United States Government Accountability Office

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Report to the Chairman, Committee on the Judiciary, House of Representatives

October 2005

COMMUNITY POLICING GRANTS

COPS Grants Were a Modest Contributor to Declines in Crime in the 1990s

GAO-06-104

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Highlights

Highlights of GAO-06-104, a report to the Chairman, Committee on the Judiciary, House of Representatives

Why GAO Did This Study

Between 1994 and 2001, the Office of Community Oriented Policing Services (COPS) provided more than $7.6 billion in grants to state and local communities to hire police officers and promote community policing as an effective strategy to prevent crime. Studies of the impact of the grants on crime have been inconclusive.

GAO was asked to evaluate the effect of the COPS program on the decline in crime during the 1990s. GAO developed and analyzed a database containing annual observations on crime, police officers, COPS funds, and other factors related to crime, covering years prior to and during the COPS program, or from 1990 through 2001. GAO analyzed survey data on policing practices that agencies reportedly implemented and reviewed studies of policing practices. GAO assessed: (1) how COPS obligations were distributed and how much was spent; (2) the extent to which COPS expenditures contributed to increases in the number of police officers and declines in crime nationwide; and (3) the extent to which COPS grants during the 1990s were associated with policing practices that crime literature indicates could be effective.

In commenting on a draft of this report, the COPS Office said that our findings are important and support conclusions reached by others.

www.gao.gov/cgi-bin/getrpt?GAO-06-104.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Laurie Ekstrand at (202) 512-8777 or ekstrandl@gao.gov.

What GAO Found

About half of the COPS funds distributed from 1994 through 2001 went to law enforcement agencies in localities of fewer than 150,000 persons and the remainder to agencies in larger communities. This distribution roughly corresponded to the distribution of major property crimes but less so to the distribution of violent crimes. For example, agencies in larger communities received about 47 percent of COPS funds but accounted for 58 percent of the violent crimes nationwide. From 1994 through 2001, COPS expenditures constituted about 1 percent of total local expenditures for police services.

For the years 1994 through 2001, expenditures of COPS grants by grant recipients resulted in varying amounts of additional officers above the levels that would have been expected without the expenditures. For example, during 2000, the peak year of COPS expenditures by grant recipients, they led to an increase of about 3 percent in the level of sworn officers—or about 17,000 officers. Adding up the number of additional officers in each year from 1994 through 2001, GAO estimated that COPS expenditures yielded about 88,000 additional officer-years. GAO obtained its results from fixed-effects regression models that controlled for pre-1994 trends in the growth rate of officers, other federal expenditures, and local- and state-level factors that could affect officer levels.

From its analysis of the effects of increases in officers on declines in crime, GAO estimated that COPS funds contributed to declines in the crime rate that, while modest in size, varied over time and among categories of crime. For example, between 1993 and 2000, COPS funds contributed to a 1.3 percent decline in the overall crime rate and a 2.5 percent decline in the violent crime rate from the 1993 levels. The effects of COPS funds on crime held when GAO controlled for other crime-related factors—such as local economic conditions and state-level policy changes—in its regression models, and the effects were commensurate with COPS funds' contribution to local spending on police protection. Factors other than COPS funds accounted for the majority of the decline in crime during this period. For example, between 1993 and 2000, the overall crime rate declined by 26 percent, and the 1.3 percent decline due to COPS, amounted to about 5 percent of the overall decline. Similarly, COPS contributed about 7 percent of the 32 percent decline in violent crime from 1993 to 2000.

From 1993 though 1997, agencies that received and spent COPS grants reported larger changes in policing practices and in the subsets of practices that focus on solving crime problems or focus on places where crime is concentrated than did agencies that did not receive the grants. The differences held after GAO controlled for underlying trends in the reported use of these policing practices. From 1996 to 2000, there was no overall increase in policing practices associated with COPS grants. In its review of studies on policing practices, GAO found that problem-solving and place-oriented practices can be effective in reducing crime.

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Abbreviations

AHEAD	Accelerated Hiring, Education, and Deployment
BJA	Bureau of Justice Assistance
BJS	Bureau of Justice Statistics
COPS	Office of Community Oriented Policing Services
DLEA	Directory of Law Enforcement Agency
DOJ	Department of Justice
FAST	Funding Accelerated for Smaller Towns
FBI	Federal Bureau of Investigation
FIPS	Federal Information Processing Standards
LLEBG	Local Law Enforcement Block Grants
MORE	Making Officer Redeployment Effective
NCHS	National Center for Health Statistics
NVCS	National Crime Victimization Survey
OJP	Office of Justice Programs
ORI	originating agency identifier
UCR	Uniform Crime Reporting
UHP	Universal Hiring Program
VCCLEA	Violent Crime Control and Law Enforcement Act of 1994

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United States Government Accountability Office
Washington, DC 20548

October 14, 2005

The Honorable F. James Sensenbrenner, Jr.
Chairman
Committee on the Judiciary
House of Representatives

Dear Mr. Chairman:

Provisions of the Public Safety Partnership and Community Policing Act of 1994, Title 1 of the Violent Crime Control and Law Enforcement Act of 1994 (VCCLEA), authorized appropriations of $8.8 billion for fiscal years 1995 through 2000 for grants to states and local communities to increase the hiring and deployment of community police officers and to promote nationwide the concept of community policing—an approach to policing that involves the cooperation of law enforcement and community residents in identifying and developing solutions to crime problems—as an effective strategy to improve public safety.[1] To administer the grants, in October 1994, the Attorney General created the Office of Community Oriented Policing Services (COPS).

According to its Director, the COPS Office was responsible for "one of the greatest infusions of resources into local law enforcement in our nation's history,"[2] and in a report to Congress the former Attorney General linked increases in COPS-funded officers to declines in crime. By the summer of 2000, the former Attorney General reported, the COPS Office had awarded more than $7.6 billion in grants to more than 12,000 local law enforcement agencies—primarily municipal, state, and county police and sheriff's departments whose officers have general arrest powers—and funded over 105,000 community policing officers. The report claimed that the funded officers led to an increase in the number of police officers that was well above what would have been expected in the absence of the passage of

[1]P.L. 103-322 (1994), 42 U.S.C. § 3796dd. The act contained other provisions to address violent crime, such as those encouraging states to increase the use of incarceration for violent offenders, enhancing penalties for gang crimes, and expanding the number of federal offenses punishable by death.

[2]Frazier, Thomas, C., "Introduction from the Director," in Attorney General, *Report to Congress: Office of Community Oriented Policing Services*, Washington, D.C.: U.S. Department of Justice, 2000.

VCCLEA, and it cited research that showed that increased police presence led to reductions in crime. As evidence that these officers led to reductions in crime, the report showed that the average number of violent crimes per police department declined as the number of COPS-funded officers increased.

A study funded by the COPS Office and released in 2001, which attempted to control for some of the other factors that could influence crime rates and also be correlated with the distribution of COPS funds, concluded that COPS grants contributed to the reduction in crime in the 1990s.[3] You previously asked us to review this study, and we reported that its methodological limitations were such that the study's results should be viewed as inconclusive.[4]

In response to our assessment of the results of the study that we reviewed, you asked us to undertake an independent evaluation of the impact of COPS grants on the decline in crime that occurred during the 1990s. This report provides results from our evaluation of interrelated questions about COPS funds, officers, crime, and policing practices. Specifically, regarding COPS funds: (1) From 1994 through 2001, how were COPS obligations distributed among local law enforcement agencies in relation to the populations they served and crimes in their jurisdictions, and how much of the obligated amounts did agencies spend? Regarding officers and crime: (2) To what extent did COPS grants contribute to increases in the number of sworn officers and declines in crime in the nation during the 1990s? Regarding policing practices: (3) To what extent were COPS grants during the 1990s associated with police departments adopting policing practices that the crime literature indicates could contribute to reductions in crime?

To address our reporting objectives, we created and analyzed a database consisting of 12 years of data on local law enforcement agencies for the years 1990 through 2001. We included data from the Department of Justice's (DOJ) Office of Justice Programs (OJP) on federal law enforcement grant obligations and expenditures (including COPS grants);

[3]Zhao, J., and Q., Thurman. *A National Evaluation of the Effect of COPS Grants on Crime from 1994 to 1999*. Report submitted to the Office of Community Oriented Policing Services, Washington, D.C.: U.S. Department of Justice, December 2001.

[4]We reported our review of this study in GAO, *Technical Assessment of Zhao and Thurman's 2001 Evaluation of the Effects of COPS Grants on Crime*, GAO-03-867R (Washington, D.C.: June 13, 2003).

the Federal Bureau of Investigation's (FBI) Uniform Crime Reporting (UCR) Program on crime and sworn officers; the Department of Commerce's Bureau of Economic Analysis on local economic conditions such as employment rates and per capita income; and the National Center for Health Statistics and U.S. Census Bureau's estimates of demographic characteristics of local populations—such as their age, race, and gender composition. The UCR crime data that we used are data on crimes reported to or known by the police and reported to the UCR Program. The crimes in the UCR are based on the FBI's crime index. The index crimes include the violent crimes of murder and non-negligent manslaughter, forcible rape, robbery, and aggravated assault as well as the property crimes of burglary, larceny-theft, motor vehicle theft, and arson. The FBI reports that there is limited reporting of arson offenses to the UCR Program by law enforcement agencies. We therefore excluded arson crimes from our analysis.[5]

Prior to developing and using the database to address our objectives, we assessed the reliability of each data source, and in preparing this report, we used only the data that we found to be sufficiently reliable for the purposes of our report. We also assessed possible biases in our estimates of the effects of COPS funds on crime arising from our use of UCR data on reported crimes. We concluded from our analysis that our estimates of the impacts of COPS funds are likely to understate the effect of COPS funds on crime. (See app. I for a more detailed discussion of our approach, methods, and database construction.)

To describe how COPS grant funds were distributed and spent, we analyzed data on COPS obligations to and expenditures by local law enforcement agencies, comparing them with several characteristics of the agencies that received COPS funds, such as population size and crime levels.

To assess the possible relationships between COPS expenditures and changes in the number of officers and rates of crime, we analyzed data on the agencies that reported complete crime and officer data for at least 1 year from 1990 through 2001 using a two-stage regression model of these relationships. In the first stage, we estimated the relationship between the

[5]Because of the limited reporting of arson, the FBI also excludes arson from its published tables containing national estimates of index crimes. See Federal Bureau of Investigation, *Crime in the United States, Uniform Crime Reports*, Washington, D.C.: U.S. Department of Justice, published annually.

variation in the timing and amount of agencies' expenditures on COPS grants that were for hiring officers and changes in the number of officers. In the second stage, we estimated the relationship between changes in COPS expenditures and changes in crime rates using fixed-effects regression models. We used the results from these two sets of regressions to calculate the amount of the change in crime (from the second stage) due to changes in officers (from the first stage). As the relationship between officer levels and crime rates may reflect a complex causal relationship, we used COPS hiring grants as a statistical instrument to help to identify the relationship between officers and crime. In both sets of regression models, we used agency and year fixed effects to control for unobserved sources of variation among agencies (within a given year) and within agencies (over time). We also included variables to measure agencies' pre-1994 trends in the growth of crime rates and officers. These controls allowed us to compare agencies that had similar, pre-COPS trends in these variables, thereby reducing further the differences among agencies that are not due to COPS expenditures. To control for economic factors that may be related to crime—such as employment and income—we included measures of local economic conditions, and to control for changes in the composition of local populations that could be correlated with crime, we included measures of age and race composition of local populations. Finally, to control for changes in state-level practices that could affect crime rates, such as changes in state incarceration rates or state sentencing policy, we included state-by-year fixed effects in our regression models. (See app. VI for additional details about our regression models.)

To address the relationship between COPS grants and changes in policing practices, we analyzed data from two surveys of nationally representative samples of local law enforcement agencies on policing practices that they reportedly implemented in various years from 1993 to 2000. The first survey—the Policing Strategies Survey—was administered in 1993 and 1997 to provide information on the development and implementation of community policing.[6] The second survey—the National Evaluation of

[6]The first survey was the National Survey of Community Policing Strategies, and it was administered in 1993 and 1997. The Police Foundation administered the 1993 wave of the survey, and ORC Macro International, Inc. and the Police Executive Research Forum administered the 1997 wave of the survey. Both surveys used the same sampling frame. In the remainder of this report, we refer to the two waves of this longitudinal survey as the Policing Strategies Survey.

COPS Survey—was administered in 1996 and 2000.[7] We identified and analyzed practices that are associated with problem-solving, place-oriented approaches to policing, community collaboration efforts, and the use of crime analysis. We assessed changes in the levels of reported practices between agencies that spent COPS grants over particular periods with those that did not receive or spend COPS grant funds. To control for the underlying trends in reported policing practices, we estimated fixed-effects regression models of the effects of COPS grants expenditures on changes in reported policing practices. To assess the possible relationship between policing practices and crime, we analyzed systematic reviews of the effectiveness of policing practices in reducing crime to identify the types of policing practices that have been judged to be effective in preventing crime. (See app. VII for details about the surveys and our analytic methods.)

In addition, we reviewed relevant economic and criminological literatures that addressed issues related to estimating models of the effects of federal grant funds on crime rates. We spoke with officials at the Department of Justice about the operation of the COPS program, and we also spoke with researchers about our approach and methods. We reviewed our approach and methods with a group of experts in the field of policing and crime. The group consisted of criminologists, economists, statisticians, and criminal justice practitioners, and was convened for us by the National Research Council of the National Academies to enable participants to offer their individual views as experts in the field.

We conducted our work between January 2004 and August 2005 in accordance with generally accepted government auditing standards.

Background

Established in October 1994 by the Attorney General to implement the administration of community policing grants under VCCLEA, the Office of Community Oriented Policing Services announced it first grant programs in 1994. Prior to its establishment, in December 1993 the Department of

[7]The second survey was the National Evaluation of the COPS Program survey, which was conducted by the National Opinion Research Corporation for the Urban Institute in its evaluation of the implementation of the COPS program. It was a nationally representative sample of law enforcement agencies that were contacted in 1996 and again in 2000. In the remainder of this letter, we refer to this second survey as the National Evaluation of COPS Survey.

Justice awarded community policing grants to hire officers under the Police Hiring Supplement.[8]

The COPS Office distributed grants in a variety of program funding categories. Hiring grants, which required agencies to hire new officers and at the same time to indicate the types of community policing strategies that they intended to implement with the grants, was the largest COPS grant program category in terms of the amounts of grant funds obligated.[9] The hiring grants paid a maximum of $75,000 per officer over a 3-year period (or at most 75 percent of an officer's salary) and generally required that local agencies cover the remaining salary and benefits with state or local funds. From 1994 through 2001, more than $4.8 billion in COPS obligations (or about 64 percent of COPS obligations over this period) were in the form of hiring grants. The Making Officer Redeployment Effective (MORE) grant program, which provided funds to law enforcement agencies to purchase equipment, hire civilians, and redeploy existing officers to community policing was the second largest COPS grant program, obligating more than $1.2 billion. Additional COPS grant programs provided funds for specific innovations in policing and for a variety of other purposes.

Each year the COPS Office was required to distribute half of the grant funds to agencies in communities whose populations exceeded 150,000

[8]The Police Hiring Supplement Program was established by the Supplemental Appropriations Act of 1993 (P.L. 103-50 (1993)). The grants made under this program were funded by DOJ's Bureau of Justice Assistance. In this report, when we refer to COPS grants, we include both the grants made under the Police Hiring Supplement and the community policing grants authorized under VCCLEA.

[9]Hiring programs authorized under VCCLEA and administered by the COPS office included the Phase I program, which funded qualified applicants who had applied for the Police Hiring Supplement but were denied because of the limited funds available; COPS AHEAD (Accelerated Hiring, Education, and Deployment) for municipalities with populations of 50,000 and above; and COPS FAST (Funding Accelerated for Smaller Towns) for towns with populations below 50,000. In June 1995, Phase I, COPS AHEAD, and COPS FAST were replaced by the Universal Hiring Program.

persons and half of the grant funds to agencies in communities with populations of 150,000 or fewer persons.[10]

In the applications for hiring grants, the COPS Office requested agencies to indicate the types of community policing practices that they planned to implement with their grants. The various practices related to community policing included practices such as identifying crime problems by looking at records of crime trends and analyzing repeat calls for service, working with other public agencies to solve disorder problems, locating offices or stations within neighborhoods, and collaborating with community residents by increasing officer contact with citizens and improving citizen feedback. These types of policing practices also corresponded with general approaches to policing. For example, problem-solving policing practices may rely on crime analysis tools to help to identify crime problems and develop solutions to them. Place-oriented practices attempt to identify locations where crime occurs repeatedly and to implement procedures to disrupt these recurrences of crime. By collaborating with community residents, agencies attempt to improve citizen feedback about crime problems and effectiveness of policing to address these problems.

In 2000, DOJ reported that COPS-funded officers helped to reduce crime and reported that the drop in crime that occurred after 1994 was more than what would have been expected in the absence of the passage of VCCLEA and the creation of the COPS Office.[11] The report suggested that COPS had achieved its goal of funding 100,000 officers, and through increases in officers and the practice of community policing, the COPS program was credited with reducing crime. However, while COPS may have funded 100,000 officers, it was not apparent that the funded officers had resulted in new officers having been hired. Researchers at the Urban Institute reported in 2000, for example, their estimates that by 2003, the COPS program would have raised the level of police on the street by the

[10]Of funds available in any fiscal year, up to 3 percent could have been used for technical assistance or for evaluations or studies carried out or commissioned by the Attorney General. The requirement to allocate the funds by size of agency population applies to the remaining funds in any fiscal year (42 U.S.C. § 3793 (a)(11)(B)). In addition, COPS had to meet a national coverage requirement to ensure that no state received less than 0.5 percent of total funding.

[11]Attorney General, *Report to Congress: Office of Community Oriented Policing Services*, Washington, D.C.: U.S. Department of Justice, 2000.

equivalent of 62,700 to 83,900 full-time equivalent officers.[12] They also indicated that it was unclear whether the program would ever increase the number of officers on the street at a single time by 100,000.[13]

The COPS Office-funded study of the effect of COPS grants on crime in over 6,000 communities from 1995 through 1999 that had received COPS grants concluded that COPS grants were effective in reducing crime.[14] The study also reported that COPS grants that encouraged agencies to implement a variety of innovative strategies to improve public safety had larger impacts on reducing violent and property crime than did other COPS grant types.[15] However, a study released by the Heritage Foundation, which was based upon an analysis of county-level data, was unable to replicate the findings of the COPS Office-funded study.[16] Specifically, the Heritage study found no effect of COPS hiring grants on crime rates, but it did find that the COPS grants for specific problems—such as gangs, domestic violence, and illegal use of firearms by youth—were associated with reductions in crime. In addition, we questioned whether the sizes of the effects of COPS grants on crime that were reported in the COPS Office-funded study were large enough to be significant in a practical sense and whether they could accurately represent the expected returns on the investment of billions of dollars.[17]

[12]Roth, Jeffrey, et al., *National Evaluation of the Implementation of the COPS Program*, Washington, D.C.: National Institute of Justice, August 2000.

[13]In a 2002 report, the Urban Institute researchers updated their estimates of the number of officers due to COPS and reported an estimate of a permanent increase of between 69,100 and 92,200 officers post-2005, taking into account post-grant attrition of officers. Koper, Christopher, et al., *Putting 100,000 Officers on the Street: A Survey-Based Assessment of the Federal COPS Program*, Washington, D.C.: The Urban Institute, 2002.

[14]Zhao and Thurman, 2001.

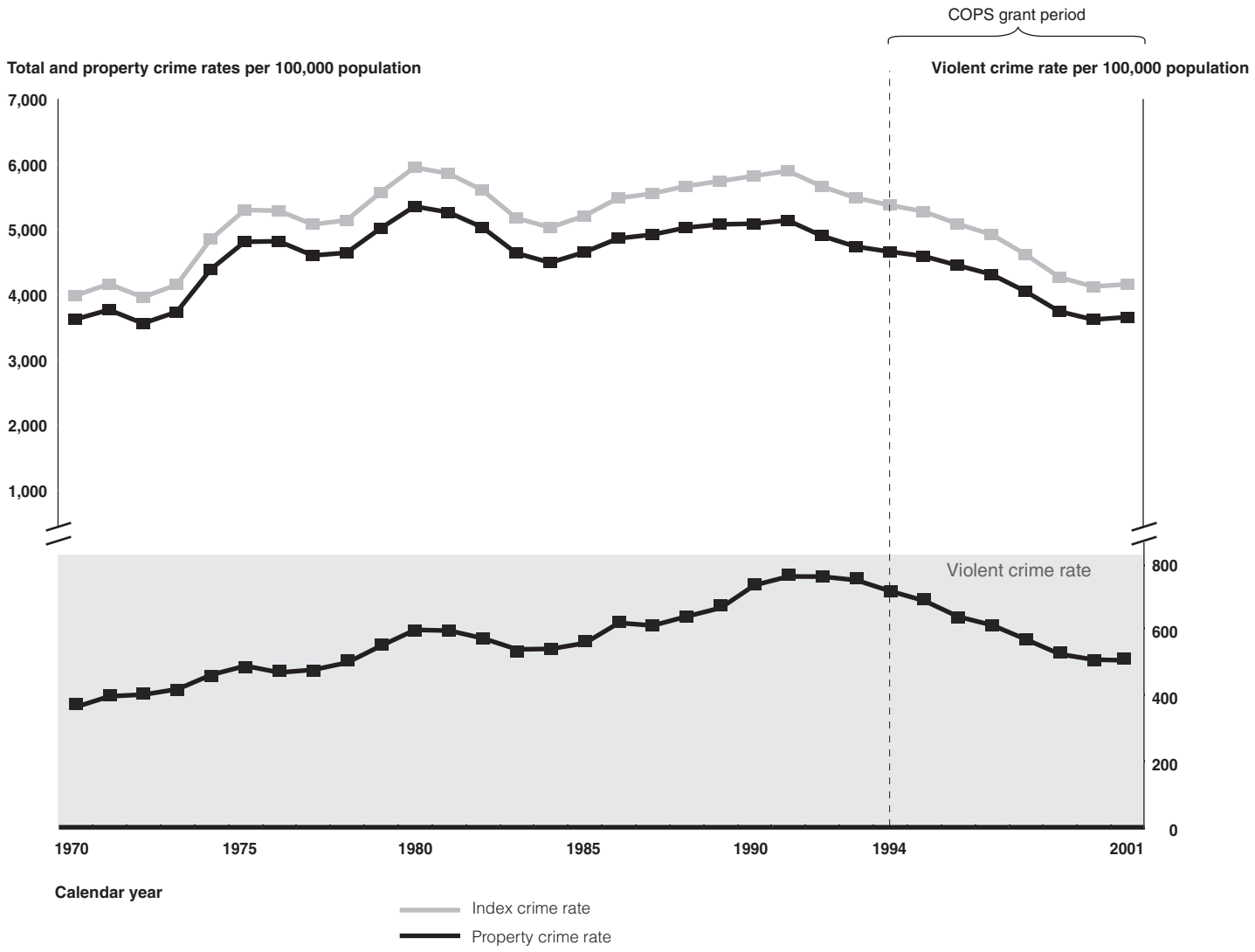
[15]The authors of the COPS Office-funded study revised their report to take into account criticism presented by reviews, and in 2004, they released their final report on the effect of COPS grants on crime. In their final report, they updated their findings through 2000, and their results were comparable to what they reported in their initial report. Zhao, J., and Q. Thurman, *Funding Community Policing to Reduce Crime: Have COPS Grants Made a Difference from 1994 to 2000?* Report submitted to the Office of Community Oriented Policing Services, U.S. Department of Justice, July 2004.

[16]Muhlhausen, D., *Do Community Oriented Policing Services Grants Affect Violent Crime Rates* (Washington, D.C.: The Heritage Foundation, May 25, 2001).

[17]GAO *Technical Assessment of Zhao and Thurman's 2001 Evaluation of the Effects of COPS Grants on Crime*, GAO-03-867R (Washington, D.C.: June 13, 2003).

Assessing the contribution of COPS funds to the decline in crime during the 1990s presents challenges for evaluators. Nationwide, crime rates began to decline in about 1991, before the COPS program announced its first grant programs in 1994 (fig. 1). Hence the factors other than COPS grants that were responsible for precipitating the decline in crime could have continued to influence its decline throughout the 1990s. Researchers have pointed to a number of factors that could have precipitated the decline in crime, including increased use of prison as a punishment for violent crimes, improved economic conditions, and the subsiding of violence that accompanied the expansion of drug markets. To the extent that any of these factors are correlated with the distribution of COPS grants, they could be responsible for impacts that have been attributed to COPS grants.

Figure 1: Total, Violent, and Property Crime Rates per 100,000 Persons, as Reported in the Uniform Crime Reports, 1970-2001



Source: GAO analysis of Uniform Crime Report data as reported on the Bureau of Just ice Statistics online analysis of Uniform Crime Report data. Prepared by the National Archive of Criminal Justice Data. Data available at http://.bjsdata.ojp.usdoj.gov/dataonline/

Prior studies of the impact of COPS grants on crime have correlated COPS funds with crime rates, controlling for other factors that could influence crime rates. The authors of the prior studies describe various mechanisms by which COPS grants may affect crime, but their statistical models do not explicitly take these mechanisms into account in estimating the effects of the grants. By identifying and explicitly modeling mechanisms through

which COPS funds could affect crimes—such as increasing the number of sworn officers on the street who are available for patrolling places or contributing to changes in policing practices that may be effective in preventing crime—the possibility of a spurious relationship between inputs (such as COPS funds) and outcomes (such as crime) can be minimized. (For additional background information, see app. II.)

Results

Our analysis showed that from 1994 through 2001, COPS obligated more than $7.32 billion to 10,680 agencies for which we were able to link Office of Justice Programs financial data on COPS obligations to the records of law enforcement agencies.[18] About $4.7 billion (or 64 percent) of these obligations were in the form of hiring grants. About half of these funds went to agencies serving populations of 150,000 or fewer persons and about half was distributed to agencies serving populations of more than 150,000 persons. This distribution roughly corresponds to the distribution of index crimes across the two size categories of jurisdictions. However, in relation to violent crimes, the share of COPS funds distributed to larger jurisdictions was smaller than the share of violent crimes that they contributed to the national total. For example, agencies serving populations of more than 150,000 persons contributed about 58 percent of all violent crimes reported to the UCR during this time period while receiving about half of all COPS funds. To be specific, the smallest agencies—those serving populations of fewer than 10,000 persons—received an average of $1,573 per violent crime reported to UCR. Agencies serving populations of more than 150,000 persons received about $418 in COPS funds per violent crime.

By the end of 2001, the COPS grantee agencies in our sample had spent about $5 billion (or 68 percent of the $7.3 billion obligated to them) from 1994 through 2001. Annually, the total amount of COPS expenditures made by grantees increased each year from 1994 until 2000, and then declined, while the number of agencies that drew down COPS funds peaked in 1998 at about 7,600 and declined to about 6,000 in 2001. From 1994 through 2001, a total of about 10,300 agencies spent COPS funds. The maximum number of agencies spending funds in any given year occurred during 1998, when about 7,600 agencies spent funds. From 1998 through 2000, the amount of COPS expenditures per person in the jurisdiction served by an

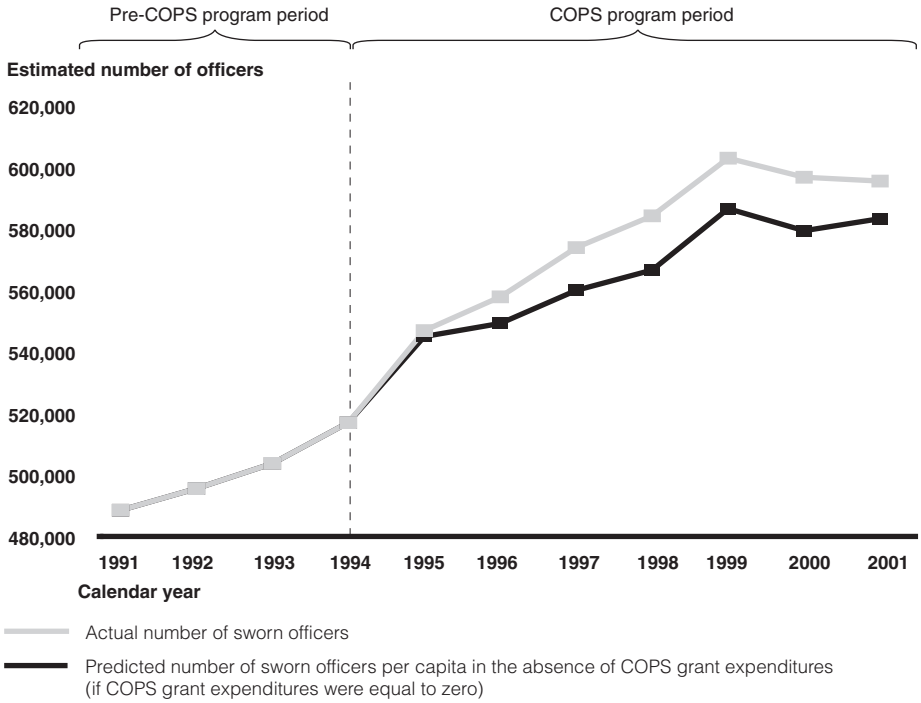
[18]The amount obligated to these agencies was 96.1 percent of the $7.6 billion total in COPS obligations reported in the Office of Justice Programs financial data.

agency increased from about $4 to about $4.80. COPS expenditures amounted to an annual average of about 1 percent of total expenditures for police services by local law enforcement agencies from 1994 through 2001. This contribution varied by year. For example, in 1999 and 2000, COPS expenditures were about 1.5 percent of total local police expenditures. (See app. III for a further discussion of COPS obligations and expenditures.)

For the years 1994 through 2001, we infer from our estimates that COPS hiring grant expenditures contributed to increases in sworn officer levels above the levels that would have been expected without these funds. The additional number of sworn officers stemming from these funds varied over the years, and it increased from 1994 though 2000 and declined in 2001 (fig. 2). For example, for 1997 we estimate that COPS funds contributed about 14,000 additional officers in that year—or about 2.4 percent of the total number of sworn officers nationwide—and for 2000, COPS funds contributed about 17,000 additional officers—or about 3 percent of the total number of sworn officers nationwide. For all years from 1994 through 2001, we estimate that COPS expenditures paid for a total of about 88,000 additional officer-years over this entire period, where the total number of officer-years equals the sum of the number of officers due to COPS grant expenditures in each year. An officer-year refers to the number of officers in a given year that we could attribute to COPS expenditures, and the additional officers in a given year attributable to COPS expenditures represent a net addition to the stock of sworn officers.[19] Using the results from our regression estimates of the effects of COPS expenditures on the level of sworn officers, we set the values for COPS expenditures to zero to predict the level of officers absent COPS funds. The difference between this number and the actual number of sworn officers yields the number of officers due to COPS expenditures. Our analysis also shows that apart from the COPS hiring and COPS MORE grants, other COPS grant types did not have a significant effect on officer strength. (See app. IV for more detailed information about the results of our analysis of COPS expenditures on officers.)

[19]An officer-year is not equivalent to the total number of officers or full-time officer equivalents hired as a result of COPS funds; nor is it equivalent to the total number of officers funded by COPS grants. Across years, the COPS funds may have paid for the same person. In counting officer-years, this person would be counted one time for each year in which we estimated that COPS funds paid for the position.

Figure 2: Estimated Effects of COPS Grant Expenditures on the Number of Sworn Officers, 1991-2001

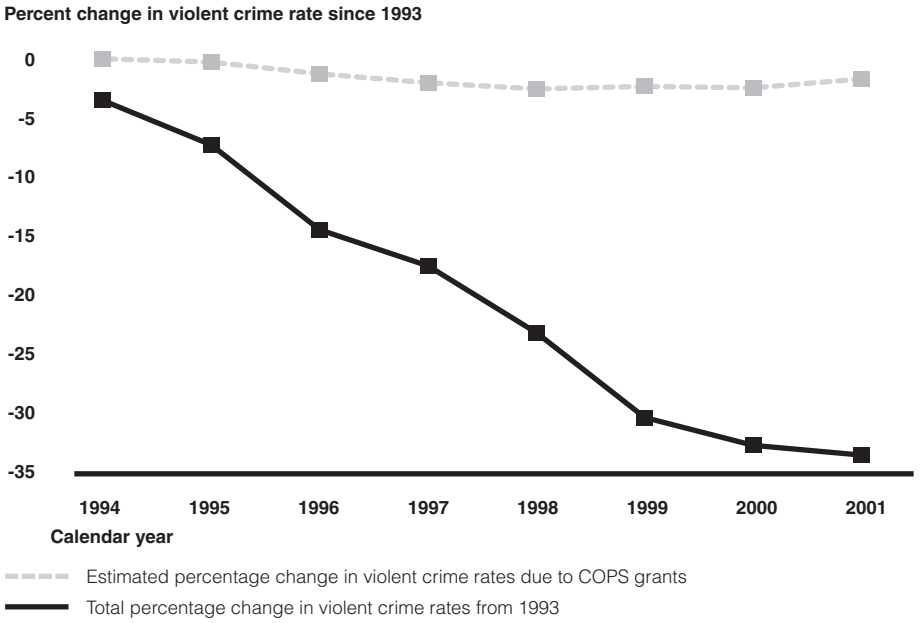


Source: GAO analysis of Uniform Crime Report, Office of Justice Programs, National Center for Health Statistics, U.S. Census Bureau, and Bureau of Economic Analysis data.

We estimate that the COPS grant expenditures contributed to the reduction in crime in the 1990s independently of other factors that we were able to take into account in our analysis. Other factors that could have contributed to the reduction in crimes in the 1990s that we took into account included federal law enforcement expenditures other than COPS grants, local economic conditions and changes in population composition, and changes in state-level policies and practices that could be correlated with crime, such as incarceration and sentencing policy. Specifically, from our model of the effect of changes in sworn officers on crime, we estimate that a 1 percent increase in the number of sworn officers per capita would lead to a 0.4 percent reduction in the total number of index crimes. Through their effects on changes in officers in a given year, COPS expenditures led to varying amounts of declines in crime rates over the years from 1994 through 2001. For example, the 2.4 percent increase in sworn officers due to COPS expenditures in 1997 was responsible for about a 1.1 percent decline in the total index crime rate from 1993 to 1997, while the roughly 3 percent increase in officers due to COPS expenditures

in 2000 was responsible for about 1.3 percent decline in the total index crime rate from 1993 to 2000. Put into another context, the total crime rate declined from 5,904 per 100,000 persons in 1993 to 4,367 per 100,000 persons in 2000, or by about 26 percent. Of this 26 percent drop, we attribute about 5 percent to the effect of COPS. From our analysis of violent crimes, we estimated that declines in the violent crime rate due to COPS expenditures also varied with the level of officers due to COPS funds. The declines in violent crime rates attributable to COPS increased from about 2 percent in 1997 to 2.5 percent in 2000, where both of the amounts of decline attributable to COPS expenditures are based upon comparisons with the 1993 violent crime rate (fig. 3). We further estimate that at its peak in 1998, COPS accounted for about a 1.2 percent decline in the property crime rate.

Figure 3: Annual Percentage Changes in the Violent Crime Rate from 1993: Total Change and Estimated Change Due to COPS Grants



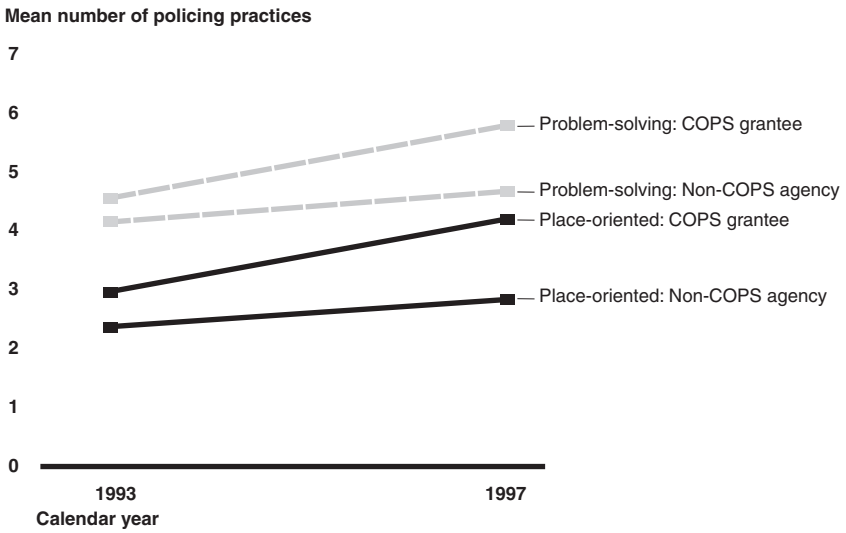
Source: GAO analysis of Uniform Crime Report, Office of Justice Programs, National Center for Health Statistics, U.S. Census Bureau, and Bureau of Economic Analysis data.

Our estimates of the impacts of COPS expenditures on the broad categories of crime are supported by our findings from our crime-type-specific regression models. We find significant reductions due to COPS expenditures for the crimes of murder and non-negligent manslaughter, robbery, aggravated assault, burglary, and motor vehicle theft. Our analysis of larceny indicates that while the relationship between COPS

funds and larceny is a negative one, it is not statistically significant, nor is the effect of COPS on rape statistically significant. Further, we estimated the effects of COPS grants on the total crime rate under various assumptions about lags between the receipt of COPS grants and expenditures of COPS funds. The estimates for the amount of the decline in the total crime rate that we report here—for example, the 1.3 percent of the decline in crime from 1993 to 2000—are among the smallest effects that we estimated from our various models. Under different assumptions about lags associated with COPS expenditures, the amount attributable to COPS could be as high as 3.2 percent. Interestingly, the 1.3 percent decline in the index crime rate that we attribute to COPS expenditures in 2000 is on the same order of magnitude as the contribution of COPS expenditures to total local spending on police. In 2000, for example, COPS expenditures accounted for about 1.5 percent of total local police expenditures. We further find that factors other than COPS expenditures account for the majority of the decline in the crime rate. (See app. IV for more detailed information about the results of our analysis of COPS expenditures on crime.)

Our regression analysis of the Policing Strategies Survey data for 1993 and 1997 indicate that receipt of a COPS grant and the amount of per capita COPS expenditures by agencies were associated with increases in the agencies' reported use of problem-solving and place-oriented policing practices but not crime analysis and community collaboration policing practices (fig.4). According to our review studies of the effectiveness of policing practices, problem-solving and place-oriented practices are among those that the crime literature indicates may be effective in reducing crime. With problem-solving practices, police focus on specific problems and tailor their strategies to them. Place-oriented practices include efforts to identify the locations where crime repeatedly occurs and to implement procedures to disrupt these recurrences of crime. Crime analysis includes the use of tools such as geographic information systems to identify crime patterns. Community collaboration includes attempts to improve or enhance citizen feedback about crime problems and the effectiveness of policing efforts to address them. In our regressions, we controlled for the underlying trends in the reported adoption of policing practices, agency characteristics, and local economic conditions.

Figure 4: Reported Levels of Policing Practices in 1993 and 1997 in Agencies That Did and Did Not Receive COPS Grants, by Category of Policing Practice



Source: GAO analysis of Policing Strategies Survey and Office of Justice Programs financial data.

Our analysis of the National Evaluation of COPS Survey—which measured practices in 1996 and again in 2000—showed that while COPS grantee agencies increased their reported use of all policing practices combined, these changes were not statistically significant in regressions that controlled for the underlying trends in the reported adoption of policing practices, agency characteristics, and local economic conditions. (See app. V for more detailed information about the results of our analysis of COPS expenditures and policing practices.)

Concluding Observations

While we find that COPS expenditures led to increases in sworn police officers above levels that would have been expected without these expenditures and through the increases in sworn officers led to declines in crime, we conclude that COPS grants were not the major cause of the decline in crime from 1994 through 2001. Other factors—which other researchers have attempted to sort out—combined to contribute more to the reduction in crime than did COPS expenditures. This is not surprising, as COPS expenditures—while a large federal investment in local law enforcement—made a comparatively small contribution to local law enforcement expenditures for policing.

Nevertheless, our analysis shows that COPS grant expenditures did reduce crime during the 1990s. Our models isolate the effects of COPS

expenditures from the effects of other factors. We cannot identify another variable that is correlated with changes in COPS expenditures, officers, and crime rates in local communities that would explain away our findings. Thus, we conclude that the results of our model are sound. Further, our results do not address whether the COPS program met its goals of putting 100,000 officers on the street—and the evidence suggests that while it funded more than 100,000 officers, it may have fallen short of achieving this goal. Still, through the increases in officers that we attribute to COPS expenditures, we find that COPS grants affected crime rates. Therefore, as a demonstration of whether a federal program can affect crime through hiring officers and changing policing practices, the evidence indicates that COPS contributed to declines in crime above the levels of declines that would have been expected without it.

Our work cannot identify an optimum number of officers needed by any individual agency to maximize the effect of officers on reducing crime, nor can it identify the specific types of practices that agencies should adopt in particular settings. It is highly likely that there is indeed a point where additional officers no longer affect crime. The numbers of additional officers hired as a result of COPS were relatively small compared with the sizes of individual police agencies, and these small increases led to commensurate reductions in crime rates. Given resource constraints and competing priorities at all levels of government, it is probably unlikely that most police agencies would have the resources available to hire large enough numbers of officers to go past the point of diminishing returns.

Agency Comments and Our Evaluation

We provided a draft of this report to the Attorney General for comment on September 13, 2005. In its written comments, the Office of Community Oriented Policing Services (COPS) drew upon information from both this report and our prior correspondence on the effects of COPS grants on crime. They said that we were careful and diligent in our research, and that our findings support conclusions reached by others and correspond with what local law enforcement leaders report. The COPS Office also expanded upon some of our main findings, which they characterized correctly. In their comments, the COPS Office introduced data and opinions about potential effects of the COPS grants that were beyond the scope of our work. We therefore cannot corroborate these statements.

For example, in discussing our findings about the effects of COPS grants on sworn officers, the COPS Office introduced data about officers derived from the MORE technology grants and reports that 42,058 (or 36 percent) of the 118,397 officers that the COPS Office has funded to date are derived

from the MORE grants. Our work does not corroborate either of these figures. We point out in Appendix VI that our estimates of a total of 88,000 additional officer-years takes into account the effects of MORE grant expenditures.

In their comments on our finding about changes in policing practices that resulted from COPS, the COPS Office points out that the aggregate counts of policing practices that we used in our analysis provide only a superficial measure of the level of community policing taking place. We acknowledged this point in appendix VII, but chose not to speculate on the extent to which police departments increased the amount of problem solving or other policing practices they engaged in. By speculating that agencies may have increased the quantity of a specific activity, the COPS Office provides only one view of what may have happened. Another view, proffered by policing researchers, is that there is little evidence to suggest that problem-solving policing was implemented with sufficient rigor in enough departments to have contributed to declines in violent crime during the 1990s. As they point out, problem-solving activities may have increased, and they may have contributed to declines in crime, "but we simply do not know."[20]

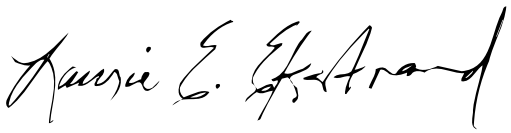
We are sending copies of this report to other interested congressional committees and the Attorney General. We will also make copies available to others upon request. In addition, the report will be available at no charge on GAO's Web site at http://www.gao.gov.

If you or your staff have any questions concerning this report, please contact Laurie Ekstrand at (202) 512-8777 or by e-mail at Ekstrandl@gao.gov or Nancy Kingsbury at (202) 512-2700 or by e-mail at

[20]Eck, John, and Edward Maguire, "Have Changes in Policing Reduced Violent Crime? An Assessment of the Evidence." In Blumstein, Alfred, and Joel Wallman (eds.), *The Crime Drop in America*, Cambridge: Cambridge University Press, 2000: p. 245.

Kingsburyn@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix IX.

Sincerely yours,



Laurie E. Ekstrand, Director
Homeland Security and Justice Issues

Nancy R. Kingsbury, Managing Director
Applied Research and Methods

Appendix I: Objectives, Scope, and Methodology

In response to a request from F. James Sensenbrenner, Jr., Chairman, Committee on the Judiciary, House of Representatives, this report provides the findings of our evaluation of the impact of Community Oriented Policing Services (COPS) grants on the decline in crime that occurred during the 1990s. Our objectives were to address interrelated questions about COPS funds, officers, crime, and policing practices. Specifically, regarding COPS funds: (1) From 1994 through 2001, how were COPS obligations distributed among local law enforcement agencies in relation to the populations they served and crimes in their jurisdictions, and how much of the obligated amounts did agencies spend? Regarding officers and crime: (2) To what extent did COPS grants contribute to increases in the number of sworn officers and declines in crime in the nation during the 1990s? Regarding policing practices: (3) To what extent were COPS grants during the 1990s associated with police departments adopting policing practices that the crime literature indicates could contribute to reductions in crime?

Overview of Our Approach and Methodology

To address our reporting objectives, we analyzed a database consisting of 12 years of data from 1990 through 2001 on local law enforcement agencies. To create this database—our primary analysis database—we obtained data from several sources, and we organized the data as a panel dataset in that it contained information on multiple law enforcement agencies over multiple years. For each agency, we obtained data on COPS and other federal law enforcement grant obligations and expenditures from the Department of Justice's (DOJ) Office of Justice Programs (OJP), and data on index crimes and the number of sworn officers from the Federal Bureau of Investigation's (FBI) Uniform Crime Reporting (UCR) Program. Index crimes include the violent crimes of murder and non-negligent manslaughter, forcible rape, robbery, and aggravated assault, as well as the property crimes of burglary, larceny-theft, motor vehicle theft, and arson.[1] As shown in table 1, in 2002, property crimes constituted 88 percent of the 11,877,218 index crimes. Among violent crimes, robberies accounted for 3.5 percent of all index crimes, and aggravated assaults accounted for 7.5 percent.

[1]We excluded arson from our analyses because according to the FBI, there is limited reporting of arson offenses to the UCR Program by law enforcement agencies. Also because of the limited reporting of arson by law enforcement agencies, the FBI does not include estimates for arson in its published tables that contain offense estimates, including its table 1, which reports its estimates of index crimes for the nation as a whole.

Table 1: Index of Crimes, 2002, as Reported by the FBI, Excluding Arson

Crime category	Number	Percentage of index crimes[a]
Index crimes[b]	**11,877,218**	**100.0%**
Violent crimes[c]	**1,426,325**	**12.0%**
Murder and non-negligent manslaughter	16,204	0.1%
Forcible rape	95,136	0.8%
Robbery	420,637	3.5%
Aggravated assault	894,348	7.5%
Property crimes[d]	**10,450,893**	**88.0%**
Burglary	2,151,875	18.1%
Larceny theft	7,052,922	59.4%
Motor vehicle theft	1,246,096	10.5%

Source: Table 1 of Federal Bureau of Investigation, *Crime in the United States, 2002*, Uniform Crime Reports, Washington, D.C.: Department of Justice. Printed annually.

Note: Although arson is part of the crime index, the FBI does not estimate the number of arson crimes for the nation as a whole, and consequently, it does not include an estimate for arson crimes in its table 1 of *Crime in the United States*.

[a]Percentages for specific types of crime within a category may not add up to category totals because of rounding.

[b]Sum of violent and property crimes.

[c]Sum of murder and non-negligent manslaughter, forcible rape, robbery, and aggravated assault.

[d]Sum of burglary, larceny theft, and motor vehicle theft.

We obtained data on some of the factors that the research literature on crime suggests are related to changes in crime. From the Department of Commerce's Bureau of Economic Analysis, we obtained data on local economic conditions—including employment rates and per capita income—and from the National Center for Health Statistics and the U.S. Census Bureau—we obtained data on demographic variables—including the percentage of the population aged 15 to 24, and the racial and gender composition of the population.

We also analyzed data from two surveys of nationally representative samples of police departments on the policing practices that they reportedly implemented in various years from 1993 to 2000. We refer to the first survey as the Policing Strategies Survey, and it was administered in

1993 and again in 1997.[2] We refer to the second survey as the National Evaluation of COPS Survey, as it was completed as part of the Urban Institute's national evaluation of the implementation of the COPS program, and we used the data from the surveys that were administered in 1996 and 2000. [3] The multiple administrations of each survey allowed us to analyze changes in policing practices. Using agency and year identifiers, we matched and merged data from our primary analysis database with the agency-level records in each of the surveys.

Prior to developing and analyzing our database, we assessed the reliability of each data source, and in preparing this report, we used only the data that we found to be sufficiently reliable for the purposes of our report.

In addition, to identify policing practices that are considered to be effective in preventing crime, we analyzed reviews of research and evaluation literature. We also reviewed relevant economic and criminological literatures that addressed issues related to estimating models of the effects of federal grant funds on crime rates. We spoke with officials at the Department of Justice about the operation of the COPS programs, and we also spoke with researchers about our approach and methods. We reviewed our approach and methods with a group of experts in the field of policing and crime. The group consisted of criminologists, economists, statisticians, and criminal justice practitioners, and was convened for us by the National Research Council of the National Academies to enable participants to offer their individual views as experts in the field.

We conducted our work between January 2004 and August 2005 in accordance with generally accepted government auditing standards.

[2]Rosenthal, Arlen M., and Lorie Fridell. *National Survey of Community Policing Strategies Update, 1997, and Modified 1992-1993 Data* [Computer file]. Inter-university Consortium for Political and Social Research (ICPSR) version. Calverton, Maryland: ORC Macro International, Inc. [producer], 2002. Ann Arbor, Michigan: ICPSR [distributor], 2002. In the remainder of this report, we refer to the two administrations of this longitudinal survey as the Policing Strategies Survey.

[3]The second survey was conducted by the National Opinion Research Center for the Urban Institute in 1996 and 2000 as part of the National Institute of Justice-funded implementation evaluation of the COPS program. See Roth, J., et al., *National Evaluation of the COPS Program—Title I of the 1994 Crime Act*, Washington, D.C.: National Institute of Justice, August 2000. In the remainder of this report, we refer to the two administrations of this second longitudinal survey as the National Evaluation of COPS Survey.

Methods Used to Address the Flow of Funds Reporting Objective

To address our first objective, we analyzed OJP financial system data on grant obligations and expenditures and UCR data on the size of populations served by agencies and crimes occurring within the jurisdictions of the agencies that reported crime to the UCR. We used the OJP financial data to compute the amount of COPS funds obligated by COPS grants and the amount expended by local police agencies during the period from 1994 through 2001. To describe the overall COPS funding trends by grant type, we analyzed the universe of agencies in the OJP data that received any federal law enforcement grant during the period from 1990 through 2001, regardless of whether or not the agency received a COPS grant during the period and regardless of whether we were able to link the data from these agencies to records in the UCR. For the years from 1990 through 2001, the OJP data show that 13,332 agencies received any federal law enforcement grant. For analyses of COPS funds by agency population sizes and for comparisons of funding levels with levels of violent and total index crime, we limited our analysis to the sample of agencies whose crime and population data we were able to link to the OJP data. This resulted in a sample of 11,187 agencies in our primary analysis database. These 11,187 agencies accounted for 86 percent of the reported crimes in the UCR data that we received from the FBI.

The COPS Office distributed grants in a variety of programs. To describe the amounts of COPS obligations and expenditures, we organized the COPS grant programs into four broader categories of grants, and we reported our results at the level of these broader categories. These four categories include: Hiring, Making Officer Redeployment Effective (MORE), Innovative, and Miscellaneous grants, and the specific grant programs within each category, along with obligated amounts from 1994 through 2001 for each grant program and category, are shown in table 2.

Table 2: COPS Obligations, 1994 through 2001, by COPS Grant Categories and Types of Grant Programs

COPS grant category and types of grant programs	Obligations	
	Amount (in billions of dollars)	Percentage of total
Total, all grant programs	**$7.616**	**100.0%**
Hiring grant programs	**$4.863**	**63.9%**
Police Hiring Supplement	$0.143	1.9%
COPS Phase I	$0.184	2.4%
AHEAD	$1.245	16.4%
FAST	$1.234	16.2%
Universal Hiring Program	$2.055	27.0%
MORE grants	**$1.262**	**16.6%**
Innovative grant programs	**$0.418**	**5.5%**
Advancing Community Policing	$0.034	0.5%
COPS 311	$0.005	0.1%
Distressed Neighborhoods Pilot Program	$0.112	1.5%
Community Policing to Combat Domestic Violence	$0.070	0.9%
Anti-Gang Initiatives	$0.011	0.1%
Integrity Initiative	$0.018	0.2%
Methamphetamine Initiative	$0.089	1.2%
Problem Solving Partnerships	$0.038	0.5%
School-Based Partnership Programs	$0.031	0.4%
Youth Firearm Violence Initiative	$0.009	0.1%
Miscellaneous grants programs	**$1.073**	**14.1%**
COPS in Schools	$0.533	7.0%
Demonstration Sites Program	$0.005	0.1%
Miscellaneous	$0.132	1.7%
Technology Grants	$0.207	2.7%
Regional Community Policing Initiative	$0.084	1.1%
Small Community Grant Program	$0.013	0.2%
Tribal Grant Program	$0.098	1.3%

Source: GAO analysis of Office of Justice Programs financial data.

In our analysis, we compared the distribution of COPS obligations with the distribution of crimes contributed by agencies serving populations of

150,000 or fewer persons and those serving more than 150,000 persons. We used UCR population to identify agency size and crimes. The UCR population may not reflect the population that agencies provided on the applications for COPS grants. Our analysis of the distribution of COPS funds describes the extent to which the distribution of funds is related to agency size—as measured by populations served—and the distribution of violent crimes.

Methods Used to Address the Effects of COPS Expenditures on Officers and Crime

To assess the effects of COPS expenditures on the number of sworn officers and crime, we developed and estimated a two-stage regression model of these relationships. In the first stage, we estimated the relationship between per capita COPS expenditures and per capita sworn officer rates in the agencies included in our sample. The per capita measures were based upon the UCR population for the jurisdiction covered by an agency. In the second stage, we estimated the relationship between changes in per capita COPS expenditures and changes in crime rates per 100,000 persons. As the relationship between officer levels and crime rates may reflect a complex and interrelated causal relationship, we used COPS hiring grants as an instrument to help to identify the relationship between officers and crime. To use COPS hiring grant expenditures as an instrument for sworn officers, we made use of the fact that, unlike the purposes of other COPS grant types, the purpose of hiring grants was limited to hiring officers. Given the number of officers, variation in hiring grant expenditures should be uncorrelated with other changes in crime. From our regression results, we calculated the elasticity of crime with respect to officers or the effect of a 1 percent change in the levels of officers on the percentage change in crime. To assess the robustness of our results, we estimated several specifications of our crime rate regression and calculated the elasticities of crime with respect to officers for each specification. We estimated these equations separately for each type of index crime. We compared the range of our estimated elasticities with those in the published literature on officers and crime. To estimate COPS' contribution to the national decline in crime, we projected our sample results to the nation as a whole by weighting our results by the ratio of the total population in the United States to the population in the sample of agencies included in our analysis.

In our regression models of the effects of COPS grant expenditures on officers and crime, we organized our primary analysis database as a panel dataset, and we limited our analysis to the 4,509 law enforcement agencies serving populations of 10,000 or more persons and that reported complete crime data for at least 1 year from 1990 through 2001. The number of

agencies that reported complete crime data and served populations of 10,000 or more persons varied over time, as in 1990 about 23 percent of all agencies in the UCR data that we received from the FBI met these criteria, and in 2001 about 21 percent did. However, these agencies also reported the majority of crimes to the UCR. From 1990 through 2001, these agencies reported between 86.8 percent and 88.8 percent of all index crimes in the UCR data that we received from the FBI. Because of data concerns with agencies serving populations of fewer than 10,000 persons, we omitted these agencies from our analysis.

We used fixed-effects regression models to estimate the relationships among COPS expenditures, officers, and crime. Given that we included agencies based on the completeness of their crime data in each year, and agencies provided complete crime data in different numbers of years over our 1990 through 2001 analysis period, our models used an unbalanced panel approach. In all of our models, we expressed expenditures, officers, and crime in per capita amounts. The fixed-effects models provide estimates of the amount of change in our dependent variables—the per capita sworn officer rate and the per capita crime rates—that can be attributed to changes in the per capita COPS hiring grant expenditures, controlling for other factors that could also contribute to changes in the per capita sworn officer rate. Our models included agency and year fixed effects to control for unobserved differences between agencies and changes over time within agencies in factors that could contribute to declines in crime. We introduced state-by-year fixed effects into our regressions to control for factors occurring at the state level—such as changes in incarceration or state sentencing practices—that could affect crime rates. Further, we included in our models variables that classify each agency in categories based upon their pre-1994 trends in the growth of officers and crime. These growth cell variables allow us to make comparisons between agencies that were similar in their pre-COPS program trends but that varied in the timing and amount of COPS expenditures. Finally, we included in our models measures of other federal law enforcement grant programs that also provided funds to state and local law enforcement agencies for hiring officers and other crime-prevention purposes. Specifically, we included measures of the per capita expenditures on Local Law Enforcement Block Grants,[4] which local governments could use to hire law enforcement officers, pay overtime,

[4]Local Law Enforcement Block Grant Program (LLEBG), as authorized by the Omnibus Consolidated Rescissions and Appropriations Act of 1996. (P.L. 104-134.)

purchase equipment, as well as several other purposes. Because of data limitations, we were unable to track amounts of the Edward Byrne Memorial State and Local Law Enforcement Assistance (Byrne Formula Grant Program)[5] grants that went to local agencies. Byrne Formula Grant funds could be used to provide for personnel, equipment, training, technical assistance, and information systems, among other purposes. In addition to the formula grant program, there was also a Byrne discretionary grant program, and we included measures for these grants.

In appendix VI, we provide the details about the specific models that we estimated and our methods for calculating elasticities of the relationship between changes in officers and changes in crime rates.

Methods to Assess Changes in Policing Practices

To assess whether COPS funds contributed to changes in policing practices, we analyzed data from the Policing Strategies and National Evaluation of COPS surveys, two nationally representative surveys of local law enforcement agencies that asked about the types of policing practices that the agencies reported implementing in various years. In each survey, chief executives or their designees were presented a list of policing practices and asked to indicate whether their agency implemented the practice. We classified items in the surveys into four categories of policing practices corresponding to general approaches to policing identified in the criminal justice literature: problem-solving practices, place-oriented practices, community collaboration activities, and crime analysis activities. Problem-solving practices call for police to focus on specific problems and tailor their strategies to the identified problems. Place-oriented practices include attempts to identify the locations where crime occurs repeatedly and to implement procedures to disrupt these recurrences of crime. Community collaboration practices include improving citizen feedback about crime problems and the effectiveness of policing efforts to address these problems. Crime analysis includes the use of tools such as geographic information systems to identify crime patterns. These tools may help an agency support other practices for preventing crime, such as problem-solving and place-oriented practices.

[5]42 U.S.C. § 3750 et seq. The Byrne Formula Grant Program was a variable pass-through grant program administered by the Bureau of Justice Assistance. States were required to pass through to local jurisdictions amounts of funding based upon a variable pass-through formula.

For each agency in a survey, we created a summary index of the number of such practices that agencies reportedly implemented in the years in which the surveys were administered. We then compared mean levels of reported practices between groups of agencies that participated in the COPS program and those that did not participate in the program.

We used the data from the Policing Strategies Survey to make pre- and within-COPS program comparisons of changes in reported policing practices in 1993 and in 1997. Levels of reported practices among agencies that received COPS grants were compared with levels among agencies that were not funded by COPS grants over this period. We used the National Evaluation of COPS Survey to compare levels of practices in 1996 and 2000 between groups of agencies that received COPS grants and those agencies that were not funded by COPS over this period. In appendix VII, we provide additional details about the surveys and our methods for analyzing the survey data.

To assess changes in reported practices in relation to participation in the COPS program, we estimated separate regression models of the effects of the receipt of a COPS grant and per capita COPS expenditures on changes in reported policing practices, controlling for various characteristics of agencies and underlying trends in the reported adoption of policing practices.

To identify policing practices that may be effective in reducing crime, we analyzed six studies that provided summaries of research on the effectiveness of policing practices and activities on reducing crime. We chose to review studies that reviewed research, rather than reviewing all of the original studies themselves, because of the volume of studies that have been conducted on the effectiveness of policing practices. (See app. VII for a list of the studies that we reviewed and additional details on policing practices and crime.)

Database Construction and Samples Used in Our Analyses

To construct our primary analysis database, which consisted of 12 years of data from 1990 through 2001 for law enforcement agencies that reported at least 1 complete year of crime data to the FBI's Uniform Crime Reporting Program, we obtained data from several sources and merge-matched information from these various sources to the level of the local law enforcement agency. The sources of data that we used to compile the annual observations from 1990 through 2001 on local police departments included:

- Office of Justice Programs Financial Data—Annual data on the obligation and expenditures on each grant awarded by OJP. Obligations refer to the funds that are expected to be paid on a grant, and expenditures refer to the grant funds that have been paid to a recipient. Because OJP and the COPS Office share data on awards, the OJP data also included COPS grant obligation and expenditure amounts. We used data on grant obligation amounts to and annual amounts expended by each recipient of a community-oriented policing (or COPS) grant,[6] and annual amounts of other federal local law enforcement grants expended both by agencies that received COPS funds and those that did not. We used information about place codes and OJP vendors to link these data to our other sources.

- The UCR—Annual data files on the number of crimes and sworn officers reported by each agency to the UCR. The data on sworn officers represent the reported number of full-time officers in each agency on October 31 of each year. We analyzed the number of sworn officers per 10,000 persons in the covered jurisdiction. We analyzed data on the violent crimes of murder and non-negligent manslaughter, forcible rape, robbery, and aggravated assault, and the property crimes of burglary, larceny-theft, and motor vehicle theft. We analyzed the crime rate per 100,000 persons in the covered jurisdiction for each type of crime, as well as the rates for all index crimes, violent crimes, and property crimes. We used the originating agency identifier (ORI) variable and place codes to link crime and officer data to other data sources.[7]

[6]In this report, COPS grants refer both to DOJ grants awarded through the Police Hiring Supplement Program and the COPS Office's community policing grants authorized under the Violent Crime Control and Law Enforcement Act of 1994.

[7]We used Federal Information Processing Standards codes (or FIPS codes), which identify named population places and are issued by the National Institute of Standards and Technology.

- Bureau of Economic Analysis (U.S. Department of Commerce)—Annual county-level estimates of per capita income and employment for each year from 1990 through 2001. We included in our analysis of officers, crime, and policing practices, measures of economic factors that are related to crime, such as the employment-to-population ratio and per capita income. We linked these data to agency-level data using place codes. Local economic conditions within each county are applied to each agency within a county.

- National Center for Health Statistics (NCHS) and U.S. Census Bureau—Annual estimates of the United States resident population for each county from 1990 through 2001. Data obtained include population totals and population breakdowns by gender, race, and age. Under a collaborative arrangement with the U.S. Census Bureau and with support from the National Cancer Institute, NCHS prepared postcensal population estimates for 2000 through 2001. The Census estimates of county population from 1990 through 1999 are updated to take into account these postcensal estimates. We included in our analysis of officers, crime, and policing practices measures of demographic factors that are related to crime, such as the percentage of total population in the 15-to-24 age group—an age group associated with high crime rates—and the racial composition of populations. We linked these data to agency-level data using place codes.

- Law Enforcement Agency Identifiers Crosswalk (Bureau of Justice Statistics)—The crosswalk file provides geographic and other identification information for each record included in either the Federal Bureau of Investigation's Uniform Crime Reporting Program files or in the Bureau of Justice Statistics (BJS) Directory of Law Enforcement Agencies (DLEA). The main variables each record contains are the UCR originating agency identifier number, agency name, mailing address, Census Bureau's government identification number, and Federal Information Processing Standards (FIPS) state, county, and place codes. We utilized FIPS codes to merge records from the crosswalk with OJP financial data and then used agency ORI codes to merge the crosswalk and financial data with crime data from the UCR.

Data Used in Our Analysis of Obligations and Expenditures

To report on COPS obligations and expenditures, we first analyzed the amounts reported in OJP financial data before we merged the financial information onto the agency-level crime records in the UCR. In the OJP data, each record represents either an obligation or an expenditure amount, and an agency appears in the database each time it has either an

obligation or an expenditure. The total amount of obligations for COPS grants for the 1990- through 2001- period in the OJP data was $7.62 billion.

Second, we linked the OJP financial data to agency information in the BJS crosswalk file. We used agency identifying information in the OJP financial data—such as FIPS state, county, and place codes—to link OJP records with agencies in the crosswalk file. This resulted in our identifying 13,332 agencies that had at least one record of an obligation in the OJP financial data. Of these, 10,680 (or 80 percent) received at least one COPS grant, and among the agencies that received COPS grants, the total amount of COPS obligations was $7.32 billion (or 96 percent of all COPS obligation amounts).

Third, to describe the distribution of obligations relative to agency population and crime, we selected agencies that reported complete crime data—12 months of crime data within a given year—in at least 1 year from 1990 through 2001, and we merged their records onto the records of the agencies for which we had OJP financial information. This last group contained 11,187 agencies, and 8,819 (or 78.8 percent) of these agencies received at least one COPS grant. The total amount of COPS obligations among these agencies was $6.01 billion (or 79 percent of the total amount of COPS obligations from 1994 through 2001).

Data Used in Our Analysis of Officers and Crime

To analyze the impacts of COPS expenditures on officers and crime, we started with the UCR data and included in our samples agencies that met specific criteria. First, we identified and included agencies that reported at least 1 year of complete crime data—that is, 12 months of crime data in a given year—to the UCR from 1990 through 2001, and we included agencies only in the years in which they provided complete crime data.

Second, we excluded from our analysis agencies that the UCR classifies as "zero-population" agencies. To avoid double counting of citizens within geographic areas, the UCR program assigns population counts only to the primary law enforcement agency within each jurisdiction. Consequently, transit police, park police, university police, and similar agencies that are contained within these jurisdictions are assigned a value of zero for population. Because of the fact that jurisdictions among zero-population agencies overlap with primary agencies, calculation of precise per capita crime rates for these nonprimary agencies is problematic. Many state police agencies also enforce laws among populations that are policed by other local agencies, which also makes problematic calculating per capita crime rates for state police agencies. Additionally, given that state police

agencies often have multiple substations in varied locations throughout the state, the correct allocation of the proportion of federal dollars to each substation is unknown. As a result, we excluded zero-population and state police agencies from our analysis. Further, we included in our analysis agencies whose crime records we were able to merge-match and link with OJP financial data about COPS and other federal law enforcement grant expenditures, as well as link with Bureau of Economic Analysis and Census data on economic and population characteristics.

Overall, we identified 13,133 agencies that provided complete crime data for at least 1 year from 1990 through 2001, that were not zero-population agencies, and that we were able to link to our other data sources. For example, in 1990, we found 10,160 agencies out of 17,608 that met our conditions. These 10,160 agencies represented 57.7 percent of the agencies that were included in the 1990 data that we obtained from the FBI, but they contained 93.2 percent of the crimes included in the 1990 data. That the agencies that we included in our sample in 1990 represented about 58 percent of all agencies but 93 percent of all crimes indicates that most of the agencies that we omitted with our criterion of providing complete crime data within a year were small agencies that reported relatively small amounts of crime to the national total. For 2001, the 9,733 agencies that reported complete crime data and were not zero-population agencies represented 49.1 percent of all agencies in the UCR data in 2001 and covered 94.8 percent of all crimes (table 3).

In our analysis of officers and crime, we further limited our sample to agencies that covered populations serving 10,000 or more persons. Complete crime data for agencies serving populations of fewer than 10,000 persons were missing for a large percentage of agencies, and we determined that the data for these smaller agencies were unreliable for the purposes of this report. In 1990, we found 4,051 of agencies serving populations of 10,000 or more persons, which represented 23 percent of the agencies included in the data that we received from the UCR for 1990 but also represented 86.8 percent of the crimes (table 3).

Table 3: Law Enforcement Agencies Reporting to the UCR and in Our Analysis Dataset

Database	Year 1990		Year 2001	
Uniform Crime Report data provided by the FBI				
Number of agencies	17,608	100.0%	19,820	100.0%
Number of index crimes[a]	13,962,575	100.0%	11,092,578	100.0%
Agencies in the UCR data that reported complete crime data in at least 1 year[b]				
Number of agencies	12,168	69.1%	11,802	59.5%
Number of index crimes	13,456,345	96.4%	10,902,718	98.3%
GAO primary analysis dataset—agencies reporting complete crime data in at least 1 year and not zero population agencies[b]				
Number of agencies	10,160	57.7%	9,733	49.1%
Number of index crimes	13,010,329	93.2%	10,520,533	94.8%
Percentage of population in UCR data covered by agencies	[c]	86.6%	[c]	84.5%
GAO dataset used in the analysis of officers and crime—from the primary analysis dataset, agencies serving populations of 10,000 and more persons				
Number of agencies	4,052	23.0%	4,247	21.4%
Number of index crimes	12,113,789	86.8%	9,797,096	88.3%
Percentage of population in UCR data covered by agencies	[c]	76.6%	[c]	76.8%

Source: GAO analysis of Uniform Crime Report data.

[a]The number of index crimes reported in the data that we received from the FBI is less than the number of index crimes that appears in *Crime in the United States: Uniform Crime Reports*. For example, for 2001, *Crime in the United States* reported a total of 11,876,669 index crimes, while the data that we received from the UCR reported 11,092,578 index crimes. The totals reported in *Crime in the United States* are the estimated total numbers of index crimes in the nation. These totals are based upon the crime reports that the FBI receives from individual agencies and upon the methodology that the FBI uses to estimate crimes occurring in agencies that did not submit complete crime reports. The data that we received from the FBI contain the crimes actually reported by law enforcement agencies to the FBI.

[b]"Complete crime data" means that an agency reported 12 months of crime data in a given year.

[c]Not applicable.

Data Used in Our Analysis of Reported Changes in Policing Practices

To assess changes in reported policing practices, we analyzed data from two separate surveys of nationally representative samples of local law enforcement agencies. The surveys asked key officials at agencies about the types of policing practices that they reportedly used. Both surveys

consisted of two administrations or waves of observations on the agencies in their respective samples. The first survey, the National Survey of Community Policing Strategies (or Policing Strategies Survey), was administered in 1993 and again in 1997. A total of 1,269 agencies in the 1993 and 1997 samples responded to both waves of the survey. We limited our analysis to the 1,188 agencies that had complete data on each of the policing practices items that we included in our analysis and that we were able to link to our larger database on crime, officers, money, and economic conditions. These agencies amounted to about 94 percent of the agencies that responded to both waves of the survey. For comparability with our analysis of the effects of COPS grants on officers and crime, we limited our analysis to the sample of agencies that served jurisdictions with populations of 10,000 or more persons.

The second survey, which we call the National Evaluation of COPS Survey, was conducted by the National Opinion Research Center for the Urban Institute in its national evaluation of the implementation of the COPS program.[8] Of the 1,270 agencies that responded to both the 1996 and 2000 administrations of the survey, we were able to link the data from 1,067 agencies to our larger database on crime, officers, money, and economic conditions. We restricted our analysis to agencies that served jurisdictions having populations of 10,000 or more persons, and we excluded from our analysis state police agencies and other special police agencies. (See app. VII for more information about the sample of agencies that we analyzed.)

Reliability and Validity of the Data That We Used

Prior to developing our database, we assessed the reliability of each data source. To assess the reliability of the various data sources, we (1) performed electronic testing for obvious errors in accuracy and completeness; (2) reviewed related documentation, including data dictionaries, codebooks, and published research reports that made use of the data sources; and (3) worked closely with agency officials to identify any data problems. When we found discrepancies (such as nonpopulated fields or what appeared to be data entry errors) we brought them to the agencies' attention and worked with them to correct the discrepancies before conducting our analyses. We determined that the data were sufficiently reliable for the purposes of our report.

[8]See Roth, Jeffrey., et al., *National Evaluation of the COPS Program—Title I of the 1994 Crime Act*.

In our regression analysis of the effects of COPS expenditures on crime, we use the UCR reported crime rates as our dependent variables. Crimes reported to the UCR are those brought to the attention of law enforcement agencies and subsequently reported to the UCR, or reported crimes. Reported crimes are a subset of all crimes committed, which is the sum of reported crimes plus crimes that are not reported to the police. Our ultimate interest, however, lies in determining whether COPS expenditures affected the crime rate for all crimes, whether or not they were reported to the UCR. This raises issues related to analyzing reported crimes to learn about all crimes.

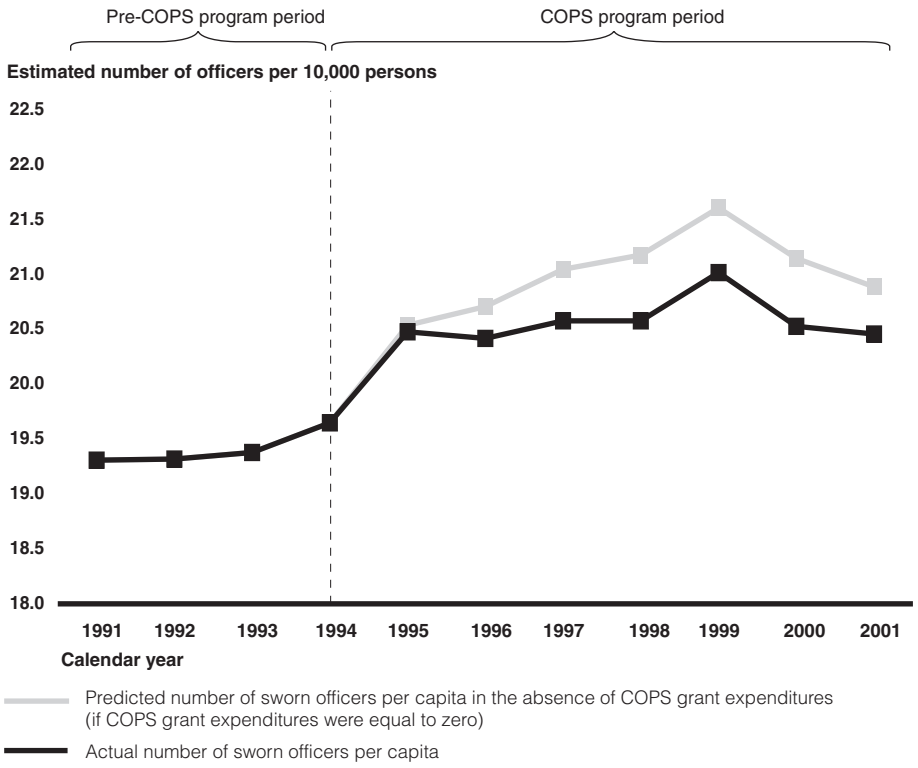
Because data on all crimes—reported and unreported—committed within local jurisdictions are unavailable in national data systems, we use the data on reported crimes. The nature of the relationship between reported crimes and all crimes therefore determines whether the results of our analysis of COPS expenditures on reported crime would lead to biased estimates of the effects of COPS expenditures on all crimes. Under certain circumstances, it is possible that our analysis of the effects of COPS on the reported crime rate could lead to overestimates of the effect of COPS on the crime rate for all—reported plus unreported—crimes. This would lead us to overstate the effect of COPS in reducing crime.

Several conditions could lead to overestimates of the effects of COPS expenditures on reducing crime. If the reported crime rate and the crime rate for all crimes diverge, we would attribute to COPS a larger reduction in crime than is warranted. If these crime rates diverge, the reported crime rate would either decline at a faster rate or increase at a slower rate than the rate for all crimes, and our analysis of the effects of COPS on the reported crime would reveal either larger declines or smaller increases than would occur if we had data on the rate for all crimes. A divergence between the reported crime rate and rate for all crimes could arise for either or both of two reasons: Citizens do not report all of the crimes they experience to the police, or the police do not record and send to the UCR all of the crimes that citizens report to them.

To assess whether citizens decreased the rate at which they reported crimes to the police, we reviewed data from the National Crime Victimization Survey (NCVS). These data are drawn from a nationally representative sample of households and are gathered independently of the police agencies that report crime to the UCR. They therefore provide a measure of crime that is independent of the reporting practices of police agencies. Respondents in the NCVS are asked about their experiences as victims of crimes. If respondents were victims of crime, they are asked if

they or others reported the criminal victimization to the police. Using the NCVS data, it is possible to assess whether the rate at which citizens report crimes to the police has changed over time. These data show that during the 1990s, victims generally increased the rate at which they reported crimes to the police. As figure 5 shows, the decline in violent crime over the decade was steeper for all crimes reported in the survey than for the violent crimes reported to the police. Consequently, because the rates diverged rather than converged, victims' practices of reporting of crime to the police during the 1990s are not likely to lead us to overestimate the effects of COPS grants on the crime rate.

Figure 5: Violent Crimes and Violent Crimes Reported to the Police, as Reported in the National Criminal Victimization Survey and Including Homicides from the Uniform Crime Reports, 1990-2001



Source: GAO analysis of Uniform Crime Report, Office of Justice Programs, National Center for Health Statistics, U.S. Census Bureau, and Bureau of Economic Analysis data.

For police recording practices to lead to overestimates of the effects of COPS grants on crime, it would be necessary for the agencies that received COPS grants to decrease the rate at which they recorded and reported crimes to the UCR. Research on police recording practices

suggests that agencies are unlikely to underreport serious crimes, such as murder, rape, robbery, and aggravated assault. Other studies found, second, that as police agencies adopt computer technology and become more sophisticated in recording crimes, they became more likely to increase the rate at which they included all citizen-reported crimes to the UCR.[9] As COPS MORE grants provided funds for technology—such as laptop computers in police cars—that would have increased the level of sophistication within agencies, COPS grantee agencies would be more likely to report a larger percentage of the crimes that citizens drew to their attention. Consequently, changes in police reporting practices that stem from COPS grants and lead to increases in police reporting of crimes to the UCR are likely to lead us to underestimate the magnitude of effects of COPS grants on reducing crime.

Two other conditions that could affect our estimates include the following: (1) Criminals who commit the crimes that are not reported to the police are unresponsive to the effects of COPS expenditures, and (2) as the number of police increase, the number of reported crimes increases, independently of the true crime rate.

If criminals who commit crimes that go unreported to the police are unresponsive to police presence, then we would overestimate the effects of COPS on crime only if criminals changed their behavior to victimize more persons who would be unlikely to report crimes to the police. This appears to be an unlikely occurrence, as the NCVS data show a convergence between the total number of criminal victimizations, especially for violent crimes, and the number of crimes reported to the police.

Second, if the size of the police force systematically affects the willingness of victims to report crime to the police or a police department's likelihood of recording and reporting to the UCR crime victims' reports, then these changes could lead to biased estimates of the impact on the crime rate. However, if changes in reporting behaviors occurred as the result of the COPS program, the likely impact on our estimates of the effect of COPS

[9]Lynch, James P., "Exploring the Sources of Non-response in the Uniform Crime Reports." Paper presented at the Annual Meetings of the American Society of Criminology Research Conference, November 19, 2003.

grants on crime through their effects on the number of officers is that we would underestimate the effects of the grants on crime.[10]

Given these considerations, our analysis of the effects of COPS expenditures on crime is more likely to underestimate than overestimate the effect of COPS funds on changes in the true crime rate.

[10]Levitt uses three methods to estimate the bias associated with changes in reporting practices in efforts to estimate the effects of changes in the size of the police force on crime rates. He concludes that ignoring this effect will lead researchers to understate the benefits associated with increases in the size of the police force. See Levitt, Steven D., "The Relationship between Crime Reporting and Police: Implications for the Use of Uniform Crime Reports," *Journal of Quantitative Criminology*, Vol. 14, No. 1,1998: pp. 61-81.

Appendix II: Background on the COPS Program and Studies of the Impacts of COPS Grants on Crime

Established in October 1994 by the Attorney General to implement the administration of community policing grants under the Violent Crime Control and Law Enforcement Act (VCCLEA) of 1994,[1] the Office of Community Oriented Policing Services announced its first grant program in November 1994. Prior to its establishment, in December 1993 the Department of Justice began making community policing grants to state and local law enforcement agencies that the COPS Office monitored. In 1993, DOJ awarded community policing grants under the Police Hiring Supplement Program, which was established by the Supplemental Appropriations Act of 1993 (P.L. 103-50 (1993)). The grants made under this program were funded by DOJ's Bureau of Justice Assistance.[2]

Two goals of the COPS Office were to advance community policing by providing funding for 100,000 community policing officers and to promote the practice of community policing, an approach to policing that involves the cooperation of law enforcement and the community in identifying and developing solutions to crime problems. COPS attempted to achieve these goals by providing law enforcement agencies with grants to hire officers, purchase equipment, and implement innovative policing practices.

COPS and Other Local Law Enforcement Grants Distributed throughout the 1990s

According to our analysis of Office of Justice Programs data, from 1994 through 2001, the COPS Office distributed more than $7.6 billion in grants. Grants were made in a variety of grant program funding categories. Table 2 in appendix I contains more information about these funding categories. The largest amount of COPS grant funds obligated—about $4.8 billion, or 64 percent of the total—was in the form of hiring grants. These grants required agencies to hire new officers and at the same time to indicate the types of community policing strategies that they intended to implement. Hiring grants paid a maximum of $75,000 per officer over a 3-year period (or at most 75 percent of an officer's salary) and generally required that local agencies cover the remaining salary and benefits with state or local funds. Hiring programs authorized under VCCLEA and administered by the COPS Office included the Phase I program, which funded qualified applicants who had applied for the Police Hiring Supplement but were denied because of the limited funds available; COPS AHEAD (Accelerated Hiring, Education, and Deployment) for municipalities with populations

[1]P.L. 103-322 (1994), 42 U.S.C. § 3796dd.

[2]In this report, when we refer to COPS grants, we include both the grants made under the Police Hiring Supplement and the community policing grants authorized under VCCLEA.

50,000 and above; and COPS FAST (Funding Accelerated for Smaller Towns) for towns with populations below 50,000. In June 1995, Phase I, COPS AHEAD, and COPS FAST were replaced by the Universal Hiring Program.

The next largest grant category was the Making Officer Redeployment Effective (MORE) grant program, which provided funds to law enforcement agencies to purchase equipment and hire civilians, with the goal of expanding the amount of time spent on community policing. COPS obligated more than $1.3 billion—or about 17 percent of total obligations—as MORE grants. Additional COPS grant programs provided funds for specific innovations in policing. For example, the Distressed Neighborhoods Pilot Project grants provided funds to communities with high levels of crime or economic distress to hire officers and implement a variety of strategies to improve public safety, and the Methamphetamine Initiative provided funds to state and local agencies to support a variety of enforcement, intervention, and prevention efforts to combat the methamphetamine problem. About $418 million—or about 5.5 percent of the total—was obligated under these innovative grant programs. The COPS Office also provided grants for a variety of other purposes, including funding to meet the community policing training needs of officers and representatives of communities and local governments (through a network of Regional Community Policing Institutes), and grants to law enforcement agencies to hire and train school resource officers to help prevent school violence and improve school and student safety (the COPS in Schools Program). Over $1 billion—or about 14 percent of total obligations—was obligated among these miscellaneous grant programs.

In each year, the COPS Office was required to distribute half of the grant funds to agencies in communities whose populations exceeded 150,000 persons and half of the grant funds to agencies in communities with populations of 150,000 or fewer persons.[3]

During the 1990s, other federal law enforcement grant programs also provided funds to state and local law enforcement agencies for hiring

[3]Of funds available in any fiscal year, up to 3 percent were available for use for technical assistance or for evaluations or studies carried out or commissioned by the Attorney General. The requirement to allocate the funds by size of agency population applies to the remaining funds in any fiscal year (42 U.S.C. § 3793 (a)(11)(B)). In addition, the COPS Office had a national coverage requirement to ensure that no state received less than 0.5 percent of total funding.

officers and other crime prevention purposes. The Edward Byrne Memorial State and Local Law Enforcement Assistance (Byrne Formula Grant Program)[4] was a variable pass-through grant program administered by the Bureau of Justice Assistance (BJA). According to our analysis of data that we obtained from OJP, from 1990 through 2001, the Byrne Formula Grant Program distributed between $415 million and $520 million in grants. States were required to pass through to local jurisdictions amounts of funding based upon a variable pass-through formula. Byrne Formula Grant funds could be used to provide for personnel, equipment, training, technical assistance, and information systems, among other purposes. According to an evaluation of the Byrne formula grant program, about 40 percent of Byrne subgrant funds—the amounts passed through the states to local jurisdictions—were for multijurisdictional task forces.[5] In addition to the formula grant program, there also was a Byrne discretionary grant program. According to an official at the Bureau of Justice Statistics (BJS), a large percentage of the Byrne discretionary funds were targeted for specific programs.

The Local Law Enforcement Block Grant (LLEBG) Program was also administered by BJA.[6] The LLEBG grant funds amounted to about an average of $475 million per year from 1996 through 2000. According to BJS officials, these funds were allocated by a formula based upon violent crimes as reported in FBI's crime index. LLEBG funds were available to local governments for hiring law enforcement officers, paying overtime, purchasing equipment, as well as several other purposes. According to the Urban Institute's evaluation of the implementation of the COPS program, agencies that received COPS grants reported using both Byrne and LLEBG funds to support their transitions to community policing.[7]

Additional grant programs that provided funds to local law enforcement agencies included the Juvenile Accountability Incentive Block Grants,

[4]42 U.S.C. § 3750 et seq.

[5]Dunworth, Terence, Peter Haynes, and Aaron J. Saiger, *National Assessment of the Byrne Formula Grant Program*, Washington, D.C.: National Institute of Justice Research in Brief, June 1997.

[6]Local Law Enforcement Block Grant Program, as authorized by the Omnibus Consolidated Rescissions and Appropriations Act of 1996 (P.L. 104-134).

[7]Roth, Jeffrey A., et al., *National Evaluation of the COPS Program—Title I of the 1994 Crime Act*, Washington, D.C.: National Institute of Justice Research Report, August 2000.

Weed and Seed Grants, and several Office on Violence Against Women grants, according to a BJS official.

Debates over whether the COPS Office Met Its Goals for Officers and Promoted Community Policing

The amount of COPS funding was more than sufficient to fund the federal portion for 100,000 officers. According to the Attorney General's report, from 1994 through 2000, the COPS Office awarded more than 30,000 grants to over 12,000 law enforcement agencies and funded more than 105,000 community policing officers.[8] However, a research report by the Heritage Foundation questioned how effective the COPS Office had been in putting 100,000 officers on the street.[9] The study analyzed trends in the number of officers and concluded that the COPS program had not added 100,000 additional officers above historic trends. In its review of the COPS Office's performance for the fiscal year 2004 budget, the Office for Management and Budget (OMB) indicated that by 2002, COPS grants funding was sufficient for almost 117,000 officers, a number that exceeded the program's original commitment to fund 100,000 officers.[10] At the same time, OMB acknowledged that fewer than 90,000 officers had been hired or redeployed to the street. OMB reported that the COPS Office counted 88,028 COPS-funded officers on duty as of August 2002—or about 75 percent of funded officers. In their report of October 2002 on the COPS program, researchers at the Urban Institute updated earlier estimates of COPS-funded officers.[11] They projected that over the years from 1994 through 2005, COPS-funded officers would add between 93,400 and 102,700 officers to the nation's communities on a temporary basis, but that not all of these officers would be available for service at any one point in time. They further estimated that the permanent impact of COPS, after taking into account postgrant attrition of officers and civilians, would be between 69,100 and 92,200 officers.

[8]Attorney General of the United States, *Report to Congress: Office of Community Oriented Policing Services*, Washington, D.C.: U.S. Department of Justice, September 2000.

[9]Davis, Gareth, et al., "The Facts about COPS: A Performance Overview of the Community Oriented Policing Services Program," Washington, D.C.: The Heritage Foundation, September 25, 2000.

[10]Executive Office of the President, *Performance and Management Assessments: Budget of the United States Government, Fiscal Year 2004*, Washington, D.C.: White House, 2003.

[11]Koper, Christopher S., et al., *Putting 100,000 Officers on the Street: A Survey-Based Assessment of the Federal COPS Program*, Washington, D.C.: The Urban Institute, October 2002.

In addition to promoting the hiring of officers, the COPS Office sought to promote community policing. COPS hiring grant applications asked agencies to report the types of practices that they planned to implement with their grants, such as identifying crime problems by looking at records of crime trends and analyzing repeat calls for service, working with other public agencies to solve disorder problems, locating offices or stations within neighborhoods, and collaborating with community residents by increasing officer contact with citizens and improving citizen feedback. In 2000, the Attorney General reported that 87 percent of the country was served by departments that practiced community policing.[12]

Studies that have addressed the extent to which the COPS Office grants caused the spread of community policing suggest that COPS grants accelerated the adoption of these practices but did not launch the spread of community policing. The Police Foundation's study of community policing practices during 1993—1 year before the COPS Office began making grants—indicated that the practice of community policing was fairly widespread, especially in larger police departments.[13] The Police Foundation researcher reported that 47 percent of the agencies surveyed in 1993 reported that they either were in the process of adopting or had adopted community policing, but that 86 percent of municipal agencies with more than 100 sworn personnel were either in the process of implementing or had implemented community policing. In their evaluation of the implementation of the COPS program, Urban Institute researchers credited COPS with promoting community policing, but the researchers concluded that COPS funds seemed to have fueled movements that were already accelerating rather than have caused the acceleration. In a later report, they pointed out that for large agencies, the problem-solving practices that they examined were already widespread by 1995, and almost no COPS grantees reported adopting problem-solving practices for the first time between 1998 and 2000.[14]

Some of the types of practices that agencies planned to implement with their COPS grants correspond with approaches to policing that recent

[12]Attorney General of the United States, *Report to Congress*, 2000.

[13]Wycoff, Mary Ann, *Community Policing Strategies: A Comprehensive Analysis,* Washington, D.C.: The Police Foundation, November 1994.

[14]Johnson, Calvin C., and Jeffrey A. Roth, *The COPS Program and the Spread of Community Policing, 1995-2000.* Washington, D.C.: The Urban Institute, June 2003.

reviews of policing practice suggest are effective in preventing crime. [15] For example, our review of policing practices indicates that problem-solving policing and place-oriented policing practices—such as those in which officers attempt to identify the locations where crime occurs repeatedly and to implement procedures to affect crime—are among the types of practices that research has demonstrated to be effective in preventing crime. These practices were among the types that agencies could implement with their COPS grants.

Debates about COPS' Contribution to the Decline in Crime in the 1990s

In 2000, the Attorney General reported that COPS-funded officers helped to reduce crime.[16] The Attorney General's report to Congress asserted that the drop in crime that occurred after 1994 was more than would have been expected in the absence of the passage of VCCLEA and the creation of the COPS Office. As evidence of the impact of COPS grants on crime, it proffered the inverse relationship between increases in the per agency number of police officers and decreases in the per agency levels of violent crimes.

Studies of the impact of COPS grants on crime that attempted to take into account factors other than just the underlying trends in crime were released in 2001. A COPS Office-funded study examined the impact of COPS grants on local crime rates in over 6,000 communities from 1995 through 1999.[17] Analyzing changes in crime rates in communities that had received COPS grants, the study concluded that COPS hiring grants were effective in reducing crime and that COPS grants for innovative policing practices had larger impacts on reducing violent and property crime than did other types of COPS grants. However, a study released by the Heritage Foundation, which was based upon the analysis of county-level data, was

[15]Skogan, Wesley, and K. Frydl, "The Effectiveness of Police Activities in Reducing Crime, Disorder, and Fear," in Skogan, W., and K. Frydl, (eds.) *Fairness and Effectiveness in Policing: The Evidence*, Washington, D.C.: National Academies Press, pp. 217-251, 2004.

[16]Attorney General of the United States, *Report to Congress*, 2000.

[17]Zhao, J., and Q. Thurman, *A National Evaluation of the Effect of COPS Gants on Crime from 1994 to 1999*. Report submitted to the Office of Community Oriented Policing Services, Washington, D.C.: U.S. Department of Justice, December 2001. In 2004, Zhao and Thurman released a revised report on the impacts of COPS grants on crime covering the years from 1994 through 2000. In their 2004 report, the estimated effects of hiring grants were larger and the estimated effects of innovative grants were smaller than they reported in 2001.

unable to replicate the findings of the COPS-funded study.[18] Specifically, the Heritage study found no effect of COPS hiring grants on crime rates, but it found that grants for specific problems—such as gangs, domestic violence, and illegal use of firearms by youth—were associated with reductions in crime. In addition, our review of the COPS-funded study found that its methodological limitations were such that the study's results should be viewed as inconclusive.[19]

The inconclusiveness of the findings of studies was reflected in OMB's assessment of the performance of the COPS program. According to OMB, although the COPS Office used evaluation studies to assess whether its grants had an impact on crime, the results of the findings were inconclusive, and OMB rated the COPS program as "Results Not Demonstrated" in 2004 using its Program Assessment Rating Tool (PART).

Issues in Assessing the Contribution of COPS Grants to the Decline in Crime in the 1990s

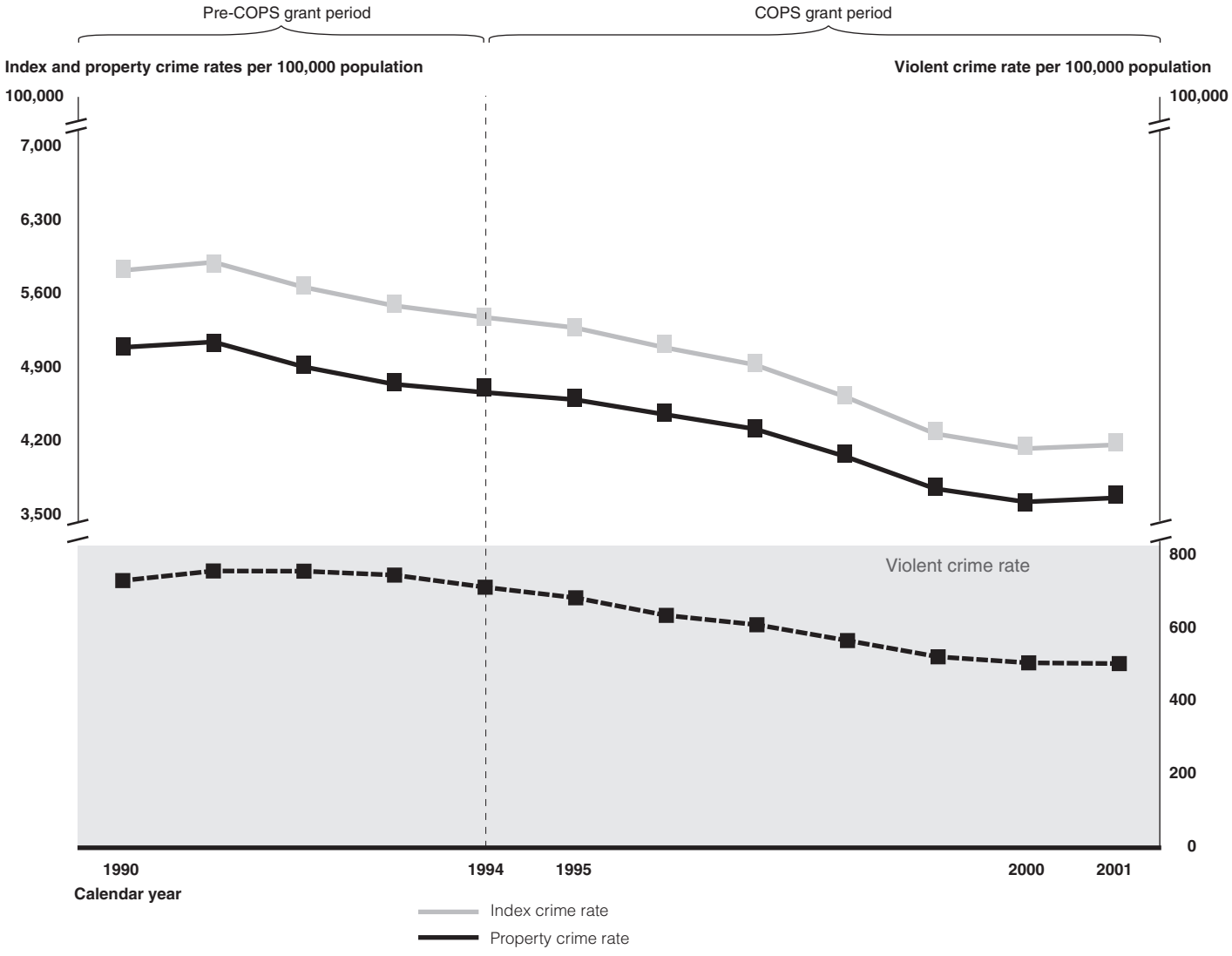
Assessing whether COPS funds contributed to the decline in crime during the 1990s is complicated by many factors. Nationwide, the decline in crime began before 1993, which was before the COPS program made its first grants. According to the FBI's data on index crimes—the violent crimes of murder, rape, aggravated assault, and robbery and the property crimes of burglary, larceny, and motor vehicle theft—the decline in the overall index crime rate, as well as the property and violent crime rates started as early as 1991 or 1992 (fig. 6).[20]

[18]Muhlhausen, David. *Do Community Oriented Policing Services Grants Affect Violent Crime Rates* (Washington, D.C.: The Heritage Foundation, May 25, 2001).

[19]Our review of this study was reported in GAO, *Technical Assessment of Zhao and Thurman's 2001 Evaluation of the Effects of COPS Grants on Crime*, GAO-03-867R (Washington, D.C.: June 13, 2003).

[20]Although arson is included in the crime index, the FBI reports that it excludes arson crimes from its estimates of national crime totals because of limited reporting of arson by law enforcement agencies to the UCR.

Figure 6: Total Index, Violent, and Property Crime Rates per 100,000 Persons, 1990-2001



Source: GAO analysis of Uniform Crime Report data.

As COPS grants cannot be the cause of the start of the decline in crime rates, the other factors that led to the decline in the crime rate could also have affected the decline in crime during the period that the COPS Office made its grants. Factors such as a downturn in handgun violence, the expansion of imprisonment, a steady decline in adult violence, changes in drug markets, and expanding economic opportunities are among those suggested as related to the decline in crime—especially violent crime—in

the 1990s. To the extent that these factors also are correlated with the disbursement of COPS funds, this increases the challenges involved in isolating the effects of COPS grants.

Other federal funds for local law enforcement could also have contributed to expanding the number of police officers and contributed to declines in crime. If the distribution of non-COPS funds such as LLEBG and Byrne grants is correlated with that of COPS funds, and if research does not take these funds into account, a study could attribute some of the effect on crime of these other grant funds to COPS grants.

COPS grants were distributed in ways that make rigorous evaluations of their causal impacts difficult to implement. Receipt of a COPS grant was not randomly assigned; therefore, it is difficult to determine whether the agencies that received grants are the same ones that, in the absence of the grant, would have experienced reductions in crime. The amount of funding certain agencies receive may also relate to the agency's ability to combat crime. For example, certain police chiefs may be more capable than others at acquiring funds and also more up-to-date on policing methods. This underlying capacity of an agency to organize policing, rather than the receipt of a particular grant, would then be the cause of a crime decline as opposed to a particular grant. Additionally, COPS grants were fairly widespread throughout police departments and the nation as a whole. This distribution of grants leaves relatively few unfunded agencies to serve as comparison groups against which to assess the performance of the agencies that received COPS grants. The roughly 12,000 agencies that the former Attorney General reported received COPS grants by 2000 represent about 61 percent of the agencies that reported crime to the Uniform Crime Reports.

The mechanisms by which COPS funds could affect crime have not been explicitly examined. For example, the two prior studies that we cited did not examine whether COPS grants potentially affect crime through changes in police officers or through changes in policing practices, both of which may have been affected by COPS funds. Additional officers may affect crime by increasing police presence, by increasing arrests that lead to incapacitation of offenders, or by deterring offenders by increasing the likelihood of capture. Changes in policing practices toward problem-solving or place-oriented practices that focus police resources on recurring crime problems could also lead to reductions in crime.

Appropriate methodologies from research on crime have been developed to address issues that could confound efforts to assess the impacts of

COPS grants on crime rates. For example, if COPS grants are to affect crime through their impacts on the number of officers, then isolating the effects of increases in officers on crime presents a challenge in assessing the direction of the relationship between officers and crime. If additional officers are hired in response to increases in crime rates, then it could appear that crime causes officers. Alternatively, if additional officers lead to reductions in crime below the levels that they would have been without the officers, then it would appear that officers caused changes in crime. To isolate the causal effect of COPS grants, researchers employ the use of instruments for causal variables. One suggestion in the research literature for an instrument for police officers is COPS hiring grants.[21] To the extent that COPS hiring grants buy only officers, COPS hiring grants can be used as an instrument for the actual number of police officers and therefore be used to estimate the relationship between crime and police officers in a way that takes into account the possibility of this simultaneous relationship.

Second, particular forms of statistical models take advantage of information about the variation in the amount and timing of COPS grants among agencies to assess how changes in the number of sworn officers and crime rates are associated with these two sources of variation. These fixed-effects regression models use a panel of data—or repeated observations on the same units, in this case, police agencies, over several time periods—to assess the effects of changes in the number of sworn officers and crime rates that are associated with variation in the timing and amount of COPS grant expenditures. These regression methods also allow for the introduction of controls for unobserved preexisting differences between units (agencies) and differences over time within units. Incorporating each agency's underlying trajectories (or growth rate trends) in crime rates and sworn officers into the modeling of the effects of COPS funds allow for explicit comparisons within groups of agencies sharing similar trajectories, which helps to control for potential biases associated with preexisting trends.[22] By identifying and explicitly modeling the mechanisms through which a program could have its effects—such as COPS funds leading to increases in the number of officers and their effects

[21]Evans, William N. and Emily Owens. "Flypaper COPS," College Park, Maryland: University of Maryland. Available online at www.bsos.umd.edu/econ/evans/wpapers/Flypaper%20COPS.pdf, 2005.

[22]This methodology was implemented by Evans and Owens (2005).

on crime—the possibility of a spurious relationship between inputs (such as COPS funds) and outcomes (such as crime) can be minimized.

Appendix III: COPS Grant Obligation and Expenditure Patterns

This appendix addresses how COPS obligations were distributed among local law enforcement agencies in relation to the populations they served and the crimes in their jurisdictions. It also addresses how much of the obligated amounts agencies spent. Specifically, it covers (1) the amount of COPS obligations between 1994 and 2001, (2) the distribution of grant funds to larger and smaller agencies relative to total index and violent crimes, (3) the number of agencies in our sample that received COPS grants, (4) the amounts of COPS expenditures, and (5) the amount of these expenditures relative to total local law enforcement expenditures.

Smaller Agencies Received Larger Amounts of COPS Obligations per Crime than Did Larger Ones

Our analysis showed that from 1994 through 2001, COPS obligated more than $7.32 billion to 10,680 agencies for which we were able to link OJP financial data on COPS obligations to the records of law enforcement agencies.[1] As shown in table 4, about $4.7 billion (or 64 percent) of these obligations were for hiring grants. Equipment and redeployment grants made under the MORE category of grants amounted to about $1.2 billion (or about 17 percent) of total obligations.

Table 4: COPS Grant Obligations 1994-2001, by COPS Grant Program

COPS grant program category	Obligations	
	Amount (in billions of dollars)[a]	Percentage of total[b]
Total, all grants	$7.32	100.0%
Hiring grants	$4.69	64.1%
MORE grants	$1.22	16.7%
Innovative grants	$0.42	5.7%
Miscellaneous grants	$1.00	13.7%

Source: GAO analysis of Office of Justice Programs financial data.

Note: Table 2 in appendix I identifies the specific grant programs that we classified into these four categories of grants.

[a]Amounts for each grant program category may not add up to total because of rounding.

[b]The percentages may not add up to 100 percent because of rounding.

As shown in table 5, from 1994 through 2001, slightly more than half of the COPS obligations in the sample of agencies for which we were able to link

[1]The amount obligated to these agencies was 96.1 percent of the $7.6 billion total in COPS obligations reported in the OJP financial data.

OJP financial data to the records of agencies that reported crime and population to the FBI's Uniform Crime Reporting Program[2] went to those agencies serving populations of 150,000 or fewer persons and slightly less than half went to those agencies serving populations of more than 150,000 persons, roughly consistent with the requirements of COPS authorizing legislation.[3]

The largest agencies—those serving populations of 150,000 or more persons—accounted for more than half of all violent crimes reported to the UCR. Specifically, in our sample, these agencies accounted for about 58 percent of all violent crimes reported in the UCR from 1994 through 2001. Their share of all violent crimes declined slightly from 60 percent from 1994 through 1997 to 57 percent from 1998 through 2001. These agencies received about 47 percent of all COPS obligations, a share that is disproportionately small relative to their contribution to all violent crimes. However, as shown in table 5, the amount of COPS obligations going to agencies serving populations of 150,000 or fewer persons and those serving populations of more than 150,000 persons was about equal to the distribution of all index crimes occurring within these agencies.

[2]The population data that we used in our analysis came from the UCR, and they may not reflect the population information that agencies submitted to the COPS Office on their applications.

[3]Each year, the COPS Office was required to allocate half of its grant funds in each year to agencies serving populations of 150,000 or fewer persons and half to agencies covering populations of more than 150,000 persons.

Table 5: Percentage Distribution of COPS Obligations and Crime from 1994 through 2001, by Population Size Group

Population size group (number of persons)	Percentage of total COPS obligations	Percentage of total crimes	Percentage of all violent crimes	Percentage of all property crimes
Fewer than 10,000	15%	7%	5%	7%
10,000 to fewer than 25,000	13%	11%	8%	12%
25,000 to fewer than 50,000	11%	12%	9%	13%
50,000 to 150,000	15%	22%	19%	22%
Subtotal (150,000 or fewer)	54%[a]	52%	41%	54%
More than 150,000	47%[a]	48%	58%	46%
Total	**100%**	**100%**	**100%**	**100%**

Source: GAO analysis of Office of Justice Programs financial and Uniform Crime Report data.

[a]The subtotal for agencies serving 150,000 or fewer persons and those serving populations of more than 150,000 may not add to 100 percent because of rounding.

Table 6 shows that law enforcement agencies serving the smallest populations received the largest amounts of COPS obligations on a per crime basis. For example, agencies serving populations of fewer than 10,000 persons received, on average, $1,573 per violent crime reported from 1994 through 2001. By comparison, agencies serving populations of more than 150,000 persons received $418 per reported violent crime.

Table 6: Per Crime COPS Obligations, by Population Size Group and Category of Crime, 1994 through 2001

Population size group	Ratio of total COPS obligations to total crimes		
	All index crimes	Violent crimes	Property crimes
Fewer than 10,000	$146	$1,573	$160
10,000 to fewer than 25,000	$78	$844	$86
25,000 to fewer than 50,000	$61	$625	$68
50,000 to 150,000	$47	$404	$53
More than 150,000	$67	$418	$80
Total	**$69**	**$525**	**$79**

Source: GAO analysis of Office of Justice Programs financial and Uniform Crime Report data.

Note: Ratios are computed as COPS obligations over the number of each type of crime. The ratio for all index crimes is not weighted by the contribution of violent and property crimes to the total.

Most Agencies Had Received Their First COPS Grant by 1996

As shown in table 7, of the 10,680 agencies included in our analysis, just under half (49 percent) had received at least their first COPS grant by 1995, and 71 percent had received at least their first grant by 1996. Of the 9,845 agencies that received at least one COPS hiring grant, 53 percent had received their first hiring grant by 1995, and 73 percent had done so by 1996.

Table 7: Number of Agencies That Received at Least One COPS Grant Obligation, 1994-2001, by COPS Grant Program, and Year of First COPS Obligation

Year of first COPS grant	At least one COPS grant	Hiring grants	MORE grants	Innovative grants	Miscellaneous grants
1994	241	241	0	0	0
1995	4,989	4,988	0	3	1
1996	2,319	1,965	1,394	265	255
1997	825	750	624	200	17
1998	910	941	231	234	18
1999	803	605	1,010	131	1,339
2000	241	141	216	3	678
2001	352	214	378	13	476
Total number of agencies	**10,680**	**9,845**	**3,853**	**849**	**2,784**

Source: GAO analysis of Office of Justice Programs financial and Uniform Crime Report data.

Note: The sum of agencies across specific COPS program categories does not equal the total number of agencies that received at least one COPS grant because some agencies may have received more than one type of COPS grant in the same year.

We estimated that about 67 percent of the agencies that reported complete crime data to the UCR for at least 1 year from 1990 through 2001 received a COPS grant by 2001.[4] The percentages of agencies that received COPS grants varied by the size of agencies, as measured by the size of the population in the jurisdictions served by the agencies. As table 8 shows, as the population served by the agencies increased, the percentage of agencies that received a COPS grant also increased. Among the largest agencies—those serving populations of more than 150,000 persons—about 95 percent received a COPS grant. By comparison, among agencies serving populations of fewer than 10,000 persons, about 61 percent in our sample of agencies received at least one COPS grant.

[4]According to our definition, an agency reports complete crime data if its reports to the UCR contain crime data for all 12 months within a year.

Table 8: Percentage of Agencies in GAO's Primary Analysis Sample That Received at Least One COPS Grant Obligation from 1994 through 2001, by Size of Population Served by Agencies

Size of population served by agencies (number of persons)	Number of agencies	Percentage receiving at least 1 COPS grant
Fewer than 10,000	7,940	60.6%
10,000 to fewer than 25,000	2,673	76.2%
25,000 to fewer than 50,000	1,127	81.7%
50,000 to 150,000	702	85.2%
More than 150,000	185	94.6%
Total, all agencies[a]	**13,133**	**67.2%**

Source: GAO analysis of Office of Justice Programs financial and Uniform Crime Report data.

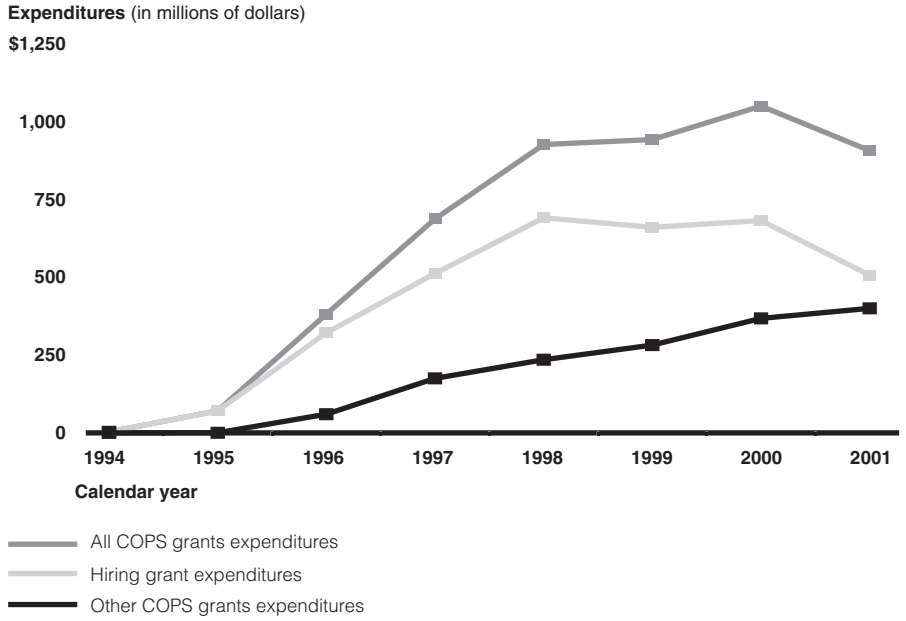
Note: GAO's primary analysis sample consists of 13,133 agencies that reported at least 12 months of crime data in at least 1 year from 1990 through 2001. (See app. I.)

[a]The sum of the agencies in each population size group does not add up to the total of 13,133 because data on the size of the population served were missing for 506 agencies. Among these 506 agencies, 276, or 54.5 percent, received at least one COPS grant.

Total COPS Expenditures and Per Capita Expenditures Peaked in 2000, and Smaller Agencies Spent More than Larger Ones on a Per Capita Basis

By 2001, agencies had drawn down about $5 billion in COPS funds (or roughly 68 percent of all obligations awarded from 1994 through 2001). As figure 7 shows, total COPS expenditures increased annually from 1994 to 2000. Total expenditures exceeded $900 million per year in each year from 1998 through 2001, and in 2000, they exceeded $1 billion. COPS hiring grant expenditures totaled $3.5 billion (or roughly 70 percent of the roughly $5 billion in hiring grant obligations made from 1994 through 2001). Hiring grant expenditures peaked in 1998—exceeding $690 million—and declined slightly in 1999 and 2000.

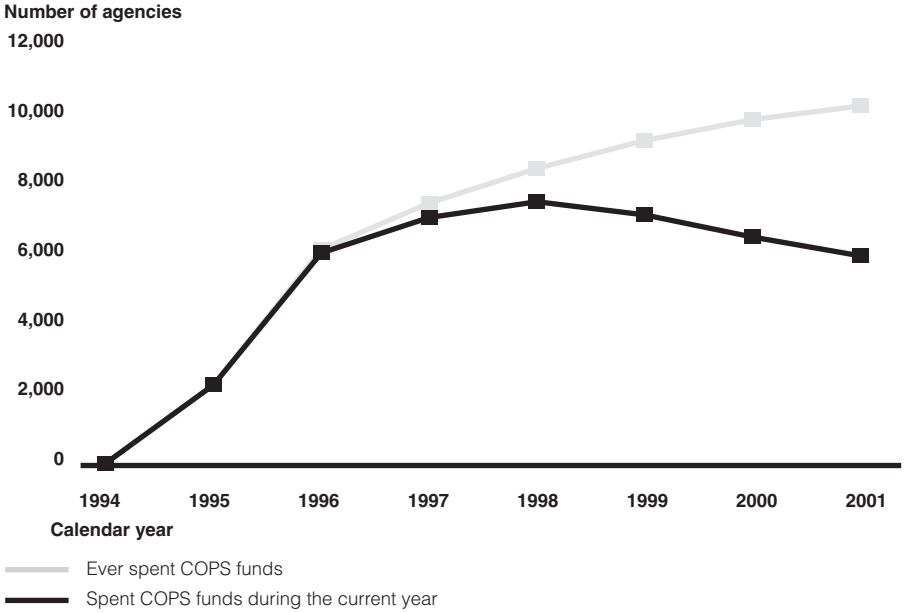
Figure 7: Annual Expenditures of COPS Grant Funds, by Year



Source: GAO analysis of Office of Justice Programs financial and Bureau of Justice Statistics crosswalk data.

The number of agencies that spent COPS funds peaked in 1998 and declined thereafter, as figure 8 shows. In 1998, more than 7,500 agencies were spending COPS funds. However, by 2001, the number had fallen to about 6,000.

Figure 8: Number of Agencies That Spent COPS Funds, 1994 through 2001



Source: GAO analysis of Office of Justice Programs financial and Bureau of Justice Statistics crosswalk data.

COPS expenditures per population in the jurisdictions that spent funds—per capita expenditures—also increased as the total amount of COPS expenditures increased. Total per capita COPS expenditures peaked in 2000 at $5.6 per person. Hiring grant expenditures per capita similarly peaked at $4.8 per person in 2000. The per capita expenditure amounts varied by size of agency, as smaller agencies generally spent more on a per capita basis than did larger agencies. Agencies serving populations of fewer than 10,000 persons spent about twice as much COPS grant monies on a per capita basis than did the larger agencies. For example, per capita COPS expenditures for agencies serving fewer than 10,000 persons averaged $6.6 as compared with about $3.4 for agencies serving populations of more than 150,000 persons.

COPS Expenditures Amounted to about 1 Percent of All Local Law Enforcement Expenditures

From 1994 through 2001, COPS expenditures amounted to about 1 percent of total local expenditures for nationwide police services, based upon BJS data on criminal justice expenditures and our analysis of OJP data on COPS grant expenditures.[5] From 1994 through 2001, total local expenditures for police services increased from about $46 billion to $72 billion. During the years from 1998 through 2000, when COPS expenditures neared and then exceeded $1 billion per year, the contribution of COPS expenditures to local police expenditures increased to about 1.5 percent of total local expenditures for police services.

[5]This includes total expenditures for jurisdictions with agencies that received COPS grants as well jurisdictions with agencies that did not receive COPS grants.

Appendix IV: COPS Expenditures Led to Increases in Sworn Officers and Declines in Crime

This appendix addresses our second reporting objective, which has two parts: determining the extent to which COPS grant expenditures contributed to increases in the number of sworn officers in police agencies, and determining the extent to which COPS grant expenditures led to reductions in crime through their effects on sworn officers.

COPS Expenditures Led to Increases in Sworn Officers above Levels That Would Have Been Expected without Them and Were Responsible for about 88,000 Officer-Years

We found that COPS hiring grants were significantly related to increases in sworn officers above levels that would have been expected without the expenditures, after controlling for economic conditions in the counties in which agencies were located, population composition, and preexisting trends in agencies in the growth rate of sworn officers. Further, the effects of COPS hiring grants were consistent across several different regression models, including those that controlled for state-level factors that could affect the size of local police forces—such as state-level differences in the amount of funding provided to local departments. Overall, the parameter estimates from our models indicate that each $25,000 in COPS hiring grant expenditures was associated with roughly an additional 0.6 officers in any given year.[1] With the exception of MORE grants, no other types of COPS grant expenditures were associated with increases in officers.

Using the results from our regression models, we calculated for each year from 1994 through 2001 the number of sworn officers nationwide that would have been on the street absent the COPS expenditures in each year. The difference between this amount and the actual level of sworn officers yielded the number of officers due to COPS expenditures in a given year. The number of officers due to COPS increased from 84 in 1994 to 17,387 in 2000, and then declined to 12,226 in 2001 (table 9). The increase and decrease in the number of officers due to COPS followed the pattern of COPS expenditures, which peaked in 2000 and then declined (see fig. 7 in app. III). Adding up the number of officers due to COPS in each year across the years from 1994 through 2001, we arrive at a total of about 88,000 sworn officer-years due to COPS expenditures.

From 1997 through 2000, when COPS expenditures neared or exceeded $1 billion per year, we estimated that the expenditures led to increases in

[1]Our estimate of the effect of COPS expenditures on officers is consistent with those in the research conducted by Evans and Owns, who used COPS hiring grants to estimate the relationship between changes in sworn officers and crime. They estimated that each $25,000 in COPS hiring grant expenditures produced an additional 0.7 of an officer in a given year. Evans and Owens, "Flypaper COPS," 2005.

sworn officers of between 2.4 percent and 2.9 percent above levels expected without them. In years prior to 1997, and in 2001, when COPS expenditures were lower, the percentage of officers due to COPS expenditures were lower than occurred from 1997 through 2000.

Table 9: Estimated Effect of COPS Expenditures on the Number of Sworn Officers Nationwide in Each Year, 1994-2001

Year	Estimated number of officers due to COPS expenditures	Percentage of total number of officers in the United States
1994	84	0.02%
1995	1,916	0.35%
1996	8,639	1.55%
1997	13,897	2.42%
1998	17,630	3.02%
1999	16,415	2.72%
2000	17,387	2.91%
2001	12,226	2.05%
Total, officer-years[a]	**88,195**	[b]

Source: GAO analysis of Uniform Crime Report, Office of Justice Programs financial, Bureau of Economic Analysis, National Center for Health Statistics, and U.S. Census Bureau data.

[a]The total number of officer-years due to COPS expenditures is the sum of the number of officers due to COPS in each year. We call this total the number of officer-years due to COPS expenditures. It is not directly comparable with estimates of the number of sworn officers on the street as a result of COPS funds or with estimates of the number of officers funded by the COPS Office.

[b]Not applicable.

An officer-year is the number of officers in a given year that were associated with COPS expenditures. According to this measure, an individual officer—or person—might be included in our counts of officers due to COPS in several years. Therefore, our estimate of the total number of officer-years arising from COPS expenditures is not equivalent to the number of officers that the COPS Office reportedly funded, nor does it represent an estimate of the total number of officers as a result of COPS grants. For a given year, however, our estimate represents the number of COPS-funded officers on the street. (For additional details on the methods we used to estimate the effects of COPS expenditures on officers, see app. VI.)

LLEBG Funds Also Contributed to Increases in Officer Strength

In addition to our findings of the effects of COPS expenditures on the level of sworn officers, we found that Local Law Enforcement Block Grants expenditures also contributed to increases in officers above levels expected without them. Our finding about LLEBG grants effects on sworn officers is consistent with interview and survey responses reported by Urban Institute researchers in their evaluation of the implementation of the COPS program.[2] In their interviews with police chiefs, they found that the chiefs reported that they used LLEBG to supplement COPS funds. LLEBG grants could be used for a variety of purposes in addition to funding officers.

COPS Expenditures Led to Reductions in Crime through Increases in Officers

Estimating the impact of COPS expenditures on changes in crime rates through their effects on the number of sworn officers, we found that COPS expenditures were associated with declines in crime rates for total, violent, and property crimes, as compared with their baseline levels in 1993, the year prior to the distribution of COPS grants. The amounts of decline in crime rates varied among crime types and across years. The variation in the decline in crime rates in various crime types arose from our estimates of the effects of changes in officers on crime rates, and the variation over time within crime types arose from the variation in COPS expenditures. For example, for the total crime rate, we found that the impact of COPS peaked in 1998, as for that year, we estimated that COPS led to a reduction in the total crime rate of almost 1.4 percent from the level of crime in 1993. From 1999 and 2000, COPS expenditures of between $920 million and about $1 billion led to reductions in the total crime rate of about 1.3 percent, again, as compared with the 1993 level. In years prior to 1998 and in 2001, when COPS expenditures were lower than their levels in 1998 through 2000, the declines in total crime arising from COPS expenditures also were less than 1.3 percent (table 10).

Similarly, for violent and property crimes, we found that the amount of decline associated with COPS expenditures varied from year to year, and for both of these crime categories, the largest decline in crime occurred during 1998. COPS expenditures led to a decline in violent crime of almost 2.6 percent in 1998, compared with violent crime levels in 1993. For 1999 and 2000, COPS expenditures led to about a reduction of about 2.4 percent in violent crime, from the 1993 level. For property crimes, the impact of

[2]Roth, Jeffrey, et al. *National Evaluation of the COPS Program*, 2000.

COPS expenditures from 1998 through 2000 was between 1.1 percent and 1.2 percent, as compared to the 1993 level (table 10).

Table 10: Estimated Percentage Change in Crime Rates from 1993 Levels Due to COPS Expenditures, 1994-2001, by Crime Type Category

	Crime category		
Year	Total crimes	Violent crimes	Property crimes
1994	–.01	–.01	–.01
1995	–.16	–.29	–.13
1996	–.70	–1.29	–.60
1997	–1.11	–2.05	–.95
1998	–1.39	–2.57	–1.19
1999	–1.28	–2.36	–1.10
2000	–1.34	–2.48	–1.15
2001	–0.93	–1.73	–.80

Source: GAO analysis of Uniform Crime Report, Office of Justice Programs financial, Bureau of Economic Analysis, National Center for Health Statistics, and U.S. Census Bureau data.

Note: All estimates of the magnitude of the impact of COPS on crime are made with respect to the level of crime in 1993, the baseline year for our comparisons. The crime rates in 1993 in the data in our sample were as follows: the total crime rate was 5,904 per 100,000 persons; the violent crime rate was 846 per 100,000 persons; and the property crime rate was 5,058 per 100,000 persons.

Our estimates of the impact of COPS expenditures on crime through their effects on the number of officers represent the effects of COPS expenditures on crime net of the effects of other factors that we controlled for in our model—including changes in economic conditions, population composition, and pre-COPS program trends in police agencies' growth rate of sworn officers and growth rate in crime. By controlling for pre-COPS program growth rates in officers and crime, we made comparisons between agencies within population size categories that had similar growth rates in officers and crime but which differed on the timing and amount of COPS expenditures. In addition, through the use of state-by-year fixed effects, we controlled for state-level factors that could affect crime rates, such as changes in sentencing policy or state incarceration.

As our estimates of the impact of COPS expenditures on crime come, in part, from our estimates of the effects of changes in officers on crime, we compared our estimates of the effect of changes in officers on changes in crime with estimates of these effects that appear in recent research. We found that each 1 percent increase in sworn officers was associated with about a 0.4 percent decline in total crime, about a 0.8 percent decline in violent crime, and a slightly less than 0.4 percent decline in property

crime. Our estimates of this relationship—the elasticity of crime with respect to officers—is consistent with estimates that appear in recent literature of the effects of changes in police officers on changes in crime rates. Others report elasticities that are similar to ours. For example, in a study that used COPS granted officers to estimate the effect of increases in officers on crime, the authors reported an estimated elasticity for violent crime of –0.99 (a 1 percent increase in officers led to a 0.99 percent decline in violent crimes) and a property crime elasticity of –0.26.[3] In another paper that used electoral cycles to estimate the effect of increases in officers on crime, the author provides a set of elasticities under different model specifications.[4] The elasticity for property crimes was calculated to be about –0.3, and the elasticity for violent crimes was about –1.0. (See app. VI for more information on the methods that we used to calculate our elasticities and to estimate the impact of COPS expenditures on crime.)

Various Specifications of Our Regressions Yielded Consistent Findings about the Effect of COPS Expenditures on Crime

While we found that COPS expenditures were associated with reductions in total crime and the violent and property crime categories, when we examined the effects of COPS expenditures on specific types of index crimes, we found significant reductions in murder, robbery, aggravated assault, burglary, and motor vehicle theft. We found a negative association between COPS expenditures and larceny, but this effect was not statistically significant. Finally, we found a positive but statistically insignificant association between COPS expenditures and rape. (See table 17 in app. VI.)

Additionally, for agencies that served populations of 10,000 or more persons, we found that the effects of COPS expenditures on the total crime rate were consistent across agencies that served populations of varying sizes with the exception of agencies that served populations of between 25,000 and 50,000 persons. The magnitude of the effects tended to increase with the size of agencies, where agency size refers to the population served by the agency. In general, as the size of agencies

[3]Evans and Owens, "Flypaper COPS," 2005.

[4]Levitt, Steven D. "Using Electoral Cycles in Police Hiring to Estimate the Effect of Police on Crime: Reply" *American Economic Review*, September 2002, 92(4), pp. 1244-50. Justin McCrary found that Levitt's original estimates of the effect of officers on crime suffered from a computation error. Levitt was able to confirm his results after correcting the error using an alternative instrument. See McCrary, Justin, "Do Electoral Cycles in Police Hiring Really Help Us Estimate the Effect of Police on Crime: Comment." *American Economic Review*. June 2002, 92(4), pp. 1236-43.

increased, we found that the impact of COPS expenditures on the total crime rate also increased. For agencies serving populations between 25,000 and 50,000, we observed a negative relationship between COPS expenditures and crime. However, the estimated effect was not statistically significant. (See table 18 in app. VI.)

As there are uncertainties associated with formulated regression models, and point estimates derived from a single regression model can give misleading information, we estimated our regressions under different assumptions about how COPS expenditures could affect crime. Under the various models, we introduced lagged effects, nonlinear effects for COPS hiring grants, and effects for the year of receipt of COPS grants—to test whether the impact of COPS occurred in the years in which the money was spent. From the various specifications, we estimated the elasticity of crime with respect to officers. We found that the elasticity for total crimes ranged from –0.41 to –0.95. The elasticity that we used to calculate the impact of COPS on the decline in index crimes was –0.42, which is at the lower end of the range of elasticities that we estimated. Therefore, under assumptions different from the preferred specification about how COPS expenditures are related to officers and crime, we would arrive at a larger estimated impact of COPS on the decline in crime than we report above. Also, under the varying assumptions about how COPS expenditures are related to crime, we estimated elasticities of violent crimes with respect to officers and elasticities of property crimes with respect to officers. For violent crimes, the elasticities derived from these regressions ranged from –0.76 to –1.8. The elasticity that we used to estimate the impact of COPS on the decline in violent crimes was –0.8. This elasticity is at the lower end of the range of elasticities that we estimated, which implies that the impacts of COPS on violent crimes could be larger than the impacts that we reported. For property crimes, the range of estimated elasticities was from –0.35 to –0.80. (See table 20 in app. VI.)

In addition to our findings of the effects of COPS expenditures on crime, we found that LLEBG expenditures were consistently associated with declines in total crime rates and declines in the murder, rape, robbery, aggravated assault, burglary, and larceny crime rates. Only for motor vehicle theft did we not find a significant effect of LLEBG expenditures. However, because LLEBG grant funds are related to the levels of violent crime occurring within a jurisdiction, the relationship between LLEBG

expenditures and crime may be one of bidirectional causality.[5] By this, we mean because LLEBG grant amounts were determined in part on the levels of violent crime, violent crime in a community can be construed as a cause of LLEBG grants in addition to an effect of having received them. (See table 17 in app. VI.)

Factors other than COPS Expenditures Contributed Larger Amounts to the Reduction in Crimes, but COPS Contribution Was in Line with COPS Expenditures

The decline in crimes attributable to COPS expenditures accounted for at most about 10 percent of the total drop in crime from 1993 to 1998, and about 5 percent of the drop from 1993 to 2000. Therefore, various factors other than COPS expenditures were responsible for the majority of the total decline in crime during the 1990s. While in our regression models of the effects of COPS funds on crime, we were able to control for the effects of many factors that could be related to the decline in crime, we did not attempt to estimate the amount that each of these factors individually had contributed to the overall drop in crime.[6] Rather, by isolating the amount by which crime rates declined because of COPS and comparing that amount with the total decline in crime from our 1993 baseline year, we calculated COPS contribution to the overall decline in crime. The amount of the total drop in crime not associated with COPS expenditures reflects the amount due to factors other than COPS.

While COPS' contributions to the decline in crime rates did not account for the majority of the total drop in crime rates, the amounts of declines in crime rates attributable to COPS were on the same order of magnitude as were COPS expenditures' contributions to local law enforcement expenditures for police. From 1994 through 2001, COPS expenditures amounted to slightly more than 1 percent of total local expenditures for

[5]According to officials at the Bureau of Justice Statistics, the formula for determining LLEBG grant amounts is based in part upon the level of violent crime occurring within a jurisdiction. By comparison, there was no requirement for COPS funding to be related to violent crime. Therefore, without an instrument to isolate the relationship between LLEBG expenditures and crime rates, we cannot conclude that the estimated effects of LLEBG expenditures on crime would hold if we were able to isolate statistically the causal direction of effects.

[6]Some of the factors associated with the crime drop have been discussed in Blumstein and Wallman (2002). See Blumstein, A., and J. Wallman (eds.), *The Crime Drop in America*, Cambridge, United Kingdom: Cambridge University Press, 2000.

police services nationwide. As we found and reported, COPS expenditures were responsible for about a 1.4 percent decline in the total crime rate.

Appendix V: COPS Expenditures Associated with Policing Practices That Crime Literature Indicates Are Effective in Preventing Crime

This appendix addresses our third reporting objective: determining the extent to which COPS grant expenditures during the 1990s were associated with police departments adopting policing activities or practices that the crime literature indicates could contribute to reductions in crime. Specifically, it describes the results of our analyses of the relationships between COPS grant expenditures and changes in policing practices reported in two surveys of local law enforcement agencies, and it summarizes our assessment of studies that conducted systematic reviews of research on the effectiveness of various policing practices. Our analysis of the first of the two surveys of policing practices compares changes in reported policing practices between 1993 and 1997, that is, prior to the distribution of COPS grants and after many COPS grants had been distributed. In our analysis of the second survey, we compare changes from 1996 to 2000, or during the implementation COPS program. In addition, we provide a limited summary of our analysis of systematic reviews of evaluations of policing practices that could contribute to reductions in crime. (See app. VII for the details related to our methodology for analyzing policing practices.)

Comparisons of Pre- and Within-COPS Grant Program Levels of Reported Policing Practices Show That COPS Grantee Agencies Reported Larger Increases than Non-COPS Agencies

Prior to the implementation of COPS grants, many local law enforcement agencies had adopted a number of problem-solving, place-oriented, crime analysis, and community collaboration policing practices. Problem-solving practices refer to efforts by the police to focus on specific problems and tailor their strategies to the identified problems. Place-oriented practices include attempts to identify the locations where crime repeatedly occurs and to implement procedures to disrupt these recurrences of crime. Crime analysis includes the use of tools such as geographic information systems to identify crime patterns. Community collaboration includes attempts to improve or enhance citizen feedback about crime problems and the effectiveness of policing efforts to address them.

Our analysis of the Policing Strategies Survey data for 1993—the year before COPS grants were distributed—indicates that surveyed agencies that received a COPS grant between 1994 and 1997 reported higher mean levels of the above policing practices than agencies that did not receive a COPS grant between 1994 and 1997. For example, in 1993, the mean number of all practices reported by grantee agencies was about 13 out of a possible 38 practices, while the mean number of all practices reported by nongrantee agencies was about 11 practices. However, among the agencies that received a COPS grant between 1994 and 1997, there were larger increases in the mean level of all reported practices between 1993 and 1997 except for those related to crime analysis. COPS grantee

agencies reported in 1997 an increase of about 3.5 practices overall, as compared with a mean increase of less than 2 practices by the agencies that did not receive COPS grants during this period. The largest differences between COPS grantees and nongrantee agencies in the reported increase in practices occurred for the problem-solving and place-oriented practices (table 11).

Table 11: Mean Levels of Policing Practices in 1993 and 1997, by Category of Policing Practices and whether Agencies Received a COPS Grant between 1994 and 1997

	COPS grantee agencies			Agencies that did not receive a COPS grant		
Category of policing practice	**1993**	**1997**	**Difference**	**1993**	**1997**	**Difference**
Problem solving	4.57	5.80	1.24	4.16	4.68	0.52
Place oriented	2.98	4.21	1.23	2.38	2.84	0.47
Community collaboration	3.48	4.41	0.93	2.69	3.45	0.76
Crime analysis	1.88	1.93	0.05	1.66	1.71	0.05
Total	**12.90**	**16.34**	**3.44**	**10.89**	**12.69**	**1.80**

Source: GAO Analysis of Policing Strategies Survey, Office of Justice Programs financial, Bureau of Economic Analysis, National Center for Health Statistics, U.S. Census Bureau, and Uniform Crime Report data.

From a series of regression models of the effects of COPS grants on changes in policing practices, we found that both the receipt of a COPS grant, and the amount of per capita COPS expenditures by agencies were associated with increases in the levels of reported policing practices between 1993 and 1997. Our regressions control for the underlying trend in the reported use of policing practices, for differences in agency characteristics that could be associated with increases in reported levels of policing practices—such as the size of the jurisdiction—and changes in the economic and social characteristics of the county in which the agency was located. We estimated separate regressions of the effect of the receipt of a COPS grant and of the cumulative per capita amount of COPS expenditures on the levels of reported policing practices.

Our regression models for estimating the effects of receipt of a COPS grant on the change in police practices between 1993 and 1997 show that agencies that received at least one COPS grant had significantly larger changes in the overall number of practices than did agencies that did not receive a COPS grant during this period. Specifically, according to our analysis of the survey data, the average number of practices increased by 2.9 over this period, and the receipt of a COPS grant accounted for 1.8 of this reported increase. Further, when we examined our results from

separate regressions for the different categories of practices, we found that receipt of a COPS grant was associated with significant increases in reported levels of problem-solving and place-oriented practices, but was not related to changes in community collaboration or crime analysis practices. (See app. VII for details.)

Our regression models further show that changes in practices were also associated with the cumulative amount of per capita spending on COPS grants. All other things being equal, a $1 increase in per capita spending was associated with an increase of 0.23 policing practices. As we found for the effects of the receipt of a grant on changes in police practices, these regressions also showed that the level of per capita spending on COPS grants was significantly associated with increases in problem-solving and place-oriented practices. However, per capita spending on COPS grants was also associated with increases in crime analysis practices. (See app. VII for details.)

The Effects of COPS Grants on Agencies' Reported Increases in Policing Practices Differed across Agencies Serving Populations of Different Sizes

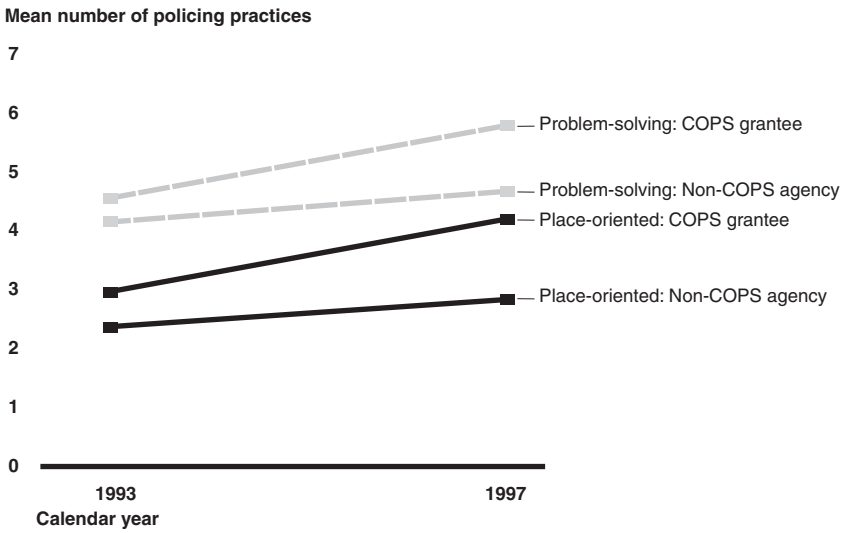
Receipt of a COPS grant was associated with increases in the overall adoption of policing practices among agencies serving populations of different sizes. Regardless of the size of populations served, agencies that received COPS grants adopted almost twice as many practices between 1993 and 1997 as agencies that did not receive COPS grants. However, in both years, agencies serving larger populations also reported higher mean levels of policing practices (table 12 and fig. 9).

Table 12: Mean Levels of Policing Practices in 1993 and 1997, by Size of Agency and whether Agencies Received a COPS Grant between 1994 and 1997

	COPS grantee agencies			Agencies that did not receive a COPS grant		
Jurisdiction population (number of persons)	1993	1997	Difference	1993	1997	Difference
10,000 to fewer than 50,000	11.87	15.14	3.27	10.12	11.80	1.68
50,000 to 150,000	14.58	18.70	4.12	14.40	16.81	2.41
More than 150,000	19.30	22.82	3.52	19.00	20.91	1.91

Source: GAO Analysis of Policing Strategies Survey and Office of Justice Programs financial data.

Figure 9: Reported Levels of Policing Practices in 1993 and 1997 in Agencies That Received and Did Not Receive COPS Grants, by Size of Population Served



Source: GAO analysis of Policing Strategies Survey and Office of Justice Programs financial data.

Our regressions of the effect of COPS expenditures on changes in reported levels of policing practices between 1993 and 1997, indicate, however, that the effects of receiving a COPS grant were larger in agencies in jurisdictions serving fewer than 50,000 persons and in jurisdictions serving more than 150,000 persons, than in agencies in jurisdictions serving populations of between 50,000 and 150,000 persons.

Reported Levels of Policing Practices among COPS Grantees Did Not Increase Overall from 1996 to 2000

Our analysis of the National Evaluation of COPS Survey data on policing practices in 1996 and in 2000 also showed that agencies that received COPS grants reported larger increases in the mean level of policing practices than did non-COPS grantee agencies, but that the effects were not statistically significant. The findings suggest that there was no continued overall increase in reported policing practices in the period from 1996 to 2000.

Regardless of when agencies received COPS grants and made COPS expenditures, we found that COPS grantee agencies reported larger increases in policing practices between 1996 and 2000 than did the agencies that did not have COPS grants in these years. For example, for the agencies that received their first COPS grant in 1996 or before, the average increase in reported use of policing practices from 1996 to 2000 was about 21 percent, and for the agencies that made COPS grant

expenditures after 1996, the average increase in reported use of policing practices was about 17 percent. By contrast, for the agencies that had not made any COPS grant expenditures by 2000, there was about a 0.2 percent decrease in the reported use of policing practices from 1996 to 2000, and for the agencies that did not make any COPS grant expenditures after 1996, there was about a 3 percent increase in the reported use of policing practices from 1996 to 2000 (table 13).

Table 13: Difference in Mean Levels of Reported Policing Practices in 1996 and 2000, by Category of Policing Practices and Timing of COPS Grant Expenditures

	Made COPS expenditures after 1996		Made COPS expenditures in 1996 or before		Did not make COPS expenditures after 1996		Did not make COPS expenditures between 1994 and 2000	
Category of policing practice	1996	Change	1996	Change	1996	Change	1996	Change
Problem solving and place oriented	6.09	1.00	6.08	1.45	6.91	0.11	7.08	-0.13
Community collaboration	3.36	0.53	3.42	0.56	3.28	0.47	3.33	0.38
Crime analysis	1.67	0.32	1.70	0.39	1.87	-0.20	1.88	-0.26
Total	**11.12**	**1.86**	**11.21**	**2.38**	**12.06**	**0.38**	**12.30**	**-0.02**

Source: GAO analysis of National Evaluation of COPS Survey and Office of Justice Programs financial data.

Although we observed larger average increases in reported policing practices among agencies that spent COPS grant funds than among agencies that did not spend COPS grant funds, when we controlled for underlying trends in the reported adoption of policing practices and agency characteristics, we found that changes in per capita COPS expenditures made between the period preceding wave 1 of the survey (1994 through 1996) and the period following wave 1 of the survey (1997 through 2000) were not associated with changes in reported overall policing practices between 1996 and 2000 (app. VII). This suggests that there was no continued overall increase in reported policing practices in the period from 1996 to 2000, as a function of COPS grant expenditures.

Crime Literature Provides Evidence for Effectiveness of Some Policing Practices

Our analysis of six systematic reviews of evaluations of the effectiveness of various policing practices in preventing crime indicates that the current evidence ranges from moderate to strong that problem-oriented policing practices and place-oriented practices are either effective or promising as strategies for addressing crime problems. For example, problem-oriented approaches that focus on criminogenic substances such as guns and drugs

appear to be effective in reducing both violent and property crimes. And hot spots approaches—place-oriented approaches that temporarily apply police resources to discrete locations where crime is concentrated at much higher rates than occur jurisdictionwide—have also been found to be effective in reducing crime. However, the magnitudes of the effects of these interventions are difficult to estimate, especially on citywide crime rates, as the interventions that were reviewed as effective generally were concentrated in comparatively small places. Further, the enduring nature of these interventions is not fully understood. It is not known, for example, how long the effects of a problem- or place-oriented intervention persist. In addition, some of the reviews point out that research designs undertaken to date make it difficult to disentangle the effects of problem-oriented policing from hot spots policing. There is suggestive, but limited, evidence that the combination of these practices may be more effective in preventing or reducing crime than any one strategy alone.

In contrast to the findings on problem-oriented and place-oriented policing practices, there is little evidence in the literature for the effectiveness of community collaboration practices—such as increasing foot patrol, establishing community partnerships, and encouraging citizen involvement—in reducing or preventing crime.

Appendix VI: Methods Used to Estimate the Effects of COPS Funds on Officers and Crime

In this appendix, we describe the methods we used to address our reporting objective regarding the impacts of the COPS funds on officers and crime: determining (1) the extent to which COPS grant expenditures contributed to increases in the number of sworn officers in police agencies in the 1990s and (2) the extent to which COPS expenditures contributed to declines in crime in the 1990s through their effects, if any, on officers.

Prior Literature on the Relationship between Officers and Crime Addresses Issues Relating to Estimating the Effects of COPS Funds on Crime

In examining the effect of COPS funds on crime, we estimate the impacts of the funds on crime through their impacts on officers. The effect of police on crime has a theoretical basis in the economics literature. Economic models posit that criminals weigh the gains from criminal activity against its costs—the possibility of arrest and incarceration. Anything that increases the probability of arrest, such as additional police, will thus deter criminal activity; we might call this the deterrence effect. A second effect stems from arrests directly. If criminals are arrested and incarcerated, they will not be able to commit street crimes; we might call this the incapacitation effect.

The relationship between police and crime has been studied empirically, with mixed results. Several reviews of research that investigated this relationship have reported that a minority of papers find a significant negative relationship between increases in the number of officers and crime.[1] However, these reviews also point out that many of the studies have methodological flaws. In a report to Congress on what works in crime prevention, Lawrence Sherman and others drew upon a limited body of research that addressed the methodological concerns and concluded that increases in the number of police officers work to prevent crime.[2]

One of the major methodological issues associated with estimating the relationship between police officers and crime is the issue of reverse causality. This issue revolves around determining how to disentangle the relationship between the number of police officers and crime, as

[1]For example, see: Marvell, Thomas, and Carlisle Moody. "Specification Problems, Police Levels, and Crime Rates," *Criminology* 1996, 34. pp. 609-46. Eck, John, and Edward Maguire, 2000. "Have Changes in Policing Reduced Violent Crime? An Assessment of the Evidence." in A. Blumstein and J. Wallman, eds., *The Crime Drop in America*. New York: Cambridge University Press, 2000. pp 207-65.

[2]Sherman, Lawrence, 1998. "Policing for Crime Prevention," in Sherman, L., et al. (eds.) *Preventing Crime: What Works, What Doesn't, What's Promising: A Report to the United States Congress.* Washington, D.C.: National Institute of Justice, Chapter 8.

municipalities having higher crime rates generally also have more officers. For example, Detroit has twice as many police per capita as Omaha and four times the violent crime rate, but it would be incorrect to conclude that the additional officers in Detroit were the cause of its higher crime rate than Omaha's.[3] By simply comparing a municipality's police force and crime rate to those in other municipalities, one would incorrectly infer that Detroit's higher crime rate was caused by its additional police officers.

Repeated observations on crime and police in a locality lead to a more robust research design by controlling for the time-invariant differences in rates of crime and police between areas. This is done by introducing fixed effects into regression models. Using this approach, the question that the analysis attempts to address becomes: Do we see the crime rate fall as the number of police rises? By controlling for the "baseline" crime rates in different areas, some researchers have estimated a negative relationship between police and crime.[4]

However, if the rise in the number of police in a locality is a response to increasing crime rates, including fixed effects does not resolve the issue of reverse causality raised by the Detroit example. A next step is to introduce an instrument—for example, a variable that affects the size of the police force but that, given this size, does not affect crime. In one study, the researcher made use of the fact that the size of a police force increases before an election. If the only way that crime is affected by the election is through the number of police, then this approach can be used to estimate the relationship between crime and police. In this study, the researcher found that crime fell in several index categories before an election.[5]

A series of more recent papers that used instruments found a negative relationship between police and crime. Two studies used an increase in

[3]Levitt, Steven D. "Using Electoral Cycles in Police Hiring to Help Estimate the Effect of Police on Crime." *American Economic Review*, 87 (1997): 270-290.

[4]See, for example, Levitt (1997) and Marvel and Moody (1996).

[5]McCrary (2002) found that Levitt's estimation of standard errors suffered from a computational error. Levitt (2002) was able to confirm his results when the error was corrected by using an alternative instrument—the number of municipal workers and firemen. McCrary, Justin. "Using Electoral Cycles in Police Hiring to Estimate the Effect of Police on Crime: Comment." *American Economic Review*. June 2002, 92(4), pp. 1236-43. Levitt, Steven D. "Using Electoral Cycles in Police Hiring to Estimate the Effects of Police on Crime: Reply" *American Economic Review*, September 2002, 92(4), pp. 1244-50.

police presence because of a terrorist alert and showed declines in nonterrorist-related crimes within a single city. In a study of Buenos Aires, the researchers found that police stationed in response to a terrorist threat on Jewish centers caused a decline in automobile theft.[6] In another paper, the researchers showed that crime fell in Washington, D.C., on days when the Department of Homeland Security increased the terror alert level.[7] At the national level, researchers at the University of Maryland used the number of police officers granted through the COPS program as an instrument for the actual number of police and estimated negative relationships between increases in police officers and crime.[8]

Our Approach to Estimating the Effects of COPS Expenditures on Officers and Crime

We adopted a two-stage approach to estimating the effects of COPS expenditures on crime. Much as the University of Maryland researchers did, we used COPS funds as a source of variation to explain officers. However, while the University of Maryland researchers used officers granted by COPS funds, we used COPS expenditure amounts—the actual COPS dollars spent by agencies in given years—as the source of variation. We began with an analysis of the "first stage" and tested whether COPS funds had an effect on the number of officers. To the extent that hiring funds affected the number of police but did not affect crime in any other way, these funds would be a valid instrument for estimating the effect of officers on crime. We then estimated the "reduced form," or the relationship between COPS expenditures and crime. Using parameters estimated from these regressions, we are able to calculate the relationship between police and crime.

This approach has limitations, however. For example, we learn very little about how agencies operate. If agencies were to use the additional officers to employ different police tactics, and were able to reduce crime, we would be unable to say whether it was the increase in officer numbers or tactics that was the true cause of the decrease. Thus, we would be unable

[6]Di Tella, Rafael, and Ernesto Schargrodsky. "Do Police Reduce Crime? Estimates Using the Allocation of Police Forces after a Terrorist Attack." *American Economic Review*. March 2004, 94(1). pp. 115-133.

[7]Klick, Jonathan, and Alexander Tabarrok. "Using Terror Alert Levels to Estimate the Effect of Police on Crime." *Journal of Law and Economics*, April 2005, vol. XLVIII.

[8]Evans, William N., and Emily Owens. "Flypaper COPS," College Park, Maryland: University of Maryland. Available online www.bsos.umd.edu/econ/evans/wpapers/Flypaper%20COPS.pdf, 2005.

to contribute to the question of whether increases in officer strength are either necessary or sufficient to reduce crime, without a change in police tactics.

A second concern is that agencies that were more likely to take initiative in applying for and receiving COPS grants might be those that were also more effective in preventing crime. These agencies might also be those that achieved larger or more rapid declines in crime. If this were the case, we might incorrectly associate declines in crime with COPS grant expenditures because of other possible factors. To assess this potential, we estimated a regression that predicted whether an agency spent COPS funds in a given year from 1994 through 2001 based on demographic characteristics, economic conditions, and lagged property and violent crime rates. From the regressions, we predicted the probability of spending COPS grant funds—or the propensity of agencies to spend COPS funds. Whether or not an agency actually spent COPS funds, it received a propensity score, based upon the values of its characteristics in the model that predicated the probability of spending COPS funds. Agencies that actually spent COPS funds can then be compared to similar agencies—those with similar propensity scores—that did not spend COPS funds. We grouped agencies into five categories based on their propensity scores. Within each of these five categories, we compared the patterns of violent crime rates and property crime rates between the agencies that spent COPS funds and those that did not spend them. Our analysis showed that within these groupings of agencies having similar propensity scores, the agencies that actually spent COPS funds generally had larger declines in crime rates than did those that did not spend COPS funds.

Another question is whether a drop in a specific crime type, such as automobile theft, in a certain locality is a net gain for society as a whole. For example, the rationality of criminals may lead them to respond to an increase in the number of police by moving to an area with fewer police or switching to a different type of crime.[9] In addition, there is the possibility that an increase in the number of police increases the reporting rate of crimes, and not the crimes themselves.[10] This possibility, however, would

[9]Cook, Philip, "The Clearance Rate as a Measure of Criminal Justice System Effectiveness," *Journal of Public Economics*, Vol. 11, 1979, pp. 135-142.

[10]Swimmer, Eugene, "The Relationship of Police and Crime: Some Methodological and Empirical Results," *Criminology*, Vol. 12, 1974: pp. 293-314.

lead us to underestimate the effects of COPS funds on crime, as discussed in appendix I.

Model of the Effect of COPS Expenditures on the Number of Police Officers

Our main specification estimated the effect of COPS funds on officers, using the following control variables:

(1) $POLICE_{it} = \beta_1 HIRE_{it} + \beta_2 MORE_{it} + \beta_3 INNOV_{it} + \beta_4 MISC_{it} + \beta_5 BYRNEDIS_{it} + \beta_6 LLEBG_{it} + \beta_7 NONCOPS_{it} + \gamma X_{it} + \alpha_i + \alpha_t + \alpha_{st}$ + (quartile of prior growth rates) * (population stratification) * year

Where

- $POLICE_{it}$ is the dependent variable, the sworn officers per 10,000 in population in agency i in year t;
- $HIRE_{it}$ is the amount of money paid in Hiring grants; and
- $MORE_{it}$ are COPS MORE grants; $INNOV_{it}$ are COPS grants for innovative policing, and $MISC_{it}$ refers to the remaining types of COPS grants; all are expressed as expenditure in per capita amounts.
- $BYRNEDIS_{it}$ are Byrne discretionary grant expenditures,[11] $LLEBG_{it}$ are LLEBG grant amounts, and $NONCOPS_{it}$ are all other federal non-COPS law enforcement grants; all are expressed in per capita amounts. We introduce these variables to control for other federal funds.
- X_{it} contains a number of demographic and economic control variables, including local employment rates, per capita income, and population composition variables that measured the percentage of population 15 to 24 years old and the percentage of the population that was nonwhite. The economic and demographic controls were measured at the level of

[11]Because Byrne formula grants are passed through states to local agencies and the methods to track the amount of Byrne dollars going to local agencies are unreliable, we were unable to include Byrne formula grant amounts in our models. Moreover, according to an Abt Associates evaluation of Byrne formula grants, about 40 percent of the amounts passed through the states to local law enforcement agencies went to multijurisdictional task forces, thereby further complicating the task of tracking Byrne discretionary grant expenditures to local law enforcement agencies. See Dunworth, Terence, and Aaron J. Saiger, *National Assessment of the Byrne Formula Grant Program: Where the Money Went—An Analysis of State Subgrant Funding Decisions Under the Byrne Formula Grant Program, Report 1*, Washington, D.C.: National Institute of Justice Research Report, December 1996.

the county within which a particular agency was located. The parameters for these variables are represented by γ.

We included state-by-year fixed effects—represented by α_{st}—to correct for changes in crime policy at the state level, such as changes in the number incarcerated and changes in sentencing policy. We included agency fixed effects—represented by α_i—to capture time invariant differences across agencies, and time fixed effects—represented by α_t—to capture changes affecting the entire nation.

Because of how the money was distributed, there may be some concern that our estimate of the effect of the COPS money on officers is biased. For example, it might be that agencies that received a disproportionate share of the money relative to their populations had the benefit of preexisting positive growth of numbers of officers, in addition to possible declines in crime. If the trends continued, we might be incorrectly associating increases in officers or decreases in crime with the amount of COPS money received, rather than these preexisting trends.

To address this concern, we separated the agencies into four groups, based on the growth rate in both officers and crime during 1990–1993, when the COPS program was introduced. We constructed each combination of these groups, producing 16 cells. These cells were then "interacted" with each year and four population categories, for a total of 768 effects. In essence, each agency was compared with another agency that had a similar "trajectory" of crime and officers in the pre-COPS period.[12] These growth trends are represented by the (quartile of prior growth rates) expression in equation (1).

Finally, to obtain estimates of the effects of COPS expenditures on officers relative to the average person in the United States, we estimated weighted regressions where the weights were the population served by an agency.

Because of these effects, the parameters of interest, β_1 though β_4, are the effect of the COPS funds once other federal funds, demographic and economic conditions, time and agency fixed effects, and these "growth rate" effects are controlled for.

[12]This approach was proposed by Evans and Owens (2005).

Model of the Effect of COPS Expenditures on Crime

As with our methodology in estimating the effect of COPS funds on officers, we estimate the effect of COPS funds on crime. Our main specification used the following controls in the following equation:

(2) $CRIME_{it} = \mu_1 HIRE_{it} + \mu_2 MORE_{it} + \mu_3 INNOV_{it} + \mu_4 MISC_{it} + \mu_5 BRYNEDIS_{it} + \mu_6 LLEBG_{it} + \mu_7 NONCOPS_{it} + \pi X_{it} + \delta_i + \delta_t + \delta_{st}$ + (quartile of prior growth rates) * (population stratification) * year

The independent variables are identical to those defined for equation (1). The dependent variable ($CRIME_{it}$) is the UCR total—or index—crime rate. We also estimate separate equations for the crime rates of components of the crime index: murder and non-negligent manslaughter, forcible rape, robbery, aggravated assault, burglary, larceny theft, and motor vehicle theft.[13] Again, the parameters of interest are μ_1 through μ_4.

As in equation (1), the economic and demographic covariates in equation (2) are represented by X_{it}; δ_i, δ_t, and δ_{st} represent the agency, year, and state-times-year fixed effects; and we also include the pre-1993 growth rate variables.

The Implied Relationship between Police Officers and Crime

Unlike the other COPS grant types, COPS hiring grants were to be used specifically for hiring officers. Consequently, variation in the number of officers coming from COPS hiring grants should be unrelated to other changes in police expenditures. In this sense, it may be a valid instrument for officers.

Using the coefficients of officers in equations (1) and (2), we calculated an estimate of the change in crime with respect to change in officers: (μ_1/β_1), μ_1 and β_1 are the coefficients from equations (1) and (2).

The elasticity is a measure of the percentage change in crime derived from a percentage change in police. We used coefficients of officers in equations (1) and (2) to calculate an estimate of the elasticity of crime with respect to officers in 1993:

(3) $ELASTICITY = (\mu_1 / \beta_1) * (POLICE_{1993}/CRIME_{1993})$

[13]We excluded arson from our analysis, because of limited reporting of this crime to the UCR, as indicated by the FBI. (See app. I.)

where

- μ_1 and β_1 are the coefficients from equations (1) and (2) and
- $POLICE_{1993}$ and $CRIME_{1993}$ are average police strength and crime rates for 1993.

To test the robustness of our estimates under different assumptions about how COPS grant expenditures are related to officers and crime, we estimated the elasticity of crime with respect to officers under a number of different specifications, as described in table 14.

Table 14: Alternate Specifications of the Relationship between COPS Expenditures and Crime

Variable in specification	1	2	3	4	5
MORE, Innovative, and Miscellaneous COPS expenditures	x	x			x
LLEBG, Byrne discretionary, and other federal non-COPS expenditures	x	x			x
"Got grant" specification					x
Lagged values of MORE, Innovative, and Miscellaneous COPS expenditures			x	x	
Lagged values of LLEBG, Byrne discretionary, and other federal non-COPS expenditures			x	x	
Demographic and economic controls	x	x	x	x	x
Growth rate cells		x	x		x
Lagged value of Hiring grant expenditures			x		
Quadratic term for Hiring grant expenditures		x			
State by year fixed effects		x	x	x	x

Source: GAO analysis.

Note: An X indicates that a variable was included in a specification.

Other than the "got grant" specification, all variables are as defined above. Including the "got grant" variable provides a test for whether the effects of COPS grants occurred in the year in which the money was actually spent—as we specified in equations (1) and (2)—or whether the announcement of a grant award led to changes in officers and, subsequently, crime. If the announcement of the award were more important than the actual expenditures, it would imply that estimates of the effect of changes in expenditures on officers or crime in equations (1) and (2) would overstate the effects. To address this, we added indicator variables for the year in which a grant was received. Additionally, the

quadratic term for COPS hiring grant expenditures provides a test for nonlinear effects of COPS hiring grants on crime. This specification examines whether the effects of officers on crime diminish as the number of officers rises above certain levels.

Data Used in Our Analysis

We use data on 4,247 police agencies that reported complete crime (12 months of crime) in any year and that served populations of 10,000 or more persons. These agencies represented about 23 percent of the agencies that appeared in the UCR data that we received from the FBI. However, they also covered more than 86 percent of the crimes and they represented about 77 percent of the population in the UCR data that we received. Because of concerns about data quality, we restricted our sample to agencies that met these criteria of complete crime reporters and serving populations larger than 10,000 persons. Across years, the number of agencies that met these conditions varies, so our panel of data is unbalanced. We used grant expenditure data from the OJP financial data, which we linked to the crime and officer records of agencies. We included county level demographic and economic data from the Census Bureau, the National Center for Health Statistics, and the Bureau of Economic Analysis. (See app. I for more information regarding the construction of the dataset.)

Table 15 provides the means and standard deviations of the variables included in the regression models. As shown in the table, the per capita expenditures derived from COPS hiring grants exceeded the per capita amounts from other federal grants.

Table 15: Means and Standard Deviations of Variables Used in Regression Models

Variables	Mean	Standard deviation
Officers per 10,000 persons	20.31	12.37
Federal grant expenditures per capita		
COPS hiring	0.978	2.18
COPS MORE	0.292	1.35
COPS innovative	0.082	0.496
COPS miscellaneous	0.003	0.043
Byrne discretionary	0.045	0.471
LLEBG	0.770	1.93
Crime rate variables (per 100,000 persons)		
Total index crime	5,349	3,170
Murder	8.7	10.9
Forcible rape	38	31
Robbery	247	317
Aggravated assault	424	391
Burglary	1,034	647
Larceny theft	2,990	1,752
Motor vehicle theft	608	593
Other control variables		
Log per capita income	10.12	0.33
Employment-to-population ratio	0.631	0.453
Fraction of population aged 15 through 24	0.141	0.027
Fraction of population nonwhite	0.186	0.136

Source: GAO analysis of Uniform Crime Report, Office of Justice Programs financial, Bureau of Economic Analysis, National Center for Health Statistics, and U.S. Census Bureau data.

Explanation of the Results of Our Analysis

In this section, we discuss our regression analyses and describe how we arrived at the results that are discussed in this report.

The Effect of COPS Expenditures on the Number of Police Officers

To arrive at the effects of COPS expenditures on officers, we estimated specifications for equation (1), as shown in table 16. With only the fixed effects, the models explain more than 90 percent of the variation in officer strength. In specification 1, we added only the COPS hiring grant

expenditures per capita to the model that contained only the fixed effects. The effects of hiring grants are significant at the 1 percent level, and the coefficient indicates that an additional dollar of hiring grant expenditures per capita changes the officer rate (measured per 10,000 persons) by 0.317. In specifications 2 through 5, we introduce various combinations of the growth rate cells, demographic and economic conditions, and the other grant types. Across specifications 2 through 5, the estimated coefficient on the hiring grant variable remains fairly consistent, ranging from 0.227 in specification 5 to 0.261 in specification 3, where the interpretation of the coefficient is the effect of a $1 increase in per capita COPS hiring grant on the per 10,000 person rate of officers. Specification 5 presents our preferred specification, in that it includes all of the relevant controls. Using the coefficient on COPS hiring grant expenditures from specification 5, we calculate the effect of $25,000 in COPS hiring grant expenditures in a given year to produce roughly 0.6 additional officers in a given year.[14] Finally, in addition to the COPS hiring grant expenditures, COPS MORE and LLEBG grant expenditures also consistently predict officer strength, as indicated by the MORE and LLEBG parameter estimates in specifications 2 through 5.

[14]Bearing in mind that the officer strength is per 10,000 in the population, we arrive at this result by the following calculation: (25,000)*(.227/10,000) = 0.57 officers.

Table 16: Parameter Estimates from Regressions of Officers Per Capita on COPS Hiring Grant Expenditures and Other Outside Funds (Standard Errors in Parentheses)

Variable	1	2	3	4	5
Hiring	**0.317 (0.055)**	**0.231 (0.025)**	**0.261 (0.047)**	**0.247 (0.028)**	**0.227 (0.025)**
MORE		**0.124 (0.043)**	**0.238 (0.090)**	**0.159 (0.054)**	**0.121 (0.043)**
Innovative		0.0477 (0.050)	–0.029 (0.075)	0.042 (0.054)	0.047 (0.050)
Miscellaneous		1.46 (1.20)	0.906 (1.30)	1.13 (1.28)	1.43 (1.19)
Byrne		0.001 (0.06)	0.169 (0.129)	0.148 (0.102)	0.0003 (0.06)
LLEBG		**0.172 (0.05)**	**0.259 (0.065)**	**0.201 (0.049)**	**0.168 (0.049)**
Federal non-COPS		0.056 (0.045)	0.022 (0.066)	0.033 (0.047)	0.053 (0.045)
Demographic and economic covariates[a]	No	No	Yes	Yes	Yes
Population weights	Yes	Yes	Yes	Yes	Yes
Growth rate cells	No	Yes	No	Yes	Yes
State-by-year fixed effects	No	Yes	No	No	Yes

Source: GAO analysis of Uniform Crime Report, Office of Justice Programs financial, Bureau of Economic Analysis, National Center for Health Statistics, and U.S. Census Bureau data.

Notes: Officers per capita is measured in terms of officers per 10,000 persons; all expenditure variables are in per capita amounts. All regression specifications include agency and year fixed effects. Bold-face parameter estimates and standard errors indicate that a parameter estimate is statistically significant at the 5 percent level using robust standard errors.

[a]Demographic and economic covariates include log per capita income, employment to population ratio, percentage of population between 15 and 24 years of age, and percentage of population that is nonwhite.

Effect of COPS Expenditures on Crime

Our reduced-form estimates of the effects of COPS expenditures on crime, the result of our estimating equation (2) appear in table 17. This first column (labeled "Officers") repeats the results from specification 5 of table 16. The other columns of table 17 show the parameter estimates for the effects of hiring grants and outside funds on the crime rate for index crimes and separately for type of index crime (except for arson). With the exception of rape, COPS hiring grant expenditures per capita have a negative effect on index crime rates and the crime rate for each type of index crime. Further, while the direction of the effect of the hiring grant variable on the larceny rate is negative, the effect is not significant at the 5

percent level. LLEBG expenditures have a negative and significant effect on all crime types. The other grant fund types have a negative effect on some crime types.

We estimated the effect of COPS hiring grant expenditures on index crimes to be -29.19. In other words, $1 in COPS hiring grant expenditures per capita translates into a reduction of almost 30 index crimes per 100,000 people.

Table 17: Parameter Estimates from Regressions of Crime Rates on COPS Hiring Grant Expenditures and Other Outside Funds (Standard Errors in Parentheses)

	Officers	Index	Murder	Rape	Robbery	Assault	Burglary	Larceny	Motor vehicle
	1	2	3	4	5	6	7	8	9
Variable									
Hiring	**0.227**	**–29.19**	**–0.133**	0.128	**–4.94**	**–2.77**	**–8.01**	–4.18	**–9.26**
	(0.025)	**(6.67)**	**(0.028)**	(0.075)	**(1.07)**	**(1.08)**	**(1.33)**	(3.05)	**(3.44)**
MORE	**0.121**	**–17.14**	–0.083	0.008	**–2.80**	**–1.72**	**–2.04**	**–6.91**	**–3.58**
	(0.043)	**(6.55)**	(0.031)	(0.063)	**(0.919)**	**(0.86)**	**(1.14)**	**(3.43)**	**(1.51)**
Innovative	0.047	**–88.25**	**–0.219**	–0.102	**–8.45**	**–9.71**	**–17.62**	**–23.30**	**–28.8**
	(0.050)	**(17.80)**	**(.081)**	(.255)	**(2.13)**	**(3.80)**	**(4.81)**	**(11.5)**	**(6.77)**
Miscellaneous	1.43	**–123.7**	1.13	2.37	41.2	–13.56	**–90.61**	–121.8	57.51
	(1.19)	**(18.79)**	(.887)	(2.31)	(29.74)	(33.27)	**(36.15)**	(101.4)	(46.98)
Byrne	0.0003	11.72	-.099	–0.388	.270	7.01	–0.172	10.16	–5.25
	(0.06)	(16.03)	(.069)	(.280)	(1.61)	(1.33)	(3.87)	(10.14)	(3.39)
LLEBG	**0.168**	**–73.13**	**–0.365**	**–0.784**	**–13.07**	**–16.00**	**–16.06**	**–15.2**	**–11.59**
	(0.049)	**(10.60)**	**(.051)**	**(.132)**	**(1.68)**	**(2.09)**	**(2.31)**	**(3.87)**	**(2.20)**
Federal non-COPS	0.053	**22.96**	.027	.082	**2.25**	1.57	1.34	10.40	**7.28**
	(0.045)	**(9.14)**	(.038)	(.090)	**(1.07)**	(1.34)	(1.60)	(5.07)	**(1.90)**

Source: GAO analysis of Uniform Crime Report, Office of Justice Programs financial, Bureau of Economic Analysis, National Center for Health Statistics, and U.S. Census Bureau data.

Notes: All regressions include agency and year fixed effects, state-by-year fixed effects, and growth rate cells. Additionally, regressions include log per capita income, employment over population ratio; percentage of county population aged 15 to 24; and percentage nonwhite. Officers are per 10,000 persons; all grant expenditures are per capita amounts. Observations are weighted by the population of the agency to obtain the national effect. Bold-face parameter estimates and standard errors indicate that a parameter estimate is statistically significant at the 5 percent level using robust standard errors.

The Effects of Different Population Sizes across Agencies

Given the variation in per capita COPS expenditures that occurred across agencies serving populations of different sizes, we explored whether COPS hiring grants had different effects on crime rates based on the size of the population served by agencies. We stratified agencies into four population size groups: those serving populations of between 10,000 and 25,000 persons; between 25,000 and 50,000 persons; between 50,000 and 150,000 persons; and more than 150,000 persons. We found that the effect of the hiring grant was consistent across all population categories less than 150,000, but insignificant in the population category of more than 150,000 persons. We found that negative effect of COPS hiring grants on index crime rates ran across all population size categories. However, the effects of hiring grants were largest in the 50,000 to 150,000 population category, and insignificant in the 25,000 to 50,000 population category (table 18).

Table 18: Parameter Estimates from Regressions of Index Crime Rates and Officers Per Capita on COPS Hiring Grant Expenditures and Other Outside Funds, by Population Size Category (Standard Errors in Parentheses)

	Population							
	10,000 to fewer than 25,000		25,000 to fewer than 50,000		50,000 to fewer than 150,000		More than 150,000	
	Officers	Index	Officers	Index	Officers	Index	Officers	Index
	1	2	3	4	5	6	7	8
Grant								
Hiring	**.180**	**-10.11**	**.288**	-8.79	**.245**	**-39.1**	.095	**-31.5**
	(.019)	**(4.74)**	**(.032)**	(10.00)	**(.034)**	**(10.1)**	(.074)	**(15.2)**
MORE	**.043**	2.86	.027	-14.67	.102	3.79	.053	-35.2
	(.021)	(2.32)	(.027)	(13.25)	(.069)	(14.16)	(.148)	(24.0)
Innovative	-.007	-19.94	-.058	-28.8	.036	-87.7	-.043	-108
	(.043)	(20.67)	(.137)	(36.9)	(.052)	(23.3)	(.130)	(48.32)
Miscellaneous	-.282	**-379**	-.338	**-473**	-.996	-145	**4.79**	-161
	(.360)	**(179)**	(.692)	**(234)**	(.574)	(231)	**(1.97)**	(368)
Byrne	-.010	-7.87	.440	-4.37	-.084	24.88	.173	40.2
	(.074)	(12.74)	(.516)	(55.52)	(.084)	(29.91)	(.153)	(26.5)
LLEBG	.010	**-23.08**	.032	**-141.3**	-.012	**-109**	**.492**	**-90.4**
	(.013)	**(6.87)**	(.046)	**(18.28)**	(.069)	**(15.6)**	**(.176)**	**(22.6)**
Federal non-COPS	.031	-1.177	-.087	20.06	-.016	**36.06**	.045	11.4
	(.016)	(4.74)	(.113)	(16.79)	(.096)	**(13.03)**	(.127)	(32.6)

Source: GAO analysis of Uniform Crime Report, Office of Justice Programs financial, Bureau of Economic Analysis, National Center for Health Statistics, and U.S. Census Bureau data.

Notes: All regressions include agency and year fixed effects, state-by-year fixed effects, and growth rate cells. Additionally, regressions include log per capita income, employment over population ratio; percentage of county population aged 15 to 24; and percentage nonwhite. Officers are per 10,000 persons; all grant expenditures are per capita amounts. Observations are weighted by the population of the agency to obtain the national effect. Bold-face parameter estimates and standard errors indicate that a parameter estimate is statistically significant at the 5 percent level using robust standard errors.

Calculations of the Elasticity of Crime with Respect to Officers

As COPS hiring grants were to be used only to hire officers, we explored their use as an instrument to predict the effect of officers on crime. Assuming that COPS grants were used in that way, our preferred specification from our regressions crime on COPS hiring grants and other outside funds would produce estimates of the elasticity of crime with respect to officers that are shown in table 19.

To assess the degree to which the elasticities that we calculated were in line with those appearing in the economics of crime literature, we compared our elasticities with those estimated by Evans and Owens (2004), Levitt (1997), Levitt (2002), and Klick and Tabarrok (2005). Our estimates are in line with those in the literature (table 19).

Table 19: Elasticities of the Impact of Police Officers on the Crime Rate

Elasticity	Murder	Rape	Robbery	Assault	Burglary	Larceny	Motor vehicle
	1	2	3	4	5	6	7
Estimate							
Average crime rate 1993	11	40	311	484	1183	3173	703
Levitt 1997[a]	–1.98	–0.27	–0.79	–1.09	–0.05	–0.43	–0.50
Levitt 2002	–0.91	–0.03	–0.45	0.40	–0.20	–0.14	–1.70
Evans and Owens 2005[b]	–0.84	–0.42	–1.34	–0.96	–0.59	–0.08	–0.85
GAO (this report)	–1.04	0.28	–-1.36	–0.49	–0.58	–0.11	–1.12
Klick and Tabarrok 2005							–0.30
GAO aggregate elasticity, by crime category							
Index	–0.42						
Violent	–0.78						
Property	–0.36						

Source: GAO analysis of Uniform Crime Report, Office of Justice Programs financial, Bureau of Economic Analysis, National Center for Health Statistics, and U.S. Census Bureau data.

Notes: Estimates are derived from the parameter estimates in tables 16 and 17. The average police count per 10,000 in 1993 is 19.38. Crime is per 100,000.

[a]Levitt's (1997) elasticities are taken directly from his regression specification. Levitt calculates elasticities for a range of alternate specifications that are not reported here.

[b]Evans and Owens' (2005) elasticities were evaluated at the same mean level of crime as were GAO's.

In addition, Evans and Owens report aggregate point elasticities for violent and property crimes of –0.99 and –0.26, respectively, and Levitt reports aggregate point elasticities for violent and property crimes of –0.44 and –0.50, respectively. Our aggregate elasticities for violent and property crimes fall between these two sets of estimated point elasticities.

Equations (1) and (2) depend on certain assumptions about the way that COPS hiring grant expenditures and other outside funds affect officers and crime. For example, the specifications reported previously only allow the effect of the federal funds to affect crime contemporaneously. However, it may take a certain amount of time for the expenditures to have an effect on either officers or crime, as it may take a certain amount of time for new officers to become fully acclimated to a department, or to become proficient in their duties. To explore the robustness of our findings under varying assumptions about how COPS hiring grant expenditures could affect officers and crime, we recalculated our elasticities after estimating our regressions under the specifications outlined previously in table 20. We report the elasticities that we calculated from these various regression models (in the last three rows of the table). The elasticities for index crimes range from –0.41 to –0.95; those for violent crimes range from –0.76 to –1.8; and those for property crimes range from –0.35 to –0.8. The elasticities that we report in our results all fall at the lower end of the range of elasticities that we estimated.

Table 20: Elasticity of Violent and Property Crime with Respect to Officers under Alternate Specifications of the Relationship between COPS Expenditures and Crime

Variables in specification	1	2	3	4	5
MORE, Innovative, and Miscellaneous COPS expenditures	x	x			x
LLEBG, Byrne discretionary, and other federal non-COPS expenditures	x	x			x
"Got grant" specification					x
Lagged values of MORE, Innovative, and Miscellaneous COPS expenditures			x	x	
Lagged values of LLEBG, Byrne discretionary, and other federal non-COPS expenditures			x	x	
Demographic and economic controls	x	x	x	x	x
Growth rate cells		x	x	x	x
Lagged value of Hiring grant expenditures			x		
Quadratic term for Hiring grant expenditures		x			
State by year fixed effects		x	x	x	x
Elasticity					
Violent crimes	–1.17	–.76	–1.8	–.81	–.76
Property crimes	–.51	–.35	–.80	–.37	–.35
Index crimes	–.61	–.41	–.95	–.44	–.41

Source: GAO analysis of Uniform Crime Report, Office of Justice Programs financial, Bureau of Economic Analysis, National Center for Health Statistics, and U.S. Census Bureau data.

Note: An X indicates that a variable was included in a specification.

Estimating the Net Number of Officers Paid for by COPS Expenditures

We used our regression results to derive estimates of the net number of officers paid for by COPS grant expenditures separately for each year. By net number of officers, we refer to the increase in the number of officers on the street attributable to COPS net of attrition. For example, if at the beginning of a year, there were 100 officers on the street, while during a year COPS grants were responsible for hiring 10 officers and 5 officers left the force, the net number of officers due to COPS would be 5.

To obtain the total number of officer-years due to COPS expenditures, we summed the number of officers across years. Table 21 presents the estimated number of officers that COPS expenditures funds paid for in each year. In column 1 we present the actual number of per capita officers used in our regressions that generated the results in table 21. Not shown in the table, but used in the calculation of the number of officers due to COPS expenditures are the per capita amounts of COPS expenditures,

including COPS hiring, MORE, innovative, and miscellaneous grant expenditures. Column 2 presents our estimate of what the per capita number of officers would have been absent the COPS expenditures. Columns 3 and 4 show the number of officers per capita and the percentage of officers per capita explained by COPS expenditures. Column 5 presents our estimates of the number of officers in each year in the sample of agencies that we analyzed that were explained by COPS expenditures. To arrive at the number of officers in the United States due to COPS expenditures, we weighted the numbers in column 5 up to the U.S. population total (in column 6). On the basis of this analysis, in year 2000, for example, when they peaked, the COPS expenditures per capita were responsible for about 2.9 percent of the net increase in officers in the United States, or more than 17,000 officers. Across all years, we estimate that COPS was responsible for an increase of about 88,000 officer-years during the years from 1994 through 2001.

Table 21: Estimated Per Capita Effect of COPS Expenditures on the Number of Officers

	Police per 10,000 population		Police explained by COPS funds		Number of police in	
	Number	Minus COPS funds	Per capita	Percentage difference	Sample	United States
Year	**1**	**2**	**3**	**4**	**5**	**6**
1991	19.32	19.32	0	0	0	0
1992	19.32	19.32	0	0	0	0
1993	19.38	19.38	0	0	0	0
1994	19.65	19.65	0.003	0.02	64	84
1995	20.55	20.47	0.07	0.35	1,407	1,916
1996	20.71	20.39	0.32	1.55	6,210	8,639
1997	21.05	20.54	0.51	2.42	10,085	13,897
1998	21.18	20.54	0.64	3.02	12,900	17,630
1999	21.61	21.02	0.59	2.72	12,153	16,415
2000	21.15	20.53	0.62	2.91	13,335	17,387
2001	20.89	20.46	0.43	2.05	9.535	12,226
Total					**65,688**	**88,195**

Source: GAO analysis of Uniform Crime Report, Office of Justice Programs financial, Bureau of Economic Analysis, National Center for Health Statistics, and U.S. Census Bureau data.

Estimating the Number of Crimes Reduced by COPS Expenditures

On the basis of our analysis of the increase in officers attributable to COPS expenditures, we estimated the amount of crime that could be attributable to COPS, given the estimated effect of COPS expenditures on officers. On the basis of our analysis of the number of officers due to COPS expenditures and our estimated elasticities of crime with respect to officers, we can estimate the number of crimes associated with COPS expenditures through the increase in officers attributable to these expenditures. In table 22, we show our calculations of the decline in crime attributable to COPS for each year, compared with the 1993 levels of crime, the pre-COPS baseline year.

Columns 1 through 3 of table 22 give the average crime rates per 100,000 persons in the agencies in our sample. Columns 4 through 6 give the percentage change from 1993 in crime rates for each category of crime. Columns 7 though 9 report data on officers. Column 7 reports the growth in the officer rate from 1993 due to the change in COPS expenditures. Column 8 presents the growth (from column 7) as a percentage change from 1993. Columns 9 through 11 provide estimates of the percentage change in crime rates from 1993 using the elasticities shown in table 22. Finally, columns 12 through 14 provide the estimated amount of change in crime rates from 1993 that arise from COPS expenditures.

Table 22: Estimated Per Capita Growth of COPS Expenditures on Police Officers and Crime from 1993

	Average number of crimes[a]			Percentage change in crime[b]		
	Violent	Property	Total	Violent	Property	Total
Year	1	2	3	4	5	6
1991	868	5519	6,387			
1992	854	5235	6090			
1993	846	5058	5904			
1994	816	4973	5789	-3.55	-1.68	-1.95
1995	784	4919	5703	-7.33	-2.75	-3.42
1996	723	4718	5440	-14.54	-6.72	-7.86
1997	697	4593	5290	-17.61	-9.19	-10.40
1998	649	4313	4962	-23.29	-14.73	-15.96
1999	588	3947	4535	-30.50	-21.97	-23.19
2000	568	3799	4367	-32.86	-24.91	-26.03
2001	561	3845	4406	-33.69	-23.98	-25.37

Number of officers[c]		Expected percentage change in crime due to COPS funds			Change in crime per 100,000 persons		
Predicted[d]	Percentage change	Violent	Property	Total	Violent	Property	Total
7	8	9	10	11	12	13	14
19.38							
19.38	.02	-.01	-.01	-.01	-.09	-.25	-.34
19.45	.37	-.29	-.13	-.16	-2.08	-5.90	-8.01
19.70	1.65	-1.29	-.60	-.70	-9.56	-27.11	-36.75
19.89	2.63	-2.05	-.95	-1.11	-15.48	-43.86	-59.47
20.02	3.30	-2.57	-1.19	-1.39	-19.67	-55.74	-75.58
19.97	3.04	-2.36	-1.10	-1.28	-19.26	-54.57	-74.00
20.00	3.18	-2.48	-1.15	-1.34	-20.19	-57.22	-77.59
19.81	2.21	-1.72	-.80	-.93	-14.08	-39.90	-54.10

Source: GAO analysis of Uniform Crime Report, Office of Justice Programs financial, Bureau of Economic Analysis, National Center for Health Statistics, and U.S. Census Bureau data.

[a]Average number of crimes per 100,000 for the agency; means are weighted by population.

[b]Percentage change in crime from 1993.

[c]Column 7 is the predicted level in the number of officers from only a change in COPS funds from 1993; column 8 is the percentage change from 1993.

[d]Predicted number of officers due to growth in COPS funds, from base 1993 level of officers of 19.38 per 10,000 persons.

Appendix VII: Methods Used to Assess Policing Practices

Our objective in assessing policing practices was to determine the extent to which COPS grant expenditures were associated with police departments' adoption of policing activities or practices that may have contributed to reduction in crime during the 1990s. To determine whether COPS grants were associated with changes in policing practices, we analyzed data from two national surveys of local law enforcement agencies on the policing practices that they reportedly implemented in various years from 1993 to 2000. In addition, we analyzed systematic reviews of research on the effectiveness of policing practices in preventing crime.

Methods to Address Changes in Policing Practices

To address whether COPS grants were associated with changes in policing practices that may be associated with preventing crime, we analyzed data from the two administrations of the Policing Strategies Survey (in 1993 and 1997) and two of the four administrations of the National Evaluation of COPS Program Survey (in 1996 and 2000). Because the purposes of the surveys differed, each used different samples of agencies (with some agencies appearing in both surveys). The Policing Strategies Survey drew a sample representative of all municipal police, county police, and county sheriff agencies in the United States with patrol functions and with more than five sworn officers in 1992, and the National Evaluation of COPS Program Survey drew a sample that was representative of all law enforcement agencies believed to be in existence in the United States that had received, or were eligible to receive a COPS grant. Each survey provided respondents in police agencies with lists of items that identified specific types of policing practices, and respondents were asked whether they had implemented each of the practices on the list. Survey responses were obtained from knowledgeable officials within each agency, such as the police chief or the chief's designee. The number of items related to policing practices differed between the two surveys.

We classified items in the surveys into four categories of policing practices corresponding to general approaches to policing identified in the criminal justice literature: problem-solving practices, place-oriented practices, community collaboration activities, and crime analysis activities. Problem-solving practices call for police to focus on specific problems and tailor their strategies to the identified problems. Place-oriented practices include attempts to identify the locations where crime occurs repeatedly and to implement procedures to disrupt these recurrences of crime. Community collaboration practices include improving citizen feedback about crime problems and the effectiveness of policing efforts to address these problems. Crime analysis includes the use of tools such as geographic

information systems to identify crime patterns. These tools may help an agency support other practices for preventing crime, such as problem-solving and place-oriented practices.

Three social science analysts with research experience in criminal justice independently reviewed the list of policing practice items in each survey and placed each item in one of the four categories or determined that the item did not fit in any of the four categories. Following initial classification, the analysts met to discuss and address any inconsistencies in their classification of items.

After classifying practices, we created an index to represent the total number of problem-solving, place-oriented, community collaboration, and crime analysis practices, and we gave each agency that responded to both waves of a survey a score equal to the number of these practices that the agency reportedly implemented in the survey years. We also identified, for each agency, the number of practices in each of the four categories.

We then analyzed the levels and changes in reported practices within each survey. Our analysis focused on the differences in levels of practices reported by agencies that received COPS grants and those that did not receive them. To assess the influence of COPS grant expenditures on reported practices, we analyzed changes in reported practices as a function of the per capita amounts of COPS dollars spent by agencies. For agencies that did not receive COPS grants, we set their per capita COPS expenditure amounts to zero.

A limitation of our analysis is that the surveys did not ask explicitly about the extent to which each listed practice was implemented by law enforcement agencies. Thus agencies that report that they had implemented a specific practice may vary considerably, from sporadic use of the practice among a subset of officers in the agency to more frequent use of the practice throughout the agency.

Characteristics and Analysis of the Policing Strategies Survey

The Policing Strategies Survey was administered in 1993 and again in 1997. The Police Foundation administered the 1993 wave of the survey, and ORC Macro International, Inc. and the Police Executive Research Forum administered the 1997 wave of the survey.[1] The sampling frame for both the 1993 and 1997 waves consisted of 11,824 local police and sheriffs' departments listed in the Law Enforcement Sector portion of the 1992 Justice Agency list developed by the U.S. Bureau of the Census. In constructing the sampling frame, state police departments, special police agencies, agencies that did not perform patrol functions, and agencies with fewer than five sworn personnel were excluded from the larger list of all law enforcement agencies. A total of 2,337 police and sheriffs' departments were selected to be in the main sample for the 1993 survey, and surveys were mailed to 2,314 of them after 23 agencies were found to be out of scope before the surveys were mailed.[2] Follow-up mailings and facsimile reminders were sent to nonrespondents. The overall response rate for the 1993 survey was 71.3 percent. All of the agencies in the first sample were then selected for participation in the 1997 survey. The survey employed a multiphased data collection approach, using postal mail for the first phase, followed by facsimile reminders, a second mailing, and computer-assisted telephone interviewing for nonrespondents. The response rate for the 1997 survey was 74.7 percent. A total of 1,269 agencies were present in both the 1993 and 1997 surveys. The sample was a stratified random sample with probability of inclusion varying by the number of sworn personnel (5-9; 10-49; 50-99; and 100 or more sworn personnel).[3]

[1]The 1993 survey was designed to provide information on what was occurring and what needed to occur in the development and implementation of community policing. The 1997 survey was designed to provide information on the most current practices and trends in community policing. See: A. Rosenthal et al, *Community Policing: 1997 National Survey Update of Police and Sheriffs' Departments*, ORC Macro and Police Executive Research Forum, Washington D.C.: National Institute of Justice, April 2001.

[2]Agencies were considered out of scope if they had fewer than five sworn officers, no patrol function, or were a state police agency or other "special" police agency.

[3]When ORC Macro and the Police Executive Research Foundation drew the sample for the 1997 wave of the survey, they discovered that instead of excluding agencies with fewer than five sworn officers, the Police Foundation had used information on the agencies' total number of employees to select the agencies for the sampling frame and had excluded agencies with fewer than five employees. Thus some agencies were misclassified, and some were included that should not have been. In addition, the weights provided with the 1993 data were incorrect for agencies with 10 to 49 employees. ORC Macro and PERF were able to assign the appropriate weights retroactively to the 1993 sample and were able to exclude agencies with fewer than five sworn officers.

We identified agencies in the Policing Strategies Survey that responded to both waves of the survey and had complete data on each of the policing practices items, and of these, we were able to link the data from 1,188 agencies to our larger database on crime, officers, money, and economic conditions.[4] For comparability with the analyses of the effects of funding on officers and crime, we limited our analysis to those agencies serving jurisdictions with populations of 10,000 or more persons. This resulted in usable data on 1,003 agencies.

We used the Policing Strategies Survey data to compare reported changes in the types and levels of policing practices that occurred during the COPS program with pre-COPS levels of practices. The analyses reported in this appendix are weighted to adjust for the sample design effects. The findings are generalizable to all municipal police agencies, county police agencies, and county sheriff agencies in the United States with patrol functions and serving jurisdictions with populations of 10,000 or more persons.

We used 38 items on policing practices from the Policing Strategies Survey. We combined 12 practices pertaining to increasing officer contact with citizens and improving citizen feedback into a community collaboration index. We used 6 items on the crime analysis units within police departments to create our index of crime analysis. We combined 8 practices pertaining to increasing enforcement activity or place management in buildings, neighborhoods, or other specific places into an index of place-oriented practices. And we compiled the data on 12 items that reflected organizational efforts to reduce or interrupt recurring mechanisms that may encourage crime into a problem-solving practices index. The classification of items from the Policing Strategies Survey into our four indexes of types of policing practices is shown in table 23.

[4]These agencies represented about 94 percent of the agencies that responded to both waves of the Policing Strategies Survey.

Table 23: Categories of Policing Practices and Specific Items within Each Category in the Policing Strategies Survey

Community collaboration
Agency uses foot patrol as a specific assignment
Agency uses foot patrol as a periodic expectation for officers assigned to cars
Agency uses citizen surveys to determine community needs and priorities
Agency uses citizen surveys to evaluate police service
Patrol officers conduct surveys in area of assignment
Patrol officers meet regularly with community groups
Supervisors maintain regular contact with community leaders
Agency has permanent, neighborhood-based offices or stations
Agency has mobile, neighborhood-based offices or stations
Patrol officers make door-to-door contacts in neighborhoods
Patrol officers develop familiarity with community leaders in area of assignment
Patrol officers assist in organizing community
Crime analysis
Agency has a decentralized crime analysis unit/function
Agency has a centralized crime analysis unit/function
Supervisors manage crime analysis for geographic area of responsibility
Geographically based crime analysis made available to officers at the beat level
Patrol officers conduct crime analysis for area of assignment
Agency has means of accessing other city or county databases to analyze community or neighborhood conditions
Place-oriented practices
Agency designates some officers as “community” or “neighborhood” officers
Agency uses building code enforcement as a means of helping remove crime
Agency has landlord/manager training programs for order maintenance and drug reduction
Command or decision-making responsibility tied to neighborhoods or beats
Patrol officers enforce civil and code violations in area
Fixed assignment of patrol officers to specific beats or areas
Agency uses other regulatory codes to combat drugs and crime
Agency has beat or patrol boundaries that coincide with neighborhood boundaries
Problem-solving practices
Agency prepares agreements specifying work to be done on problems by citizens and police
Specific training provided to officers for problem identification and resolution
Training for citizens in problem identification or resolution

Patrol officers teach residents how to address community problems
Interagency involvement in problem identification and resolution
Line supervisors elicit input from officers/deputies about solutions to community problems
Multidisciplinary teams to deal with special problems such as child abuse and neglect
Specialized problem-solving unit
Patrol officers work with citizens to identify and resolve area problems
Citizens work with police to identify and resolve community or neighborhood problems
Organization has been redesigned to support problem solving efforts
Patrol officers work with other city agencies to solve neighborhood problems

Source: Policing Strategies Survey, 1993 and 1997.

Note: Each individual item is coded dichotomously (yes/no) to indicate whether an agency implemented the specific practice.

The Policing Strategies Survey provided us with an opportunity to assess changes in reported policing practices using a pre-COPS grant and within-COPS grant program framework. The 1993 administration of this survey occurred several months prior to the distribution of the first COPS grants, while the 1997 administration occurred after COPS grants had been made to about 75 percent of the agencies in the sample. To implement the pre-within examination of the effects of COPS grants on policing practices, we first compared the levels of practices in 1993 and 1997 between the group of agencies that had received a COPS grant by 1997 and the group that had not received a COPS grant by 1997.

Second, we estimated separate regressions of the effect of the receipt of a COPS grant and of the cumulative per capita amount of COPS expenditures on the levels of reported policing practices. To assess the extent to which COPS grant expenditures were associated with changes in reported policing practices, we estimated regressions of the changes in reported policing practices that occurred within agencies as a function of the cumulative per capita amount of COPS grant expenditures that they made during the years from 1994 through 1997. We used two-factor fixed-effects regression techniques, which allowed us to control for unobserved characteristics of agencies and underlying trends in the adoption of policing practices. We also controlled for economic conditions and population changes in the localities in which the agencies were located. In addition, we used weighted regressions to address nonresponse patterns and the probability with which the original sampling units were drawn.

Our regression equations show that both the receipt of a COPS grant and the amount of per capita COPS expenditures by agencies were associated with increases in the levels of reported policing practices between 1993 and 1997. Agencies that received at least one COPS grant had significantly larger changes in the overall number of practices than did agencies that did not receive a COPS grant during this period. Specifically, of the roughly 2.9 average increase in the number of practices reported by agencies over this period, the receipt of a COPS grant accounted for 1.8 of the increase in the reported increase in practices. Further, when we examined our results from separate regressions for the different categories of practices, we found that receipt of a COPS grant was associated with significant increases in reported levels of problem-solving and place-oriented practices, but was not related to changes in community collaboration or crime-analysis practices (table 24).

Table 24: Parameter Estimates from Regressions of Changes in Mean Number of Policing Practices and Category of Practices between 1993 and 1997 on whether or Not Agencies Received COPS grant between 1994 and 1997 and on Per Capita COPS Expenditures between 1994 and 1997 (Standard Errors in Parentheses)

Independent variable in model	Changes in policing practices from 1993 to 1997				
	All 38 practices	Problem-solving	Place-oriented	Crime analysis	Community collaboration
Regression 1: Received COPS grant	**1.78**	**.76**	**.78**	.01	.25
	(.732)	**(.284)**	**(.245)**	(.180)	(.273)
Regression 2: COPS expenditures per capita	**.226**	**.076**	**.086**	**.041**	.023
	(.080)	**(.034)**	**(.034)**	**(.017)**	(.026)

Source: GAO analysis of Policing Strategies Survey, Office of Justice Programs financial, Bureau of Economic Analysis, Census, and Uniform Crime Report data

Notes: All regressions include agency and year fixed effects and changes in county level demographic variables (percentage of persons aged 15 to 24, percentage nonwhite, and percentage employed) between 1993 and 1997. Observations are weighted to take into account response rates and the probability at which the original sampling units were drawn. Bold-face parameter estimates and standard errors indicate that a parameter estimate is statistically significant at the 5 percent level.

Our regression models further show that changes in practices were also associated with the cumulative amount of per capita spending on COPS grants. All other things being equal, a $1 increase in per capita spending was associated with an increase of 0.23 policing practices. As we found for the effects of the receipt of a grant on changes in police practices, these regressions also showed that the level of per capita spending on COPS

grants was significantly associated with increases in problem-solving and place-oriented practices. However, per capita spending on COPS grants was also significantly associated with increases in crime analysis practices.

Characteristics and Analysis of the National Evaluation of COPS Survey

The National Evaluation of COPS Survey was conducted by the National Opinion Research Center for the Urban Institute in its national evaluation of the implementation of the COPS program.[5] The sampling frame for the survey consisted of 20,894 law enforcement agencies believed to be in existence between June 1993 and June 1997 who had either received a COPS grant during 1995 or appeared to be potentially eligible for funding but remained unfunded through 1995. The list of COPS grantees was obtained from applicant records from the grants management database from the COPS Office, and included those agencies that had been funded from the following programs: FAST, AHEAD, Universal Hiring Program, and MORE. The list of potentially eligible grantees was derived from the FBI's UCR and National Crime Information Center data files. The sampling frame was stratified by COPS grantee status (Not Funded, FAST or AHEAD, Universal Hiring Program (UHP), MORE), and by population (jurisdictions with populations of fewer than 50,000 persons and those with populations of 50,000 or more persons), and agencies in each stratum were sampled at a different rate in order to select a representative sample of law enforcement agencies.[6] A total of 2,098 agencies were selected to be in the sample.[7]

Telephone interviews with agency representatives were conducted in 1996 (wave 1) and 2000 (wave 4).[8] A total of 1,471 agencies responded to wave 1

[5]See Roth, Jeffrey, et al., *National Evaluation of the COPS Program—Title I of the 1994 Crime Act*.

[6]Roth, et al. note that they lacked population data for 4,208 agencies in the sampling frame. For sample selection purposes, they treated the missing agencies as a separate stratum. However, because inspection indicated that a large majority served jurisdictions of fewer than 50,000 persons, these agencies were analyzed in that population category.

[7]Some agencies received more than one type of COPS grant and appeared in more than one stratum. The analyses were weighted to take into account the multiple probabilities of selection associated with each grant program.

[8]The National Evaluation also conducted two other waves of telephone interviews, in 1997 and 1998. However, for those surveys, only subsets of the original sample were contacted.

of the survey in 1996, for a 77 percent response rate.[9] In 2000, all wave 1 respondents were recontacted, and interviews were completed with 1,270, or 86 percent, of the target agencies.

We were able to link the data from 1,067 of the agencies that responded to both of these waves of the survey to our larger database on crime, officers, money, and economic conditions.[10] For comparability with the analyses of the effects of funding on officers and crime, we excluded from our analysis state police agencies, and other "special" police agencies, as well as law enforcement agencies serving jurisdictions with populations of fewer than 10,000 persons. This resulted in usable data on 724 agencies.

We used the National Evaluation of COPS Survey to compare levels of practices in 1996 and 2000 between groups of agencies that received COPS grants and those agencies that were not funded by COPS over this period, and to assess changes in reported practices in relation to per capita COPS expenditures. The analyses reported in this appendix are weighted to adjust for nonresponse and the multiple counting of agencies that received more than one COPS grant. The findings are generalizable to all law enforcement agencies in the United States serving jurisdictions with populations of 10,000 or more persons.

We used 19 items on policing practices from the National Evaluation of COPS Survey, and we classified these items into the same 4 categories of practices as we did with the Policing Strategies Survey data (table 25). However, because of the shortage of items covering place-oriented practices, for analysis purposes we combined these 3 items with the 7 problem-solving items into one index of problem solving and place oriented practices.

[9]The response rate is not equal to the number of completed interviews of the number of agencies because of the possibility of agencies appearing in multiple strata of the sample.

[10]These agencies represented about 84 percent of the agencies that responded to both waves 1 and 4 of the National Evaluation of COPS Survey

Table 25: Categories of Policing Practices and Specific Items within Each Category in the National Evaluation of COPS Survey

Community collaboration
Regular community meetings to discuss crime
Surveys of citizens to determine general community needs and satisfaction with agency
Clean-up/fix-up projects with community residents
Considering neighborhood values in creating solutions or planning projects
Varying styles of preventive patrol (e.g., bike patrol, walk-and-talk patrol)
Joint projects with local businesses to reduce disorder or petty crime
Crime analysis
Analyzing crime patterns using computerized geographic information systems
Officers analyze community residents' comments to identify recurring patterns of crime and disorder on their beats
Officers analyze and use crime data to identify recurring patterns of crime and disorder on their beats
Place-oriented practices
Joint projects with community residents to reduce disorder such as loitering or public drinking
Beat or patrol boundaries that coincide with neighborhood/community boundaries
Alcohol, housing, or other code enforcement to combat crime and disorder
Problem-solving practices
Designating certain recurring patterns as "problems" or "projects" requiring nontraditional responses
Analyzing problems with business or property owners, school principals, or property managers or occupants
Analyzing problems with probation/parole officers or others who monitor offenders
Using agency data to measure effects of responses to problems
Using citizens' input to measure effects of responses to problems
Document problems, projects, analyses, responses, failures, and successes in writing
Making sure problems stay solved

Source: National Evaluation of COPS Survey, 1996 and 2000.

Note: Each individual item is coded dichotomously (yes/no) to indicate whether an agency implemented the specific practice.

Unlike the Policing Strategies Survey, which provided a pre-COPS and a within-COPS measure of policing practices, both observations (in 1996 and 2000) on policing practices in the National Evaluation of COPS Survey occurred while the COPS program was making grants. This complicates our analysis, as in 1996 there were agencies that had already received and

spent COPS funds, and to the extent that COPS expenditures were associated with the adoption of policing practices, the level of such practices that they reported in 1996 would reflect their experiences with COPS grants. Some of these agencies continued to spend COPS funds throughout the years from 1996 through 2000. However, some of the agencies that spent COPS funds in 1996 ceased to spend them during the intervening years before 2000. A third group of agencies consists of those that had not received their first COPS grant in 1996 but had received a grant before 2000. This third group is analogous to our group of agencies that received COPS grants in the Policing Strategies survey, with the exception that while members of this group received their first COPS grant after the first administration of the National Evaluation survey in 1996, their practices in 1996 could have been influenced by the COPS program indirectly. A final group of agencies is those that did not receive a COPS grant before the 1996 administration of the survey or during the years from 1997 through 2000.

Because the effects of experience with COPS grants before and after 1996 could differ, we chose to make two types of comparisons. First, we examined the mean changes in policing practices from 1996 to 2000 for each of the following groups of agencies: (1) agencies that made expenditures on COPS grants in 1994 through 1996, (2) agencies that made expenditures on a COPS grant in 1997 through 2000, (3) agencies that made no expenditures on a COPS grant after 1996, and (4) agencies that made no expenditures on a COPS grant in 1994 through 2000. These mean comparisons allowed us to see whether changes in practices were associated with receipt of a grant in either the early period of the program (through 1996) or when the program was more fully implemented (1997 through 2000).

We then examined whether the level of COPS expenditures between the two administrations of the survey were associated with changes in practices between 1996 and 2000 by regressing the change in practices on the change in cumulative per capita COPS expenditures between the period preceding wave 1 of the survey (1994 through 1996) and the period following wave 1 of the survey (1997 through 2000). As with the Policing Strategies Survey, we used two-factor fixed-effects regression techniques, which allowed us to control for unobserved characteristics of agencies and underlying trends in the adoption of policing practices. We also controlled for economic conditions and population changes in the localities in which the agencies were located. In addition, we used weighted regression to address the complex design of the National Evaluation of COPS Survey. We estimated separate regressions of the

effect of the receipt of a COPS grant and of the cumulative per capita amount of COPS expenditures on the levels of reported policing practices.

There were no significant differences in the overall adoption of policing practices associated with changes in per capita spending on COPS grants (table 26).

Table 26: Parameter Estimates from Regressions of Changes in Mean Number of Policing Practices and Category of Practices between 1996 and 2000 on Whether or Not Agencies Received COPS grant Between 1997 and 2000 and on Per Capita COPS Expenditures between 1994-1996 and 1997-2000 (Standard Errors in Parentheses)

	Changes in policing practices from 1996 to 2000			
Independent variable in model	All 19 practices	Problem-solving and Place-oriented	Crime analysis	Community collaboration
Changes in COPS expenditures per capita between 1994-1996 and 1997-2000	.056	.030	.011	**.016**
	(.032)	(.021)	(.008)	**(.008)**

Source: GAO analysis of National Evaluation of COPS Survey, Office of Justice Programs financial, Bureau of Economic Analysis, Census, and Uniform Crime Report data

Notes: All regressions include agency and year fixed effects and changes in county level demographic variables (percentage of persons aged 15 to 24, percentage nonwhite, and percentage employed) between 1996 and 2000. Observations are weighted to take into account sample design effects. Bold-face parameter estimates and standard errors indicate that a parameter estimate is statistically significant at the 5 percent level.

Methods to Review Policing Practices

To determine whether the certain types of policing practices may be effective in reducing crime, we analyzed systematic reviews of research studies on the effectiveness of policing practices.

How We Selected Studies

We identified six studies that provided summaries of research on the effectiveness of policing practices on reducing crime. We chose to review studies that reviewed research, rather than reviewing all of the original studies themselves, because of the volume of studies that have been conducted on the effectiveness of policing practices. We reviewed the following studies:

- Braga, Anthony. "Effects of Hot Spots Policing on Crime," *Annals, AAPSS*, vol. 578 (November 2001), pp. 104-125.

- Eck, John. "Preventing Crime at Places" in Sherman, L., et al. (eds.) *Preventing Crime: What Works, What Doesn't, What's Promising: A Report to the United States Congress*. Washington, D.C.: National Institute of Justice, 1998.

- Eck, John, and Edward Maguire. "Have Changes in Policing Reduced Violent Crime? An Assessment of the Evidence." in Blumstein, A., and J. Wallman, eds., *The Crime Drop in America*. United Kingdom: Cambridge University Press, 2000.

- Sherman, Lawrence. "Policing for Crime Prevention," in Sherman, L., et al. (eds.) *Preventing Crime: What Works, What Doesn't, What's Promising: A Report to the United States Congress*. Washington, D.C.: National Institute of Justice, 1998.

- Skogan, Wesley, and Kathleen Frydl. "The Effectiveness of Police Activities in Reducing Crime, Disorder, and Fear," in Skogan, W., and K. Frydl, (eds.) *Fairness and Effectiveness in Policing: The Evidence*, Washington, D.C.: National Academies Press, pp. 217-251, 2004.

- Weisburd, David, and John Eck. "What Can Police Do to Reduce Crime, Disorder, and Fear?" *Annals, AAPSS*, Vol. 593 (November 2004), pp. 42-65.

A limitation of basing our work on reviews is that we did not assess the original studies, but rather we relied on the descriptions and assessments as provided by the authors of the reviews. Sometimes the reviews did not cite specific information about the strength of the methodology of the underlying studies that were included in reviews.

How We Reviewed Studies

We developed a data collection instrument to capture systematically information about the methodologies of the reviews, the types of policing practices reviewed, findings about each type of practice, and the reviewers' conclusions about the effectiveness of a particular practice or group of practices in reducing crime. Each research review was read and coded by a social science analyst who had training and experience in reviewing research methodologies. This analyst recorded, for each practice discussed in the research review, (1) the types of crimes against which the practices were used (e.g., all crimes, violent crimes, property crimes, disorder); (2) whether the practice was generally effective in reducing crime, had no effect in reducing crime, or the impact was ambiguous; (3) whether there was displacement of crimes away from the

areas where the practices were used; and (4) whether there were negative effects of the practices (e.g., complaints against the police or the diversion of resources from other policing activities). A second, similarly trained analyst then read the reviews and verified the accuracy of the information recorded by the first analyst. We then summarized the findings about each practice from the data collection instruments prepared for each of the six reviews. Some practices were discussed in only one review, while others were discussed in more than one review.

The Research Literature Shows That Some Policing Practices May be Effective in Reducing Crime

Our analysis of six systematic reviews of evaluations of the effectiveness of various policing practices in preventing crime indicates that the current evidence ranges from moderate to strong that problem-oriented policing practices and place-oriented practices are either effective or promising as strategies for addressing crime problems. For example, problem-oriented approaches that focus on criminogenic substances such as guns and drugs appear to be effective in reducing both violent and property crimes. And hot spots approaches—place-oriented approaches that temporarily apply police resources to discrete locations where crime is concentrated at much higher rates than occurs jurisdictionwide—have also been found to be effective in reducing crime. However, the magnitudes of the effects of these interventions are difficult to estimate, especially on citywide crime rates, as the interventions that were reviewed as effective generally were concentrated in comparatively small places. Further, the enduring nature of these interventions is not fully understood. It is not known, for example, how long the effects of a problem- or place-oriented intervention persist. In addition, some of the reviews point out that research designs undertaken to date make it difficult to disentangle the effects of problem-oriented policing from hot spots policing. There is suggestive, but limited, evidence that the combination of these practices may be more effective in preventing or reducing crime than any one strategy alone.

In contrast to the findings on problem-oriented and place-oriented policing practices, there is little evidence in the literature for the effectiveness of community collaboration practices—such as increasing foot patrol, establishing community partnerships, and encouraging citizen involvement—in reducing or preventing crime.

Appendix VIII: Comments from the Department of Justice

U.S. Department of Justice

Office of Community Oriented Policing Services (COPS)

October 4, 2005

VIA FACSIMILE and ELECTRONIC MAIL

Ms. Laurie E. Ekstrand
Director, Homeland Security and Justice
United States General Accountability Office
Washington, DC 20548

Dear Ms. Ekstrand:

The COPS Office thanks the GAO for the opportunity to respond to their interim and final reports on the effects of COPS Office funding.

The findings from these studies are important. They show that COPS grants resulted in significantly greater numbers of law enforcement officers, are associated with increasing the community policing capacity of law enforcement agencies and have produced significant reductions in violent and property crimes. They support the conclusions reached by others[1] and correspond with what local law enforcement leaders report. The GAO was careful and diligent in their research, examining multiple statistical models, controlling for a large number of relevant variables and reviewing their analyses with the National Research Council.

Reduction in Crime

The GAO found that COPS funding resulted in declines in the rates of total index crimes, violent crimes and property crimes. Specifically, the GAO found that the decline in crimes attributable to COPS expenditures accounted for 10% of the total drop in crime from 1993 to 1998 and approximately 5% of the drop from 1993 to 2000, including "significant reductions due to COPS expenditures for the crimes of murder and non-negligent manslaughter, robbery,

[1] Evans, W. N. and E. Owens. "Flypaper COPS" College Park, Maryland: University of Maryland. Available online. 2005; Koper, Christopher, et al. *Putting 100,000 Officers on the Street: A Survey-Based Assessment of the Federal COPS Program*, Washington, DC: The Urban Institute, 2002; Zhao, J. and Q. Thurman. *A National Evaluation of the Effect of COPS Grants on Crime from 1994 to 1999.* Report submitted to the Office of Community Oriented Policing Services, Washington, DC: U.S. Department of Justice, December 2001; Zhao, J. and Q. Thurman, *Funding Community Policing to Reduce Crime: Have COPS Grants Made A Difference From 1994 to 2000.* Report submitted to the Office of Community Oriented Policing Services, Washington, DC: U.S. Department of Justice, December 2004; Zhao, J., M. Scheider, and Q. Thurman. 2003. "A National Evaluation of the Effect of COPS Grants on Police Productivity (Arrests) 1995-1999." *Police Quarterly* 4: 387-409.

aggravated assault, burglary and motor vehicle theft." GAO data estimates that those reductions amounted to 200,000 to 225,000 fewer index crimes from 1993 levels, consisting of about one-third violent crimes and two-thirds property crime.

A key finding is that these reductions in crime were found to be in line with the amount of COPS funds expended. COPS funds amounted to about one percent of all local law enforcement expenditures. The amount of the reduction in crime attributable to COPS funding grants is commensurate with and to be expected when compared to that amount. A significant finding that cannot be overlooked is that, according to the GAO, for every one dollar in COPS hiring grant expenditures per capita, there was a reduction of almost 30 index crimes per 100,000 persons. For MORE grants and innovative grant programs, the GAO estimated the impact to be 17 and 88 crimes per 100,000, persons respectively.

It should also be noted that the GAO itself points out that the results of the study are more likely to underestimate the magnitude of the effect of COPS grants on reducing crime, rather than overestimate it. In addition, the GAO selected effect sizes (elasticities) for the impact of COPS grants on hiring by which to calculate the impact of COPS grants on the decline in crime, that are at the lowest end of the ranges that they estimated. Thus, under slightly different assumptions about the statistical models, the impact of COPS grants on violent and property crime would be even larger than the impacts reported.

Significant Increase in Officers on the Beat

To date, the COPS Office has provided funding for 118,397 officers and internal reports show 104,150 of these officers have been deployed to the Nation's streets to combat crime. In addition, a comprehensive study conducted by the Urban Institute estimates that between 1994 and 2005 the COPS Office would add between 93,400 and 102,700 additional officers.[2] The GAO reports that COPS Office grants were significantly related to increases in sworn officer levels above that which would have been expected without these expenditures after controlling for a large number of relevant factors. Specifically, the GAO estimates that COPS Office grants have resulted in a minimum of 88,000 additional officer-years, above and beyond what would have been expected in the absence of COPS funds.

The GAO points out that it would be incorrect to interpret this total number of officer-years as a measure of the overall increase in the number of sworn officers that resulted from COPS funds, and is not directly comparable to the number of sworn officers on the street as a result of COPS funds or with estimates of the number of officers funded by the COPS Office. However, it is important to clarify one point regarding the number of officers funded by the COPS Office. Of the 118,397 officers that the COPS Office has funded to date, 76,339 are for the direct hiring of community policing officers and 42,058 of them are derived from the statutorily created MORE technology program. The MORE technology program is designed to save officer time through the purchase of time-saving law enforcement technology such as report writing software,

[2] Koper, Christopher, et al. *Putting 100,000 Officers on the Street: A Survey-Based Assessment of the Federal COPS Program*, Washington, DC: The Urban Institute, 2002

records management systems, in-car computers, etc. This time-savings then allows officers to be redeployed to the street to engage in additional community policing activities. Thus, the 42,058 officer equivalents[3] funded by the MORE program would not be expected to show up in aggregate counts of the number of officers hired by local law enforcement such as those used by GAO in their analysis.

Significant Increase in Practice of Community Policing

It is well accepted that community policing strategies have a strong effect on addressing crime problems. The GAO found that agencies that received COPS grants had larger increases in the average levels of reported use of problem solving, place-oriented and community collaboration practices than did the agencies that did not receive a COPS grant. This finding is supported by a great deal of anecdotal evidence[4] and research that documents the acceleration in the adoption of community policing activities as a result of COPS funding.[5] This has resulted in a fundamental shift in the way that law enforcement agencies conduct business, and has resulted in a safer America.

GAO data shows that the average level of reported use of problem-solving practices increased by about 35 percent, as compared to about 30 percent by non-grantees. The increase in place-oriented practices among COPS grantee was about 32 percent, as compared to about 13 among non-grantees. Problem solving relies on developing proactive solutions by identifying and responding to crime and social disorder problems through systematic processes. Place-oriented practices identify locations where crime occurs and implements procedures to disrupt those recurrences of crime and social disorder. By collaborating with the community, local law enforcement improves citizen feedback about crime problems and the effectiveness of policing to address these problems.

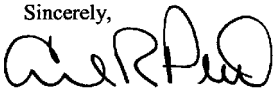
While the GAO research does provide some evidence on the effects of COPS grants on community policing, it is important to point out that the aggregate counts, such as those used by the GAO in their analysis, of the number of community policing activities that law enforcement agencies engage in, provide only a superficial measure of the level of community policing taking place. For example, through their COPS grant, a law enforcement agency may have greatly increased the amount of problem solving they engage in and, at the same time, may not have greatly increased the absolute number of different types of community policing related activities

[3] The COPS Office estimates that for every 1,824 hours saved over the course of a year, as a direct result of the technology, produces the equivalent of one additional officer.
[4] *Promising Strategies from the Field: A National Overview*. Office of Community Oriented Policing Services: U.S. Department of Justice, 2003; *Promising Strategies from the Field: Community Policing in Smaller Jurisdictions*. Office of Community Oriented Policing Services: U.S. Department of Justice, 2003; *Promising Strategies from the Field: Spotlight on Sheriffs*. Office of Community Oriented Policing Services: U.S. Department of Justice, 2003. For more information see www.copsreportsfromthefield.org.
[5] Johnson, C. and J. Roth, *The COPS Program and the Spread of Community Policing, 1995-2000*. Washington, DC: The Urban Institute, 2003.

they conduct. These types of increases in the quantity of a specific activity may very well represent great enhancements in their community policing capacity but would not be reflected in the GAO's analyses.

We thank the GAO for their careful examination of COPS Office grant programs and for the opportunity to respond to this report.

Sincerely,



Carl R. Peed
Director

cc: Richard P. Theis
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Appendix IX: GAO Contacts and Staff Acknowledgments

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