies revealed a negative correlation between police officer staffing and crime rate. In fact, the data results were contrary to what the authors expected. The limitations of this study were discussed earlier and must be reiterated here in the conclusions. This study did not control for any other factors that might influence crime rates in these agencies. It is possible that factors other than the level of police officer staffing influenced the crime rates of these agencies during the study period. Moreover, this study does not directly account for lag—the period in which additional police officers must be trained and gain experience; police officers and sheriffs cannot affect the crime rate in their agency, for example, during their training—both in the police academy and their 6 months to a year on-the-job training. Nevertheless, a time series design does make an indirect allowance for lag. Twelve years allows considerable time for officer training and experience to have an effect on the crime rate in their agency.

Perhaps the most revealing finding of this study is that one-third of the negative correlations were the result of police officer decreases combined with crime rate increases. It appears that when cities or counties reduce the number of sworn police officers as a result of bad economic conditions or other factors, the crime rate tends to increase. The explanation for this may be that criminals or potential criminals learn about the officer reductions through media reports and decide that times of reduced police officer staffing may be the most opportune time to commit their crimes. A reduction in police officer staffing makes headlines in the local newspapers and television stations. It is not farfetched to assume that criminals and potential criminals watch or read the news about police officer reductions and see this as an opportunity to commit more crimes. Perhaps the results of this study point toward this possibility.

This study only touches on the very important topic of police officer staffing levels and crime rates. It is a topic that requires further research because more data are necessary to support the political stance not to lay off police and sheriff officers in times of financial crisis. Public safety should be the first concern of cities, but politicians need empirical support for not laying off officers when other city or county services are making cuts in times of financial crisis. Moreover, politicians should not be made the only scapegoats when they do make the politically dangerous decision to lay off officers. Agencies can do

more in times of crisis as cited earlier (see Walker, 2008). As discussed earlier in this paper, Mayor Frank Jackson of Cleveland, Ohio, imposed a redistricting plan that eliminated the city's Third Patrol District, and this put 30 more officers on patrol duty and added 11 more patrol vehicles. Police chiefs and sheriffs must be willing, on their own, to reassign officers temporarily from non-patrol duty to patrol duty until staffing returns to the traditional officer-to-citizen ratio. The safety of citizens should not be put in jeopardy while politicians and police administrators fight over cuts versus reassignment; both should be a part of any plan.

More agencies must be included in a follow-up study and perhaps a longer longitudinal study to add external validity to this study. Clearly, more research is needed.

Note

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References

- Bahl, R., Johnson, M., & Wasylenko, M. (1980). State and government expenditure determinants: The traditional view and a new approach. In R. Bahl, J. Burkhead, & B. Jump, B. (eds.), *Public employment and state and local government finance* (pp. 65–119). Cambridge, MA: Ballinger.
- Bayley, D. H. (1985). *Patterns of policing: A comparative analysis*. New Brunswick, N.J.: Rutgers University Press.
- Benson, B. L., Kim, I., & Rasmussen, D. W. (1996). Estimating deterrence effects: A public choice perspective on the economics of crime literature. *Southern Economic Journal*, 67, 160–168.
- Blumstein, A., Cohen, J., & Nagin, D. (1978). *Deterrence and incapacitation: Estimating the effects of criminal sanctions and crime rates*. Washington, D.C.: National Academy Press.
- Cameron, S. (1988). The economics of crime deterrence: A survey of theory and evidence. *Kyklos*, 41, 301–323.
- Coe, C. K. & Weisel, D. L. (2001). Police budgeting: Winning strategies. *Public Administration Review*, 61(6), 718–727.
- Correa, H. (2005). Optimal expenditures on police protection. *Socio-Economic Planning Sciences*, 39, 215–228.

- Gennaro, V. F. & Kunselman, J. (2000). Reinventing government: The view of police managers. *Police Quarterly*, 3(3), 315–330.
- Gottfredson, M. R. & Hirschi, T. (1990). *A general theory of crime*. Stanford, CA: Stanford University Press.
- Guffey, J. (2009). *Assessing the cost-benefit of police officer staffing: Do cities with higher police officer to citizen ratios have less crime? Global Conference on Business and Finance Proceedings*, 5(11), 120–128.
- Hirsch, W. Z. (1977). Production, cost, and expenditure determinate functions of police services. In S. S. Nagel, (ed.), *Modeling the criminal justice system* (pp. 127–141). Beverly Hills, CA: Sage Publications.
- Jordan, R. E. (1992). *Policing strategies that address community needs in the 21st century*. Sacramento, CA: The Commission on Police Officer Standards and Training.
- Kelling, G. L., Pate, T., Dieckman, D., & Brown, C. E. (1972). *The Kansas City preventive patrol experiment*. Washington, D.C.: The Police Foundation.
- Levitt, S. D. (1997). Using electoral cycles in police hiring to estimate the effect of police on crime. *The American Economic Review*, 87(3), 270–290.
- Levitt, S. D. (1998). The relationship between crime reporting and use of uniform crime reports. *Journal of Quantitative Criminology*, 14(1), 61–81.
- Marvel, T. B., & Moody, C. E. (1996, November). Specification problems, police levels, and crime rates. *Criminology*, 34(4), 609–646.
- Sherman, L. W. (1992). Attacking crime: Police and crime control. In M. Tonry & N. Morris, (eds.), *Modern policing*. Chicago, IL: University of Chicago Press.
- Southwick, L. (2005). Economies of scale and market power in policing. *Managerial and Decision Economics*, 26(8), 461–473.
- Sparrow, M. K., Moore, M. H., & Kennedy, D. (1990). *Beyond 911: A new era for policing*. New York: Basic Books.
- Walker, R. (2008, May 7). Safety threatened by new plan, says police union. *Call & Post*, p. A3. Retrieved on October 9, 2009, from Ethnic News Watch (Doc ID: 1496995051).

