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ASSESSING JURISDICTION-LEVEL CRIME TRENDS DURING THE 1990s: AN ANALYSIS OF THE IMPACT OF POLICING CHANGES

by

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ABSTRACT

ASSESSING JURISDICTION-LEVEL CRIME TRENDS DURING THE 1990s: AN ANALYSIS OF THE IMPACT OF POLICING CHANGES

By David R. Lilley

Although a number of researchers have suggested that changes in policing may have contributed to the "crime drop" of the 1990s, little is known regarding the relative impact that changes in policing tactics, force strength and arrests may have had in jurisdictions across the nation (Blumstein, Steinberg, Bell & Berger, 2002; Sherman, Gottfredson, MacKenzie, Eck et al., 1998). Criminal justice literature asserts that implementation of crime analysis, regulatory code enforcement, community policing and problem solving became more widespread during this decade. Additionally, data suggest that the number of officers per capita and arrests for minor drug and disorder offenses also changed substantially. Using panel data from two national samples of police jurisdictions during the 1990s, this study assessed the relative effects of these policing changes on each of seven primary UCR offenses within jurisdictions across the nation. Results indicate that implementation of crime analysis, civil and regulatory code enforcement, as well as increased problem solving and citizen involvement in police activities were associated with substantial reductions in rates of robbery, burglary, larceny and vehicle theft and smaller reductions in murder, rape and aggravated assault. Additional crime declines were also associated with increases in officers and minor drug and disorder arrests. Patterns among the types of policing changes that were most closely associated with reductions in each type of offense were also identified.

To my wife, Tara.

There you are in the early light of day
Every time I turn around
When I'm lost and when I'm found
Like an angel standing guard
There you are

Every time I take a breath
And when I forget to breathe
You're watching over me
There you are

When I look for the light
In the darkness of the night
And when I move afar
There you are

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CHAPTER 1

INTRODUCTION

What impact did changes in policing practices have on crime during the 1990s? During this decade a steep decline in crime rates occurred within nearly all major crime index categories (murder, robbery, aggravated assault, burglary, larceny, auto theft) in jurisdictions across the United States. Subsequently, a number of researchers reviewed broad systemic changes that were thought to be key determinants yielding inconclusive results (Blumstein et al., 2002; Lafree, 1998a; Travis & Waul, 2002). The list of causal factors that have been hypothesized pertaining to this rapid and substantial decrease in crime (often referred to as the "crime drop") includes changes in population age demographics and drug trafficking, improvements in labor market conditions, perceptions of the legitimacy of the criminal justice system, and increases in incarceration (Blumstein & Wallman, 2000; Lafree, 1998b; Ralston, 1999). However, a number of criminal justice researchers have also asserted that changes in policing might have contributed to the nationwide decline (Eck & Maguire, 2000; Lafree, 1998b; Ouimet, 2002; Sherman, Gottfredson, MacKenzie, Eck, et al., 1998). These assertions regarding the possible role of new policing efforts have not yet been rigorously tested using a methodology that allows generalization of findings to jurisdictions across the nation.

At present, little is known about which specific changes in policing tactics, organizational strategies and technologies were most closely associated with reductions in crime during the 1990s. For example, no study has yet been published that assesses the relative effect sizes or amounts of possible contribution that these policing practices may have demonstrated with regard to declines in various types of offenses such as

robbery, burglary or larceny. This study is intended to provide a starting point for researchers in their efforts to identify mechanisms through which policing efforts may reduce crime by examining relationships between specific types of police practices and crime rates. Additionally, through the assessment of changes within jurisdictions of all sizes and from all regions of the nation, policing practices that demonstrated robust relationships with crime among a variety of environments and organizational contexts will be identified, providing crime control information for police administrators.

Changes in Policing and the Crime Decline

Technology and Community Policing

During the 1990s, the institution of American policing began to incorporate different tactics, strategies and technologies resulting in what could be described as the most substantial transformation in its history. The emergence of personal computers, vehicle-mounted mobile data terminals, cellular phones and investigative software provided real-time information that allowed officers in the field to take action as events were occurring. Additionally, these technology changes were accompanied by a paradigm shift from a "professional model" that was designed to detach individual officers from the community to an approach where many police organizations began to embed routine citizen contact and feedback into decision-making processes pertaining to neighborhood problems and potential solutions (Braga, 2002; Skogan & Frydl, 2004; Trojanowicz, Kappeler, Gaines, & Bucqueroux, 1998). As a result, hundreds of thousands of police officers were encouraged to address neighborhood disorder and citizen concerns that previously may have been considered to be beyond the scope of traditional law enforcement (Braga, 2002; Roth, Ryan, Gaffigan, Koper et al., 2000).

Systematic Problem Solving Efforts

This era also emphasized systematic problem solving such that police began to actively and routinely intervene to limit or remove recurring situation-specific factors that were conducive to criminal activity, such as poorly managed taverns that allow intoxicated patrons to congregate outside the building and dimly lit parking lots that provide a location for the distribution of contraband (Braga, 2002). The systematic search for solutions to recurring problems led to increased police awareness of crime "hot-spots" which are geographic locations or buildings where criminal activity is frequent (Eck & Weisburd, 1995; Sherman, 1995). Subsequent strategies that emerged with regard to hot spots involved police efforts to simply block or deny criminal opportunities in specific places by concentrating patrol presence (Fritsch, Caeti & Taylor, 2003) and address problems indirectly through the use of civil code enforcement against absentee landlords or inattentive property managers (Mazerolle & Roehl, 1998).

Policing Research - Paradigm Shift

Criminal justice research during the 1990s also began to shift from a debate about whether the police could significantly impact crime toward analysis of the conditions under which police crime-prevention activities could be most effective (Sherman, Gottfredson, MacKenzie, Eck, et al., 1998). In years prior, some prominent researchers had suggested that police should abandon their crime prevention efforts. One such researcher declared that "Suppression of crime is a will-of-the-wisp which the police should no longer pursue."(Walker, 1984, p. 88). However, within 10 years after this declaration, a number of crime-prevention studies indicated that new policing tactics could substantially reduce crime in places where criminal activity was most prevalent.

One recent review that assessed the impact of concentrating police presence in high-crime areas indicated that 12 of 13 studies demonstrated local crime reduction effects (Scott, 2004). Additionally, case studies have found that problem solving efforts were associated with reported crime reduction in New Jersey, Oakland, and Santa Anna (Braga, 1997; Green, 1995; Jesilow, Meyer, Parsons, et al., 1998).

Incarceration and Police Force Size

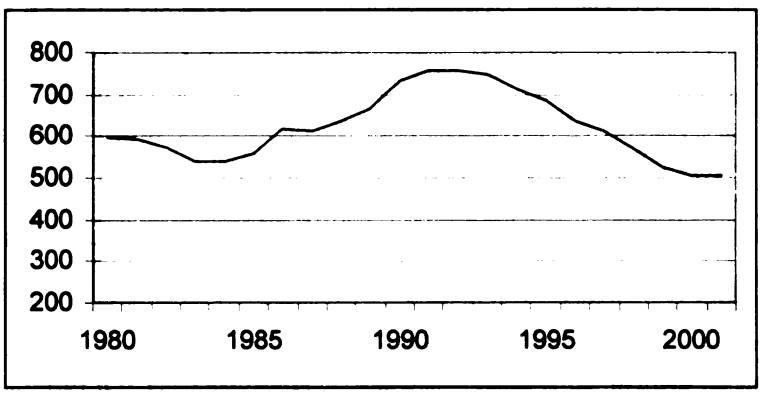
Although these significant changes in policing practices occurred at approximately the same time as one of the largest and longest lasting crime decreases in American history, some researchers have suggested that increases in incarceration or the number of officers per capita may be more important driving forces behind the crime drop of the 1990s (Kleiman, 2000; Levitt, 2004; Marvell & Moody, 1996; Rosenfeld, 2000). However, it is important to note that many places that experienced decreases in crime during the 1990s did not increase incarceration rates or overall size of police forces relative to population. Additionally, researchers have suggested that among the largest cities that experienced a crime reduction from 1990 to 1996, some did so without a substantial increase in officers per capita (Eck & Maguire, 2000). In a recent review of this issue, Eck and Maguire pointed out that San Diego had one of the largest crime reductions during this period but their officer to citizen ratio increased by only 1%. Dallas and Seattle also reported substantial crime decreases while officer rates declined approximately 3%t and 6% respectively (Eck & Maguire, 2000). In addition, the nation of Canada has historically experienced very similar violent crime patterns to those in the U.S. including a substantial decrease in crime during the 1990s. However, the ratio of

officers to citizens did not increase in that nation during this period and incarceration rates actually declined as a result of budget shortfalls (Ouimet, 2002).

Characteristics of the Crime Drop

Another useful mechanism in analyzing the impact of recent policing changes in the U.S. is to examine the trends of the dependent variables (i.e. crime rates). At an aggregate, national level, the rate of violent felony index offenses across the nation peaked around 1991 and then began a sharp decline around 1993 (Figure 1). This decline continued throughout the 1990s (Blumstein, Steinberg, Bell, & Berger, March, 2002).

Figure 1. National Violent Crime Index (UCR 1980-2001)

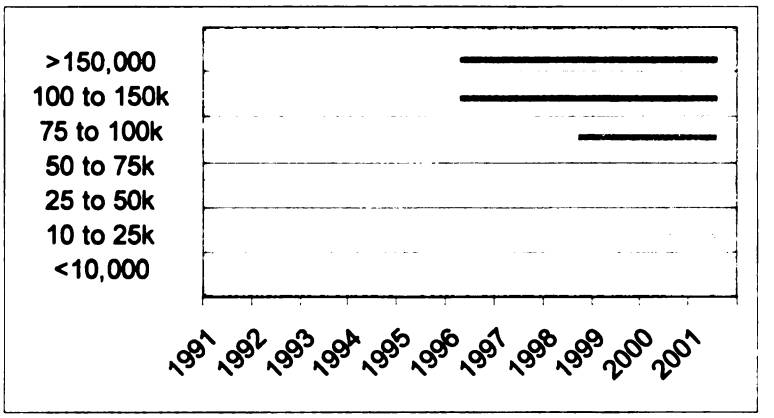


However, national trends in crime are driven by large cities and when subgroups of cities with populations below 100,000 are examined, the decline of violent index offenses appears substantially later as city population decreases. Using the 1990 violent index rate as a baseline, for example, UCR data indicate that 60% of cities with population greater than 100,000 reported a decline in violent index offenses in 1996 [1].

[1] Analysis of 8,940 agencies that reported a full 12 months of data from 1990-2001 by population subgroups indicates that the violent crime trend occurred in larger places several years prior to this trend in smaller cities. A "trend" was defined as at least 60% of agencies within the subgroup reporting violent crime at below 1990 levels. See pp. 51-52 for further details.

However, as shown in Figure 2, this trend did not occur in cities with populations from 50-75,000 until 1998, followed by cities of 25-50,000 population in 1999. Further, data indicate it was nearly 5 additional years (post 1996) before 60% of cities with population 10,000-25,000 would report violent crime rates below 1990 levels. Thus, although crime trends across jurisdictions in the U.S. tended to decline during the 1990s, they did not take place uniformly with regard to temporal occurrence.

Figure 2. Trends in Agencies Below their 1990 Levels for Violent Crime by Jurisdiction Size



Recent research has also suggested that the spatial distribution of reduction in crime may have been uneven or disproportionate within city boundaries. In Seattle, Washington for example, one study indicated that the vast majority of the overall city-wide reduction in crime during the 1990s took place within a few narrow high-crime neighborhoods (Weisburd, Bushway, Lum & Yang, 2004). Approximately 86% of city sectors with low and moderate historical levels of crime did not experience a significant decrease and several of these sectors actually experienced a crime increase. Consequently, although the overall city crime rate declined by nearly 24%, the physical

locations where substantive crime reductions actually took place represented only about 14% of the land mass of the city.

Statement of the Research Problem

Given that principles of causal inference generally require that cause precede effect and that effects occur whenever causal conditions are met, the types of variables that should be examined most closely as contributors to the crime drop during the 1990s should include factors that emerged (or changed) similarly in all places where declines occurred, effected large cities first followed by places with smaller population, and impacted specific, high-crime segments of cities to a substantially greater extent than places with low or moderate historical levels of criminal activity. It is noteworthy, however, that very few of the commonly asserted causal variables with regard to the recent crime drop actually meet these criteria. Broad changes in labor market conditions, for example, tend to impact large and small cities at approximately the same time and would likely effect low and moderate crime neighborhoods as well as those relatively few places where crime has been previously most problematic. Changes in age demographics might be expected to impact large and small cities as well as high and low crime neighborhoods in similar manner with regard to timing and neighborhood impact. Additionally, as previously mentioned, increases in incarceration and police officers per capita were not universal among places where crime declined.

Recent changes in policing tactics and technologies, however, do meet these causal criteria and are consistent with patterns of crime reduction that occurred during the 1990s. Technological advances in policing began in large agencies and diffused to smaller jurisdictions as cost decreased (Eastern Kentucky University, 2003; Mullen,

1996). Additionally, recent studies indicate that the implementation of problem solving and community policing approaches expanded throughout the U.S. and Canada during the 1990s (McKenna, 2000). However, as with technological innovations, data pertaining to policing practices indicate that large agencies began to implement systematic problem solving and community policing approaches several years prior to places with smaller population (Rosenthal & Fridell, 2002; Roth et al., 2000). There is evidence, for example, suggesting that agencies below 50,000 population required several additional years to implement policing innovations (Roth et al., 2000). Moreover, problem and place oriented tactics were often directed toward high-crime places and would likely result in the crime reductions that were concentrated in specific high crime areas, consistent with patterns that were observed in Seattle.

The Need for the Current Study

Despite the evidence that recent changes in policing tactics and technologies are consistent with patterns of crime reduction throughout the U.S. during the 1990s, the relationship between these policing changes and crime rates has not yet been closely scrutinized across jurisdictions of various sizes nationwide. Although a number of researchers have acknowledged that such a relationship likely exists (Eck & Maguire, 2000; Lafree, 1998b; Ouimet, 2002; Sherman et al., 1998), there are at least four factors that may have contributed to this lack of specific attention in recent criminal justice literature. First, consistent evidence that specific types of policing actions such as problem solving may impact crime in places has emerged only recently (since the early 1990s). As a result, there has not been a great deal of available data pertaining to the implementation of specific policing tactics that would allow inference to jurisdictions

throughout the nation. Second, the relationship between police tactics and crime reduction is likely to be complicated by differences in jurisdiction size, region and composition. For example, certain tactics such as foot and bike patrol that are commonly utilized in urban areas may not be feasible in rural locations where the population is more widely dispersed. Additionally, seasonal differences may decrease the effectiveness of these tactics in regions of the nation where cold and inclement weather persists throughout much of the year. Third, the effects of specific tactics may vary based on differences in police organizational structure, personnel and extent of implementation. For example, strategies that focus on crime hot spots may require that the number of police officers per capita be at a certain level to avoid displacement of criminal activities to other areas of the city. Finally, there is a possibility that changes in policing tactics may be reciprocally or simultaneously related to crime patterns such that increases in crime result in changes in tactics and these new tactics also result in changes in crime. If crime and tactics are endogenously related, the effects of specific policing efforts may be difficult to measure unless a sufficient instrumental variable can be found to assist in the isolation of these relationships.

Purpose and Objectives of this Study

Despite these research challenges there is emerging evidence that policing tactics and strategies can result in crime reduction. Furthermore, recent changes in the implementation of problem solving, use of civil and regulatory codes, crime analysis and other policing practices have been consistent with recent patterns of crime reduction across the United States. Consequently, although the purpose of this study is not to explicitly model the "crime drop," it is intended to provide a more detailed examination of these relationships in an effort to provide useful information for researchers and

practitioners. At present, no nationally representative study has examined the effects of specific policing tactics on crime. In this regard, it has been noted, for example, that the vast majority of case studies concerning problem and place oriented strategies have been conducted in urban environments and have involved large police agencies. Thus, it is currently unknown whether relationships from case studies of problem solving, use of civil and regulatory codes to reduce disorder and other recent policing innovations will be found in environments that substantially differ in terms of population demographics, level of urbanicity, and police agency size.

Additionally, at present, it is not known to what extent specific types of tactics might be effective against different types of offenses. Foot patrol, for example may be effective in reducing vehicle theft as a result of a increased police presence (Di Tella & Schargrodsky, 2004). However, this approach may not demonstrate any effect with regard to the offense of murder, which often occurs in locations that are not easily surveilled. The purpose of this study is to examine these relationships in jurisdictions across the nation in a manner that will identify recent policing changes that were associated with crime reductions to enable further research pertaining to the mechanisms by which community security is effected. Additionally, by identifying the specific policing tactics and strategies that were associated with reductions in murder, rape, robbery, aggravated assault, burglary, larceny and vehicle theft, policy recommendations regarding tactics that should be emphasized or selected when only a few are possible given limited agency resources may become apparent.

CHAPTER 2

REVIEW OF THE LITERATURE - POLICING CHANGES

Events Leading to the Paradigm Shift of the 1990s

Prior to the 1990s, a number of criminal justice researchers asserted that police actions could not substantially affect jurisdiction-wide crime rates (Bayley, 1994; Walker, 1984). There were both theoretical and empirical reasons supporting this assertion. From a theoretical standpoint, criminologists had argued that a substantial portion of crimes were committed as consequences of extreme poverty (Cullen & Agnew, 2003). Consequently, since police could do little to address this causal factor, it was assumed that little could be done to reduce crime rates. Additionally, studies regarding incarceration suggested that "nothing worked" with regard to recidivism (Martinson, 1974). Finally, in the policing arena studies did not demonstrate any crime reduction effects from randomized patrol and shorter response time to criminal incidents (Kelling et al., 1974; Sparrow, Moore & Kennedy, 1990). Consequently, a primary mechanism of crime control under the professional model of American policing was to seek the arrest of more serious offenders after their crimes were committed (Skogan & Frydl, 2004; Trojanowicz et al., 1998; Visher, 2000).

During the 1980s and early 1990s, however, research findings increasingly suggested that specific types of police activities could impact community security and perceptions of well being. For example, a Neighborhood Foot Patrol Program in Flint, Michigan was associated with crime rate reductions of 8.7 percent (Trojanowicz, 1982). Additionally, the Newark Foot Patrol Experiment was associated with improved perceptions of neighborhood safety among citizens (Police Foundation, 1981). In Houston, implementation of community police stations, foot patrol, and community

organizing teams also resulted in decreased fear as reported by area residents (Pate, Skogan, Wycoff & Sherman, 1986). These modest successes highlighted the connections between police-community relations, citizen fear, and crime, encouraging a paradigm shift where police researchers began to seek out conditions under which crime and fear could be reduced, rather than focusing on police responses after events unfolded.

During the late 1980s, concepts relating to community oriented policing and problem solving approaches were increasingly adopted by police agencies (Braga, 1997). Although there is no universal agreement as to the precise definition of community oriented policing, this approach emphasizes efforts to improve the quality of police services by reducing disorder and fear while improving the ability of citizens to engage community self-regulation. In contrast to traditional policing, which emphasized efficiency and limiting officer mistakes by reducing discretion, community policing advocates argued for a broader police role (Bayley, 1994; Trojanowicz et al., 1998). The concept of systematic problem solving also emerged as a tool to assist police agencies in addressing aggravating factors that result in recurring crime problems (Goldsetin, 1979)[2]. Frequently, problem solving was employed as a technique to achieve broader community policing objectives (Braga, 1997; Cordner & Biebel, 2005).

By 1985, the Police Executive Research Forum had evaluated several problem solving efforts by the Newport News Police Department in Virginia (Eck & Spelman, 1987). One of these efforts included the demolition and rebuilding of an apartment complex, resulting in a 35 percent reduction in burglary. Another effort in Baltimore County, Maryland involved the hiring of an additional 45 officers and creation of a special unit with the mission of reducing fear and developing stronger community ties

(Cordner, 1988). Subsequent surveys of residents indicated that fear decreased significantly after the special unit was operational.

Policing Changes During the 1990s

The number of police agencies that reported transitioning from traditional law enforcement to a community oriented policing approach rose from around 50% in 1994 to nearly 80% in 1998 (Breci & Erickson, 1998; Johnson & Roth, 2003; Oliver, 1998). Frequently, these transitions to community policing were accompanied by the permanent assignment of officers to specific areas so that they could become familiar with residents and the unique characteristics of each neighborhood (Kelling & Moore, 1991). Additionally, data from a study of two large agencies indicated that community police officers tended to spend less time on general patrol than traditional officers and more time in community meetings and problem solving activities (Parks, Mastrofski, DeJong, & Gray, 1999). Whereas traditional policing only required officers to react to crisis, community officers were expected to have the ability to address problems before a crisis occurred (Reiter, 1999).

Efforts to Improve Community Appearance and Orderliness

One method that was utilized by police organizations to achieve this new proactive agenda was to attempt to improve community appearance and orderliness. These efforts were based, in part, on criminal justice theories that asserted that patterns or cycles of interrelated behavior within communities and neighborhoods could create an environment that made criminal behavior more likely (Eck & Weisburd, 1995; Green, 1995; Scott, 2000). Thus, if these cycles of behavior could be altered, it was argued that

[2] Strategic problem solving will be discussed in detail in a subsequent section.

police might be able to decrease or disrupt undesirable patterns of behavior, rather than simply responding to crime after it occurred.

Under the ecological perspective, for example, Burgess' concentric zone theory (Burgess, 1925) asserted that rapid population turnover and urban decay led businesses to move out of the centers of cities, causing resources, routine maintenance, and property upkeep to decline. However, from a theoretical perspective, the subsequent decline in property values within these central urban zones could also create an incentive for new development if fear and social incivilities could be reduced. Toward that end, some police agencies began to coordinate with business leaders, schools and local community groups to support the removal of graffiti and reduction of juvenile loitering, and public drug dealing. One such project in Oakland, California involved the creation of a special team (known as SMART or Specialized Multi-Agency Response Team) which coordinated with other city agencies to inspect and identify drug/problem properties that failed to comply with civil ordinances. This team utilized regulatory codes and drug abatement laws to control drug and disorder problems. The study examined 321 places using time series analysis and findings indicated that calls regarding disorder and drug offenses were reduced while the overall appearance of the neighborhood improved (Green, 1995).

During the 1990s, a central tenet of the community policing movement involved the expansion of the functional role of police to include efforts to address "quality of life" issues in communities (Trojanowicz et al., 1998). Much of the motivation behind this broadened policing role emanated from the "broken windows" thesis, which asserted that signs of disorder and decay in the visible environment (e.g. litter, graffiti, abandoned

automobiles, boarded-up buildings, and other signs of physical disorder) serve as cues to residents and passers by that residents in the neighborhood do not care about disorder, cleanliness and upkeep (Wilson & Kelling, 1982). An extension of this thesis further suggests that "behavioral incivilities" such as aggressive panhandling, public urination and defecation, prostitution, loitering, public intoxication and other signs of social disorder increase perceptions that personal victimization may be likely, causing law-abiding citizens to fear for their safety and thus, attempt to avoid the area (Field, 2002; Kelling & Coles 1996; Skogan, 1990). Consequently, one police strategy that was developed during the 1990s, attempted to utilize civil and regulatory codes to persuade or coerce law abiding individuals and non-offending third parties to take responsibility and action to prevent or end criminal or nuisance behavior (Mazerolle & Roehl, 1998).

Tactics that were utilized in conjunction with this strategy included providing training for landlords and property managers, fines for non-compliance, and civil actions to achieve property forfeiture. In San Diego, California, an experiment was conducted among 121 rental properties that had been recent targets of drug enforcement (Eck & Wartell, 1998). Landlords in one treatment group received a follow-up letter indicating that the city could take legal action if the drug problem was not addressed. Landlords in a second treatment group were contacted by a narcotics detective and city code enforcement official who inspected the property and worked with the property owner to devise a plan to remove or reduce the drug problem. A 30 month review indicated that crime had declined by approximately 60% in places where landlords were met by city officials while crime in places that had received a letter of warning declined by 13% when compared with a control group.

These types of non-traditional approaches became more popular as law enforcement officials recognized that criminal remedies were often ineffective for dealing with recurring behaviors or problems that increase the likelihood of crime but are not criminal in and of themselves. For example, the purchase of spray paint by minors was legal in many jurisdictions but often led to problems with graffiti. As a result, another strategy that was employed was to seek legal prohibitions of spray paint sales to minors, drug paraphernalia, cigarette vending machines and other items that may support or encourage criminal activity (Mazerolle & Roehl, 1998).

Civil remedies were also expanded to specifically target offending parties such as gangs, batterers, and delinquent youth. In Southern California, police and legal officials gathered evidence that gang activities created a "public nuisance" and sought gang injunctions that would allow civil fines or arrest of certain individuals that were identified as gang members (Maxson, Hennigan & Sloan, 2003). Subsequently, Ventura and Redondo Beach officials reported a near 90% decrease in gang crimes and a 70% decrease in police contact with gang members (Maxson, Hennigan & Sloan, 2003). Additionally, a time series analysis of violent felony offenses in 14 Los Angeles counties between 1993 and 1998 indicated that these offenses declined by 5-10% overall when compared with the pre-injunction period (Grogger, 2002).

By 1998, civil remedies were described as "the norm," rather than the exception by some researchers (Mazerolle & Roehl, 1998). However, although the use of regulations, civil gang injunctions, and asset forfeiture may have provided strong leverage for law enforcement officials, some researchers suggested that extensive use or misapplication of these tactics could result in new negative consequences in some

communities. In the legal arena, constitutional challenges concerning the breadth of civil gang injunctions were made and some California courts required that officials provide evidence of conduct that posed a substantial threat to the health or property rights of citizens before action was allowed (Cheh, 1998). Additionally, in order to be effective in the long term, these invasive non-criminal measures needed to be supported by the community.

Improving Citizen Collaboration as a Tactic

It is noteworthy that this substantial increase in law enforcement intervention in the routine affairs of citizens might not have been tolerated under the traditional or professional model of policing. During the professional era, concerns over the corruption of officers who developed close contacts with community officials and individual citizens resulted in policies that required the rotation of officers to different neighborhoods or areas of the jurisdiction, often on a daily or weekly basis (Sparrow, Moore & Kennedy, 1990). Unfortunately, this procedure, combined with decreased usage of foot patrols (due to the emergence of patrol cars) and urban geographic expansion, led to a decline in routine police-citizen interactions (Bratton & Knobler, 1998; Sparrow, Moore & Kennedy, 1990). Consequently, some researchers argued that this relative lack of interaction resulted in distrust between citizens and police officers (Trojanowicz et al., 1998). Additionally, some research suggests that crime increases and decreases often correlate with, or are causally related to public perceptions regarding the legitimacy of the government and criminal justice system (Lafree, 1998a, 1998b). There is evidence that citizen trust and perceptions of legitimacy increased significantly during the 1990s (Skogan & Hartnett, 1997). Nevertheless, a substantial portion of the aforementioned

civil remedies and "quality of life" tactics may not have been possible if police-community relations had not improved.

A related theme in recent criminal justice literature asserts that policies of the professional policing model increased isolation of police officers from the needs and concerns of the communities that they served (Sparrow, Moore & Kennedy, 1990). As a result, a substantial portion of policing literature has asserted that the types of neighborhood problems and environmental influences that were distressing to citizens often differed from those to which officers invested much of their time and effort (Carter, 1995; Kelling & Coles, 1996; Trojanowicz et al., 1998; Wilson & Kelling, 1982). Consistent with the traditional and more narrow law enforcement role, police agencies had invested resources in the apprehension of felons after they had committed serious offenses through rapid response to calls, use of tracking dogs, and vehicular pursuits (Sparrow, Moore & Kennedy, 1990). However, citizens were often more interested in safety, physical decay and minor but routine disorderly conduct (Carter, 1995; Trojanowicz et al., 1998). Consequently, agencies that improved their collection and processing of citizen feedback may have been more effective in achieving crime reductions than those that did not.

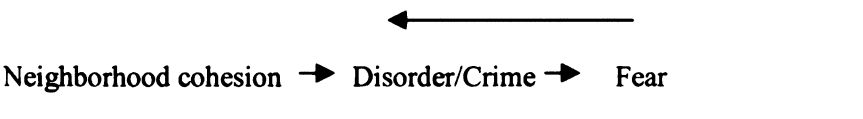
Combating Fear as a Tactic

Another aspect of the relationship between communities and crime that received increased attention during the 1990s was citizen fear of victimization (Field, 2002; Skogan & Frydl, 2004). Fear is important not only as a quality of life or police service issue, but because a number of theoretical perspectives assert that it may actually effect crime rates indirectly. For example, the standard model of social disorganization

suggests that fear leads individuals to physically and psychologically withdraw from community life (Shaw & McKay, 1942). This withdrawal may lead to a weakening of the informal social control processes that inhibit crime and disorder resulting in further deterioration of the neighborhood.

However, in recent years, a number of researchers have also suggested that the relationship between fear and disorder is reciprocal or dynamic as illustrated in Figure 3 (Bursik & Grasmick, 1993; Markowitz, Bellair, Liska, & Liu, 2001; McGarrell, Giacomazzi & Thurman, 1999). A recent study that employed structural equation modeling to analyze three waves of interviews from over 10,000 British residents found evidence for the existence of a reciprocal relationship between fear and disorder as well (Markowitz, Bellair, Liska, & Liu, 2001). Additionally, researchers that assessed crime and disorder in 196 neighborhoods found that the inclusion of a reciprocal effect between disorder and violence improved the overall fit and explanatory power of their models (Sampson & Raudenbush, 1999).

Figure 3. Partial Model of Social Disorganization and Fear



The existence of a dynamic or reciprocal effect involving fear, disorder and crime may have important implications for policing tactics. If, for example, police are able to disrupt this feedback loop by significantly decreasing citizen fear, the resulting decreases in disorder and crime could be substantial. Interestingly, a number of studies have

suggested that community policing as a general strategy or specific components of community policing have resulted in measurable reductions in citizen fear. Assessments of the impact of foot patrols in both New Jersey and Michigan suggested that citizen fear was reduced (Braga, 2002). Additionally, a review of community policing studies by the Committee on Law and Justice, sponsored by the National Research Council found evidence that door to door contacts by patrol officers, storefront offices and community newsletters regarding crime often reduced perceptions of disorder (Skogan & Frydl, 2004).

Another noteworthy finding with regard to the relationship between fear and disorder is that community fear can arise from observations of physical signs or cues (e.g. abandoned cars, trash or graffiti) that disorder in the area may be problematic (Perkins & Taylor, 1996). In this regard, Perkins and Taylor (1996) obtained data from 412 residents across 50 block segments within 50 different neighborhoods in Baltimore, Maryland and found that the relationship between disorder and fear was generally supported at the individual, block segment and community levels. Further, their analyses of surveys and on-site observations suggested that citizens rely both on physical and social cues in assessing the danger of victimization. This finding may suggest that clean-up, fix-up projects may have crime control implications if residents fear is significantly reduced.

The Importance of Social Cohesion, Collective Efficacy and Networks

Ecological and social disorganization perspectives suggest that social cohesion may play an important role in regulating community crime in addition to that of citizen fear of victimization. In this regard Hunter (1985) argued that informal and formal social mechanisms can be classified into three levels of control (private, parochial, public).

Private control is the most basic level and involves interactions among intimate groups (e.g. family and close friends). The primary mechanisms of influence under this category involve allocation or withdrawal of social support which can result in direct criticism, ridicule or ostracism from the group. Parochial influence comprises the second level of social control via broader interpersonal networks and interconnections with local institutions such as churches, stores and schools. The final level of social control takes place in the public arena. Influences in the public sphere emanate primarily from formal process and allocation of resources via institutions such as police agencies, juvenile justice offices and social welfare organizations.

A similar line of reasoning with regard to mechanisms of community control can be found in the work of Greenberg et al. (1982), who identified three additional forums that are dedicated to community self-regulation (Bursik & Grasmick, 1993). First, informal surveillance was described as typically casual but influential in terms of the observation of neighborhood streets. Additionally, it was asserted that movement-governing rules may result from the avoidance of areas in the city that are viewed as unsafe. Lastly, direct intervention or questioning of strangers and residents in the neighborhood about suspicious activities may be utilized to exert influence on individual behavior.

Consistent with these concepts regarding levels of control and community self regulation, researchers have also advanced the idea of collective efficacy, or shared community expectations of intervention to maintain community stability and order (Sampson, & Raudenbush, 1999). For example, Sampson (1986) argued that rapid rates of population turnover and increases in structural density can lead to a greater proportion

of strangers and neighborhoods who are unlikely to intercede on behalf of local residents. Thus, these systematic social processes may decrease the collective efficacy in some communities.

Research has been generally supportive of levels of control, collective efficacy and self regulation as contributors to community social control. One study implemented a systematic social observation of urban neighborhoods via a video taping method to assess crime and disorder in 196 neighborhoods (Sampson & Raudenbush, 1999). Analyses of these data led authors to assert that collective efficacy was linked to lower rates of violent crime after controlling for disorder and the reciprocal effects of violence. Additionally, data from a representative survey of 2,482 Illinois residents suggested an interaction-effect between fear and social ties (Ross & Jang, 2000). The authors of this study concluded that interpersonal social connections decreased fear of victimization and that participation in neighborhood organizations provided a "buffering effect" with regard to fear and perceptions of disorder (Ross & Jang, 2000).

However, Carr (2003) has cautioned that the social disorganization perspective does not necessarily imply that social cohesion and collective efficacy are the sole factors that influence local crime rates. Findings from his five year ethnographic study of a Chicago neighborhood indicated that residents have changed what they do in response to controlling youths whose families are unwilling or unable to exert sufficient private control. Rather than contacting parents of problem youth directly, many residents in this study contacted community police officers who intervened on their behalf. Carr asserted that this approach has resulted in a new form of parochialism that involves increasing

private reliance on public officials at key points of intervention to achieve community self-regulation (Carr, 2003).

Carr's ethnographic analysis is also consistent with recent work by Reisig and Parks (2004), who analyzed survey data from over 6,000 citizens in 62 neighborhoods in Indiana and Florida, finding that individuals that view the police as partners with the community perceive fewer problems with neighborhood incivilities and report higher perceptions of safety. Taken together, these studies suggest that if police agencies are able to establish routine, ongoing and supportive relationships with neighborhood residents, new public-private partnerships may result and mechanisms of social control that were not previously employed by many communities may develop.

Directed Patrol and Renewed Crime Focus

Despite assertions in criminal justice literature regarding the importance of a broadened police role in American society, another theme that was reflected in the literature during the 1990s is more consistent with the professional model in that it maintains that some of the most significant changes with regard to crime involved continued efforts toward police efficiency. During this era, researchers became increasingly aware that most crime was concentrated in a few specific places within jurisdictions. For example, an analysis of 323,000 calls for police service in Minneapolis during 1986 indicated that 3% of the geographic locations generated 50% of all calls for police service (Sherman, 1995). Further, 5% of reporting addresses produced 100% of calls for predatory offenses such as robbery, rape and auto theft. Consequently, although randomized police patrol, a key component of the professional-era had been demonstrated to be ineffective (Kelling, Pate, Dickman & Brown. 1974), a new approach

known as "directed patrol" was developed which required police administrators to organize patrols more efficiently to target specific high-crime areas (Eck & Weisburd, 1995; Koper, 1995).

In 1992, a study of directed patrol was conducted in Kansas City with funding via a federal program entitled "Weed and Seed" (Sherman et al., 1995). This initiative concentrated police presence in areas with very high levels of homicide and firearm-related violent crime. For 6 months, a group of officers patrolled these areas without the responsibility of responding to calls for service, providing more than 1,200 hours of police presence in these locations. Records from this study indicate that officers issued nearly 1,100 traffic warrants, and made approximately 600 arrests, primarily through vehicle stops, resulting in a 65% increase in gun seizures and a 49% decrease in gun crimes during the study period.

A number of similar studies also supported the notion that specific geographic locations, known as "hot spots" were often the source of a disproportionate number of offenses. Spelman (1995) assessed the variability of reported crime in places over time, finding that around 10% of locations accounted for 50% of calls for service. Additionally, 20% of disorder offenses and 14% of crimes against persons occurred in 56 drug crime hot spots in Jersey City, New Jersey (Weisburd & Green, 1995). Similar patterns were also reported in the Bronx and Baltimore (Eck et al., 2000).

Evidence from these studies is consistent with a number of theoretical perspectives and hypothesized relationships in criminal justice literature. For example, Newman (1972) asserted a "defensible space" perspective that crime is more likely in areas that are familiar to the perpetrator and that the probability of success is increased if

perpetrators can take advantage of buildings and locations that provide concealment. Additionally, routine activities theory, described by Cohen and Felson in 1979 suggests that predatory crime involves more than individuals in that it requires the simultaneous intersection of a target, motivated offender and a suitable location (place) for the offense to occur. Eck (1994) added another element of influence known as place managers, asserting that the absence of these observers is one element that may increase the likelihood of criminal activity. Sherman (1995) also advanced a "patron hypothesis" which suggests that certain places such as bars and nightclubs often tend to attract a larger than normal proportion of the criminal element.

Findings from the previously mentioned studies regarding crime hot spots during the 1990s were generally supportive of the assertions of routine activities, defensible space and related perspectives. Over time, these concepts and empirical findings developed into a theory of place. Thus, the physical locations where criminal activities occur became an additional subject of analysis (Eck & Weisburd, 1995). Consequently, one police response to these findings regarding high-crime locations has been to increase patrol and enforcement activity in these areas.

Increasing Police Force Concentration – Hot Spots

Empirical findings relating to the concentration of police in high-crime areas have supported crime reduction effects on a fairly consistent basis. Scott (2004), for example, reviewed 13 studies pertaining to targeted police presence and found that all but one resulted in reductions of criminal offenses or crime related calls for police service. Furthermore, unlike most other police tactics, targeted policing has been subjected to rigorous evaluation. Weisburd and Green (1995) conducted a randomized experiment

among 56 drug hot spots that were identified via computer crime analysis and found consistent strong reduction effects pertaining to disorder-related emergency calls for service. This study also resulted in a diffusion of benefits to locations outside the experimental areas.

Another randomized controlled trial attempted to provide 3 hours of daily police patrol of hot spots during a year long study (Sherman & Weisburd, 1995). Despite the fact that the 3 hour goal was not consistently achieved, total crime was reduced by 6 to 13 percent in treatment locations (Sherman & Weisburd, 1995). Interestingly, lengthy duration of police presence may not be required in order to substantially reduce disorder. Using observational data from a one-year study in Minneapolis, Koper (1995) found that patrol presence of about 10 minutes was sufficient to generate significantly longer time without disorder and that uniformed police presence of longer than 15 minutes resulted in diminishing returns.

Aggressive Policing and Crackdowns

Although there is substantial evidence that targeted police presence in hot spots may result in crime reduction, many of these policing efforts have been coupled with increases in enforcement of disorder or drug offenses. Thus, an empirical question arises as to whether the cause of sustained reduction emanates from the heightened enforcement aspect (i.e. police crackdown) or the presence of officers in these locations. In one study, court authorized raids of drug houses were randomly conducted at 98 of 207 locations where at least five calls for police service had been made in the preceding 30 days (Sherman, et al., 1995). Experimental blocks showed reductions in both calls for service and offense reports but effects were small and decayed within approximately two weeks.

Additionally, in this study raids where arrests were made (23 out of 98) did not consistently result in differing impacts from raids in which no arrests were made.

In another study, a crackdown in a Richmond, Virginia neighborhood resulted in a 92% reduction in reported crime during the month-long trial period (Smith, 2001). However, these results also decayed after the raid-month and the cost of this policing effort was very high. A similar decay in crime reduction effects was also reported in the Kansas City drug raid experiment that was discussed previously. Nevertheless, some researchers have noted that if crackdowns are followed up with further police contacts, crime prevention benefits could be reinforced and sustained for long periods of time (Skogan & Frydl, 2004). Recall, for example, that the Eck and Wartell (1998) study demonstrated that immediate follow up contact with landlords led to long term reductions in offenses in specific locations. As a result, the evidence with regard to raids and crackdowns suggests that sustainable crime reduction typically requires more than short-term enforcement efforts.

The precise range or duration with regard to the length of the effects of targeted policing presence has not yet been established. However, it is noteworthy that crime patterns in at least one extensive study indicated that long term reductions in high crime areas are possible. Analyses of over 29,000 street segments in Seattle during a 14 year time period indicated that although this city experienced a substantial overall crime drop in the aggregate during the 1990s, crime rates did not actually decline in the vast majority of the places within the city (Weisburd et al., 2004). Rather, nearly all of the decrease in criminal activities occurred within narrowly defined high-crime areas that comprised no more than 16% of geographic locations. This finding is noteworthy because it provides

evidence that crime decreases that occurred in high-crime places may have resulted from focused or directed patrols and other place oriented tactics.

Area Denial of Criminal Activities

During the 1990s aggressive policing and hot spot policing were sometimes combined into a "saturation patrol" that formed the basis of an area denial strategy (Fritsch, Caeti & Taylor, 2003). In 1995, John Eck described the reasoning behind this approach by stating that "Sellers and buyers of illicit goods and services (e.g. drugs, sex, stolen merchandise, stolen and illegal firearms) must find ways of meeting each other and making exchanges in order to get the rewards they seek." Thus, area denial approaches seek to remove certain problematic locations from public use by offenders. Eck (1995) also laid out a "general model" of illicit retail marketplaces, noting that routine activities theory suggests that sellers of illegal goods and services will strive to limit the distance that they move in order to maximize profits. Eck suggested that the most desirable marketplaces would frequently be located along major arteries where place management was weak or non-existent. A similar argument was also made by Matthews (1993) who noted that shoppers for illicit good and services often circle through an area, looking for sellers. Consequently, these researchers have suggested that limiting or controlling circular traffic patterns via one-way streets and other techniques might inhibit these routine criminal patterns (Eck, 1995; Matthews, 1993).

Although Eck's general model has not yet been explicitly tested, a number of police agencies during the 1990s employed area denial or saturation patrol strategies. With funding from the COPS (Community Oriented Policing Services) office, Dallas police department dramatically increased patrols in areas with high gang violence in

1996. Results from this one-year quasi-experiment indicated 64 to 73 percent reductions in gang-related offenses in targeted areas. These treatment areas significantly differed from control areas where gang offenses decreased by only 22 percent during the same time period (Fritsch et al., 2003). A similar approach was also implemented by Detroit police department between 1995 and 1998 yielding promising but less spectacular results (Bynum & Varano, 2003).

Problem Solving

Place-oriented policing tactics, such as those discussed in the preceding section fall into a broader stratagem, commonly known as problem solving, that was also increasingly recognized and implemented by agencies across the nation throughout the 1990s. Although police in America have a longstanding tradition of seeking solutions to a variety of community problems, the implementation of a formal problem solving strategy during the 1990s differed from most previous efforts in two important respects. First, policing efforts focused on limiting or removing events that serve to mediate or moderate criminal activity, rather than attempting to reduce crime directly. In other words, police began to systematically focus on intermediate variables that repeatedly occur between broad societal causal factors, such as poverty, and subsequent outcome of a specific type of criminal behavior.

It is noteworthy that the amount or contribution of these intermediate-level factors or variables to criminal activity may be unique to a specific place or situation. For example, the contribution of poor lighting to criminal activity in a public parking lot that is visible from a busy roadway may be less problematic than that of dim lighting in a more obscure location. As a result, assessment of the impacts these contributing factors

is also needed. Criminal justice researchers encouraged police officials to begin the process of identifying these intermediate context-specific aggravating problems by looking for patterns that occur with some frequency. More specifically, three main types of "repeats" (i.e. repeat places, offenders, and victims) have been advanced as a starting point of assessment with regard to problem solving (Eck & Weisburd, 1995).

A second difference in the implementation of this strategy during the 1990s was that formal models of the problem solving process that facilitated systematic policing efforts and analysis became widely known (Braga, 2002). One such design, commonly referenced as the "SARA model," has become virtually synonymous with the problem solving approach. This model begins with a problem identification phase (scanning), followed by an assessment of recurring factors that aggravate the situation (analysis), then action to limit, reduce or remove the aggravating factors (response) and examination of data to determine whether the response was effective (assessment) (Braga, 2002). This systematic approach to problem solving differs from traditional police responses to crime problems that have often been somewhat ad hoc. For example, enforcement of traffic and criminal laws has often been left to individual officers without coordination from higher levels of the organization or emphasis on a specific location (Braga, 1997). Additionally, the location of narcotics enforcement has often been influenced by convenience or ease of apprehension more than community concern. Moreover, both of these approaches focus on crime (the behavioral outcome) rather than recurring intermediate events as the problem.

Controlling Crime Facilitators

In addition to a focus on hot spots, another problem solving strategy involves efforts to limit or control the crime facilitators such automobiles, guns, and cash. These approaches have been more prominently implemented in Europe than in America (Sherman et al., 1998). However, simple techniques such as requiring passengers on busses to have exact fare and removing large quantities of coins from vending machines have reduced thefts in some U.S. jurisdictions (Clarke, 2001). In a related approach in Britain, electronic monitoring of phone booths resulted in a 49% reduction in attacks on coin compartments in telephones. Additionally, in Australia, researchers reported substantial reductions in vandalism incidents following a combined target hardening and rapid repair program (Challinger, 1991).

Focusing on Repeat Victims

Removing substances that entice or encourage criminal behavior has also been utilized as a victim-oriented problem solving approach. For example, the removal of coin-vending machines reduced burglary in a public housing complex in England by 75% and these reductions also spilled over to other houses in the area (Braga, 1997; Pease, 1991). Another approach that has been utilized in an effort to reduce repeat victimization involved placing multiple clerks in convenience stores that have been robbed. The evidence of the effectiveness of this technique, however, has been very mixed.

In Gainesville (Florida) the police evaluated a city ordinance requiring two clerks to be on duty and found that convenience store robberies declined immediately after the ordinance took place (Clifton, 1987). Nevertheless, these declines may also have occurred because the offenders were arrested just before the ordinance became active

(Sherman et al., 1998; Wilson (1990). Another study, compared 230 convenience stores with two or more clerks on duty at night, to 346 stores with only one clerk on duty and found no impact across all stores. However, stores that had recently been robbed did demonstrate a reduction in subsequent robberies during the study (National Association of Convenience Stores, 1991; Sherman et al., 1998).

In terms of repeated victimization with regard to domestic violence, one study indicated that 70% of police were not filing any charges at all in residences with frequent domestic violence calls (Braga, 2002). Once officers and supervisors received training and were teamed with social workers, 47% of repeated victims left abusive relationships, compared to a control group (26%).

Another recent study indicated that the risk of burglary is predictable, finding that properties within 400 meters of a burgled household are at a significantly elevated risk of victimization for up to two months after an initial event (Bowers, Johnson, & Pease, 2004). This finding suggests that police could proactively distribute officers in to protect neighborhoods from ever becoming repeat victims, rather than simply reacting after repeated victimization occurs.

Focusing on Repeat Offenders

Focusing on repeat offenders is another problem solving approach. One such project was conducted in Boston during the mid-1990s, resulting in the arrest of more than 20 members of a single street gang in one day after a 9 month investigation (Kennedy, 1998). Many of these gang members were arrested on gun charges after coordination with federal officials. Another project was conducted in Lowell, Massachusetts in 1997 where, one by one, 20 of the worst troublemakers were brought

into a meeting with 14 local and state officials. These officials informed the youths that they were being targeted and that their unlawful conduct would no longer be tolerated (Braga, 2002). The youths also received counseling and offers of assistance in getting back into school or finding a job. These approaches have been noted as "promising" in criminal justice literature and utilize a tactic known as "pulling levers" where community officials and citizens from a variety of criminal justice and social service agencies work together in an effort to exert a combined influence on the youths that is stronger than that of any single individual or organization (Kennedy, 1998; Sherman et al., 1998).

With regard to the research concerning repeat offenders, the literature has noted that the majority of criminal offenders specialize in a type of offense such as burglary or larceny (Chaiken & Chaiken, 1982; Spelman, 1990). However, high-rate offenders tend to be generalists and commit four times the crimes as others (i.e. twice as many violent and property offenses) (Chaiken & Chaiken, 1982; Spelman, 1990). As a result, approximately 50% serious offenses are committed by a small group of frequent offenders that comprise only about 10% of the offending population (Chaiken & Chaiken, 1982). Consequently, it has been suggested that if police were to focus on these relatively few high rate offenders, crime could be reduced without burdening the criminal justice system (Braga, 2002).

A repeat offender program (ROP) in Washington, D.C. was assessed by the Police Foundation and results indicated that ROP targeted individuals were significantly more likely to be re-arrested, prosecuted and convicted (Martin & Sherman, 1986). Additionally, analysis from a repeat offender research study known as "ADAM" (Arrestee drug abuse monitoring) indicated that heavy drug users are typically frequent

offenders (Kleiman, 1997). Further, those with expensive habits were often both high frequency and persistent long term offenders. Criminal justice literature indicates that most frequent offenders also deal drugs in high volume (Chaiken & Chaiken, 1982). These findings suggest that tactics that target drug dealing and usage may also reduce crime if these high-rate offenders can be located and arrested. However, Spelman (1990) has noted that targeting repeat offenders is often problematic due to lack of timely information among police agencies as well as the mobility of frequent offenders, and surveillance coordination issues.

Increasing Police Force Size

Many of the problem solving and place oriented approaches described in this chapter require increases in the number of police officers that are available within the organization. Assigning a team of officers to a specific hot spot or task implies that calls for service throughout the jurisdiction that were previously handled by these officers must be addressed by replacements. At least one analysis of policing effects, for example, found that the increased focus on drug offenses during the 1980's resulted in fewer resources being devoted to other types of offenses and a subsequent increase in property offending (Benson, Sebastian, & Rasmussen, 2001). As a result, agencies that attempted to implement innovative policing approaches during the 1990s often sought to increase the overall size of their forces. In 1994, federal legislation created the Community Oriented Policing Service (COPS), which had primary objectives to encourage the hiring of additional officers and encouraging innovations in policing practices in agencies across the nation (Johnson & Roth, 2003; Roth et al., 2000). In the years directly preceding the formulation of the COPS office, the nationwide average of

officers per capita was approximately 21 per 10,000. However, after 1994, the rate increased to over 23 per 10,000. This overall change in officers suggests that, a typical city of 100,000 would have added approximately 20 officers to a 210 officer department (a change of approximately 10%) if the change was dispersed equally.

There is substantial disagreement among researchers as to whether marginal increases (e.g. increases from 5% to 10%) in the number of officers, without any changes in policing practices can produce significant reductions in crime. After reviewing 27 studies pertaining to increases in officer strength, Eck and Maguire concluded that "We are unaware of any study showing reductions in recent crime rates..." (Eck & Maguire, 2000). Furthermore, research on the police-crime relationship that was conducted prior to 1995 generally shows police levels have little impact on crime rates (Marvel & Moody, 1996). However, two recent analyses presented evidence that most of these prior police-crime studies were methodologically flawed and found that increased police levels are associated with reductions in crime (Levitt, 1997; Marvel & Moody, 1996). The primary flaw in prior work emanated from failure to address the simultaneous or reciprocal relationship between levels of officers and crime. Increases in crime may cause officials to seek additional officers. Nevertheless, these additional officers may result in crime reduction which may lead to layoffs or force reductions (Marvel & Moody, 1996).

To address this problem of endogeneity, Marvel and Moody (1996) utilized multiple time series analysis with Granger testing for direction of causality. After adjusting for endogeneity via the lag structure in the time series, they found that marginal increases in police per capita at the state level did result in small crime reductions during

the 1968-1993 period. Another study by Levitt (1997) utilized an instrumental variable and two-stage least squares (2SLS) regression to isolate the effects of police on crime. An instrumental variable is one that is correlated with only one of the two primary variables (i.e. crime or officers) that are reciprocally related. In Levitt's (1997) analysis, the number of firefighters per capita in the same jurisdiction were utilized as the independent variable to predict the number of officers in the first stage of the regression. Next, the resulting predicted values from the first stage regression were used as predictors of crime. Since the number of police and firefighters per capita are correlated but the number of firefighters is not correlated with changes in crime, it was argued that the effects of police on crime were isolated. Levitt estimated elasticities (i.e. the percent change in the dependent variable that results from a percentage change in the independent variable) of -1 for the effect of additional officers on violent crime (and -.2 for property crime) in large cities during the time period 1970-1993. A more recent study of counties in Florida from 1980-1998 utilized the Marvel and Moody approach and also found officer effects. (Kovandzic & Sloan, 2002). The resulting elasticities that were reported were -.21 for robbery and -.19 for burglary, which indicates that a 10 percent increase in officers would result in a 2.1 percent decrease for robbery and 1.9 percent decrease for burglary.

Mechanisms through which Policing Effects Occur

A noteworthy critique of these studies associating marginal changes in officer rates with changes in crime is that none of them has included or addressed the primary rival explanation concerning what it is that the police actually do or the tactics that are employed (Skogan & Frydl, 2004 p. 225). Any agency that makes a decision to invest

additional dollars to increase officers at a faster rate than the growth of population is, by definition, making a conscious effort to change what it is doing in the community. As a result, it seems likely that these changes in officer rates might also be accompanied by changes in policing tactics. For example, New York City's change in policing approach during the 1990s was accompanied by a redeployment and growth in officers (Skogan & Frydl, 2004 p. 225). This pattern might also occur during a change in leadership, such as the appointment of a new chief, who then brings in different ideas to the organization while simultaneously lobbying for additional officers.

Nevertheless, parsing out the effects that are due solely to changes in officer levels and not changes in the police organization or tactics may be difficult for both empirical and practical reasons. First, because these changes may often occur simultaneously, the timing or lag structure can not be relied upon to disentangle the effects. Additionally, as a practical matter, data pertaining to officer strength are more readily available on an annual basis than data pertaining to policing tactics. Finally, it is possible that both changes in officers and changes in policing tactics may be reciprocally or endogenously related to crime. Consequently, the effects of officers and tactics have not yet been fully tested in existing literature.

Another ongoing debate within justice research literature concerns the extent to which the effects of police enforcement (e.g. increases in police force strength) occur through deterrence. The Economics of Crime literature is founded on the assumption that criminals are rational and make conscious decisions about the potential costs and rewards of criminal actions (Becker, 1968). Consequently, much analysis by economists emphasizes the importance of a deterrent effect (Benson, Kim-Iljoong & Rasmussen,

1994; Levitt, 1997; Levitt, 1998). If the deterrence hypothesis is correct, increases in arrests or punishment significantly impact not only offenders that are caught by police but also others who are contemplating similar actions. However, criminal justice literature is much more mixed with regard the precise role and importance of deterrence (Nagin, 1998). In a review of literature on this topic, Nagin (1998) reported that studies of police crackdowns often show a temporary deterrent effect. However, with regard to increasing penalties, he noted that there is little evidence that criminals are aware of most policy changes.

A substantial point of contention with regard the deterrence issue involves differences in levels of analysis. Most studies that have supported a significant deterrent effect involve analysis at an aggregate (e.g. neighborhood, city, state) level of analysis. However, studies at the individual level have not consistently found evidence of a deterrent effect (DeJong, 1997; Piliavin, Thornton, Gartner, & Matsueda, 1986). One recent study of approximately 5,000 offenders provided evidence that "naïve" or first time offenders that were incarcerated were more likely to recidivate than those who were not incarcerated (DeJong, 1997). Additionally, incarceration did not demonstrate any deterrent effect for either naïve or most experienced offenders. In another study of 3,300 offenders, addicts, and at-risk youth, interviews and analyses of official records were conducted to determine whether perception of risk or other sanctions would deter future offenses (Piliavin et al., 1986). Results did not support deterrence due to perceptions of risk or severity of punishment. However, perceptions regarding potential rewards or gains due to criminal actions were influential in the decision making process.

Two other studies of the effects of aggressive policing also attempted to identify, not only whether there was a resulting impact on crime, but the process or mechanism by which the policing effect occurred. In a study of 35 American cities with population greater than 250,000, Wilson and Boland (1978), found that cities with a high ratio of traffic citations per officer (a proxy measure of a legalistic or aggressive policing approach) had lower levels of robbery. As a result, they asserted that aggressive policing may effect crime both through incapacitation of would be offenders and through a deterrent effect that results from altering perceptions of the likelihood of being caught. In a study of 171 cities with population greater than 100,000, Sampson and Cohen (1988) replicated and extended this work by utilizing the number of arrests per officer for disorderly conduct and drunk driving as the proxy for aggressive policing. Their measure of aggressive policing was employed as an instrumental variable to identify the crime function via two-stage least squares regression and results supported their assertion of an aggregate-level deterrent effect with regard to robbery. However the effects were very weak with regard to burglary.

In sum, the literature does not generally support the deterrent effect of arrest, incarceration or increased punishment at the individual level of analysis for most serious or high-risk offenders when substantial rewards can be obtained by offending. However, deterrent effects have been identified at aggregate levels of analysis. Consequently, it is possible that the effects are too small to record at the individual level. For example, increases in sanctions may decrease offending by some fraction of an offense at the individual level (on average), which then can be totaled into a significant difference in the aggregate. Nevertheless, given that high-risk or serious offenders are not being

deterred at the individual level, and that these offenders commit most offenses, the efficacy of a general deterrence strategy is in question. Some researchers have noted that broadened laws (e.g. seatbelts, new gun laws etc.) and increases in officers that perform jurisdiction wide preventive patrol result in "casting a wider net, " which may have the greatest impact on the population of generally law-abiding citizens and first-time offenders, rather than the relatively small population of serious offenders (Roach Anleu,1998; Way, 2002).

Given the evidence that crime declines occurred disproportionately within high-crime areas within some cities (Weisburd, Bushway, Lum, & Yang, 2004), if these areas contain a greater concentration of high risk and serious offenders that are not easily deterred by police activities, a localized deterrence effect would seem an unlikely explanation for the crime drop. Nevertheless, it is possible that localized crime reductions within high crime places may have been caused by incapacitation that resulted from higher concentrations of officers and more arrests. It is noteworthy that both prison and jail populations across the United States increased substantially during the 1990s. For example, Bureau of Justice Statistics (BJS) data indicate that from 1990-2000, the proportion of the U.S. population that was serving time in state prisons rose approximately 24% (Bonczar, 2003; BJS, 2005). Data indicate that over one-half of this total increase was due to increases in incarceration for violent offenses. Nevertheless, it is unclear how much of this increased incarceration was due to increases in felony arrests or other police activities versus increases in incarceration risk due to changes in court outcomes. Additionally, it was noted that the proportion of the U.S. population that was serving time in jail also increased by a slightly higher margin (26.1%) that that of state

prisoners (BJS, 2005). As a result, another mechanism by which police may have impacted crime could have occurred through increased targeting of disorder and interpersonal incivilities.

Increased Incarceration and "Zero Tolerance" Strategies

During the 1990s a number of large police agencies implemented order maintenance or "zero-tolerance" strategies (Green, 1999; Sherman, et al., 1998). New York Police, for example targeted graffiti artists, public drunkenness and other disorderly activities such as panhandling and public urination (Green, 1999; Kelling & Sousa, 2001). After an in depth analysis of New York's order maintenance tactics during the 1990s, some researchers concluded that this policing approach had a direct effect on crime reduction, net of other factors, preventing over 60,000 violent crimes from 1989 to 1998 (Kelling & Sousa, 2001; Sousa, 2003). However, the success of order maintenance tactics coincided with the implementation of a problem solving process driven by Compstat, a crime analysis and police management program (Compstat will be discussed in the technology section).

Nevertheless, Green (1999) noted that the number of citizen complaints against police officers in New York increased substantially during the 1990s and that overall arrest rates increased by 23% in New York (40% for misdemeanor arrests) while arrest rates fell by 15% overall in San Diego and were accompanied by similar decreases in crime rates. Green argued that the problem oriented approach, utilized by both police departments, was better for citizens and more efficient than aggressive policing. However, data also indicate that the increase in citizen complaints in New York occurred primarily in a single year (1994-1995) and was followed by a steady decline in

complaints through 1999 (Kelling & Sousa, 2001). Additionally, analyses of case studies pertaining to order maintenance policing in New York suggest that police officers typically varied their approach to dealing with quality-of-life issues, based on the circumstances, such that non-punitive warnings and reminders were frequent alternatives to citation or arrest. Consequently, Kelling and Sousa (2001) argued that "broken windows policing" as implemented by the NYPD is not the rote and "mindless zero tolerance approach that critics often contend it is."

Advances in Police Technology

One of the major changes in policing that was common to crime declines that occurred throughout the U.S. and Canada during the 1990s relates to rapid advances in technology (Ouimet, 2002). In fact, it is difficult to conceive of a policing tactic or strategy that was not substantially effected by the implementation of cellular phones, computers, mobile data terminals, portable roadside breathalyzers, car-mounted cameras, laser speed detection, investigative databases and information sharing computer networks. The majority of these technological advances have not been scientifically evaluated (Sherman et al., 1998). Nevertheless, one researcher asserted in 1992 that research and development itself had become the "core technology of policing" (Reiss, 1992). Although this comment may overstate the importance of research and development during the 1990s, it highlights a key difference in more recent policing when compared with previous decades where law enforcement was focused on establishing minimum standards of conduct in communities.

During the 1990s, the U.S. Congress began providing additional funding to the National Institute of Justice (NIJ) to assess technology needs among police agencies via

the Office of Science and Technology (Seaskate, Inc., 1998) Additionally, in 1994 the National Law Enforcement and Corrections Technology Center (NLECTC) was created to help assess emerging technologies (NLECTC, 2005). The Office of Science and Technology regularly surveys police agencies and works with (NLECTC) to develop voluntary product standards, compliance and testing processes (Seaskate Inc., 1998).

Rapid Expansion of Police Technology

In addition to the influence of federal government programs and consumer-based electronic innovations, the expansion of technologies among police agencies during the 1990s was consistent with two long held values among many police organizations that may have increased their acceptance and rapid implementation. The first is the professional era goal of efficiency. Throughout the three prior decades, for example, law enforcement agencies made efforts to shorten response time to criminal incidents via police radio dispatch, emergency (911) telephone protocols, and implementation of single-officer vehicular patrols (Sparrow, Moore & Kennedy, 1990). Thus, many advances that occurred among electronic devices during the 1990s supported this objective. For example, mobile data terminals (MDT's), located in patrol cars allowed officers to directly investigate persons, vehicle license numbers and firearm registration numbers without returning to the office or waiting for a radio response from overburdened dispatchers (Stockton, 1999). Additionally, handheld breathalyzers and vehicle-mounted cameras enhanced the efficiency of evidence collection by allowing on-scene (roadside) testing and documentation.

The other longstanding value among police agencies that was consistent with the implementation of technology emanates, in part, from the fact that most agencies are

small, have limited resources and infrequent encounters with "high-profile" criminal cases. According to LEMAS (Law Enforcement Management and Statistics), 90% of the estimated 18,758 police agencies nationwide have fewer than 50 sworn officers (Hickman & Reaves, 2001). However, the few (apx. 975) police departments with over 100 sworn officers often have greater resources than the average agency and are more likely to have routine involvement with serious criminal offenses that have traditionally been viewed as "real police work" by both officers and civilians. Many of these agencies have full-time public relations officers that actively promote and publicize departmental achievements and some also employ research personnel who seek out and promote innovative programs. As a result, a number of these large and mid-sized agencies achieve a "legitimacy" or status such that others attempt to emulate them (Crank, 2003; Mastrofski & Uchida, 1996).

The struggle for institutional legitimacy is a core value that is central to the decision-making process in police agencies and sometimes encourages agencies to purchase new technologies, even when more basic equipment needs have not fully been met. For example, one agency of approximately 85 officers purchased a new mobile command center vehicle for its part-time tactical team for over $250,000, even though patrol officers lacked functional portable radios and other more basic equipment (WYPD Report, 2000; WYTT Website, 2006). Nevertheless, the desire to have similar equipment to what other respected agencies are utilizing has pressured even very small agencies to embrace technologies (Eastern Kentucky University, 2003; Stockton, 1999). However, due to lack of resources, these new technologies may require substantial time (e.g. years) for smaller agencies to purchase and implement.

It is also noteworthy that crime decreases began in cities with large populations, followed by jurisdictions of medium size and eventually effecting smaller places because this trend is consistent with patterns of technological implementation. Data from a national study of the computerization of law enforcement indicated that large agencies were more likely to have incorporated computing technology into organizational functions by 1996 (Mullen, 1996). In addition to agency size, the author of this survey of over 300 agencies also found that having a large quantity of innovative programs (e.g. DARE and full time community policing officers), and a high number of civilian employees was a predictor of computerization (Mullen, 1996). Another researcher that analyzed 1993 LEMAS data reported that agencies with more extensive computerization had fewer officers per capita when compared with other agencies (Nunn, 2001), providing some evidence that computer technology may be associated with increased efficiency. Nevertheless, by the year 2000, data from a national survey of agencies with fewer than 20 officers indicated that approximately 76% of these agencies were also using personal computers to conduct routine police activities (Eastern Kentucky University, 2003).

Crime Analysis and Compstat

William Bratton, the former New York City police commissioner, has stated that computers were an important element in allowing his agency to pinpoint emerging crime locations and develop a response before new hot spots became highly problematic (Seaskate, 1998; Sousa, 2003). In 1994, New York Police Department implemented a computerized data gathering, problem solving and management program known as Compstat (Sousa, 2003). Under Compstat, police supervisors were held accountable on a

weekly basis for crime that occurred in their areas of responsibility. The first step in achieving this accountability and the development of a local problem solving response was the gathering of timely and actionable data (e.g. crime statistics) within the neighborhood or even street-block level of the precinct (Sousa, 2003). These timely and localized data would then be utilized to implement rapid deployment of officers to emerging hotspots. Additionally, mid-level supervisors were encouraged to formulate innovative problem solving tactical responses to crime and disorder. Nevertheless, it is not clear how extensively these innovative strategies other than rapid and concentrated deployment of officers were implemented throughout the city.

Recent analyses of Compstat have noted that the diffusion of this approach to other agencies ranked among the quickest observed for any policing innovation (Weisburd, Mastrofski, Mcnally, Greenspan & Willis, 2003). Among agencies with over 100 sworn officers, 42% of those in the South, 32% in the West and 27% in the Northeast reported having adopted Compstat or a similar method by 1999, just five years after the program was first implemented in New York City. Respondents to a survey of these moderate to large sized agencies indicated that reduction of serious crime was among the most important reasons for adoption (Weisburd et al., 2003). However, the extent of crime reduction impact of Compstat remains a matter of some controversy among researchers (Green, 1999).

Although the implementation of Compstat in New York was accompanied by substantial crime decreases, critics have noted that similar decreases also occurred in other cities that did not implement this approach and argued that this program has not yet been rigorously evaluated (Green, 1999). Moreover, a number of criminal justice

researchers have suggested that the implementation of Compstat and similar programs may actually run counter to reforms that are often cited as beneficial that occurred during the 1990s. For example, Willis et al. (2004) noted that Compstat is typically accompanied by rigid and formalized hierarchical management approaches as well functional specialization and increased bureaucracy. It is also noteworthy that survey respondents from agencies that have implemented Compstat reported a significantly higher value of management "control" of field operations when compared with respondents from non-Compstat agencies (Weisburd et al., 2004). These rigid bureaucratic structures could prove counterproductive if assertions by community policing advocates are correct regarding the importance of flatter (i.e. less hierarchical) organizational structures and increased discretion and flexibility of line-level personnel which are argued to lead to greater innovation (Weisburd et al., 2003). Nevertheless, Compstat, like any other technology, can be viewed as an additional instrument that can be added to the policing toolbox with regard to crime control (Carter, 2004).

Technologies may also be utilized to support community policing and problem solving by improving communication between officers, citizens and other government agencies and improving information access to those at the line-level. For example, an often overlooked technological innovation that rapidly expanded during the 1990s was that of cellular phones. At a cost of around $35 per month, these devices increased efficiency by allowing direct communication between officers and victims and allowing follow-up calls to be made without returning to the office (Schuiteman, 1999). Additionally, through the use of simple, relatively low cost pagers and cellular phones, surveillance, undercover and foot patrol officers could request backup or additional

information without leaving their posts (Schuiteman, 1999). Consequently, by the year 2000, even among smaller agencies, approximately 91% reported using cellular phones to carry out policing duties (Eastern Kentucky University, 2003).

Another example of the relationship between innovative policing and technology was documented in the case study of a state police agency, which received an Advancing Community Policing (ACP) Grant from the COPS office to purchase cellular digital packet data (CDPD) equipment in 1997 (Nunn & Quinet, 2002). CDPD was a technological innovation that provided less expensive data transfer via existing cellular phone lines, rather than requiring a special purchase of radio towers for this function. This state police agency had received previous funding from the COPS Office to create special community problem oriented policing units which were dispersed throughout the state and officers reported that CPDP technology was utilized to improve internal communication by officers (Nunn & Quinet, 2002). Evaluative analysis indicated that officers with access to CPDP technology drove significantly fewer miles in their patrol vehicles when compared with officers that did not have access. Nevertheless, the researchers argued that, although this finding provides some evidence that efficiency was increased, traditional enforcement measures, such as arrests did not significantly increase as a result (Nunn & Quinet, 2002).

A case study of the effects of implementation of mobile data terminals was also conducted in Forth Worth, Texas during the early 1990s (Nunn, 1993). This study employed an interrupted time series design to assess the effect of in-car mobile data terminals (MDT's) on motor vehicle theft clearance and recovery rates. Mobile data terminals allow officers to directly query the status of persons, vehicles and other items.

After analyzing monthly vehicle recovery rates from 1980 to 1990, the evaluator concluded that recovery rates were associated with the use of MDT's. However, in terms of clearance or arrest rates for vehicle theft, MDT's had no effect (Nunn, 1993).

Although these studies provide evidence that computers, MDT's and cellular phones often improve efficiency and may support innovative policing efforts, at present, there is little indication that these technologies effect crime or arrests rates directly. Moreover, according to Nunn's (2001) analysis of 1993 LEMAS data, highly computerized agencies spend more per capita on law enforcement than other agencies, even after controlling for population density, size fiscal capacity, and crime levels. However, given that these highly computerized agencies tend to employ fewer sworn police officers to offer police services, it is not clear whether the resulting efficiencies offer sufficient benefits to offset smaller force strength. Nevertheless, the implementation of in-car portable computers and mobile data terminals increased substantially during the 1990s. Even among the smallest agencies (i.e. those with fewer than 20 sworn officers), approximately 18% reported implementing mobile data terminals by the year 2000 (Eastern Kentucky University, 2003). Given budget and resource restrictions among police organizations, this near 1 in 5 implementation ratio for these very small agencies is striking. Each MDT unit may cost several thousand dollars, such that many large agencies relied substantially on federal grants to purchase this technology (Johnson & Roth, 2003; Roth et al., 2000; Stockton, 1999).

Increased Federal Funding for Local Law Enforcement

According to one justice researcher, financial relationships between the U.S. Department of Justice and local law enforcement agencies were "utterly transformed"

(Cunniff, 2002 p.1) during the 1990s with the passage of the Violent Crime Control and Law Enforcement Act (VCCLEA) of 1994. This act increased funding assistance to local law enforcement tenfold and created a number of new federal government programs to deliver funding to agencies that sought to purchase and implement technology (Cunniff, 2002). One such program, known as MORE (Making Officer Redeployment Effective) was administered by the COPS office and provided approximately 1.3 billion dollars in funding to over 4,500 local agencies during the 1990s (COPS, 2005). The Santa Anna, California police department, for example, began its in-car laptop implementation program in 1997 via funding from a COPS MORE grant in the amount of 1.8 million dollars (Stockton, 1999).

Another source of federal funding that was designed to assist police agencies was the Local Law Enforcement Block Grant (LLEBG) program (BJA, 2002). The LLEBG program, enacted in 1996, is a formula block grant is distributed directly to local law enforcement agencies based on the proportion of their police expenditures in the state (BJA, 2002). LLEBG funded more than $1.2 billion during its first three years and approximately 58% of these funds were utilized to purchase and implement technologies (BJA, 2002).

Prior to the 1994 Violent Crime Act most criminal justice block grants were awarded to the states, which then distributed the funds to local governments and were allowed broad discretion in allocating these funds (Cunniff, 2002). Both LLEBG and COPS grant funds, however, were provided directly to local police agencies, increasing the speed and efficiency of the process (Cunniff, 2002). Additionally, federal funding to local agencies during the 1990s was provided for a vast array of purposes including the

hiring and redeployment of officers, crime prevention, and school security enhancements, and multi-jurisdictional task forces (BJA, 2002; Johnson & Roth, 2003; Roth et al., 2000).

The COPS office offered more than 30 different grant programs that awarded over $7.3 billion to local agencies from 1994 to 2001. Approximately 64% of these funds were provided for additional police personnel (GAO, 2005b). However, a substantial portion of COPS grants were directed toward technology, officer training, and programs to encourage innovation and problem solving (Johnson & Roth, 2003; Roth et al., 2000). For example, COPS awarded grants specifically for youth gang related policing efforts and to combat local methamphetemine production (Roth et al., 2000). Additionally, federal grant funding processes were simplified and streamlined to encourage agencies that did not have prior experience with the grant process to apply (Johnson & Roth, 2003; Roth et al., 2000). One such grant program, known as FAST (Funding Accelerated for Small Towns) provided up to $75,000 for the hiring of an additional officer after completion of a single page application. As a result, a substantial number of agencies that had never previously applied for a federal grant received funding. One estimate indicated that approximately 84% (GAO, 2005b) of the 13,000 agencies that reported crime data to the FBI during the 1990-2001 time period received at least one federal grant.

Many of these grants were awarded with requirements or instructions that local agencies implement specific types of problem solving, community collaboration or other innovative policing approaches. For example, MORE grant applications were awarded, in part, based upon agency's proposals for improving efficiencies in ways that would

allow redeployment of sworn officers to street patrol or increased productivity (Roth et al., 2000). Additionally, applications for the most prolific COPS grant program, Universal Hiring Program (UHP) contained a number of survey questions inquiring as to which of a series of tactics or strategies (e.g. problem solving, crime prevention etc.) would be utilized or increased by the agency after receiving funds to hire additional officers (COPS, 1998; COPS, 2000). The COPS office also distributed instructional guides, technical reports and training courses to local agencies via regional training centers through partnerships with area universities and local agencies (Roth et al., 2000). As a result, these increases in federal funding, training and leadership may also have encouraged the adoption of innovative crime prevention policing methods during the 1990s.

CHAPTER 3

CHANGES IN CRIME TRENDS DURING THE 1990s

This study does not attempt to explicitly model or explain the "crime drop" of the 1990s. However, given that changes in policing tactics and strategies coincided with an era of noteworthy downward crime trends, a review of the literature and available data on this topic are needed to provide some context for subsequent analyses. The precise meaning of the word "trend" as it relates to crime may differ somewhat depending on the methodology that is being employed. At a conceptual level, the phrase "crime trend" refers to consecutive years of increases or decreases in crime. However, the meaning of this word as utilized in this analysis is more specific and will be defined after a brief discussion of three methodological approaches to analyzing aggregated patterns of crime.

Methodologies of Analyzing Crime Trends

Most prior research pertaining to crime trends across the nation has examined crime at an aggregate national level by summing the total counts of offenses and dividing them by the U.S. population[3] as shown in the first row of Table 1 below (FBI, 2002). This simple approach provides a crime rate that is very sensitive to relatively small changes in crime counts. However, since the vast majority of crime occurs within large cities, such aggregated counts may not always provide an accurate representation of the nation as a whole. For example, in 1990 the violent crime counts among the 10 cities with the most crime accounted for nearly 30% of the total number of offenses among the 8,940 agencies that reported data for all 12 months. Consequently, substantial crime reductions in these 10 cities would significantly impact the national rate even if no crime reduction occurred in 99% of jurisdictions. Similarly, if a single state with a large

population changed reporting protocols or had technical reporting difficulties, the resulting effect on the national crime trend could be substantial. Consequently, although the calculation of a national aggregated crime rate based on summative counts of crimes can provide a quick assessment of overall trends, when not supplemented with additional analyses, this statistic can be misleading.

There are, however, a number of other statistical procedures that can provide additional information regarding the breadth and pervasiveness of crime trends. One such approach, reflected in row two of Table 1 (below) involves an assessment of crime at the jurisdiction level. The figures in row two were created by counting the number of jurisdictions in each year from 1991-2001 where violent crime rates were below the baseline year (1990) and dividing this count by the total number of agencies[4] resulting in a percentage of jurisdictions where crime declined. Table 1 indicates that in 1995, although the national crime rate had fallen 6% below 1990 levels, nearly one half of all jurisdictions (49%) actually experienced violent crime increases. Additionally, in the following year the national violent crime rate had fallen 23%. However, 40% of jurisdictions in this year reported crime increases. This jurisdiction-level percentage offers some insight as to the breadth of the change in crime during the 1990s. Nevertheless, the use of this statistic also results in a disadvantage in that each locality receives equal weighting, regardless of population size. Consequently, since most jurisdictions are small, crime trends among the relatively few large jurisdictions may be obscured.

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[3] See Appendix A for national trends by crime type.

[4] To eliminate agencies that reported inconsistently, only the 8,940 agencies that reported a full 12 months

A third approach to the assessment of crime trends nationwide provides a compromise between analysis at the national level (via aggregated rates) and analysis of crime within each jurisdiction. This approach, reflected in row three of Table 1, involves the calculation of mean percentage changes within each jurisdiction, weighted in proportion to the population represented. Thus, for example, the overall mean change in the violent crime index for a city of size 50,000 would receive twice the emphasis as one with only 25,000 inhabitants. The weighted mean percentage change statistic represents the crime trends that were experienced by the average person across thousands of jurisdictions. Utilizing this approach, Table 1 (row 3) indicates that the average percentage change in violent crime across thousands of jurisdictions remained slightly positive throughout most of the 1990s. Nevertheless, a similar analysis of property crime index trends (to be discussed later) confirms that crime decreased substantially for most property offense types across jurisdictions nationwide, more closely matching the standard national index (see figure 23).

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of data for at least 6 of the 12 years from 1990-2001 were included in analyses of crime trends.

Table 1. Violent Crime Nationwide During the 1990s - Comparison of Three Methodologies
(Trend-years below 1990 levels are highlighted)

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1. Nationwide Rates (Percent change)	731.8 --	758.1 (+4)	757.5 (+3)	746.8 (+2)	713.6 (-3)	684.6 (-6)	636.5 (-13)	610.8 (-17)	567.5 (-23)	523 (-29)	506.5 (-31)	504.4 (-31)
2. Percent agencies below 1990 level + *	--	41	43	48	48	51	57	59	60	65	66	66
3. Weighted mean change percent for agencies over 9,999 population *	--	+11	+16	+15	+17	+13	+8	+6	+5	-1	-2	-2

+ One agency in 1993, 1996, and 2000 reported crime rates that were precisely equal to the 1990 level.

* Includes only agencies that reported at least 6 years of data from 1990-2001

"Crime Trend" Defined

This review will employ all three of the previously described methodological approaches to assess changes in crime patterns across the nation during the 1990s. Therefore, for purposes of this analysis, the term "trend" as it relates to standard aggregated (summed) national rates refers to any period of three or more consecutive years of changes in crime in the same direction (i.e. upward or downward). Similarly, when weighted mean percentage changes for each jurisdiction are aggregated to a higher level, the term "trend" reflects consecutive years of crime increases or decreases.

However, when counts of jurisdictions that result in percentages of agencies above or below 1990 levels are utilized, the term "trend" requires that at least 60% of agencies changed in the same direction (i.e. increased or decreased) for three consecutive years. Thus, for example, if 53% of agencies with jurisdiction populations ranging from size 50,000 to 100,000 reported crime decreases in a given year, this would not be described as a downward trend (since nearly one-half of agencies in this category did not report a decline). However, if 60% of agencies a size category reported crime rates that were below 1990 levels in a given year, this could represent the beginning of a "downward trend" -- assuming that an equal or greater number of agencies in this size category (50,000 to 100,000 population) continued to report declines for the following two years.

In Table 1, trends (as defined above) are highlighted in yellow for each of the three methodological approaches analyzing crime. These data clearly indicate that some jurisdictions experienced increasingly large decreases in violent crime after 1994, ranging from 3 to 31% below 1990 levels. However, in terms of the breadth of crime reduction,

over one-third of jurisdictions did not experience any significant decline (row 2). Moreover, with regard to the average change across jurisdictions (row 3), violent crime rates remained above 1990 levels until the very end of the decade where mean crime percentages declined by 1% to 2%. In the sections that follow, more detailed analyses of individual crime types that include specific subgroups pertaining to jurisdiction size are conducted to provide additional context with regard to crime trends during the 1990s.

Percentages of Jurisdictions Below 1990 Crime Rates (by Size Category)

Figure 4 shows the violent crime index trends for agencies across the nation by size category where the brown and green lines represent jurisdictions with over 100,000 citizens and the yellow, pink and dark blue lines represent jurisdictions with less than 50,000 citizens. Utilizing the aforementioned definition of "trend" which in this case requires that 60% of each subgroup (size category) report violent crime at below 1990 levels for a period of at least three years, it is apparent that large agencies began their downward trend around 1996, followed by jurisdictions with 50,000 to 100,000 citizens approximately three years later (1999). Although the smallest three size categories never officially met the criteria for demonstrating a downward crime trend, a majority of agencies in the smaller sized jurisdictions did report violent crime at below 1990 levels toward the end of the decade. It also is important to note that the percentages among each of the size categories are based on an assessment of the crime rate in each individual agency -- compared to its own previous 1990 crime rate -- and not a group average. Thus, these percentages represent true jurisdiction-level differences from 1990.

Figure 4. Violent Index Trends
(% agencies below 1990 levels)

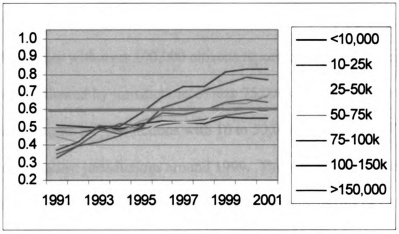


Figure 5. Property Index Trends
(% agencies below 1990 levels)

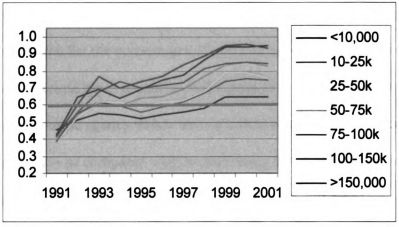


Figure 5 represents the property crime index for the same agencies by size category. As with the violent crime index, the downward trend began with agencies over 100,000 population, followed by jurisdictions of 50 to 100,000 population and finally spreading to 60% of smaller agencies toward the end of the decade. In this regard, two noteworthy aspects of the trend lines in Figure 5 are illustrated. First, the downward

trend in property offenses began approximately three years earlier than the trend for violent offenses in agencies over 100,000 population. Second, the downward trend progressed from large to small agencies in an almost categorical, step-by-step fashion such that 60% of agencies with over 100,000 citizens reported property crime at below 1990 levels in 1992, followed by jurisdictions of size 75,000 approximately three years later (1995), followed again by jurisdictions with 10 to 50,000 citizens in 1997 and finally reaching the smallest jurisdictions around 1999. These step-by-step downward trends by size category may indicate that theoretical causal mechanisms or disruptive law-enforcement activities first began among larger agencies and later spread to, or were replicated by, smaller jurisdictions. Further discussion of these trends and their implications for theoretical explanation of crime rate changes will be discussed in the subsequent literature review pertaining to crime trends.

The figures below list the percentages of agencies below 1990 crime levels for each of the individual crime types contained in the property and violent indexes. As with Figures 4 and 5 above, these agency trends also reflect an assessment of the crime rate in each individual agency -- as compared with its previously reported baseline rate in 1990. Interestingly, although the combined violent crime index in Figure 4 suggests that most small agencies did not experience an overall reduction in violent crime until much later, analysis of murder rates individually (Figure 6) suggests that over 70% of smaller jurisdictions (below 50,000 population) were already experiencing homicides at levels below the baseline year in 1991, approximately four years prior to the beginning of the downward trend in larger agencies. This may indicate that 1990 was a peak year with regard to murder rates among smaller agencies and thus, does not serve well as a baseline

for this crime type. Similarly, more than 85% of agencies among all size categories reported immediate declines in manslaughter rates (Figure 7) when compared with the baseline year (1990). Even though 1990 may not provide an adequate baseline for murder and manslaughter among smaller jurisdictions, these trend lines clearly indicate that both murder and manslaughter declined among the vast majority of agencies during the 1990s.

Figure 6. Murder Trends
(% agencies below 1990 levels)

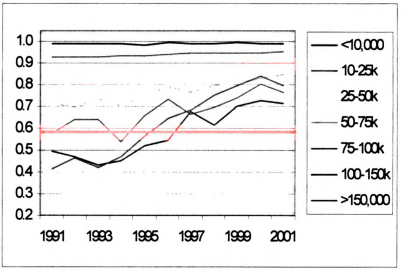


Figure 7. Manslaughter Trends
(% agencies below 1990 levels)

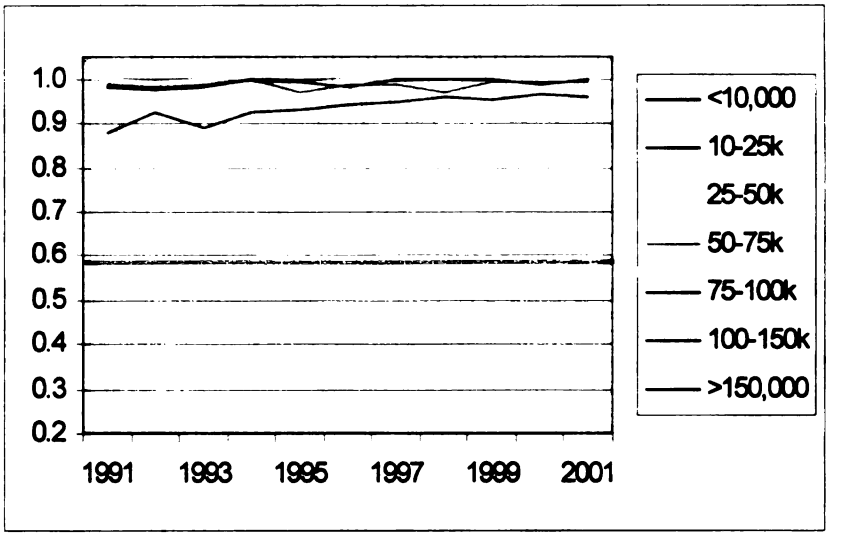


Figure 8 (below) illustrates the trend lines for the offense of aggravated assault and shows that decreases in aggravated assault began among larger agencies and were followed by those with smaller populations. Similar trends are illustrated in Figure 10 with regard to robbery rates with one exception. The smallest size category indicated by the dark blue line suggests that 1990 was the peak year for the majority of these small agencies throughout the decade with regard to robbery.

It is also noteworthy that the trend lines among this "below 10,000 population" size group are relatively flat or unchanging for virtually all of the crime types. This may indicate that causal mechanisms of crime among very small jurisdictions differ from those with larger populations. Additionally, it may suggest that there are reporting differences among these very small agencies (Maltz, 1999).

Crime trends pertaining to rape, as illustrated Figure 9, have been identified as potentially problematic due to inconsistencies between federal, state, and local definitions of this offense and technical reporting problems (Maltz, 1999). Nevertheless, Figure 9

suggests that reported rapes decreased throughout the 1990s, primarily among jurisdictions with greater than 100,000 citizens, but also extended to agencies with less than 25,000 population. Furthermore, comparisons between UCR and nationally representative victimization data (NCVS) have been conducted by Steffensmeier and Harer (1999) for the years 1980 through 1998 and very similar trends were reported for each of the crime categories, including rape (although there is some indication that reporting percentages for rape have increased since 1992). Finally, the relatively flat or straight-line for the smaller size groups may indicate that 1990 is an inadequate baseline year for this crime type among the smallest agencies.

Figure 8. Aggravated Assault Trends
(% agencies below 1990 levels)

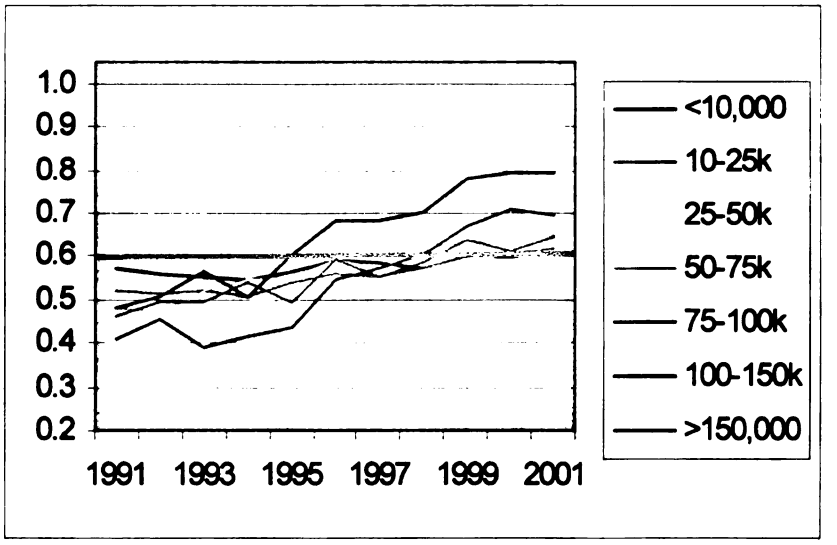


Figure 9. Rape Trends
(% agencies below 1990 levels)

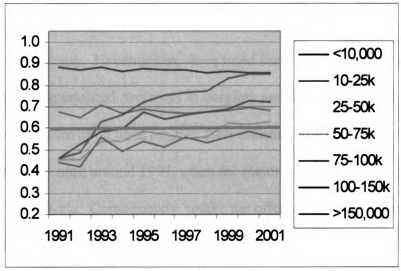
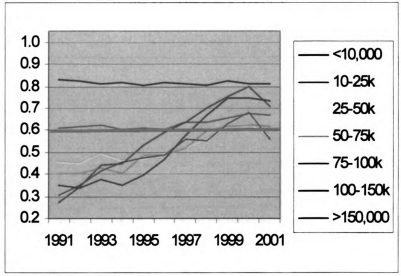


Figure 10. Robbery Trends
(% agencies below 1990 levels)



Figures 11 through 13 illustrate agency trends with regard to the property offenses of burglary, larceny, and auto theft. The percentage of agencies reporting declining levels of burglary begins early in the decade (around 1992), several years prior to this trend with regard to larceny. Nevertheless, these trend lines clearly indicate that the vast majority of agencies experienced decreases in burglary and larceny throughout most of the 1990s. In contrast, the trend lines for auto theft indicate little change in most agencies from all size categories until around 1997, when the majority of agencies began to report declines below 1990 levels. Consequently, unlike the offenses of burglary and larceny, vehicle theft did not decline among the majority of agencies until the final portion of the decade. This trend may suggest that causal mechanisms behind auto theft differ substantially from the offenses of burglary and larceny.

Figure 11. Burglary Trends
(% agencies below 1990 levels)

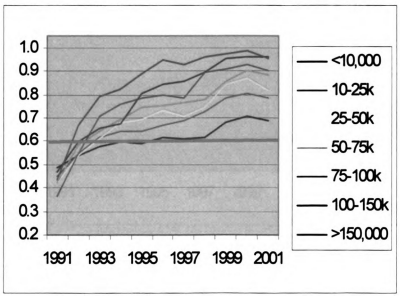


Figure 12. Larceny Trends
(% agencies below 1990 levels)

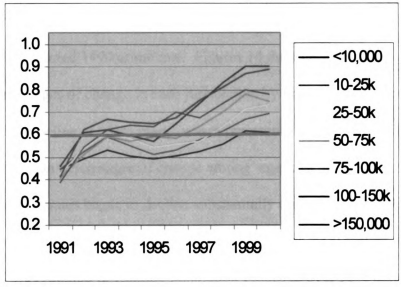
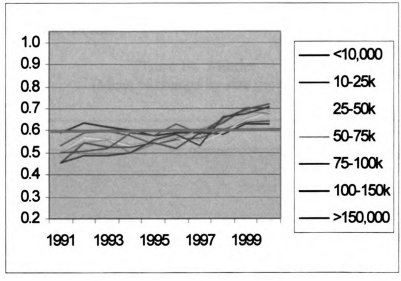


Figure 13. Vehicle Theft Trends
(% agencies below 1990 levels)



Mean Percentages of Crime Change in Jurisdictions (by Size Category)

Another method to assess the levels of crime reduction that occurred in jurisdictions across the nation is to calculate the percentage change in each jurisdiction compared with its reported 1990 crime rate. Figures 14 through 21 below illustrate the trends in the percentages of change in each jurisdiction by size category. The broader red line highlights the baseline or "zero mark" which represents the 1990 crime level. Figure 14 shows that the mean percentages of change among agencies across all size categories with regard to murder rates began to decline substantially during the mid-1990s. For jurisdictions over 25,000 population, the decreases in the year 2000 ranged from approximately 12% (100,000 to 150,000 population group) to over 35% among the 25,000 to 50,000 population group. As with previous trends, the trend lines among smallest population categories remained relatively flat but substantially below 1990 levels. Figure 15 indicates that manslaughter rates were substantially below 1990 levels across the entirety of the decade.

Figure 14. Murder
(Mean % change by size group)

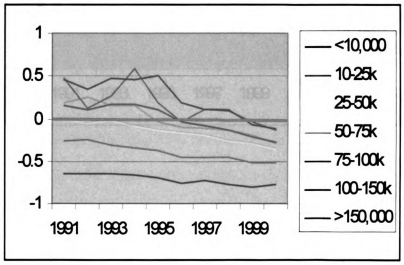


Figure 15. Manslaughter
(Mean % change by size group)

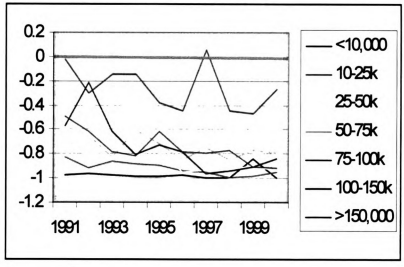


Figure 16. Rape
(Mean % change by size group)

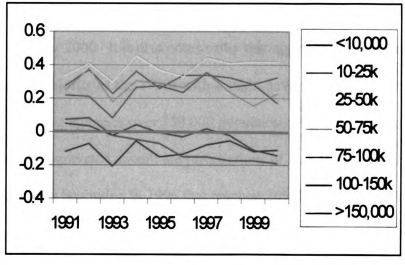


Figure 17. Aggravated Assault
(Mean % change by size group)

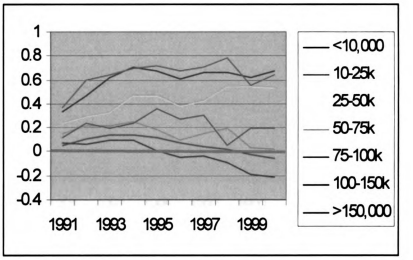


Figure 16 indicates that the mean reported percentage change in rape rates among jurisdictions between 10,000 and 75,000 population did not decrease during the 1990s. However among jurisdictions over 100,000 population reported decreases ranged from 15% to 20% by the year 2000. It is also noteworthy that aggravated assault rates increased during the majority of the 1990s with a slight downward trend toward the end of the decade and among agencies over 150,000 population (Figure 17). The exceptional group with regard to aggravated assault are jurisdictions of size 100,000 to 150,000, which reported declines beginning in 1996 that reached 20% by the year 2000.

With regard to robbery rates, Figure 18 shows that declines among jurisdictions over 100,000 population began around 1997 and continued through the year 2000 to an approximate reduction of 20%. Only one other size category (75,000 to 100,000) reported any robbery reductions during the 1990s and this reduction took place at the very end of the decade with a slight decline of approximately 4% below 1990 levels.

Figure 18. Robbery
(Mean % change by size group)

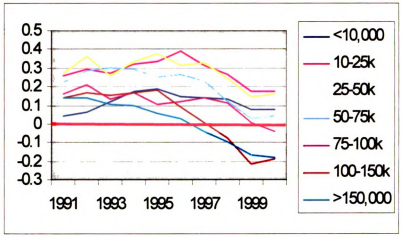
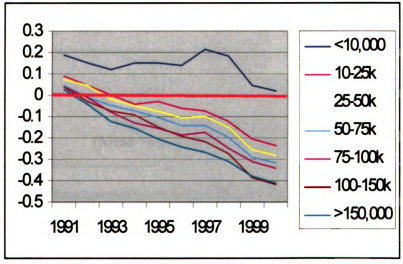


Figure 19. Burglary
(Mean % change by size group)



With regard to the offense of burglary, Figure 19 shows sharp declines across virtually every jurisdiction size, beginning around 1992 and continuing through the end of the decade. By the year 2000, declines in reported burglary rates ranged from approximately 23% to over 40% when compared with 1990 levels. The trend lines for larceny rates in Figure 20 indicate a similar but less extreme trend, with reductions

occurring somewhat later (after 1995), and ending in 2000. Crime declines for larceny among the largest jurisdictions in 2000 were slightly over 20%. However among smaller jurisdictions, declines were more modest, ranging from approximately 5% to 15%.

Figure 20. Larceny
(Mean % change by size group)

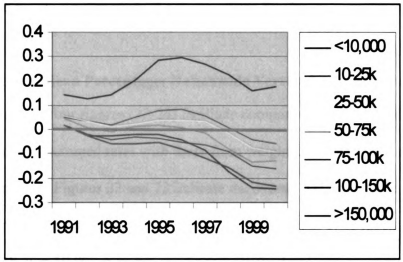
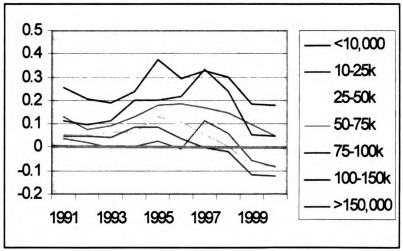


Figure 21. Vehicle Theft
(Mean % change by size group)



The final property offense category, auto theft (Figure 21), did not decline below 1990 levels in any of the size categories until approximately 1999, where declines ranged from 2% among jurisdictions of size 25,000 to 50,000 to approximately 11% among jurisdictions over 150,000. Interestingly, the 100,000 to 150,000 population size category never reported vehicle theft rates below 1990 levels throughout the entirety of the decade. The reason for this atypical pattern among this larger agencies group is unknown.

Overall Weighted Mean Percentages Nationwide Versus National Summed Rates

The following four figures (22-24) facilitate comparisons of the trend lines pertaining to national summed rates with those from weighted mean percentages of change at nationwide. Figures 22 and 23 indicate the overall weighted mean percentage changes (perhaps the best single overall measure of trends) from 1990 levels for all jurisdictions with over 10,000 population. As previously discussed, these mean percentage changes are weighted by population to provide an indication of the experiences of the average person across thousands of jurisdictions throughout the 1990s. Although the trend line for the weighted mean of the violent index (Figure 22) resembles that of the summative national rate shown in Figure 24 with regard to overall shape, the year in which the trend lines indicates crime decreases below 1990 levels differs substantially. The summative national rate trend line (Figure 24) drops below the 1990 level around 1994 while the weighted mean percentage change trend line (Figure 22) does not drop below the 1990 level until approximately 1999. One possible explanation for this is that the summed national rate more closely reflects activities in the largest jurisdictions while the weighted mean change is more representative of jurisdictions across the nation.

Figure 22. Violent Change Nationwide
(Weighted mean % change)

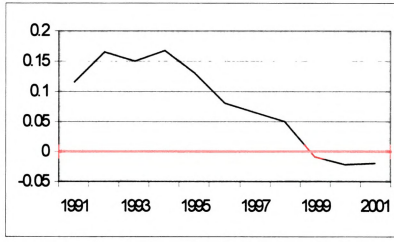
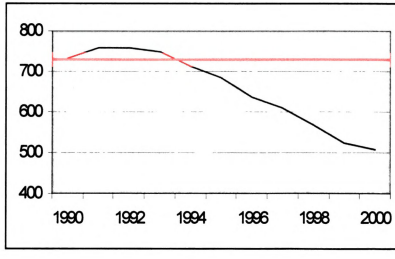


Figure 24. National Violent Rate
(Summed offenses/Population)



Another key difference between the summative national rate and the weighted mean percentage change is reflected in the amount of relative difference between the levels in the year 2000 as compared with 1990. The national rate as reflected in Figure 24 indicates a total nationwide decline of approximately 30% in violent crime. However, the mean percentage change shown by Figure 22 indicates an overall decline of only

about 2% nationwide. These differences suggest that the bulk of the decline in violent crime occurred within a relative few large jurisdictions.

Figure 23. Property Change Nationwide
(Weighted mean % change)

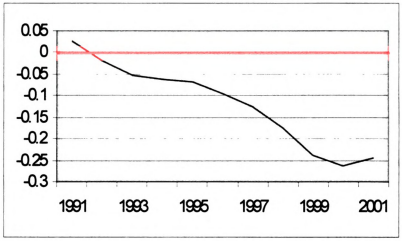
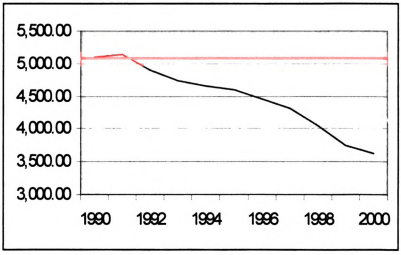


Figure 25. National Property Rate
(Summed offenses/Population)



In contrast to the differences in methodologies with regard to violent crime, Figures 23 and 25 are strikingly similar. Both the summative national rates and mean

percentage changes indicate steep and continuous declines in property crime, beginning around 1992. Further, with regard to the amount of change between the year 2000 and the baseline year (1990), both estimation methods result in similar amounts of change. The national rate of decline illustrated in Figure 25 indicates a 29% decline in property crime while the mean percentage change reflected in Figure 23 indicates a 26% decline from 1990 levels. The similarity of these approaches with regard to property crime suggests that declines in these offenses were not limited to large jurisdictions but rather occurred in the majority of localities across the nation.

National Weighted Mean Percentage Changes by Crime Type

The national weighted mean percentage changes for each type of offense during the 1990s are illustrated in Figures 26-33 (below). This method of analyzing crime change indicates that overall nationwide declines in crime were moderate for robbery (-11%), and vehicle theft (-13%) and strong for murder (-32%), manslaughter (-51%), burglary (-37%) and larceny (-19%). Overall rates of aggravated assault remained above 1990 levels as indicated by Figure 29 as did the offense of rape (Figure 28). It was also noted that nationwide declines in murder, robbery and auto theft occurred primarily after 1995, whereas declines in burglary, larceny and manslaughter occurred in the early 1990s.

These weighted mean percentage changes may be compared with the standard national summative rates, illustrated in appendix A. It is noteworthy, however, that standard FBI procedure using summative rates reflects combined murder and manslaughter rates. Thus, the downward trend for these offenses begins around 1993, halfway between the actual downward trend for murder and manslaughter individually.

Additionally, the downward trends for robbery and auto theft appear much earlier in the summative rate approach, indicating that these trends began in larger agencies.

Figure 26. Murder Change Nationwide
(Weighted mean % change)

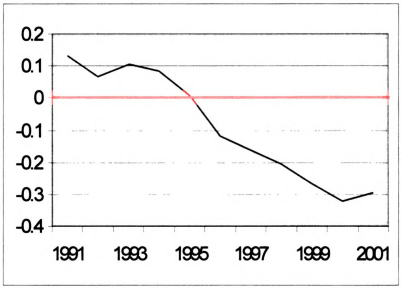


Figure 27. Manslaughter
(Weighted mean % change)

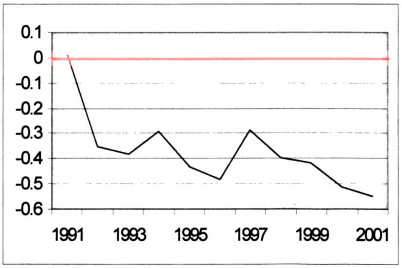


Figure 28. Rape Change Nationwide
(Weighted mean % change)

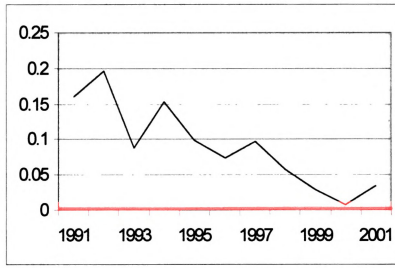


Figure 29. Aggravated Assault Change
(Weighted mean % change)

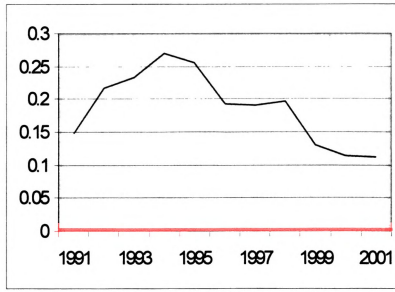


Figure 30. Robbery Change
(Weighted mean % change)

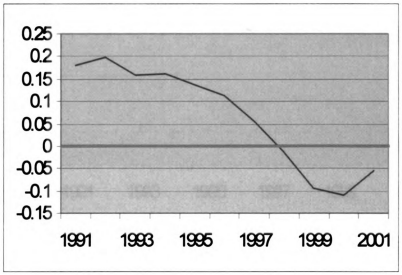


Figure 31. Burglary
(Weighted mean % change)

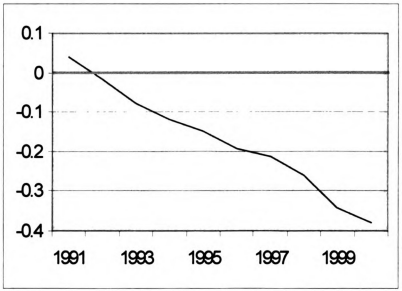


Figure 32. Larceny
(Weighted mean % change)

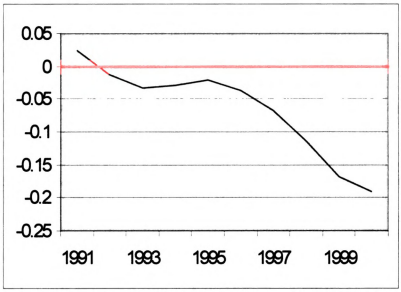
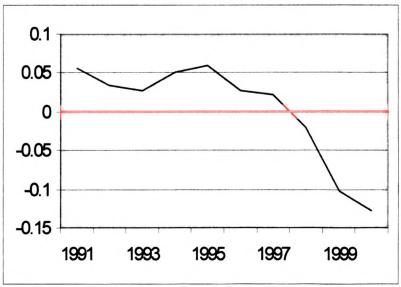


Figure 33. Auto Theft
(Weighted mean % change)



Descriptive Crime Trends - Summary of Observations

Below is a summary list of observations, based on descriptive analyses of the UCR crime data that were detailed in the previous section.

During the decade of the 1990s:

1. There was an overall nationwide decline in every crime category except rape and aggravated assault.

2. Weighted mean percentage changes indicate that these overall declines in crime were moderate for robbery (-11%), and vehicle theft (-13%) and strong for murder (-32%), manslaughter (-51%), burglary (-37%) and larceny (-19%).

3. In terms of the breadth or pervasiveness of crime declines, murder, manslaughter, burglary, and larceny decreases were the most widespread. Declines in robbery rates occurred primarily in larger jurisdictions.

4. Both violent and property offense indexes indicate that crime did not decline in all places during the same time period. Rather, declines generally began with larger jurisdictions (over 100,000 population), followed by jurisdictions of medium-size and eventually reaching the smallest jurisdictions (below 25,000 population).

5. Weighted mean percentage changes indicate that nationwide declines in murder, robbery and auto theft occurred primarily after 1995. In contrast declines in burglary, larceny and manslaughter occurred during the early 1990s.

6. Subgroup analyses by jurisdiction size categories indicate that the amount of declines in crime were not equivalent among size categories, even when percentages of change within each jurisdiction were assessed. For example, among jurisdictions with over 100,000 population, declines in burglary rates were over 40% in the year 2000.

However, among jurisdictions below 50,000 population, burglary declines in the same year ranged from 12% to 15%.

7. The trend lines among jurisdictions below 10,000 population began in 1990 an ended in the year 2000 at approximately the same level for virtually every offense category with the exception of aggravated assault (which increased). As a result, these descriptive analyses suggest that agencies below 10,000 population frequently differ from larger jurisdictions with regard to causal mechanisms of crime and/or reporting behaviors.

Descriptive Analyses of Control Variables - Systemic Influences on Crime

A number of researchers have suggested that broad systemic trends such as employment rates, per capita income, proportion of the population that is aged 15 to 24, or proportion of the population that is nonwhite (a proxy for disadvantage) are among the primary driving forces behind changes in crime rates across the nation (Allen, 1996; Blumstein, Steinberg, Bell, & Berger, 2002;. Fox, 1996; Steffensmeier & Harer, 1999). Additionally, other researchers have pointed to changes in the number of police officers per capita as potentially influential (Levitt, 2002; Marvel & Moody, 1996).

Nevertheless, before the theoretical and empirical rationales behind these relationships are discussed, annual data pertaining to each of the aforementioned variables will be presented in an effort to establish the facts regarding what took place during the 1990s. A thorough discussion of data sources pertaining to population demographics, unemployment, and per capita income may be found in the methodology section. However, a brief introduction to these data sources is listed in the following paragraphs to aid in comprehension of the descriptive analyses of changes in these systemic variables nationwide.

Annual county-level data pertaining to population demographics (i.e. proportion aged 15 to 24, and proportion nonwhite) are presented below and originate from annual intercensal estimates that have been revised since the 2000 census. Data pertaining to annual county level changes in employment and per capita income originate from the Bureau of Economic Analysis. Finally, data pertaining to per capita police officers are presented annually at the jurisdiction-level and originate from the Police Employee Master file that is maintained by the Federal Bureau of Investigation as part of the Uniform Crime Reporting (UCR) system. With the exception of per capita income, all figures below represent mean percentages of annual change from 1990 levels to facilitate relative comparison of trends among the different variables. Annual changes in per capita income are expressed in U.S. dollar amounts.

Figure 33. Population Aged 15-24
(Mean % Change)

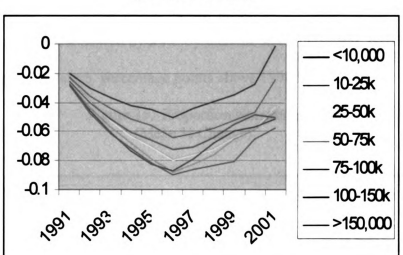


Figure 33 illustrates the trends in mean percentage changes with regard to the proportion of the population by jurisdictions size that that was aged 15 to 24 and shows a distinct, non-linear trend with decreases beginning in 1991 ranging from 2% to over 8%

by 1996. However, in 1997 the proportion of citizens aged 15 to 24 began to increase to levels that approximately equal those in 1991 or 1992.

Figure 34. Percent Employed
(Mean % Change)

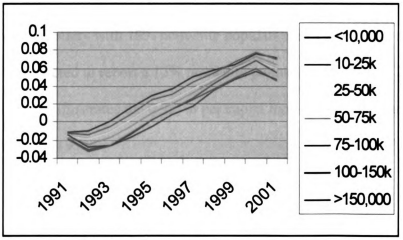


Figure 34 shows the trends for proportion of the population that was employed during the 1990s. This figure indicates a decrease of approximately 2% during the first three years of the decade followed by a steady increase in employment, peaking in the year 2000 at approximately 6 percentage points above 1990 levels.

Figure 35. Proportion Nonwhite
(Mean % Change)

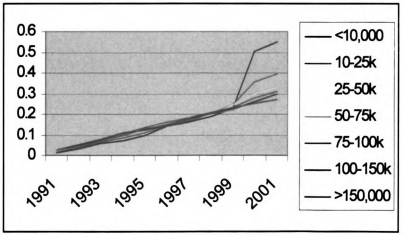


Figure 35 shows the trends in the proportion of population that was nonwhite (a proxy for disadvantage). This figure shows a steady increase in nonwhite population throughout most of the 1990s with a slightly sharper rate of increase after 1999. Most jurisdictions experienced increases in nonwhite populations of about 30% by the year 2000. For example, a county with 10% nonwhite population in 1990, under this rate of increase, could be expected to report a 13% nonwhite population in the year 2000. Additionally, Figure 36 illustrates the trend in per capita income and shows a steady increase throughout the 1990s.

Figure 36. Per Capita Income
(Mean % Change)

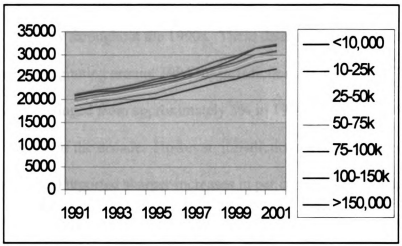


Figure 37. Per Capita Officers
(Mean % Change) - Jurisdiction Level

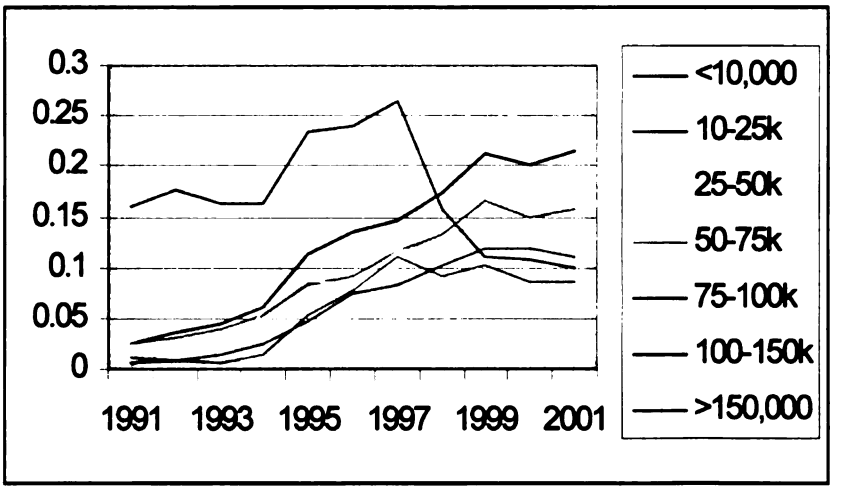


Figure 37 (above) illustrates trends in officers per citizen within each jurisdiction by size category annually throughout the 1990s. These data indicate substantial increases in officers per capita, beginning around 1994 for jurisdictions of every size. The mean percentage of increase ranged from approximately 5% in 1994 to around 13% for most jurisdictions by the end of the decade. However, jurisdictions with populations ranging from 100,000 to 150,000 reported sharper increases in per capita officers ranging from 15% in 1991 to over approximately 27% in 1997. This sharp increase in officers was followed by a steep decline or "drop-off" in per capita officers such that the per capita rate in the year 2000 remained approximately 10% above 1990 levels.

Systemic Changes and Crime Trends - A Review of Literature

Youth Population and Crime Trends

A number of criminal justice researchers have suggested that crime trends increase as the proportion of young persons (e.g. ages 15-24) in the population increases (Blumstein et al., 2002;. Fox, 1996; Grogger, 2000). From a theoretical perspective,

criminological work that focuses primarily on the individual level of analysis has been rather contentious with regard to the age-crime relationship. The developmental perspective has argued that social ties to family, school and law abiding peers are sometimes weakened among teens (Sampson & Laub, 1993). Consequently, developmental criminologists have asserted that the decreased influence of these mechanisms of social control during youth often leads to delinquency. Additionally, Warr (1998) studied the age-crime curve at the individual level and provided data suggesting that mechanisms of social control, such as marriage and full-time employment may cause delinquent behavior to desist. However, advocates of the self-control criminological perspective have argued that any apparent age-crime relationship at the individual level is spurious and results largely from differences in opportunity structure (Gottfredson & Hirschi, 1990).

Regardless of the underlying causes for delinquent behavior among youth, at aggregate levels of analysis, studies often begin discussions of the age-crime relationship by citing facts pertaining to higher overall arrest or self-reported delinquency rates among youth (Blumstein, 2000; Fox, 2000; Grogger, 2000). The empirical evidence concerning the relationship between age and crime has been generally supportive, but effect sizes vary in strength depending on the type of offense and sometimes differ across time eras or youth cohorts. Blumstein (2000) provided descriptive evidence that the arrest rate for 15-year-olds in 1993 was triple the rate in 1985. Additionally, Fox (2000), a proponent of demographic explanations of crime, noted a steep increase in homicide offence rates among persons in the 18 to 24 age category during the early 1990s. However, after analyzing descriptive trends at the national level, Fox concluded that "No one can

reasonably assert that all--or even most--of the sharp decline in homicide since 1991 could be linked to demographic change" (Fox, 2000, p. 307).

With regard to the amount of impact that changes in the youth proportion have on crime, estimates have varied substantially. Cohen and Land (1897) analyzed national time series data from 1946 to 1984 and reported that decreases in youth population could account for approximately 58% of declines in homicide and 26% of declines in auto theft. Additionally, Steffensmeier and Harer (1999) applied age standardization methods to UCR data in an effort to assess the effects of age composition on index crimes from 1980 to 1996 and estimated that youth population changes resulted in 10% to 15% of changes in property crime and 3% to 8% of violent offenses in various years during this period. Finally, Raphael & Winter-Ebmer (2001) conducted a sophisticated econometric analysis at the state level of analysis from 1971 to 1997 and found that the proportion of juveniles aged 15-17 had the highest overall impact on crime rates. Various model specifications in this analysis ranged from 8% to 14% for property and 5% to 10% for violent crime.

Some researchers have suggested that the impact of youth on crime may vary during different time periods, depending on individual offense rates and other social conditions. For example, Steffensmeier and Harer (1999) reported stronger age effects on crime rates during the 1980s when compared with the early to mid-1990s. Additionally, Fox (2000) and Blumstein and Rosenfeld (1998) have suggested that individual rates of youth offending increased during the early 1990s as a consequence of the rapid increase in incarceration for drug dealing during the 1980's, which may have resulted in a vacuum where younger dealers replaced adults and were more likely to use firearms to protect drug territory.

Nevertheless, Bernard (1999) noted that there has been a persistent and erroneous popular belief throughout recent decades that youth offending is "on the rise" and that the behavior of teens is no longer like the "good old days" of 30 or 40 years ago (p. 338). His analysis of UCR arrest and victimization data indicated that, with the exception of homicide, the general trend among juvenile offending rates has been a decrease of approximately one third overall with regard to frequency. Furthermore, Levitt (1999) argued that changes in age structure of the population have only a limited impact on aggregate crime rates. His analyses of demographic and crime data indicated that even the very large baby-boom age-trend shifted crime rates by no more than 1% per year.

Unemployment and Crime Trends

Most theoretical arguments asserting a relationship between unemployment and crime are based on a rational choice perspective that assumes that individuals seek to obtain resources according to relative costs and benefits (Allen, 1996). However, Raphael and Winter-Ebmer (2001) note that, although the relationship between unemployment and crime seems intuitive, research to date has been unable to document a strong positive effect. They further note that studies of aggregate crime rates have generally found small and statistically weak unemployment effects with stronger effects for property crime than violent crime.

Several studies have also found significant *negative* effects of unemployment on violent crime rates. Cohen, Kluegel and Land (1981) argued that this inverse relationship may occur during periods of high unemployment because there are more individuals at home to serve as guardians. Additionally, some researchers have argued that unemployment may reduce the wealth of crime targets, thus, reducing criminal

opportunity (Cohen, Felson & Land,1980). Consequently, Allen (1996) noted that this debate is not settled because both perspectives have received some measure of empirical support.

A number of recent studies have found support for a relationship between unemployment and specific types of offenses. Monthly time series data in New York City from 1974-1999 indicated that a 1% decrease in unemployment was associated with a 16% decrease in burglary (Corman & Mocan, 2002). Additionally, a study of national level data from 1958 to 1995 indicated significant positive effects associated with property offenses (Ralston, 1999). For the middle year of this analysis (1976), the reported regression coefficients translated into a 10% to 14% overall decline in property offenses among various specifications. Finally, a state level analysis of data from 1971 to 1997 found that a 1% decrease in unemployment was associated with a 2% decrease in burglary and a 1.5% decrease in larceny (Raphael & Winter-Ebmer, 2001). However, the estimated effects on violent crime in that study were inconclusive.

Interrelationships between Race, Youth, Wages and Unemployment

Embedded in many theoretical explanations concerning changes in crime, unemployment, and youth population are implicit and explicit arguments about interrelationships among racial demographics, youth population, poverty and wages. For example, Ralston (1999) noted that prior research suggested that whites might be influenced to a greater degree by changes in unemployment rates than their black counterparts due, in part, to differences in life expectations. Consequently, Ralston included variables to estimate differences among whites and blacks in his models of unemployment.

Measures of poverty, inequality, inflation and per-capita income have also been included in a number of empirical analyses pertaining to unemployment and demographic changes. In this regard, Imrohoroglu, Merlo & Rupert (2004) found that income inequality was among the top two determinants of crime rates, explaining as much as 59% of overall increases. Further, Grogger (2000) argued that per-capita income among youth may be inversely associated with violent offenses that result from increased illegal drug trade activity which becomes more profitable when wages are low. Finally, it is noteworthy that race has also been used as a proxy for disadvantage when measures of poverty and inequality were insufficient (Zhao, Scheider & Thurman, 2002).

Few, if any studies have included all of these variables together and consequently little is known about how they interrelate. It is noteworthy, for example, that Allen (1996) did not find a significant youth effect in his analyses of more than 30 years of crime data when inflation, poverty, and unemployment were entered into the model. Additionally, Imrohoroglu et al. (2004) found that changes in unemployment did not explain changes in crime from 1980-1996 when measures of incarceration, arrest probability, and income inequality were included in models. These finding highlight our ignorance with regard to interactions and interrelationships among race, poverty, wages, and unemployment. At present, it is unclear whether these variables are capturing distinct elements of changes in crime rates. Conversely, they may be measuring essentially the same variation via different mechanisms.

Systemic Changes and Crime Trends - A Look at the Data

Youth Demographics Data (1990-2001)

Based on historical data that are now available throughout the entirety of the 1990s, revised annual census data (shown in figure 33) indicate a steady decline in the proportion of young persons aged 15 to 24 during the early 1990s, reaching its lowest point in 1995. It is noteworthy, however, that violent crime index data at the jurisdiction level indicate that the majority of agencies between 1991 and 1994 experienced crime increases during these years. Thus, age demographics alone do not appear to coincide with declines in crime that occurred in large, then medium, and finally small jurisdictions. Further, a substantial 40% or greater portion of jurisdictions reported no overall decrease in violent crime through 1998 when youth were near their lowest levels.

The decline in proportion of youth did correlate with decreases in property offenses during the first five years of the 1990s. However, after 1995 when the proportion of young persons again began to rise, property offenses continued to decline nationwide. Thus, the relationship between age demographics and crime at the county or jurisdiction level is unclear and remains to be empirically tested.

Unemployment, Income and Racial Demographics Data (1990-2001)

In reviewing the descriptive data pertaining to unemployment and per-capita income trends, Figures 34 and 36 seem to mirror the patterns property crime, consistent with prior theoretical and empirical findings. Simply put, as unemployment and per-capita income increased, property crime trended downward. However, the relationship between unemployment and violent crime seems less clear with the exception of murder,

which showed a brief increase that coincided with a brief decline in employment around 1992.

In contrast, the trend of nonwhite population (Figure 35) increased throughout the 1990s which, if taken as a measure of disadvantage, should have led to increases in crime based on prior research. However, with regard to general overall trends for both property and violent crime, the opposite was true in that both indexes suggest declines from 1990 levels. In this regard, the problem may be related to the large nationwide immigration of Latinos. Prior research suggests that the occurrence of serious crime and delinquency among Latinos who recently emigrated, is lower than the population of Latinos that have lived in the United States for several generations (Sommers, Fagan, & Baskin, 1994). Consequently, in order to obtain a better measure of the specific type of disadvantage that is most likely to lead to crime, the variable pertaining to the percentage of the population that is nonwhite could be modeled as an interaction with unemployment and/or per-capita income.

Officers Per Capita - Data (1990-2001)

Finally, with regard to the number of officers per capita (Figure 37), descriptive analyses of trends are inconclusive. The rate of officers did increase during the mid-1990s, approximately one or two years before moderately sharp declines in violent offenses began in larger agencies. However, this officer trend does not appear to correspond with declines in property crime. Additionally, the step by step downward trend that migrated from large to smaller agencies with regard to declines in property and violent crime indexes does not directly correspond with patterns of increases in officers.

CHAPTER 4

METHODOLOGY

Study Objectives and Hypotheses

A primary objective of this study is to assess the impact of changes in policing practices on crime during the 1990s to determine the extent to which these efforts contributed to reported declines in murder, robbery, aggravated assault, burglary, larceny and auto theft within jurisdictions across the United States. Although a number of criminal justice researchers have asserted that changes in policing might have contributed to the nationwide decline (Eck & Maguire, 2000; Lafree, 1998b; Ouimet, 2002; Sherman et al., 1998), at present, little is known about which specific changes in policing tactics, organizational strategies and technologies were most influential. Additionally, no study has yet been published that assesses the relative impacts of these changes in policing using a methodology that allows generalization of findings to jurisdictions across the nation. This study attempts to provide information that will be useful to researchers and practitioners by examining the impact of specific types of tactics on crime across a variety of jurisdictional environments and organizational contexts.

The preceding review of literature pertaining to recent changes in policing suggests that number of officers per capita, arrests for minor offenses, problem solving and other tactics as well as crime analysis may have contributed to crime reductions across the nation. Thus, the following hypotheses were tested pertaining to rates of reported murder, robbery, aggravated assault, burglary, larceny and auto theft nationwide during the 1990s.[5]

[5] More detail pertaining to the rationale for the hypotheses can be found in a subsequent section of the methodology.

Hypothesis 1: Increases in the number of officers per capita contributed to reductions in crime.

Hypothesis 2: Increases in arrests for minor drug and disorder offenses contributed to reductions in crime.

Hypothesis 3: Increases in the implementation of the broad categories of policing tactics and strategies tactics (listed below) contributed to reductions in crime.

Collaboration Efforts, Problem Solving
Citizen Involvement, Code Enforcement
Community Policing Policies, Crime Analysis
Place Oriented Strategies, Efficiency Related Strategies

Hypothesis 4: Increases in the implementation of specific tactics and strategies (within the broad classifications listed in hypothesis 3) contributed to reductions in crime.

Methodological Overview[6]

In order to assess the hypotheses, annual changes in crime and policing that were reported during the years 1990-2001 were included in regressions using a panel data approach with fixed-effects for both jurisdictions (i.e. places) and year. The implementation of fixed effects panel data models allow the researcher to assess changes within each jurisdiction over time (Allison, 2005; Frees, 2004) and this methodology has recently been utilized by criminal justice researchers (Marvel and Moody, 1996; Zhao, Scheider and Thurman, 2002). This approach offers a substantial benefit over cross-sectional research in that omitted variables that are relatively stable over time are no longer problematic (Benson & Rassmussen, 1998; Frees, 2004). Stated another way, by comparing each jurisdiction with itself at multiple time periods, stable characteristics that are unique to each jurisdiction can no longer influence the model. For example, two

[6] Images in this dissertation are presented in color.

cities of equal size may be very different with regard to a number of characteristics. City "A" may be located in an industrial or factory based economy and city "B" may be located in a service based economy. In traditional cross-sectional analysis, these differences would be problematic unless a variable pertaining to "economy-type" were included. However, by using fixed place effects, a dummy variable is entered for each specific jurisdiction, resulting in a differencing of all modeled values from time-1 to time-2 (Benson & Rassmussen, 1998). This process is illustrated in Figure 38, where the time-1 values are subtracted from time-2 values such that stable city characteristics are eliminated from analyses.

Figure 38. Illustration of the "Canceling Effects" of Fixed Effects Regression.

City "A"		1991	Crime91 = officer_rate91 + unemployment91 + factory economy91
City "A"	(subtract)	1990	Crime90 = officer_rate90 + unemployment90 + factory economy90

In the case of "City A" the stable characteristic of factory based economy cancels out of the equation because the values in 1990 are equal to the values in 1991. This approach removes the necessity to include variables for other relatively stable jurisdictional characteristics such as region, jurisdiction size and type of government (i.e. municipal or county). Similarly, trends that effect all agencies in a given year or era can be controlled for by including a year fixed effect or variable in the model (Allison, 2005). As a result, only variables that change -- and correlate with independent variables in the model may be influential and need to be entered into the analysis (Frees, 2004).

Population of Inference and Database Overview

The population of inference for this study is comprised of all officially reported crime at the national level during the years 1990-2001. Two primary databases (detailed below) were utilized to assess changes and trends in crime during the 1990s. First, arrest and officer count data, maintained by the Federal Bureau of investigation, were combined with crime data that include over 89% of officially reported felony offenses. This database allowed an assessment of the relationships between the number of officers per capita, as well as crime rates and minor misdemeanor arrests.

A second, a database (detailed below) was created by combining data from a national policing survey with the FBI crime data and includes information pertaining to nearly one-half (49%) of officially reported crime during the years 1993 and 1997. This policing survey database allowed the assessment of relationships between specific policing practices, such as foot patrol, problem solving and crime analysis with crime reduction that occurred from 1993 to 1997.

Primary Data Sources

Changes in Crime

The Federal Bureau of Investigation (FBI) collects and maintains a database, known as the Uniform Crime Report, which contains the number of reported murders, aggravated assaults, robberies, rapes, arsons, burglaries, vehicle thefts and larcenies within individual jurisdictions across the nation (FBI, 2002). All of these crimes are of a serious nature and are classified as felonies for which the penalty may include over one year of incarceration. The Uniform Crime Reports have been collected since the 1930's and, although reporting is voluntary, the vast majority of full service (24 hour) law

enforcement agencies reported at least partial crime data during the (FBI, 2002). For example, in 1990 17,608 of the estimated 18,778 law enforcement agencies were listed in the UCR database.

State police and campus, airport and other special police agencies were removed from analyses because their jurisdictions overlap with other law enforcement agencies that have primary responsibility for policing these populations. The UCR program refers to state and special police agencies as "zero-population agencies" (FBI, 2002). Thus, calculation of crime, arrests and officer rates per capita are problematic for these jurisdictions. Additionally, following the methodologies of recent work by Zhao, Schieder and Thurman (2002) and the U.S. Government Accountability Office (2005a), crime data that do not include a complete 12 months of crime data in a given year were removed from regressions as well. The vast majority of these partial crime reports were originated by small agencies with jurisdiction sizes of less than 10,000 citizens. Overall, 12,975 jurisdictions reported at least one complete year of data during the 1990-2001 period and were not zero-population agencies. Reports from these agencies represent approximately 93% of all reported crime in the U.S. (GAO, 2005b).

Changes in Arrests and Officer Rates

Variables pertaining to changes in arrests and officers per capita are available annually from 1990-2001 via two databases that are produced by the Federal Bureau of Investigation. The number of sworn officers per 10,000 citizens is contained in the Police Employee Master Files. All of the agencies that reported at least one complete year of crime data during the are also found in the Police Employee Master File.

Data pertaining to annual arrests in each jurisdiction for 37 types of felonies and misdemeanors are contained the Arrest Master File. As with the UCR crime data, reporting of arrests is voluntary and very small police agencies are less likely to consistently report. However, the vast majority (over 89%) of the 12,975 agencies that reported crime to the UCR also reported arrest data during the 1990-2001 time period. Annual arrest reports that did not include a full 12 months of data were removed from analyses. All data pertaining to changes in crime, arrests and the number of officers were obtained directly from the Federal Bureau of Investigation via the Criminal Justice Information System (CJIS) headquarters in Clarksburg, West Virginia.

Changes in Policing Practices

Two waves of a National Survey of Community Policing Strategies were conducted during the 1990s to assess the extent to which various policing tactics and strategies were being implemented by local police agencies (Rosenthal & Fridell, 2002). The first survey wave was administered by the Police Foundation in 1993 and the second was implemented in 1997 via a partnership between Opinion Research Center (ORC) Macro and the Police Executive Research Forum (Rosenthal & Fridell, 2002). Both policing survey waves were designed to be nationally representative and consisted of random samples of over 1,600 local police agencies, stratified by size category.

The 1993 and 1997 survey waves asked law enforcement officials the same questions about the implementation of specific policing tactics and strategies. More specifically, 80 question items pertaining to problem-solving, community collaboration, place or "hot spot" oriented tactics, crime analysis and other practices were inquired in 1993 and again in 1997.

Questionnaire items were coded in a binary fashion such that "0" (zero) indicated that the activity was not performed and a "1" indicated that the activity was performed. For example, an agency that began training citizens in problem solving in 1997 received a "0" for this item in 1993 and a "1" in 1997. All 80 question items that were utilized in this study are listed in Table 1 in appendix B.

Control Variables

Independent variables pertaining to changes in officer rates, arrests and policing practices were also combined with demographic and employment data to control for contextual changes that occurred annually during the 1990s that may have effected crime rates. County level employment rates and per capita income from the Bureau of Economic Analysis were included as control variables. Additionally, the percentage of the population that was aged 15 to 24 and percentage of the population that was non-white (a proxy measure for disadvantage) were included as control variables from the U.S. Census annual intercensal estimates. To correct for within county or intra-cluster correlation, the cluster option was selected in regressions of officer and arrest effects using STATA software.

Linking Strategy

Independent variables were linked to control variables via FIPS (Federal Information Processing Standard) codes that indicate state, county and jurisdiction (or place) location. Additionally, survey data from the national community policing strategies study was linked to FBI Uniform Crime Report (UCR) data via agency ORI (Originating Agency Identifier) codes. Unique ORI codes are assigned to every police agency that reports crime data to the Federal Bureau of Investigation. Data from the FBI

Police Employee Master Files and the Arrest Master Files were linked to police survey records and UCR crime reports via ORI code as well.

Rationale for Hypotheses and Creation of Independent Variables

One of the primary objectives of this study is to identify relationships between specific policing practices and specific types of crime. Thus, each of the seven primary Index I offenses contained in the UCR (murder, robbery, aggravated assault, rape, vehicle theft, burglary and larceny) were analyzed separately.[7] Although it is fairly common in criminal justice literature for offense types to be combined into broad indexes of property and violent crime, the index approach is problematic in that it assumes that underlying causal mechanisms are the same for different offenses. Each of the seven offense categories were standardized into rates per 100,000 population for all analyses.

Crime rates and population size are closely related. For example, the rates of robberies in Detroit or Los Angeles are typically higher than in smaller jurisdictions. As a result, regression analyses of crime rates frequently include heteroskedastic error. That is, regression estimates are more precise among jurisdictions with large populations and are less precise for smaller jurisdictions. In the past, some econometric researchers have performed logarithmic transformation of crime rates in an effort to reduce heteroskedasticity (Hannon & Knapp, 2003). However, this approach has been strongly criticized by criminologists who argue that these transformations may introduce bias by limiting or "pinching off" the crime rates among the largest jurisdictions (Hannon & Knapp, 2003). Hannon and Knapp (2003) have recommended an alternative approach wherein regressions are weighted by population and standard errors are adjusted through

[7] Arson was excluded from analyses due to concerns regarding data reliability and because it is an offense that often falls under the purview of fire officials, rather than local police.

the implementation of a heteroskedasticity consistent covariance matrix (HCCM) method. All panel data regressions in this study followed the Hannon an Knapp (2003) approach. Regressions were weighted by jurisdiction population and robust standard errors were calculated through an HCCM technique that is available through STATA and SUDAAN software. Analyses of officer and arrest data was performed using STATA software. Analyses involving police survey data were conducted via SAS callable SUDAAN software.

Increases in Officers Per Capita - Hypothesis 1

Although the relationship between police force strength and jurisdiction crime rates has been somewhat contentious, recent econometric research suggests that increases in the number of officers per capita are associated with reductions in crime (Levitt, 1997; Marvel & Moody, 1996). From a theoretical standpoint, these crime reductions could result from increases in arrests and incapacitation due to officer availability. However, crime reduction may also occur through a deterrent effect that emanates from increased officer presence (Nagin, 1998). As a result, it is hypothesized that increases in the number of officers per capita contributed to reductions in crime (hypothesis 1). To test whether increases in officers contributed to reductions in crime during the 1990s, a variable containing officer rates per 10,000 citizens was calculated from annual counts of sworn personnel and reported jurisdiction population in the FBI Police Employee Master data.

Increases in Enforcement of Minor Offenses - Hypothesis 2

One of the principles of the "Broken Windows" hypothesis, advanced by Wilson and Kelling (1982) is that focusing on minor offenses may decrease citizen fear and

increase perceptions that the community expects individuals to behave in an appropriate manner. Policing literature indicates that during the 1990s a number of large police agencies were influenced by this perspective and implemented order maintenance or "zero-tolerance" strategies (Green, 1999; Sherman, et al., 1998). New York City police, for example targeted graffiti artists, public drunkenness and other disorderly activities such as panhandling and public urination (Green, 1999; Kelling & Sousa, 2001). Additionally, some empirical support has been highlighted pertaining to the crime reducing effects of increased enforcement of minor offenses. After an in depth analysis of New York's order maintenance tactics during the 1990s, Kelling and Sousa (2001) concluded that this policing approach had a direct crime reduction effect. As a result, it is hypothesized that increases in arrests for minor drug and disorder offenses contributed to reductions in crime during the 1990s (hypothesis 2).

Two arrest indexes were created to test whether minor drug and disorder arrests contributed to reductions in any of the seven felony offenses found in the UCR. The Arrest Master Files list 37 types of felonies and misdemeanor offenses. Individual items that were utilized to create both drug and disorder arrest indexes were selected only if they were relatively common non-violent misdemeanor offenses for which officers may have some measure of discretion with regard to the aggressiveness of enforcement. Offenses that are often classified as felonies (e.g. drug sale or trafficking) or that frequently cause serious harm or loss to victims were eliminated. According to the Broken Windows perspective, increasing focus on minor offenses may reduce crime. Thus, a minor drug arrest index was created by summing arrests for drug abuse and drug possession. Additionally an index of minor disorder offenses was created by summing

arrests for curfew violation, disorderly conduct, drunkenness, prostitution, runaways and vagrancy. Annual arrest totals for each jurisdiction were then converted into rates per 1,000 citizens.

Figure 39. Composition of Summative Arrest Indexes

Minor Drug Arrest Index:	(Drug abuse, Drug possession)
Minor Disorder Arrest Index:	(Curfew, Disorderly conduct, Drunkenness, Prostitution, Runaway, Vagrancy)

Arrest indexes are rates per 1,000 citizens

Policing Practices - Hypotheses 3 and 4

During the 1990s a number of trends in policing practices occurred that may have impacted crime rates. A substantial quantity of policing literature, for example, has documented the widespread adoption of community policing and problem solving strategies (MacDonald, 2002; Scott, 2000). Although empirical assessments of the impact of community policing and problem solving have yielded mixed results, most prior analyses have involved case studies or regional subsamples. Nevertheless, from a theoretical standpoint specific aspects of these strategies may have contributed to the decline in crime as a result of increased police attention to community concerns, increased information from citizens or the more permanent assignment of personnel to specific geographic areas or problems. As a result, it is asserted that increases in the implementation of community policing policies, citizen involvement and problem solving may have contributed to reductions in crime.

A number of technological, efficiency and enforcement based changes also occurred during the 1990s. For example, the implementation of crime analysis increased,

in part due to the availability of personal computers (Mullen, 1996). Additionally, police organizational efficiency improved via the implementation of cellular phones and crime tip lines (Nunn & Quinet, 2002). Policing literature also suggests that increased attention was focused on recurring crime places or "hot spots" as well as increased enforcement of civil and regulatory codes during this era (Mazzerole & Rohl, 1998). Any of these efficiency and enforcement policing trends during the 1990s may have impacted crime.

At present, the primary mechanisms through which changes in policing practice may have impacted crime are unknown. It is possible, for example, that increases in breadth or extent of implementation of problem solving reduced crime because more problems were being identified and addressed by local police through a wider array of tactics. However, it is also possible only certain types of problem solving activities were effective and that the breadth of implementation of the problem oriented policing concept was not of primary importance. Consequently, the methodology employed in this study assessed the crime impact of both the breadth of implementation of broad categories of changes through the creation of policing practice indexes as well as the impact of specific policing tactics. Two additional hypotheses are therefore asserted. First, increases in the implementation of broad categories of *Collaboration Efforts, Problem Solving, Citizen Involvement, Code Enforcement, Community Policing Policy, Crime Analysis, Place Oriented and Efficiency Oriented* policing tactics and strategies tactics contributed to reductions in crime (hypothesis 3). Second, increases in specific tactics and strategies within the broad classifications listed in hypothesis 3 contributed to reductions in crime (hypothesis 4).

Creation and Analyses of Policing Practice Indexes

Data from the National Survey of Community Policing Strategies contain information pertaining to changes in the reported implementation of a broad array of policing practices. More specifically, the survey questionnaires that were administered in 1993 and 1997 included 80 individual question items pertaining to efforts to collaborate with citizens, problem solving, civil code enforcement, place or "hot spot" oriented activities and other tactics and strategies. Each of the 80 variables were classified into an index that corresponds to the breadth of reported implementation of specific types of policing practices[8]. For example, each item that mentioned "problem solving" was classified into a problem solving index. Items that described the implementation of crime analysis were placed into a crime analysis index and a similar process was followed with regard to the remaining questionnaire items.

Eight primary indexes were created by summing together the items that were of a similar nature. Items that described efforts to increase routine citizen contact or feedback to the police were summed into a "Collaboration Effort" index. All items that mentioned problem identification or resolution were summed into a problem solving index. Items that described citizen actions to assist the police that did not fall into collaboration or problem solving were summed into a citizen involvement index. Additionally, a "Civil Code Enforcement" index was created by summing items that described efforts to utilize civil or regulatory codes to reduce crime. A "Community Policing Policies" index was created by summing items that described new policies or

[8] One item, v16, was removed because it did not fit clearly into any single index.

legislation to support community policing efforts. A "Crime Analysis" index was created by summing items that described efforts to identify crime patterns within the jurisdiction. An index of "Place Oriented Tactics" was created by summing items that described efforts to increase enforcement or management in geographic areas or specific types of places. Finally, an "Efficiency Efforts" index was created by summing items that described efforts to streamline organizational design or management. These individual items and their classification indexes can be found in Appendix B.

However, the community collaboration and problem solving indexes were further sub-divided to differentiate items that referred to actions by line-level or patrol officers and their immediate supervisors (e.g. sergeants) from actions that were carried out by the organization as a whole. Thus, community collaboration was divided into two sub-indexes: community collaboration (line level) and community collaboration (organization level). The same procedure was followed to create two problem solving sub-indexes: problem solving (line level) and problem solving (organization level). The rationale for these further subdivisions is detailed in the following paragraph.

The National Survey of Community Policing Strategies was designed to assess the implementation of policing practices at multiple levels of the organization, particularly with regard to collaboration efforts and problem solving (Rosenthal & Fridell, 2002). Consequently, question items of a similar nature were asked in reference to a specific level of the organization. For example, questionnaire item number 15 in Table 1 (Appendix B) inquired as to whether the agency trains citizens in problem identification or resolution. However, a similar item (number 52 in Appendix B) inquires as to whether officers teach residents how to address community problems. As a result, a

substantial portion of the 16 problem solving items were similar with regard to content but pertain to either the police organization as a whole or line level officers and supervisors.

At present, it is unknown whether problem solving and collaboration efforts at the line or organization levels are most likely result to in crime reduction. Therefore, ad hoc removal of any survey items was undesirable. Thus, to avoid duplication in the problem solving and collaboration effort categories, survey questions were subdivided into two groups as described above. This questionnaire levels and duplication issue was not problematic for any of the other indexes such as crime analysis civil or code enforcement. Therefore only single indexes were created for policing practices that did not fall into the collaboration for problem solving categories.

Figure 40. Composition of Summative Indexes Pertaining to Policing Practices

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Collaboration Effort: Items that describe efforts to increase routine citizen contact or feedback to the police.

Organization-Level: v7,v11,v12,v13,v25,v26,v31,v33,v65,v74 (range 0-10)
Line-Level: v46,v48,v49,v51,v55,v58 (range 0-6)

Problem Solving: Items mentioning problem identification or resolution

Organization-Level: v3, v14, v15, v22, v35, v45, v66 ,v79 (range 0-8)
Line Level: v47, v50, v52, v57, v60, v61, v62, v63 (range 0-8)

Citizen Involvement: Items that describe citizen actions to assist the police that do not fall into collaboration or problem solving.

Index: v67, v68, v69, v70, v71, v72, v73, v75, v76, v77 (range 0-10)

Code Enforcement: Items that describe efforts to utilize civil or regulatory codes to reduce crime.

Index: v19, v20, v37, v56 (range 0-4)

Community Policing Policies: Items that describe new policies or legislation to support community policing efforts.

Index: v1, v2, v4, v5, v80 (range 0-5)

Crime Analysis: Items that describe efforts to identify recurring crime patterns.

Index: v21, v43, v44, v54, v64 (range 0-5)

Place Oriented Tactics: Items that describe efforts to increase enforcement or management in geographic areas or specific types of places.

Index: v9, v10, v18, v28, v29, v30, v32, v38, v39, v40 (0-10)

Efficiency Efforts: Items that describe efforts to streamline organizational design or management.

Index: v6, v8, v17, v23, v24, v27, v34, v36, v41, v42, v53, v59 (range 0-12)

Creation and Analyses of Individual Policing Practice Variables

Although analyses of changes in the number of problem solving, place oriented or other groups of tactics may increase our understanding of relationships among broad classifications of policing practices and crime, it is possible that only specific individual policing practices may be effective. Therefore, regressions for each individual survey item were conducted to aid in identifying specific policing practices that were associated with crime reduction. Each of the 80 survey items, listed in Appendix B pertaining to specific policing practices was coded such that the change in implementation from 1993 to 1997 ranged from -1 to +1. That is, an agency that reported implementing a policing practice in 1993 and discontinued this practice by 1997 would be assigned a -1 for this survey item. In contrast, an agency that began implementing a policing practice after 1993 received a score of +1. Finally, agencies where implementation of a specific policing practice did not change received a score of zero. The fixed effects panel data

regression models utilized in this study are designed to assess within subject change, rather than cross-sectional differences in levels. Therefore, the net change within a jurisdiction that continued to implement a policing practice from 1993 through 1997 is zero.

Because there is substantial similarity with regard to subject matter among the 80 policing survey items, it was expected that reported implementation of many of these individual policing practices would be correlated. For example, an item that inquired as to whether police officers train citizens in problem solving may be correlated with practices pertaining to collaboration efforts by the agency. Consequently, to identify items that explained a unique portion of the variation in crime, subsequent regressions of individual policing practice items together (simultaneously) in a single equation were performed.

Individual policing practices that demonstrated statistical significance with regard to crime reduction were simultaneously included in a regression to determine which items were most strongly or closely associated with crime reduction. For example, if policing survey items, v1, v2, v3 and v4 were significant in individual crime regressions, these four items would be included together as explanatory variables in a subsequent regression. Next, the weakest, non- significant item was removed and the regression was performed again. Nonsignificant policing practices were continually be removed from the regression, one at a time, until only practices that were significant at the .10 level or lower remained.

The simultaneous regression modeling of individual policing practices was intend to identify activities that were most strongly associated with crime reduction. However,

this methodology also resulted in a data reduction process that aided in interpretation of the results. The final analytic step in this procedure involved the identification of the similarities and differences among policing activities that demonstrated statistical significance when included in regressions with other policing practices. For example, individual policing practices that retained statistical significance with regard to robbery might all relate to officer training but items that explain burglary might result from items that described increases in patrol visibility. Thus, a goal of this methodology was to identify the nature or types of practices that were most closely associated reduction of specific types of offenses.

Panel Data Regression Procedures

Analysis of Officers and Arrests

Research suggests that the relationship between the number of officers and crime rates may be reciprocal (Levitt, 2002; Marvel & Moody, 1996). For example, increases in crime may lead to the hiring of additional officers and falling crime may lead to reductions in police force strength. Additionally, it is possible that the relationship between minor disorder arrests and felonies may also be reciprocal since increases in serious offenses may reduce the

amount of discretionary officer time that can be devoted to lesser offenses.

Consequently, using ordinary regression to determine which event is causing the other is problematic. However, one approach that has been utilized to address this problem is a vector autoregressive method known as Granger causality testing (Granger, 1969; Paternoster & Bushway, 2001).

Recent work by Marvel and Moody (1996) utilized the Granger approach to assess the relationship between officers and crime, finding a small effect of crime on officers but a substantial effect of additional officers on crime. To assess causal direction under the Granger method, two separate sets of regressions were required. First, crime was regressed on lags of itself and then lagged values of officer rates were added and an F test of the residuals from both models was utilized to determine whether the added variables (i.e. officers) significantly increased the explanatory power of the model. Second, officer rates were regressed on lagged officer rates and then and then lagged values of crime were added and an F test was utilized to determine whether the added variables (i.e. crime) significantly increased the explanatory power of the model. The rationale behind the Granger approach was described by Loftin and McDowall (1982, 395):

> "Granger [1969] argues that if one variable (X) causes another variable (Y), then X should provide a more accurate prediction of Y's present value than could be obtained by using past values of Y alone."

The first step that was conducted pertaining to the Granger analyses involved the assessment of the nature and direction of the relationships between crime and the variables of interest. This step was carried out by regressing crime on lags of itself and then adding lagged officers into the model to determine whether the inclusion of the officers variables significantly increased the explanation of crime. Regression residuals from the model containing crime as the dependent variable with lagged crime values as independent variables were then compared with the residuals from the model where lagged officer rates were included as independent variables using an F-test.

The possibility of reverse causal direction (i.e. that crime effects the number of officers) was also explored by regressing officer rates on prior (lagged) officer rates and

comparing these residuals with models that included lagged values of crime as explanatory variables. These steps were repeated for minor drug and misdemeanor arrests as well. For these preliminary analyses, no control variables other than fixed effects for jurisdiction (place) and year were included.

Initial Models of Officers and Minor Arrests

After verifying that officer rates and minor arrest rates effect each of the seven crime types via the F-test, individual regressions of each crime on officer rates, drug arrest and misdemeanor arrest rates were conducted utilizing lagged values of these independent variables as indicated by the models in Figure 41 below.

Figure 41. Initial Models of Crime as Explained by Officers, Drug and Disorder Arrests

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$$Crime_{it} = \mu_i + \gamma_t + \alpha_1 \text{ Officers}_{(it-1)} + \alpha_2 \text{ Crime}_{(it-1)} + \alpha_3 \text{ Crime}_{(it-2)} + \beta' x_{it} + \varepsilon_{it}$$
$$Crime_{it} = \mu_i + \gamma_t + \alpha_1 \text{ Drug Arrests}_{(it-1)} + \alpha_2 \text{ Crime}_{(it-1)} + \alpha_4 \text{ Crime}_{(it-2)} + \beta' x_{it} + \varepsilon_{it}$$
$$Crime_{it} = \mu_i + \gamma_t + \alpha_1 \text{ Misd Arrests}_{(it-1)} + \alpha_2 \text{ Crime}_{(it-1)} + \alpha_4 \text{ Crime}_{(it-2)} + \beta' x_{it} + \varepsilon_{it}$$

In the above models, $Crime_{it}$ = represents the reported annual murder, aggravated assault, robbery, rape, burglary, larceny and vehicle theft rates each jurisdiction from during year t. The μ_i represents a vector of jurisdiction (place) fixed effects and the γ_t represents the years 1992 through 2001. The first year of the Granger analyses is 1992 due to the inclusion of a two-year lag of the dependent variable. The $\text{Officers}_{(it-1)}$, $\text{Drug Arrests}_{(it-1)}$, and $\text{Misd Arrests}_{(it-1)}$ represent a one year lag of these variables. Officers were modeled in rates per 10,000 citizens while drug and misdemeanor arrests were modeled as rates per 1,000 citizens to reduce the number of leading zeros in regression coefficients. $\text{Crime}_{(it-1)}$ and $\text{Crime}_{(it-2)}$ represent one and two-year lagged values of the dependent variable. Finally, the $\beta' x_{it}$ reflects a vector of control variables pertaining to

changes in the percentage of population that is aged 15-24, nonwhite, employed as well as the level of per capita income.

This analysis does not require that reciprocal relationships between officers and crime or arrests and crime be isolated or eliminated. However, by including lags of these independent variables rather than current year values, the portion of the relationship that is being assessed is the effect of independent variables in previous time periods on current rates of crime. Marvel and Moody (1996) argued that no current year effect between officers and crime is likely since training and administrative delays would limit the impact in the initial year of hire. However, it is possible that a simultaneous current year effect between arrests and crime may occur and this methodology is unable to assess this effect. Consequently, the effect of minor arrests on more serious felonies may be stronger than indicated by Granger regressions.

Effect sizes in Granger analyses must be adjusted for the influence of lagged dependent variables. The formula for this adjustment is relatively simple and requires a summation of the beta coefficients for the one and two-year lagged independent variables, divided by one minus the summation of the beta coefficients of the one and two-year lagged dependent variables as shown in Figure 42 (Marvel and Moody, 1996).

Figure 42. Formula for Calculation of Effect Sizes in Granger Analyses.

$$\frac{\text{(independent var. lag1 + independent var. lag2)}}{\text{(1 - (dependent var. lag1 + dependent var. lag2))}}$$

Final Model (Officers and Minor Arrests)

Changes in officer rates, drug arrest and minor disorder arrest rates during the 1990s were correlated as indicated by Table 5 below. Consequently it was necessary to determine which of these variables explained unique variation in crime. After assessing the crime effects of officers, drug and disorder arrest individually, these variables were included together in a single regression along with all fixed effects and control variables. Results from this final model allowed an assessment of the amount of crime that is explained by changes in officer rates while controlling for minor drug and disorder offenses arrest rates and vice versa. The final regression model pertaining to officers and minor arrests is listed below:

Figure 43. Final Model of Crime as Explained by Officers, Drug and Disorder Arrests

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$$Crime_{it} = \mu_i + \gamma_t + \alpha_1 \text{ Officers}_{(it-1)} + \alpha_2 \text{ Drug Arrests}_{(it-1)} + \alpha_3 \text{ Misd Arrests}_{(it-1)} + \alpha_4 \text{ Crime}_{(it-1)} + \alpha_5 \text{Crime}_{(it-2)} + \beta' x_{it} + \varepsilon_{it}$$

Regression of Policing Practices Indexes vs. Individual Items

Analyses of changes in policing practices (i.e. tactics and strategies other than arrest) were conducted in two parts. The first portion assessed changes among broad categories of practices through the creation of summative indexes of individual survey items that correspond to types or classes of tactics. The second part assessed the influence of changes in the reported implementation of each individual tactic. The National Survey of Community Policing Strategies was administered in two waves (1993 and 1997). Both waves consisted of 80 items pertaining to the current implementation of specific tactics and strategies by each police organization.

Analyses of reported changes among summative indexes of groups of tactics, such as problem solving or community collaboration fundamentally differ from analysis of specific individual tactics in a number of important respects. First, summative indexes of tactics measure the breadth or range of implementation based on generic types or classifications. For example, an agency may report implementing 3 problem solving tactics in 1993, followed by 10 problem solving tactics in 1997. Thus, the problem solving index would measure a broadening of the problem solving efforts through the addition of 7 new tactics. Measures of the breadth of implementation are useful for assessing overall trends within jurisdictions but offer little information pertaining to specific mechanisms through which any resulting crime reduction occurred.

In contrast, analyses of individual tactics provide more specific information as to the nature of the policing practice (e.g. increased foot patrol) that was implemented. This approach may be more effective in identifying effective tactics than summative indexes under certain conditions. For example, if the majority of problem solving tactics are ineffective, but a few are excellent methods of crime reduction, measures of the problem solving index would likely fail to reach statistical significance. However, measures of individual items should prove useful under this condition. Nevertheless, if the generic broadening of problem solving or community collaboration by police jurisdictions results in crime reduction, the summative index approach may be useful. Consequently, both approaches were conducted in this study.

Regression Models for Policing Practices

The Granger approach cannot be conducted with only two years or panels of data as is the case with available information pertaining to policing tactics and strategies.

However, a similar method was utilized that includes information about crime levels and trends prior to the first wave that was conducted in 1993. The National Survey of Community Policing Strategies includes information about changes that occurred after the baseline year in 1993. However, crime levels or trends in years just prior to 1993 may have influenced police administrative decisions in 1993 or thereafter. For example, a high level of drug offenses in 1990 may have increased the likelihood of participation in an anti-drug task force. Additionally, a rapid increase in crime during the years immediately prior to 1993 may have increased the adoption of crime analysis techniques. Thus, it is important to include this information in models of the effects of policing changes on crime.

Police organizational changes do not occur instantaneously for a number of reasons. First, annual crime information and analysis from a given year may not be available until several months into the following year. Second, organizational planning and decision making in response to recent crime information may require substantial time. Finally, the procurement of funds and re-organization of personnel or resources require additional time before new methods are implemented at the line-level. As a result, the models of policing changes on crime included both the crime level from 1990 (3 years prior) as well as the change or trend from 1990 to 1993. The objective of including these two variables as predictors is to utilize the maximum amount of crime information that may have influenced levels of problem solving, crime analysis, collaboration and other practices that were reported in the baseline year (1993) and thereafter.

Each of the seven primary crime variables were included as dependent variables in regressions for the corresponding survey years 1993 and 1997. Additionally, the inclusion of fixed effects for jurisdiction (i.e. place) and year renders regressions that are equivalent to change scores in the two-period panel models (Allison, 1995). Consequently, with regard to robbery rates in each jurisdiction, the change in the robbery rate from 1993 to 1997 was regressed. Change scores were also utilized for the other independent and dependent variables in the two wave panel. For example, since the index of place oriented tactics ranged from 0 to 10, the resulting change score for any given jurisdiction may range from -10 to 10. Thus, if an agency reported implementation of 3 place oriented tactics in 1993 and discontinued all of these tactics by 1997, a change-score of -3 would be assigned. Conversely, if an agency reported implementing one place oriented tactic in 1993 and five of these tactics in 1997, the change score would be +4. Control variables pertaining to changes in the percentage of population that is aged 15-24, nonwhite, employed and level of per capita income were also included in the regression models. The initial regression model pertaining to the summative policing practice indexes is listed below in Figure 44.

Figure 44. Initial Model of Crime as Explained by Policing Practice Indexes

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$$\Delta Crime_k = \alpha_1 + \alpha_2 \Delta Policing\ Index_k + \alpha_3\ Crime_{k(1990)} + \alpha_4\ \Delta Crime_{k(1993\text{-}1990)} + \beta' \Delta x_k + \varepsilon_k$$

In a two wave panel design such as the National Community Policing Strategies Survey, regressions using change scores (i.e. first differenced values) from wave-1 to wave-2 yield identical results to regressions that utilize fixed effects for place and year. Thus, the more simple change score method was utilized. As illustrated above, the

$\Delta Crime_k$ represents the change in reported annual murder, aggravated assault, robbery, rape, burglary, larceny and vehicle theft rates will in each jurisdiction from 1993 to 1997 (e.g. the 1993 robbery rate subtracted from the 1997 robbery rate). The ΔPolicing Index $_k$ represents the change score for each individual policing index (e.g. the place oriented index value from 1997 minus the place oriented index value from 1993). The $Crime_{k(1990)}$ represents the level or rate of the dependent variable in 1990 and the $\Delta Crime_{k(1993\text{-}1990)}$ represents the change in the dependent variable from 1990 to 1993 (e.g. the 1990 robbery rate subtracted from the 1993 robbery rate). As previously discussed, the inclusion of information pertaining to crime prior to 1993 will reduce the effects of autocorrelation and provide additional detail pertaining to crime events that may have influenced organizational decisions pertaining to policing practices. Finally, the $\beta' x_{it}$ represents a vector of control variables pertaining to changes in the percentage of population that is aged 15-24, nonwhite, employed and the level of per capita income.

Data Reduction and Final Model (Policing Indexes)

Several of the policing practice indexes were correlated as indicated by Table 6 below. Consequently it was necessary to determine which indexes explained unique variation in crime and remove those that did not add to the crime reduction model. After assessing the crime effects of each summative index individually, all indexes that demonstrated statistical significance were entered into a regression simultaneously. Indexes that did not explain a significant amount of variation when entered into the full models of crime were removed from subsequent regressions, one at a time, beginning with the least influential (i.e. least significant) index. This procedure was followed until all remaining indexes explained variation in crime at the .10 level or lower. The final or

"full model" pertaining to regressions of policing practice indexes is listed in Figure 45 below.

Figure 45. Final Model of Crime as Explained by Policing Practice Indexes

$$\Delta Crime_k = \alpha_1 + \alpha_2 \Delta Policing\ Index1_k + \alpha_3 \Delta Policing\ Index2_k + \alpha_4 \Delta Policing\ Index3_k + \alpha_5 Robbery_{k(1990)} + \alpha_4 \Delta Robbery_{k(1993\text{-}1990)} + \beta' \Delta x_k + \varepsilon_k$$

The final model shown in Figure 45 above is nearly identical to the initial model but includes all of the relevant policing practice indexes together as explanatory variables in a single regression.[9]

Analyses of Individual Policing Practice Items

After the changes in breadth of policing strategies and tactics are assessed, the effects of each of the individual (specific) policing practices were examined utilizing the same modeling approach described above. As a first step, each of the crime seven types were regressed against each of the 80 individual survey items separately with control variables and fixed effects included. Analyses of individual tactics followed the equation listed in Figure 46 below.

Figure 46. Initial Model of Crime as Explained by Individual Policing Practice Items

$$\Delta Crime_k = \alpha_1 + \alpha_2 \Delta Policing\ Practice1_k + \alpha_3 Crime_{k(1990)} + \alpha_4 \Delta Crime_{k(1993\text{-}1990)} + \beta' \Delta x_k + \varepsilon_k$$

[9] The term "relevant indexes" refers to those that demonstrated a significant effect on crime in the previous individual regressions.

Data Reduction and Final Model (Individual Policing Items)

The following step involved a data reduction procedure that was similar to the one implemented with the summative indexes. Each of the items that significantly explained crime were simultaneously included in a regression model and the weakest non-significant items were removed one at a time until only significant policing practices remained.

Figure 47. Final Model of Crime as Explained by Individual Policing Practice Items

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$$\Delta Crime_k = \alpha_1 + \alpha_2 \Delta Policing\ Practice1_k + \alpha_3 \Delta Policing\ Practice2_k + \alpha_3 \Delta Policing\ Practice3_k + \alpha_4 Crime_{k(1990)} + \alpha_5 \Delta Crime_{k(1993\text{-}1990)} + \beta' \Delta x_k + \varepsilon_k$$

The final model shown in Figure 47 above is nearly identical to the initial model of individual policing practice items but includes all of the relevant individual policing practices together as explanatory variables in a single regression.

Methodological Challenges

Over-Reporting of Innovative Policing Practices

Some researchers have suggested that political pressures emanating from the popularity of community policing and problem solving concepts have led to exaggerated or inaccurate claims by police officials in survey formats (Maguire & Katz, 2002). Consequently, if reported problem solving or other policing activities are not truly being conducted, the likelihood of finding an effect is reduced. Furthermore, differences in the intensity or quality of implementation across agencies may also tend to decrease the size or significance of the policing effect.

Nevertheless, these potential sources of error tend to strengthen or bolster the validity of findings since the econometric models must be strong enough overcome these challenges in order to demonstrate statistical significance. There is no reason to believe that responding police officials from jurisdictions where crime was declining were more likely than others to exaggerate about community policing or problem solving. Indeed, the greatest political pressure for reform and over-reporting of innovative activities would occur in jurisdictions where crime had remained at high levels. If agencies where crime was not declining tended to over-report innovative activities, the effects of policing practice variables on crime would be underestimated. Consequently, to ensure that important relationships between policing changes and crime were not overlooked, variables that were significant at or below the .10 level are highlighted and discussed in subsequent sections.

Arrest Data Standardization Issues

One potential concern that has been noted by researchers pertaining to data in the Arrest Master Files is the lack of consistency across agencies with regard to reporting standards. Some agencies, for example, report an arrest only when a suspect is taken to the police station or a jail facility. In other police jurisdictions, however, an arrest may be reported whenever a court appearance citation or ticket for a misdemeanor offense is issued. Nevertheless, although these differences across agencies are problematic to cross-sectional analyses, they are not at all problematic to assessments of changes within each jurisdiction. The panel data analyses conducted in this study measure within subject changes. In this case, for example, two agencies of approximately equal size and population demographics may have different criteria for reporting arrests such that

"agency A" reports every appearance citation as an arrest and averages 2,000 arrests per year while "agency B" utilizes a different standard that results in an average of only 500 arrests. In a cross-sectional regression this issue would be problematic unless a variable were added to account for the different reporting standards. However, since these panel data analyses in this study assess change, arrests are measured with respect to the baseline level in each jurisdiction. Thus, change scores for each agency are relative to local conditions and not subject to standardization error in reporting.

Omitted Variables and Threats to Validity

As described in the previous section, routine cross-sectional regressions are susceptible to differences across jurisdictions that explain the dependent variable. Thus, any difference that is relatively stable across time between jurisdictions and associated with crime should be entered into regressions. Consequently, the list of potential variables that should be included in cross sectional regressions is lengthy. For example, one city may have a longstanding gang problem, another may be located near a large urban area and yet another may have inadequate jail or law enforcement facilities. These relatively stable characteristics are important for explaining differences in crime levels. However, by assessing change through panel data analyses with fixed effects, only variables that changed and trended with crime across a large number of jurisdictions need to be added to regressions (Frees, 2004). Additionally, given that crime did not decline in most jurisdictions at the same time or in precisely the same year, the list of influential variables is shortened. Stable characteristics cannot explain changes in crime and are not necessary in panel data regressions of change within jurisdictions.

Robustness Checks

After initial regression results were obtained, a series of additional regressions to assess the robustness of findings pertaining to changes in officers, arrests and tactics were conducted. To ensure that the results were not being driven entirely by large or small places, jurisdictions with over 250,000 citizens and those with less than 25,000 citizens were removed to determine whether regression results continued to be statistically significant. Additionally, to ensure that the policing effects due to changes in policing tactics and strategies were not being driven by changes in officers or minor arrest rates, these variables were entered into regressions along with policing practice items as a final robustness check.

Variable Descriptives Pertaining to the Officer and Arrest Database

Table 1a shows the amount and distribution of total crime that was reported to the Federal Bureau of Investigation via the UCR system during the 1990 to 2001 time period. Overall, 12,975 police agencies reported at least one complete year of crime data. The vast majority of these agencies (11,625) also reported at least one year of arrest data. However, the Granger methodology utilized in this study requires that at least three consecutive years of data be present due to the inclusion of two lags the crime variables. In total, the arrest data subsample includes over 89% of the total reported crime in the U.S. by 9,362 jurisdictions.

Consistent with UCR population demographics, the arrest data indicate that the largest portion of crime was reported in Southern region (37.4%), followed by the West (27.6%), Midwest (18.1%) and Northeast (16.9%). Additionally, both UCR and Arrest

Master File data indicate that over 81% of reported crime occurred in municipal jurisdictions, with remainder (17.3% to 18.5%) being reported by county agencies.

Table 1a. Comparison of UCR Population and Arrest Sample

	UCR Population		Arrest Sample	
	Total Crime	Percent	Total Crime	Percent
Reported Crimes	140,501,109	100	125,160,314	89.1
Region				
Northeast	21,579,005	15.4	21,087,113	16.9
Midwest	26,946,393	19.2	22,716,463	18.1
South	56,455,087	40.2	46,797,531	37.4
West	35,520,624	25.3	34,559,206	27.6
Government Type				
Municipal	114,543,782	81.5	103,458,992	82.7
County	25,957,327	18.5	21,701,321	17.3
Jurisdictions	12,975	100	9,362	72.2

Table 2 details the mean levels and changes in officer rates, drug arrest, and minor disorder arrest rates during the 1990s. The nationwide mean officer rate per 10,000 citizens was 20.2 % in 1990 but increased by a substantial 16.4% by the year 2000. As a result, the national officer rate increased more than 3.3 officers per 10,000 citizens by the end of the decade. Additionally, the national drug arrest rate per 1,000 citizens was 4.85 in the initial year (1990). However, it is noteworthy that this minor drug arrest rate increased more than 106% by the year 2000. Finally, the national arrest rate for minor disorder offenses was more than twice that of the drug arrest rate in 1990 (10.41). However, by the year 2000 the disorder arrest rate declined substantially (-21 .9%) such that arrests for minor drug offenses were more frequent than those for minor disorder.

Table 2. Changes in Officer and Arrests Rates from FBI data

FBI Arrest Data	Mean 1990	Standard Deviation	Change 2000	% Change 2000
Officer Rate (per 10,000)	20.18	39.01	3.31	16.4
Drug Arrest Rate (per 1,000)	4.85	9.24	5.18	106.8
Disorder Arrest Rate (per 1,000)	10.41	16.89	-2.28	-21.9

N=9,362

Variable Descriptives Pertaining to Policing the Practices Database

The National Survey of Community Policing Strategies, was conducted in 1993 and 1997. In total, 1,138 agencies responded to both survey waves and possessed an ORI code that allowed them to report official crime data to the FBI. However, approximately 77% of these agencies (868) reported complete crime data in both survey years and were included in analyses. The vast majority of agencies that did not report complete crime data in both 1993 and 1997 represent smaller jurisdictions. Fully three quarters of these agencies police populations of less than 50,000 citizens. Consequently, the estimated amount of crime that these incomplete reporting agencies represent is less than 1.9% of the total crime that was reported by the full 1,138 agencies. The impact of this underrepresentation of jurisdictions with less than 50,000 citizens is small in terms of total crime in the United States. This issue is discussed in detail in the limitations section.

Although the policing survey sample is much smaller than that of the arrest data in terms of the number of reporting jurisdictions (868), these data include nearly one half of all reported crime in United States during the years 1993 and 1997 (48.9%). Moreover, the distribution of reported crime that is represented by policing survey respondents is similar to that of the broader UCR population. Consistent with crime

reports in the UCR data, the policing survey subsample indicates that slightly more than 40% of the total reported crime in the U.S. originated from the Southern region. The second-highest level of reported crime occurred in the West (31.5%), followed by the Midwest (17.6%), and Northeast (9.4%). Finally, the distribution of crime with regard to level of government was similar among the policing survey subsample and the broader UCR population with more than 81% of crime originating from municipal agencies.

The proportion of total crime in the West among the policing survey subsample is slightly higher than that of the UCR population. Additionally, the amount of crime reported in the northeastern region among the policing survey data was approximately 6% below that of the UCR population. This underrepresentation of crime from the Northeast is a minor data limitation and is discussed in the subsequent limitations section. Nevertheless, the overall representation of crime among the policing survey subsample is sufficiently similar to allow inference to the broader UCR population.

Table 3. Comparison of UCR Population and Police Survey Subsample

	UCR Population		Police Survey Sample	
	Total Crime	Percent	Total Crime	Percent
Reported Crimes	23,703,384	100	11,593,198	48.9
Region				
Northeast	3,621,852	15.3	1,086,608	9.4
Midwest	4,343,194	18.3	2,045,116	17.6
South	9,648,825	40.7	4,805,422	41.5
West	6,089,513	25.7	3,656,052	31.5
Government Type				
Municipal	19,272,282	81.3	9,742,602	84.0
County	4,431,102	18.7	1,850,596	16.0
Jurisdictions	10,270	100	868	8.5

Table 4 details the mean levels and changes among the eight primary policing practice indexes from 1993 to 1997.[10] Overall, reported policing practices among all of the indexes increased during the mid-1990s. The mean number of community policing policies in 1993 was only 1.3 out of a possible 5 total. However, community policing policies increased to a total of 2.3 on average by 1997. Place oriented tactics increased from 3.5 to 4.9 on a scale of zero to 10. The mean number of citizen involvement practices also increased from 2.2 to 3.0. Finally, problem solving practices increased by nearly 39% from 6.6 to 8.5 on a scale ranging from zero to 16.

Table 4. Changes in Policing Practices from the National Survey of Community Policing Strategies

Policing Survey	Mean 1993	Index Range	Standard Deviation	Change	% Change 1997
Collaboration	7.2	0 - 16	2.96	1.2	16.7
Problem Solving	6.6	0 - 16	3.38	1.9	28.8
Citizen Involvement	2.2	0 - 10	1.87	0.8	36.4
Code Enforcement	1.7	0 - 4	1.25	0.5	29.4
CP Policy	1.3	0 - 5	1.46	1.0	76.9
Crime Analysis	1.7	0 - 5	1.23	0.1	6.0
Place Oriented	3.5	0 - 10	2.39	1.4	40.0
Efficiency	6.5	0 - 12	2.42	0.8	12.3

N=868

Although changes in officer rates, drug arrest and minor disorder arrest rates from 1993 to 1997 were significantly correlated (Table 5), none of these variables is highly correlated with changes in policing practices. In fact, only two of the eight indexes (place oriented and efficiency efforts) are weakly correlated with changes in officers and arrests. This lack of correlation is noteworthy because officer and arrest rates can not be modeled with the two wave policing survey data using a Granger methodology. If officer and arrest rates were highly correlated with changes in policing practices, their exclusion from regression analyses would introduce omitted variable bias. That is, the relationships

[10] See Appendix D for descriptive statistics pertaining to each of the 80 individual policing practices.

between policing practices and crime might actually be due to the fact that practices were correlated with officers or arrests. Nevertheless, officer and arrest rates were included as checks of robustness after regression of policing practices were carried out (see Tables 43-36).

The most substantial correlation shown in Table 5 below relates to officer and drug arrest rates (.60). Interestingly however, the correlation between officers and misdemeanor arrests is substantially lower (.21). Consequently, the addition of officers to a police agency may not automatically lead to equal amounts of increases in all types of arrests. Nevertheless, these correlations require that officers, drug arrest, and minor disorder arrests be modeled together in a single equation to estimate the unique effect of each variable. Finally, the Chronbach's alpha statistics indicate that the individual items that comprise the indexes for minor drug arrests (.87) and disorder arrests (.61) are sufficiently similar to be included together.

Table 5. Correlation of Officers and Minor Arrests and Policing Indexes

Tactic	Officer Rate	Drug Arrest Rate	Disorder Arrest Rate
Officer Rate	--	.60	.21
Drug Arrest Rate	.60	--	.19
Misd. Arrest Rate	.21	.19	--
Citizen Involvement	n.s.	n.s.	n.s.
Code Enforcement	n.s.	n.s.	n.s.
Collaboration Efforts	n.s.	n.s.	n.s.
CP Policy	n.s.	n.s.	n.s.
Crime Analysis	n.s.	n.s.	n.s.
Problem Solving	n.s.	n.s.	n.s.
Place Oriented	-.07	n.s.	n.s.
Efficiency	.09	n.s.	n.s.
Alpha	--	α=.87	α=.61

Table 6 below indicates that policing practice indexes are correlated at varying levels. For example, citizen involvement is only weakly correlated with code enforcement (.14) and crime analysis (.17). However, changes in the number of citizen

involvement practices demonstrate a moderately strong correlation with problem-solving (.41) and collaboration efforts (.32). As a result, the unique contribution of each of these concepts to crime reduction was obtained by modeling relevant indexes together in a single regression. Finally, the Chronbach's alpha statistics indicate that the individual items that comprise the indexes of policing practices are sufficiently similar to be included together.

Table 6. Correlations Among the Policing Practice Indexes (1993-1997)

	Citizen Involv.	Code Enforc.	Collab. Efforts	CP Policy	Crime Analysis	Problem Solving	Place Oriented	Efficiency
Citizen Involvement	--	.14	.32	.21	.17	.41	.34	.30
Code Enforcement	.14	--	.28	.19	.19	.37	.31	.33
Collaboration Efforts	.32	.28	--	.32	.24	.52	.34	.35
CP Policy	.21	.19	.31	--	.17	.40	.33	.25
Crime Analysis	.17	.19	.24	.17	--	.37	.22	.29
Problem Solving	.41	.37	.52	.40	.37	--	.40	.47
Place Oriented	.35	.31	.34	.33	.22	.40	--	.32
Efficiency	.30	.33	.35	.25	.29	.47	.32	--
Alpha	α=.63	α=.55	α=.68	α=.71	α=.50	α=.66	α=.73	α=.63

N=868

CHAPTER 5

RESULTS

Section I - The Influence of Officers, Drug and Disorder Arrests

Although hypotheses 1 and 2 in this study focus on the effects of the number of officers and minor arrests on crime rates, it was possible that the causal direction of this relationship could be opposite of the expected direction. More specifically, crime could have exerted a causal impact on officer and minor arrest rates. Additionally, the relationships between crime and the independent variables could have been reciprocal. Consequently, a preliminary step that was required in Granger analyses involved the assessment of the nature and direction of the relationships between crime and the variables of interest. As discussed in the methodology, this step was carried out by regressing crime on lags of itself and then adding lagged officers into the model to determine whether the inclusion of the officers variables significantly increased the explanation of crime via an F-test of the residuals. These steps were repeated for minor drug and disorder arrests as well. For these preliminary analyses, no control variables other than fixed effects for jurisdiction (place) and year were included.

Preliminary Granger Causality Assessments

The results of the regressions and F-tests are shown in Tables 7-12. These data clearly suggest that during the 1990s, officer rates had an impact on crime and that the relationship was unidirectional.[11] Crime did not significantly effect the number officers in police jurisdictions across the nation. More specifically, the values of the F-tests in Table 7 indicated that rates of murder, robbery, burglary and other crime types did not

[11] Reciprocal causality, however, would not be problematic as the Granger method is specifically designed for use among variables with causality in both directions.

explain subsequent changes in officer rates. However, the number of officers per capita did have a significant impact on robbery, aggravated assault, burglary, larceny and vehicle theft (but not murder or rape) according to F-test values (Table 8). When no other explanatory or control variables were entered into the regression model, R-squared values indicated that changes in officer rates explained 2.6% of the variation in larceny and slightly over 1% of the variation in aggravated assault (.014), burglary (.011) and vehicle theft (.012). To aid in the comparison of the explained variance (R-squared) between officer and misdemeanor arrests, agencies that did not report both officers and minor arrests were removed from these preliminary analyses and therefore, the number or jurisdictions (n=8,050) is slightly smaller for the initial Granger testing than for subsequent regressions. The resulting sample size 47,097 indicates the total repeated observations for each year during the 1990s.

Table 7. Granger Analyses of the Impact of Crime on the Number of Police

Independent Variables	F Value	F Probability	R^2 Value	R^2 Increase
Police	--	--	.04	--
Murder	1.00	.81	.04	n.s.
Rape	1.00	.99	.04	n.s.
Robbery	1.00	.99	.04	n.s.
Assault	1.00	.99	.04	n.s.
Burglary	1.00	.97	.04	n.s.
Larceny	1.00	.96	.04	n.s.
Vehicle theft	1.00	.99	.04	n.s.
Sample Size	47,097			
D.F.	47,092			

Agency (N)=8,050

Table 8. Granger Analyses of the Impact of the Number of Police on Crime

Police effects on Crime	F Value	F Probability	R^2 Value	R^2 Increase
	--	--		--
Murder	1.01	.547	.119	n.s. [+]
Rape	1.04	.000	.063	n.s. [+]
Robbery	1.06	.000	.746	.0001
Assault	1.12	.000	.411	.014
Burglary	1.05	.000	.530	.011
Larceny	1.38	.000	.460	.026
Vehicle theft	1.12	.000	.605	.012
Sample Size	47,097			
D.F.	47,092			

[+] t-value not significant for one year lag of officers
Agency (N)=8,050

The initial Granger assessment of causal direction with regard to drug and disorder arrests suggested that minor arrests impacted felony offense rates and that these relationships during the 1990s were also unidirectional. Lagged values of crime did not significantly effect the number minor arrests in police jurisdictions across the nation. More specifically, the values of the F-tests in Tables 9 and 11 indicated that rates of murder, robbery, burglary and other crime types did not explain subsequent changes in minor drug or disorder arrest rates.

The number of minor drug arrests per 1,000 citizens as indicated in Table 10 significantly impacted all crime categories with the exception of rape according to F-test values. When no other explanatory or control variables were entered into the regression model, R-squared values indicated that changes in drug arrest rates explained 2% of the variation in larceny, slightly over 1% of the variation in burglary (.014) and vehicle theft (.014) and less then 1% of the variation in robbery (.004) and murder (.005).

Table 9. Granger Analyses of the Impact of Crime on Misdemeanor Drug Arrests

Independent Variables	F Value	F Probability	R^2 Value	R^2 Increase
Drug Arrests	--	--	.126	--
Murder	1.00	.807	.126	n.s.
Rape	1.00	.930	.127	n.s.
Robbery	1.01	.169	.131	n.s.
Assault	1.01	.377	.130	n.s.
Burglary	1.01	.392	.129	n.s.
Larceny	1.01	.392	.129	n.s.
Vehicle theft	1.00	.818	.127	n.s.
Sample Size	47,097			
D.F.	47,092			

Agency (N)=8,050

Table 10. Granger Analyses of the Impact of Misdemeanor Drug Arrests on Crime

Drug Arrest effects on Crime	F Value	F Probability	R^2 Value	R^2 Increase
Murder	1.07	.000	.124	.005
Rape	1.05	.000	.065	n.s. [+]
Robbery	1.47	.000	.748	.004
Assault	1.01	.250	.409	.012
Burglary	1.49	.000	.533	.014
Larceny	1.17	.000	.453	.020
Vehicle theft	1.39	.000	.610	.014
Sample Size	47,097			
D.F.	47,092			

[+] t-value not significant for one year lag of minor drug arrests

Agency (N)=8,050

The number of minor, non-drug related disorder arrests per 1,000 citizens as indicated in Table 12 significantly impacted robbery, burglary and vehicle theft according to F-test values. However, the effects of disorder arrest rates on crime were small. When no other explanatory or control variables were entered in to the regression model, R-squared values indicated that changes in these disorder arrest rates explained less then 1% of the variation in robbery (.002), burglary (.003) and vehicle theft (.002).

Table 11. Granger Analyses of the Impact of Crime on Misdemeanor Disorder Arrests

Independent Variables	F Value	F Probability	R^2 Value	R^2 Increase
Disorder Arrests	--	--	.328	--
Murder	1.000	.900	.329	n.s.
Rape	1.00	.877	.329	n.s.
Robbery	1.00	.624	.330	n.s.
Assault	1.01	.388	.329	n.s.
Burglary	1.00	.648	.329	n.s.
Larceny	1.00	.813	.329	n.s.
Vehicle theft	1.00	.761	.329	n.s.
Sample Size		47,097		
D.F.		47,092		

N=8,050

Table 12. Granger Analyses of the Impact of Misdemeanor Disorder Arrests on Crime

Disorder Arrest Effects on Crime	F Value	F Probability	R^2 Value	R^2 Increase
Murder	1.02	.011	.121	n.s. [+]
Rape	1.02	.053	.063	n.s. [+]
Robbery	1.09	.000	.747	.002
Assault	1.02	.025	.397	n.s. [+]
Burglary	1.02	.016	.522	.003
Larceny	1.02	.079	.435	n.s. [+]
Vehicle theft	1.03	.000	.592	.002
Sample Size		47,097		
D.F.		47,092		

[+] t-value not significant for one year lag of misdemeanor arrests.

Agency (N)=8,050

With crime as the dependent variable, Tables 13-15 (below) show the beta coefficients and t-statistic values for the one and two-year lags of officers and minor arrests in the preliminary Granger causality regressions. The vast majority of the significant effects of officers and minor arrests occurred in the previous year (i.e. the first lag) as indicated by t values greater than, or less than 1.65. However, effect sizes as indicated by beta coefficients in Granger analyses cannot be directly interpreted as in standard OLS regression. Interpretation requires adjustment for the inclusion of lagged

dependent variables. Tables 16 through 18 provide further detail pertaining to effect sizes.

Table 13. One and Two-year Beta Coefficients for the Effects of Officer Rates on Crime

	One-Year Lag		Two-Year Lag			
Officer Effects on Crime	Coef.	t	Coef.	t	F Value	F Probability
Murder	-.0013	-1.15	-.0009	-1.35	1.01	.547
Rape	-.0155	-1.60	-.0058	-0.99	1.04	.000
Robbery	-.1003	-3.13	-.0130	-1.18	1.06	.000
Assault	-.6264	-12.23	.0331	0.81	1.12	.000
Burglary	-.9815	-11.77	-.0240	-0.35	1.05	.000
Larceny	-3.5027	-10.74	.0781	0.40	1.38	.000
Vehicle theft	-.8329	-12.57	.0464	0.92	1.12	.000
Sample Size	47,097					
D.F.	47,092					

Agency (N)=8,050

Table 14. One and Two-Year Beta Coefficients for the Effects of Drug Arrests on Crime

	One-Year Lag		Two-Year Lag			
Drug Arrest Effects on Crime	Coef.	t	Coef.	t	F Value	F Probability
Murder	-.0299	-1.77	-.0133	-1.44	1.07	.000
Rape	-.0587	-0.85	-.0749	-3.18	1.05	.000
Robbery	-.8973	-3.43	-.1859	-1.11	1.47	.000
Assault	-2.801	-2.89	.4552	1.36	1.01	.250
Burglary	-4.947	-3.59	-.2030	-0.44	1.49	.000
Larceny	-14.867	-2.62	1.80	1.13	1.17	.000
Vehicle theft	-3.9503	-3.05	.62	1.20	1.39	.000
Sample Size	47,097					
D.F.	47,092					

Agency (N)=8,050

Table 15. One and Two-Year Beta Coefficients for the Effects of Disorder Arrests on Crime

	One-Year Lag		Two-Year Lag			
Disorder Arrest Effects on Crime	Coef.	t	Coef.	t	F Value	F Probability
Murder	-.0209	-1.15	.0044	0.28	1.02	.011
Rape	.1122	1.78	-.0182	-0.29	1.02	.053
Robbery	-1.177	-4.24	0.3459	1.36	1.09	.000
Assault	-.9002	-1.06	1.1025	1.98	1.02	.025
Burglary	-2.647	-1.92	1.3092	1.33	1.02	.016
Larceny	-4.400	-1.24	1.9353	0.86	1.02	.079
Vehicle theft	-2.230	-1.82	1.6303	2.05	1.03	.000
Sample Size	47,097					
D.F.	47,092					

Agency (N)=8,050

Effect sizes in Granger analyses must be adjusted for the influence of lagged dependent variables. The formula for this adjustment is shown in Tables 16-18 along with beta coefficients for one and two-year lags of the independent variables. When no other explanatory or control variables were entered in to the regression model, results indicated that an increase of 10 officers was associated with a reduction of over 8 larcenies (-8.13), and more than 2 burglaries (-2.49) and vehicle thefts (-2.88) per 100,000 citizens.

Table 16. Adjusted Effect Sizes for Initial Granger Regressions of Officers and Crime

	Indep. Variable Effects		Dependent Variable Effects		Calculated Total Effect
Officer Effects on Crime	Lag 1	Lag 2	Lag 1	Lag 2	(x1 + x2) / (1 - (y1 + y2))
Murder	--	--	--	--	n.s.
Rape	--	--	--	--	n.s.
Robbery	-.100	n.s.	.984	-.121	- 0.73
Assault	-.626	n.s.	.652	-.101	- 1.40
Burglary	-.982	n.s.	.647	-.041	- 2.49
Larceny	-3.502	n.s.	.665	-.096	- 8.13
Vehicle theft	-.833	n.s.	.828	-.117	- 2.88
	x1	x2	y1	y2	

Officer rates are per 10,000 citizens and crime rates are per 100,000.

Table 17 (below) indicates that each additional 100 minor drug arrests by police agencies were associated with a reduction of 34 larcenies (-34.09), over 13 burglaries (-13.14) and vehicle thefts (-13.62), as well as 6.45 robberies per 100,000 citizens. Additionally, Table 18 indicates that each additional 100 minor disorder arrests by police agencies were associated with a reduction of 8.5 robberies (-8.54) and 6.5 burglaries (-6.51) and .61 vehicle thefts per 100,000 citizens when no other explanatory or control variables were entered in to the regression model.

Table 17. Adjusted Effect Sizes for Initial Granger Regressions of Drug Arrests and Crime

	Indep. Variable Effects		Dependent Variable Effects		Calculated Total Effect
Drug Arrest Effects on Crime	Lag 1	Lag 2	Lag 1	Lag 2	(x1 + x2) / (1 - (y1 +y2))
Murder	-.030	n.s.	.158	.077	-0.039
Rape	--	--	--	--	n.s.
Robbery	-.897	n.s.	.980	-.120	-6.45
Assault	--	--	--	--	n.s.
Burglary	-4.947	n.s.	.642	-.034	-13.14
Larceny	-14.861	n.s.	.647	-.083	-34.09
Vehicle theft	-3.950	n.s.	.822	-.112	-13.62
	x1	x2	y1	y2	

Drug arrest rates are per 1,000 citizens and crime rates are per 100,000.

Table 18. Adjusted Effect Sizes for Initial Granger Regressions of Disorder Arrests and Crime

	Indep. Variable Effects		Dependent Variable Effects		Calculated Total Effect
Disorder Arrest Effects on Crime	Lag 1	Lag 2	Lag 1	Lag 2	(x1 + x2) / (1 - (y1 +y2))
Murder	--	--	--	--	n.s.
Rape	--	--	--	--	n.s.
Robbery	-1.17	n.s.	.984	-.121	-8.54
Assault	--	--	--	--	n.s.
Burglary	-2.648	n.s.	.618	-.025	-6.51
Larceny	--	--	--	--	n.s.
Vehicle theft	-2.230	1.630	.795	-.093	-0.61
	x1	x2	y1	y2	

Disorder arrest rates are per 1,000 citizens and crime rates are per 100,000.

The preliminary Granger analyses shown in Tables 16-18 (above) suggest that during the 1990s, changes in the number of officers and minor arrests in jurisdictions across the nation impacted crime and that the primary effect of these variables occurred through a one-year lag. Consequently, subsequent analyses were conducted to more closely examine the effects of changes in officer rates and minor arrests on each of the

seven felony index offenses utilizing a one-year lag with control variables included as described in the methodology and shown in the equation in Figure 41.

Full Models Using Granger Regression

To more accurately determine the overall policing effect on crime during the 1990s, officer, drug and disorder arrest rates were simultaneously entered into regression models. As previously reported in Table 5, officer rates, drug arrest and disorder arrest rates are correlated. Thus, by entering these variables into together into regression, it was possible to determine the total amount of unique variation that was attributed to each independent variable.

Table 19. Final Granger Regression for Murder (Full Model)

Murder	Coef.	Robust S.E.	t	Probability
Officer Rate (lagged)	.0048	.0026	1.86	.063
Drug Arrests (lagged)	-.0394	.0209	-1.88	.060
Disorder Arrests (lagged)	-.0044	.0173	-0.25	.799
Per Capita Income *	-.1713	.1094	-1.57	.117
Age 15-24 %	.2281	.2061	1.11	.269
Nonwhite %	.1506	.1425	1.06	.291
Employment Rate *	-.0079	.0031	-2.53	.012
Dependent Var. lag 1	.1175	.0260	4.51	.000
Dependent Var. lag 2	.0553	.0150	3.67	.000
R-square change (ofc., arrests)	n.s.			
R-square	.1519			

N=9,362 * multiplied by 1,000 to reduce leading zeros.

Table 20. Final Granger Regression for Rape (Full Model)

Rape	Coef.	Robust S.E.	t	Probability
Officer Rate (lagged)	-.0039	.0080	-0.49	.625
Drug Arrests (lagged)	-.0828	.0523	-1.58	.113
Disorder Arrests (lagged)	.0805	.0495	1.62	.105
Per Capita Income *	.0870	.1029	-0.85	.398
Age 15-24 %	.7870	.3235	2.43	.015
Nonwhite %	-.7434	.2948	-2.52	.012
Employment Rate *	-.0140	.0061	-2.30	.022
Dependent Var. lag 1	.1917	.0200	9.57	.000
Dependent Var. lag 2	.0244	.0117	2.08	.038
R-square change (ofc., arrests)	n.s.			
R-square	.0962			

N=9,362 * multiplied by 1,000 to reduce leading zeros.

Murder, Rape and Robbery

Consistent with the preliminary Granger analyses, Tables 19 and 20 (above) indicate that changes in jurisdictional officer rates, as well as minor drug and disorder arrests rates were not strongly associated with declines in murder or rape. Although the t-value for drug arrests (-1.88) was marginally significant for murder, further analyses indicated that the effect size was so minute that meaningful interpretation was not feasible. Additionally, the reason for the positive, but marginally significant t-value pertaining to the relationship between officers (1.86) and murder is unknown. With regard to control variables, only the employment rate (-2.53) was associated murder. This analysis indicates that increases in employment were associated with declines in murder. However, the effect size of this control variable is not directly interpretable in Granger regression and is beyond the scope of this study.

With regard to the offense of rape, none of the t-values pertaining to changes in officers (-.49), drug arrests (-1.58) or disorder arrests (1.62) approached statistical

significance at the .05 level. With regard to control variables, this analysis indicates that as the proportion of the population that was aged 15 to 24 increased, the number of reported rapes also increased as indicated by the t-value 2.43. Additionally, the proportion of population that was nonwhite (-2.52) and employment rate (-2.30) were inversely associated with the number of reported rapes. However, the effect sizes pertaining to control variables are not directly interpretable in Granger regression and are beyond the scope of this study.

Table 21 (below) indicates that increases in both drug and disorder arrest rates were associated with decreases in robbery rates. Although effect sizes will be discussed in a subsequent section, these data indicate that minor drug arrests were more strongly associated with robbery than disorder arrests. It is also noteworthy that when the officer rate variable was simultaneously entered into the model with drug and disorder arrest rates, the officer-effect on robbery (from preliminary regressions) became non-significant. The number of officers per capita was not associated with robbery when information pertaining to drug and disorder arrests were included in the model. Lastly, these data indicate that none of the control variables significantly explained jurisdictional trends in robbery during the 1990s at the .05 level. However, it was noted that per capita income was significantly and inversely associated with reported rates of robbery at the .10 level.

Table 21. Final Granger Regression for Robbery (Full Model)

Robbery	Coef.	Robust S.E.	t	Probability
Officer rate (lagged)	.0409	.0468	0.87	.382
Drug Arrests (lagged)	-.9269	.2461	-3.77	.000
Disorder Arrests (lagged)	-.5783	.2406	-2.40	.016
Per Capita Income *	-3.713	2.173	-1.71	.088
Age 15-24 %	6.987	4.342	1.61	.108
Nonwhite %	2.136	2.459	0.87	.385
Employment Rate *	.0034	.0406	0.08	.933
Dependent Var. lag 1	.9378	.0820	11.44	.000
Dependent Var. lag 2	-.1791	.0793	-2.26	.024
R-square change (ofc., arrests)	.0112			
R-square	.7564			

N=9,362 * multiplied by 1,000 to reduce leading zeros

Aggravated Assault

Increases in the number of officers per 10,000 citizens were associated with reductions in aggravated assault as indicated by the t-value of -6.84 in Table 22 (below). Additionally, increases in drug arrests were marginally significant (-1.72). However, changes in jurisdictional disorder arrests were not associated with annual aggravated assault rates. Effect sizes pertaining to officers and drug arrests will be discussed in a subsequent section. With regard to control variables, these data indicate that increases in employment (-3.5) and per capita income (-2.1) were associated with declines in aggravated assault.

Table 22. Final Granger Regression for Aggravated Assault (Full Model)

Aggravated Assault	Coef.	Robust S.E.	t	Probability
Officer Rate (lagged)	-.4922	.0720	**-6.84**	.000
Drug Arrests (lagged)	-.7923	.4603	-1.72	.085
Disorder Arrests (lagged)	.3652	.4231	0.86	.388
Per Capita Income *	-1.982	.9424	**-2.10**	.035
Age 15-24 %	1.947	2.269	0.45	.656
Nonwhite %	2.712	2.269	1.20	.232
Employment Rate *	-.0929	.0266	**-3.50**	.000
Dependent Var. lag 1	.6328	.0191	33.09	.000
Dependent Var. lag 2	-.0892	.0153	-5.83	.000
R-square change (ofc., arrests)	.0223			
R-square	.4178			

N=9,362 * multiplied by 1,000 to reduce leading zeros.

Burglary

Increases in the number of officers per 10,000 citizens were associated with reductions in burglary as indicated by the t-value of -2.17 in Table 23 (below). Additionally, increases in drug arrests were also significantly (-2.96) associated with declines in burglary. However, changes in jurisdictional disorder arrests were not associated with annual burglary rates. Effect sizes pertaining to changes in officers and drug arrests will be discussed in a subsequent section. With regard to control variables, these data indicate that increases in employment and per capita income were associated with declines in burglary.

Table 23. Final Granger Regression for Burglary (Full Model)

Burglary	Coef.	Robust S.E.	t	Probability
Officer Rate (lagged)	-.3611	.1670	**-2.17**	.030
Drug Arrests (lagged)	-3.868	1.305	**-2.96**	.003
Disorder Arrests (lagged)	-.6397	.9202	-0.70	.487
Per Capita Income *	-5.165	2.175	**-2.37**	.018
Age 15-24 %	-3.238	8.835	-0.37	.714
Nonwhite %	-6.681	4.016	-1.66	.096
Employment Rate *	.2355	.0681	**-3.46**	.001
Dependent Var. lag 1	.6041	.0200	30.18	.000
Dependent Var. lag 2	-.0662	.0270	-2.45	.005
R-square change (ofc., arrests)	.0185			
R-square	.5591			

N=9,362 * multiplied by 1,000 to reduce leading zeros.

Larceny

Increases in the number of officers per 10,000 citizens were associated with reductions in larceny as indicated by the t-value of -5.10 in Table 24 (below). However, changes in jurisdictional drug (-1.47) and disorder arrest (-1.13) rates were not associated with annual larceny rates. The effect size of changes in officer rates pertaining to larceny will be discussed in a subsequent section. With regard to control variables, these data indicate that increases in employment (-2.59) and per capita income (-2.37) were associated with declines in larceny. Additionally, the proportion of population that was nonwhite (-2.46) and proportion of the population that was aged 15 to 24 (-1.9) were inversely associated with larceny.

Table 24. Final Granger Regression for Larceny (Full Model)

Larceny	Coef.	Robust S.E.	t	Probability
Officer rate (lagged)	-2.52	.4944	**-5.10**	.000
Drug Arrests (lagged)	-4.73	3.220	-1.47	.142
Disorder Arrests (lagged)	-4.11	3.646	-1.13	.259
Per Capita Income *	-5.17	2.175	**-2.37**	.018
Age 15-24 %	-27.69	14.567	-1.90	.057
Nonwhite %	-22.99	9.36	**-2.46**	.014
Employment Rate *	.353	.1364	**-2.59**	.010
Dependent Var. lag 1	.6209	.0241	25.73	.000
Dependent Var. lag 2	-.0909	.0232	-3.92	.000
R-square change (ofc., arrests)	.0229			
R-square	.4595			

N=9,362 * multiplied by 1,000 to reduce leading zeros.

Vehicle Theft

Increases in the number of officers per 10,000 citizens were associated with reductions in vehicle theft as indicated by the t-value of -2.60 in Table 25 (below). Additionally, increases in drug arrests were also marginally significant (-1.80) and inversely associated with vehicle theft. However, changes in jurisdictional disorder arrests were not associated with this offense. The effect sizes of changes in officer rates and drug arrests pertaining to larceny will be discussed in a subsequent section. With regard to the influence of control variables, only the proportion of population that was young (aged 15 to 24) was associated with vehicle theft at the .05 level. These data indicate that as the proportion of youth population increased, reports of vehicle theft also increased. It was also noted that per capita income was marginally and inversely related to reports of vehicle theft.

Table 25. Final Granger Regression for Vehicle Theft (Full Model)

Vehicle theft	Coef.	Robust S.E.	t	Probability
Officer rate (lagged)	-.4536	.1742	**-2.60**	.009
Drug Arrests (lagged)	-2.303	1.281	-1.80	.072
Disorder Arrests (lagged)	-1.133	.7046	-1.61	.108
Per Capita Income *	-6.839	3.823	-1.79	.074
Age 15-24 %	19.192	9.334	**2.06**	.040
Nonwhite %	3.561	4.901	0.73	.468
Employment Rate *	-.1397	.0929	-1.50	.133
Dependent Var. lag 1	.7711	.0472	16.33	.000
Dependent Var. lag 2	-.1506	.0300	-5.01	.000
R-square change (ofc., arrests)	.0157			
R-square	.6221			

N=9,362 * multiplied by 1,000 to reduce leading zeros.

Final Model Effect Sizes

As previously discussed, effect sizes pertaining Granger analyses must be adjusted for the influence of the lagged dependent variables. Consequently, effect sizes were calculated using the same formula indicated in Tables 16-18. These results are shown under the columns labeled "Total" in Tables 26-28 (below). However, to provide some additional context or perspective with regard to the relative influence of officers and minor arrests, the following column indicates the change that would be required to reduce crime by 1 unit per 100,000 population. For example, in Table 26 below, the total officer effect on larceny was calculated to be -5.36. That is, each additional officer per 10,000 citizens was associated with a reduction of 5.36 larcenies in a jurisdiction of size 100,000. To convert this figure into individual units (i.e. 1 larceny), the formula 1/total was calculated (e.g. 1/-5.36), resulting in a figure of .19 officers per 10,000 citizens. This equates to 1.9 officers per 100,000 population.

According to the Granger regression procedure and these data as shown in Table 26, the number of officers required to reduce one larceny per 100,000 citizens was 1.9.

The number of officers required to reduce one burglary per 100,000 citizens was 13. Additionally, 8.3 and 9.3 officers were required to result in one less vehicle theft and aggravated assault.

Table 26. Effect Size Calculations for Final Models of Officers and Crime

	Officers	Lag DV1	Lag 2	Total	To reduce by 1 unit per 100,000
Murder	--	.1175	.0553	n.s.	--
Rape	--	.1917	.0244	n.s.	--
Robbery	--	.9378	-.1791	n.s.	--
Assault	-.4922	.6328	-.0892	-1.08	9.3 officers
Burglary	-.3611	.6041	-.0662	-0.78	13 officers
Larceny	-2.520	.6209	-.0909	-5.36	1.9 officers
Vehicle theft	-.4536	.7711	-.1506	-1.20	8.3 officers

N=9,362

Table 27 below shows the calculated effect sizes pertaining to minor drug arrests. The same procedure followed with regard to officer rates in the previous table was utilized to provide additional context pertaining to the relative influence of drug arrests. The right hand column indicates the change that would be required to reduce crime by 1 unit per 100,000 population. For example, in Table 27 below, the total effect of minor drug arrests on burglary was calculated to be -8.37. That is, each additional arrest per 1,000 citizens was associated with a reduction of 8.37 burglaries in a city of size 100,000.

According to the Granger regression procedure and these data as reported in Table 27, the number of arrests per 1,000 required to reduce one burglary per 100,000 citizens was .119 (or 11.9 annual arrests in a jurisdiction of 100,000 citizens. To reduce crime by 1 robbery per 100,000 citizens, 26 minor drug arrests were required. The impact of drug arrests on murder was very small such that 2,000 additional arrests were associated the reduction of one murder per 100,000 population.

Table 27. Effect Size Calculations for Final Models of Drug Arrests and Crime

	Drug	Lag DV1	Lag 2	Total	To reduce by 1 unit per 100,000
Murder	-.0394	.1175	.0553	-0.05	2000 arrests
Rape	--	.1917	.0244	n.s.	--
Robbery	-.9269	.9378	-.1791	-3.84	26 arrests
Assault	-.7923	.6328	-.0892	-1.74	57.5 arrests
Burglary	-3.868	.6041	-.0662	-8.37	11.9 arrests
Larceny	--	.6209	-.0909	n.s.	--
Vehicle theft	--	.7711	-.1506	n.s.	--

N=9,362

Table 28 below shows the calculated effect sizes pertaining to minor disorder arrests. The same procedure followed with regard to minor drug arrest rates in the previous table was utilized to provide context or perspective with regard to the relative influence of disorder arrests. According to the Granger regression procedure and these data as reported in Table 28, the number of arrests per 1,000 required to reduce one robbery per 100,000 citizens was .416 (or 41.6 annual arrests in a jurisdiction of 100,000 citizens. No offense types other than robbery were significantly reduced by additional disorder arrests when officer rates and drug arrests rates were simultaneously entered into the regression model.

Table 28. Effect Size Calculations for Final Models of Disorder Arrests and Crime

	Disorder	Lag DV1	Lag 2	Total	To reduce by 1 unit per 100,000

Murder	--	.1175	.0553	n.s.	--
Rape	--	.1917	.0244	n.s.	--
Robbery	-.5783	.9378	-.1791	-2.40	41.6 arrests
Assault	--	.6328	-.0892	n.s.	--
Burglary	--	.6041	-.0662	n.s.	--
Larceny	--	.6209	-.0909	n.s.	--
Vehicle theft	--	.7711	-.1506	n.s.	--

N=9,362

Summary of Results - Officers, Drug and Disorder Arrests - Hypotheses 1 and 2

Hypothesis 1, which asserted that increases in the number of officers per capita contributed to reductions in crime during the 1990s was supported for all offense categories other than murder, rape and robbery. However, effect sizes were very small. The largest officer effect was for the offense of larceny and indicated that nearly 2 additional officers were required to reduce one larceny per 100,000 citizens nationwide.

Hypothesis 2, which asserted that increases in arrests for minor drug and disorder offenses contributed to reductions in crime during the 1990s was supported only for robbery, aggravated assault and burglary with regard to drug arrests. The strongest drug arrest effect was substantial for the offense of burglary and indicated that only 11.9 additional misdemeanor drug arrests would be needed to reduce one burglary per 100,000 citizens nationwide. However, hypothesis 2 was not supported for disorder arrests with the exception of the offense of robbery. A total of 41.6 additional disorder arrests were associated with the elimination of 1 robbery per 100,000 citizens nationwide.

The total amount of variation in crime that was explained by changes in officers and minor drug and disorder arrests varied by offense category. These specific policing changes demonstrated no effect on the offenses of murder and rape. However, their total combined effect as indicated by the change in the value of the R-square statistic

suggested that slightly more than 1% of the change in robbery rates nationwide could be attributed to changes in officers and minor arrests. Additionally, these policing variables were associated with 2.2% of the reduction in aggravated assault, as well as 1.9% of burglary, 1.6% of vehicle theft, and 2.3% of the reduction in larceny rates nationwide during the 1990s.

Results Section II - Policing Practices

Analyses of changes in policing practices (i.e. tactics and strategies) other than arrest and police force strength was conducted in two parts. The first portion assessed changes among broad categories of practices through the creation of summative indexes of individual survey items pertaining to similar types of tactics. The second part assessed the influence of changes in the reported implementation of specific individual tactics. The National Survey of Community Policing Strategies was administered in two waves (1993 and 1997). Both waves consisted of 80 items pertaining to the current implementation of specific tactics and strategies by each police organization.

Reported changes in the breadth of each of the 10 policing practice indexes were first included in regressions of crime individually. For example, problem solving was included as the key independent variable for murder, robbery, rape, aggravated assault, burglary, larceny and vehicle theft. Next, after assessing the crime effects of each summative index individually, the indexes were entered into regressions simultaneously to determine which of them explained unique variation in crime. All regression models included the control variables that were utilized in previous analyses as well as lagged values of the level and changes of the dependent variable as described in the methodology and illustrated in Figure 44.

Initial Models - Policing Practice Indexes

Table 29 (below) shows the beta coefficients and standard errors from these regressions. Numbers that are shown in bold print reflect statistically significant relationships with crime. These regression results suggest that robbery, burglary, larceny and vehicle theft were each associated with broader implementation of at least one policing practice index. However, none of the policing practice indexes significantly explained changes in murder, rape, or aggravated assault. Vehicle theft was inversely associated with increases in reported citizen involvement (-16.12), collaboration efforts by the police agency (-17.64), place or "hot spot" oriented approaches (-14.51), and problem solving techniques that were implemented at both the organization (-22.55) and line (-17.12) levels. Larceny and burglary also decreased as citizen involvement and organizational level problem solving increased. Additionally, robbery decreased as the number of reported problem and place oriented activities increased. The influence of control variables and relative effect sizes are discussed in the following sections.

Table 29. Regression Coefficients and Standard Errors for Crime and Policing Tactics Indexes

Tactic	Murder	Rape	Robbery	Assault	Burglary	Larceny	Vehicle Theft
Citizen Involvement	-0.19	0.01	-6.84	2.51	**-16.17**	**-49.78**	**-16.12**
	(0.17)	(0.36)	(4.21)	(3.79)	**(8.04)**	**(22.49)**	**(8.78)**
Code Enforcement	-0.20	0.21	-6.09	3.73	-1.71	-33.13	-12.33
	(0.21)	(0.57)	(3.97)	(7.79)	(10.38)	(27.52)	(13.04)
Collaboration Efforts (Org)	-0.11	0.16	-4.68	-1.30	-11.95	-23.87	**-17.64**
	(0.17)	(0.38)	(4.19)	(3.53)	(8.54)	(25.17)	**(9.70)**
Collaboration Efforts (Line)	-0.27	0.54	-4.33	-9.31	-4.57	-10.48	6.63
	(0.20)	(0.43)	(2.83)	(6.10)	(8.66)	(20.06)	(9.04)
CP Policy	0.34	-0.07	4.89	-0.14	-0.40	22.50	24.43
	(0.22)	(0.46)	(4.67)	(5.69)	(12.86)	(34.95)	(12.26)
Crime Analysis	0.08	-0.04	-8.44	0.01	-15.16	-24.43	-12.45
	(0.28)	(0.62)	(5.44)	(6.10)	(13.48)	(38.14)	(14.98)
Place Oriented	-0.15	0.02	**-6.88**	-1.36	-8.78	-14.77	**-14.51**
	(0.15)	(0.31)	**(3.95)**	(3.36)	(8.26)	(24.02)	**(7.34)**
Problem Solv. (Org)	-0.15	-0.29	**-9.05**	2.77	**-18.23**	**-41.26**	**-22.55**
	(0.14)	(0.40)	**(3.80)**	(3.87)	**(7.70)**	**(21.43)**	**(7.33)**
Problem Solv. (Line)	-0.06	-0.18	**-6.82**	2.99	-10.39	-21.04	**-17.12**
	(0.14)	(0.30)	**(3.06)**	(3.33)	(7.02)	(19.78)	**(6.51)**
Efficiency	-.05	0.15	-1.55	-1.07	-7.68	-11.16	-9.71
	(0.12)	(0.34)	(3.07)	(2.98)	(6.17)	(17.62)	(7.28)

N=868. Robust S.E in parentheses.
Significant coefficients ($p<.10$) are shown in bold print.

Full Model - Policing Practice Indexes

After assessing the crime effects of each summative index individually, these items were entered into a regression simultaneously to determine which indexes explained unique variation in crime. For example, to assess effects on vehicle theft, citizen involvement, collaboration efforts, place oriented and problem solving indexes were entered into a regression model along with all control variables. Indexes that did not explain a significant amount of variation in vehicle theft were removed from further regressions, one at a time, beginning with the least influential index. This procedure was followed until all remaining indexes explained variation at the .10 level or lower. The final results of the data reduction process pertaining to the policing practice indexes are shown in Tables 30-33 below.

Vehicle Theft

When the relevant indexes (i.e. those that were significant in Table 29 above) were entered together in into the regression of vehicle theft, the two problem solving indexes were all that remained in terms of statistical significance. Among the 868 jurisdictions, each additional problem solving tactic that was implemented at the organization level was associated with a decrease of nearly 17 vehicle thefts (-16.91) per 100,000 citizens (Table 30). Additionally, each new problem solving tactic that was implemented at the line-level was associated with a decrease of 10.59 vehicle thefts. With regard to the influence of control variables, this analysis indicated that the percentages of the population that were nonwhite and young (i.e. aged 15 to 24) were positively associated with reported vehicle theft. The influence of youth in the population was quite strong, indicating that a one percentage increase in population aged

15 to 24 was associated with an increase of approximately 87 vehicle thefts per 100,000 citizens nationwide.

The last line of the table labeled "R-square change" reflects that total variation in vehicle theft that was associated with the addition of both problem solving indexes to the regression. These data indicate that 3.1% of the decline in vehicle thefts from 1993 to 1997 was associated with increases in the breadth of problem solving tactics by police agencies nationwide.

Table 30. Regression Results of Vehicle Theft and Policing Practice Indexes

Vehicle Theft	Coef.	Robust S.E.	t	Probability
Problem Solving (Org.)	-16.9141	6.6167	**-2.556**	.0107
Problem Solving (Line)	-10.5966	5.6230	**-1.885**	.0597
Employment Rate	.7752	.6150	1.260	.2078
Nonwhite %	32.3039	14.3254	**2.255**	.0243
Age 15-24 %	87.0767	32.6334	**2.668**	.0077
Per Capita Income	-.0042	.0087	-.487	.6263
Vehicle 1990 Level	-.3180	.0300	-10.609	.0000
Vehicle change 1990-1993	-.3839	.0985	-3.896	.0001
R-square	.508			
R-square change	.031			

N=868 Significant items (p<.10) in bold print.

Larceny

The data reduction process described above was also followed with regard to larceny. When the relevant indexes (i.e. those that were significant in Table 29 above) were entered together in into the regression, only the citizen involvement index remained statistically significant. Among the 868 jurisdictions, each newly reported citizen involvement was associated with a decrease of nearly 50 larcenies (-49.7) per 100,000 citizens. With regard to the influence of control variables, this analysis indicated that the rate of employment was positively associated with reported larcenies. A one unit

increase in per capita employment was associated with approximately four fewer larcenies (3.99). The R-square change value also indicated that 2.5% of the decline in larcenies from 1993 to 1997 was associated with increases in the breadth of citizen involvement in policing. The percentages of the population that were nonwhite and young (i.e. aged 15 to 24) were also weakly and positively associated with reported larcenies.

Table 31. Regression Results of Larceny and Policing Practice Indexes

Larceny	Coef.	Robust S.E.	t	Probability
Citizen Involvement	-49.7781	22.4911	**-2.213**	.0271
Employment Rate	3.9999	1.5891	**2.517**	.0120
Nonwhite %	51.0735	29.0574	**1.758**	.0791
Age 15-24 %	131.3268	75.4158	**1.741**	.0819
Per Capita Income	-.0357	.0236	-1.512	.1308
Larceny 1990 Level	-.1303	.0266	-4.893	.0000
Larceny change 1990-1993	-.1280	.0763	-1.678	.0936
R-square	.134			
R-square change	.025			

N=868 Significant items (p<.10) in bold print.

Burglary

With regard to burglary, when the relevant indexes were entered together in into the regression, only problem solving at the organization level remained statistically significant. Among the 868 jurisdictions, each newly reported problem solving technique at the organization level was associated with a decrease of over 18 burglaries (-18.2) per 100,000 citizens. The R-square change value also indicated that 1.6% of the decline in burglaries from 1993 to 1997 were associated with increases in the breadth of organization level problem solving.

With regard to the influence of control variables, this analysis indicates that the rate of employment was positively associated with reported burglary. A one unit increase

in per capita employment was associated with approximately 1.6 additional burglaries per 100,000 citizens. Additionally, the influence of youth in the population was quite strong, indicating that a one percentage increase in population aged 15 to 24 was associated with an increase of approximately 71 burglaries. Lastly, as per capita income increased, reported rates of burglary decreased (-2.16).

Table 32. Regression Results of Burglary and Policing Practice Indexes

Burglary	Coef.	Robust S.E.	t	Probability
Problem Solving (Org.)	-18.2256	7.6982	**-2.368**	.0181
Employment Rate	1.5961	.6111	2.612	.0091
Nonwhite %	7.8941	9.1681	.861	.3894
Age 15-24 %	71.1785	28.2359	**2.521**	.0118
Per Capita Income	-.0203	.0093	**-2.167**	.0304
Burglary 1990 Level	-.2937	.0208	-14.088	.0000
Burglary change 1990-1993	-.3103	.0473	-6.565	.0000
R-square	.379			
R-square change	.016			

N=868 Significant items (p<.10) in bold print.

Robbery

For robbery, when the relevant indexes were entered together in into the regression, the two problem solving indexes were all that remained statistically significant. Among the 868 jurisdictions, each additional problem solving tactic that was implemented at the organization level was associated with a decrease of nearly 7 robberies (-6.8) per 100,000 citizens (Table 33). Additionally each new problem solving tactic that was implemented at the line-level was associated with a decrease of 4.2 robberies. The R-square change value also indicated that 2.1% of the decline in robberies from 1993 to 1997 was associated with increases in the breadth of problem solving at the organization and line levels.

With regard to the influence of control variables, this analysis indicated that the percentages of the population that were nonwhite and young (i.e. aged 15 to 24) were positively associated with reported robbery. A one percentage increase in population aged 15 to 24 was associated with an increase of approximately 16 robberies. Lastly, a one percentage increase in population that was nonwhite was associated with an increase of approximately 21 robberies per 100,000 citizens nationwide.

Table 33. Regression Results of Robbery and Policing Practice Indexes

Robbery	Coef.	Robust S.E.	t	Probability
Problem Solving (Org.)	-6.8340	3.1436	**-2.174**	.0299
Problem Solving (Line)	-4.2292	2.2405	**-1.888**	.0593
Employment Rate	.0268	.2565	.105	.9167
Nonwhite %	21.0976	7.1713	**2.942**	.0033
Age 15-24 %	16.0653	7.9073	**2.032**	.0424
Per Capita Income	-.0049	.0050	-.983	.3260
Robbery 1990 Level	-.3411	.0255	-13.388	.0000
Robbery change 1990-1993	-.4070	.0889	-4.580	.0000
R-square	.757			
R-square change	.021			

N=868 Significant items (p<.10) in bold print.

Summary of Results - Policing Indexes - Hypothesis 3

Hypothesis 3 asserted that increases in the implementation of broad categories of Collaboration Effort, Problem Solving, Citizen Involvement, Code Enforcement, Community Policing Policies, Crime Analysis, Place Oriented Strategies and Efficiency Efforts contributed to reductions in crime during the 1990s. This hypothesis was supported only for problem solving and citizen involvement. Each additional policing practice pertaining to problem solving reduced crime by more than 10 robberies, 18 burglaries and 27 vehicle thefts per 100,000 citizens. Additionally, each new citizen involvement was associated with a reduction of nearly 50 larcenies per 100,000

population nationwide. None of the broad policing indexes explained changes in murder, rape or aggravated assault.

The total amount of variation in crime that was explained by increases in problem solving and citizen involvement varied by offense category. These broad indexes of policing practices demonstrated no effect on the offenses of murder, rape or aggravated assault. However, their total combined effect as indicated by the change in the value of the R-square statistic suggested that slightly more than 2% of the change in robbery rates nationwide could be attributed to increases in generic problem solving. Additionally, policing practice indexes were associated with 1.6% of the reduction in burglary, as well as 3.1% of vehicle theft, and 2.5% of the reduction in larceny rates nationwide from 1993 to 1997.

Initial Models - Individual Policing Practices

The following portion of the analyses of changes in policing practices are oriented toward specific, individual tactics and strategies. As a first step, each of the crime types were regressed against each of the 80 individual survey items separately along with control variables. The following steps involved a data reduction procedure, similar to the one implemented with the summative indexes. Each of the items that significantly explained crime in the individual regressions were simultaneously included in a regression model and the weakest non-significant items were removed one at a time until only significant policing practices remained.

Table 34 (below) lists all of the individual items that were significantly associated with reductions in one or more of the crime rates. Of the 80 original individual policing practices, 39 were significantly associated with reduction of at least one crime type as

indicated by the value "X". Each variable is numbered and can be cross referenced to the complete list of tactics shown in Appendix B to obtain more specific information about the survey question and topic. However, to facilitate an overview of the relationships, items are listed by policing practice index category. For example, the first five items in the table below (items 68-73) all pertain to citizen involvement.

The table may be read from top to bottom to determine which groups of tactics were most commonly associated with the reduction of a specific type of crime. Additionally, the table may be read from left to right to determine which tactics were associated with the greatest number of crime types. Reading from top to bottom in the vehicle theft column for example, it is apparent that 9 of the 16 problem solving items were associated with reductions that were significant at the .10 level or lower. Moving one column to the left, the data indicated that five of the citizen involvement items were associated with reductions in larceny rates. Additionally, burglary and robbery were associated with the implementation of a variety of tactics. However, murder, rape and aggravated assault were associated with very few of the 80 tactics.

Reading from left to right, the data indicated that two tactics (#56 and #79) were associated with reductions in the five of the seven crime types. Variable #56 pertains to civil and regulatory code enforcement by most patrol officers in the department (see appendix B). Variable #79 indicates that citizens prepare agreements specifying work to be done the police pertaining to neighborhood problems. These two policing practices were associated with reductions of most of the crime categories. It is also noteworthy that implementation of a crime analysis function (item #43) was associated reductions in four of the seven crime categories nationwide from 1993 to 1997.

Table 34. Significant Individual Policing Practices from Initial Crime Regression Models

Index Category	Var	Murder	Rape	Robbery	Assault	Burglary	Larceny	Vehicle
Citizen involv	68					X	X	
Citizen involv	69						X	
Citizen involv	70			X			X	
Citizen involv	73					X	X	
Civil codes	56	X		X		X	X	X
Collaboration	7		X					
Collaboration	11							X
Collaboration	13							X
Collaboration	25							X
Collaboration	26					X		
Collaboration	46	X						
Collaboration	51				X			X
Collaboration	74						X	
CP policy	1			X				
Crime analysis	43	X		X		X		X
Efficiency	8				X			
Efficiency	34			X		X	X	X
Efficiency	36			X		X	X	
Efficiency	53				X			X
Place	9			X		X		X
Place	10							X
Place	29	X		X	X		X	
Place	30				X			
Place	32			X				
Place	38					X		X
Place	39							X
Place	40		X					
Problem Solving	14					X		
Problem Solving	15					X		
Problem Solving	22		X	X				X
Problem Solving	35		X					
Problem Solving	47		X					
Problem Solving	50					X		
Problem Solving	52				X			X
Problem Solving	57			X		X	X	X
Problem Solving	60			X				X
Problem Solving	61			X				X
Problem Solving	62							X
Problem Solving	63							X
Problem Solving	66		X			X		X
Problem Solving	79	X		X		X	X	X

N=868

Final Models - Individual Policing Practices

Table 35 (below) lists the variables that were significantly associated with crime declines after the data reduction process described above. Vehicle theft reduction was associated with civil code enforcement by patrol officers (#56), foot patrol (#11), implementation of a crime analysis function (#43) and implementation of a program where citizens prepared work agreements for the police pertaining to neighborhood problems (#79). Additionally, the implementation of a citizen police academy was associated with reductions in both burglary and larceny. After the data reduction process, the two most broadly influential variables were civil code enforcement (#56) and the implementation of a crime analysis unit (#43). More detailed analyses pertaining to the full models of specific offenses and crime can be found in the following sections.

Table 35. Significant Policing Practices After Data Reduction Procedure - Final Regression Models

Tactic Description	Var	Murder	Rape	Robbery	Assault	Burglary	Larceny	Vehicle
Citizens help review complaints against police	69						X	
Citizens participate in selection process for new officers	70			X			X	
Citizens attend citizen police academy	73					X	X	
Most officers enforce civil and code violations in their areas	56			X		X	X	X
Agency used foot patrol as a specific assignment	11							X
Most officers assist in organizing community	51				X			
Agency has a centralized crime analysis unit/function	43	X		X		X		X
Drug tip hot line or Crime Stoppers program	8				X			
Agency participates in an interagency drug task force	36					X	X	
Fixed assignment of patrol officers to specific beats or areas	9					X		
Mobile, neighborhood-based offices or stations	29	X			X			
Interagency involvement in problem identification and resolution	22		X	X				
Multidisciplinary teams to deal with special problems	35		X					
Most officers work with other city agencies to solve neighb. problems	47		X					
Citizens prepare agreements specifying work to be done on problems	79			X		X		X
Cpt or Lt can redesign organization to support problem solving	57			X				

Although the previous two tables are useful for obtaining an overview of regression results, more detailed information regarding the specific effects of each individual variable after data reduction can be found in Tables 36-42 (below). Each of these regressions included all control variables that were utilized in the previous regressions. Additionally, consistent with the regressions of the summative indexes, information pertaining to levels and changes in crime that occurred just prior to the first survey wave (i.e. prior to 1993) were also included.

Vehicle Theft

Results from Table 36 indicate that citizen prepared (problem solving) work agreements explained the largest portion of unique variation in vehicle theft when combined with other influential tactics. Agencies that began a citizen work agreement procedure after 1993 experienced 83 fewer vehicle thefts per 100,000 population across jurisdictions nationwide. Implementation of foot patrol as a specific assignment for officers was associated with a reduction of over 61 vehicle thefts per 100,000 population in addition to the reductions from crime analysis (-30.7) and civil code enforcement (-43.8). Finally, with regard to the influence of control variables it is noteworthy that an increase in youth population (individuals aged 15-24) was associated with increases in vehicle theft. Similar to previous regressions, each additional percentage increase in population aged 15 to 24 was associated with an increase of approximately 75 vehicle thefts per 100,000 citizens nationwide.

The last line of the table labeled "R-square change" reflects the total variation in vehicle theft that was associated with the addition of the individual policing practices to the regression. These data indicate that 6.5% of the decline in vehicle thefts from 1993 to

1997 was associated with the implementation of citizen work agreements, foot patrol, crime analysis and civil code enforcement among surveyed police agencies.

Table 36. Regression Results of Vehicle Theft and Individual Policing Practices - Final Model

Vehicle Theft	Coef	Robust S.E.	t	Prob
V11. Foot Patrol	-61.8012	26.8520	**-2.302**	.0215
V43. Crime Analysis Unit	-30.6792	16.1624	**-1.898**	.0579
V56. Ofc. Enforce Civil Codes	-43.8294	24.8125	**-1.766**	.0776
V79. Citizens contract officer work	-83.2962	28.2191	**-2.952**	.0032
Employment Rate	.6402	.5932	1.079	.2807
Nonwhite %	23.7746	14.0371	**1.694**	.0906
Age 15-24 %	75.4629	29.2946	**2.576**	.0101
Per Capita Income	-.0051	.0088	-.585	.5590
Vehicle Theft (Rate 1990)	-.3171	.0278	-11.423	.0000
Vehicle Change (90-93)	-.3979	.0940	-4.231	.0000
R-Square	.542			
R-Square Change	.065			

N=868 Significant items (p<.10) in bold print.

Larceny

Although civil code enforcement explained the largest portion of unique variation in larceny rates (-204.5) when this variable was combined with other influential tactics, the results listed in Table 37 below clearly indicated that citizen involvement was a central factor pertaining to the reduction of larceny rates. After the data reduction, three of the five remaining tactics fell into this category. These data suggest that agencies that began allowing citizens to participate in the officer hiring process, implemented a citizens police academy and initiated citizen review of officer complaints experienced over 425 fewer larcenies per 100,000 population on average. Implementation of a drug task force was also associated with reduction in larcenies (-151.1). Overall, these variables explained a substantial 7.7% of the reduction in larceny rates between 1993 and 1997.

With regard to the influence of control variables, this analysis indicated that the rate of employment was positively associated with reported larcenies. Similar to the previous regression of the policing indexes, a one unit increase in per capita employment was associated with approximately four fewer larcenies (3.97). Lastly, each percentage increase in nonwhite population was associated with an increase of more than 52 larcenies.

Table 37. Regression Results of Larceny and Individual Policing Practices - Final Model.

Larceny	Coef	Robust S.E.	t	Prob
V36. Drug Task Force	-151.1711	79.8267	**-1.894**	.0585
V56. Ofc. Enforce Civil Codes	-204.4458	53.4279	**-3.827**	.0001
V69. Citz. Review Complaints	-144.3570	64.0883	**-2.253**	.0245
V70. Citizens Hire Officers	-149.7331	73.8271	**-2.028**	.0428
V73. Citizen Police Academy	-132.3151	58.3981	**-2.266**	.0236
Employment Rate	3.9730	1.5608	**2.546**	.0110
Nonwhite %	52.5942	25.3104	**2.078**	.0379
Age 15-24 %	77.8352	69.5491	1.119	.2633
Per Capita Income	-.0428	.0226	-1.898	.0580
Larceny (Rate 1990)	-.1213	.0255	-4.753	.0000
Larceny Change (90-93)	-.1195	.0736	-1.624	.1046
R-Square	.186			
R-Square Change	.077			

N=868 Significant items (p<.10) in bold print.

Burglary

Citizen prepared (problem solving) work agreements and assignment of officers to fixed patrol areas explained substantial portions of unique variation with regard to burglary rates when these variables were combined with other influential tactics (Table 38). Agencies that began a citizen work agreement procedure after 1993 experienced 48.7 fewer burglaries per 100,000 population across jurisdictions nationwide. Implementation of a crime analysis unit was associated with a reduction of approximately 46 fewer burglaries per 100,000 population in addition to the reductions from drug task

force implementation (-51.2) and civil code enforcement (-35.7). Additionally, implementation of a citizens academy (-43.2) and fixed patrol assignment (-46.0) were also associated with burglary reduction. Overall, these variables explained 4.2% of the reduction in larceny rates between 1993 and 1997.

With regard to the influence of control variables it is noteworthy that an increase in youth population (individuals aged 15-24) and the rate of employment were associated with increases in burglary theft. These positive relationships may lend support to routine activities theory, which asserts that the number of motivated offenders and suitable targets that are away from home are both increased when employment rates and youth population are high.

Table 38. Regression Results of Burglary and Individual Policing Practices - Final Model.

Burglary	Coef	Robust S.E.	t	Prob
V9. Fixed Patrol Assign.	-46.0085	27.4239	**-1.678**	.0937
V36. Drug Task Force	-51.2124	30.5258	**-1.678**	.0937
V43. Crime Analysis Unit	-43.9837	23.1268	**-1.902**	.0574
V56. Ofc. Enforce Civil Codes	-35.6881	18.4091	**-1.939**	.0528
V73. Citizen Police Academy	-43.2390	23.8905	**-1.810**	.0706
V79. Citizens contract officer work	-48.7178	22.8665	**-2.131**	.0333
Employment Rate	1.5777	.5892	**2.678**	.0075
Nonwhite %	6.8774	8.3344	.825	.4094
Age 15-24 %	63.5226	25.6280	**2.479**	.0133
Per Capita Income	-.0229	.0086	**-2.656**	.0080
Burglary (Rate 1990)	-.2961	.0209	-14.160	.0000
Burglary Change (90-93)	-.2902	.0472	-6.147	.0000
R-Square	.406			
R-Square Change	.042			

N=868 Significant items (p<.10) in bold print.

Aggravated Assault

Only three of the 80 tactics demonstrated any significant relationship with regard to reductions in rates of aggravated assault among jurisdictions across the nation after the

data reduction procedure. Agencies where most officers began making efforts to assist communities in organizing experienced fewer aggravated assaults (-48.5) as did agencies that implemented mobile, neighborhood based offices or stations (-39.5). In this regard, it is noteworthy that implementation of mobile -- but not permanent -- neighborhood based stations was associated with reduction in aggravated assaults. Finally, jurisdictions that implemented a drug or crime tip telephone line also experienced fewer aggravated assaults (-51.3). Overall, these variables explained a substantial 2.3% of the reduction in larceny rates between 1993 and 1997.

Table 39. Regression Results of Agg. Assault and Individual Policing Practices - Final Model.

Aggravated Assualt	Coef	Robust S.E.	t	Prob
V8. Drug/Crime Tip Line	-51.2594	28.1025	**-1.824**	.0684
V29. Neighborhood Stations	-39.5115	16.8125	**-2.350**	.0189
V51. Assist Comm. Organization	-48.5381	23.1879	**-2.093**	.0365
Employment Rate	-.4470	.4463	-1.002	.3167
Nonwhite %	-1.2983	6.6888	-.194	.8461
Age 15-24 %	27.8880	13.5814	**2.053**	.0402
Per Capita Income	.0047	.0063	.745	.4565
Agg. Assault (Rate 1990)	-.2632	.0308	-8.545	.0000
Agg. Assault Change (90-93)	-.5047	.0995	-5.074	.0000
R-Square	.412			
R-Square Change	.023			

N=868 Significant items (p<.10) in bold print.

Robbery

Six of the 80 variables were associated with significant reductions in robbery rates between 1993 and 1997 after the data reduction procedure. Among these variables, the crime reduction effects were fairly evenly distributed. However, it is noteworthy that one half of these significant policing practices pertained to problem-solving, even though these items were highly correlated. Citizen prepared problem-solving work agreements

were associated with 31 fewer robberies (-31.3). Additionally, implementation of interagency problem-solving (-17.5) and the ability of middle managers to redesign the organization to support problem-solving efforts (-12.0) were also associated with substantial robbery rate reductions. The impact of civil code enforcement by patrol officers (-23.0) and implementation of a crime analysis unit (-16.4) were also significant. Overall, these variables explained a substantial 5.7% of the reduction in robbery rates between 1993 and 1997.

With regard to control variables, only the portion of nonwhite population was significantly associated with rates of robbery. A one percent increase in nonwhite population was associated with an increase in approximately 19 robberies per 100,000 citizens nationwide. Employment and youth population demographics were not associated with robbery rates during the 1993 to 1997 period among the 868 sampled agencies.

Table 40. Regression Results of Robbery and Individual Policing Practices - Final Model.

Robbery	Coef	Robust S.E.	t	Prob
V22. Interagency Problem Solving	-17.4729	8.1307	**-2.149**	.0318
V43. Crime Analysis Unit	-16.3900	7.9373	**-2.065**	.0391
V56. Ofc. Enforce Civil Codes	-23.0228	8.9490	**-2.573**	.0102
V57. Redesign Organization	-12.0327	6.5065	**-1.850**	.0646
V70. Citizens Hire Officers	-22.8167	11.9502	**-1.909**	.0565
V79. Citizens contract officer work	-31.2793	10.5010	**-2.979**	.0030
Employment Rate	.0860	.1961	.438	.6612
Nonwhite %	19.3200	5.3043	**3.642**	.0003
Age 15-24 %	8.6368	6.9083	1.250	.2115
Per Capita Income	-.0059	.0043	-1.364	.1729
Robbery (Rate 1990)	-.3285	.0200	-16.401	.0000
Robbery Change (90-93)	-.3541	.0844	-4.196	.0000
R-Square	.794			
R-Square Change	.057			

N=868 Significant items (p<.10) in bold print.

Rape

Interestingly, all three of the policing practices that demonstrated a significant relationship with regard to reported declines in rates of rape (Table 41) were oriented toward coordination with external organizations and individuals. Implementation of multidisciplinary teams to deal with special problems was associated with 2.6 fewer reported rapes per 100,000 citizens. Additionally, implementation of interagency problem-solving (-2.50) and working with other agencies (-2.61) were also associated with significant rape reduction. These relationships are particularly noteworthy given that rates of reported rape did not decline among most agencies and actually increased among smaller jurisdictions during the late 1990s.

With regard to the influence of control variables, this analysis indicated that the rate of employment was positively associated with reported rape. A one unit increase in per capita employment was associated with approximately 0.1 additional rapes per 100,000 citizens. Lastly, as per capita income increased, reported rates of rape decreased (-0.001). Overall, the policing variables explained 1.5% of the reduction in rape rates between 1993 and 1997.

Table 41. Regression Results of Rape and Individual Policing Practices - Final Model.

Rape	Coef	Robust S.E.	t	Prob
V22. Interagency Problem Solving	-2.4959	1.2593	**-1.982**	.0477
V35. Multidisc. Problem Teams	-2.6124	1.0911	**-2.394**	.0168
V47. Work With Other Agencies	-1.9455	.9595	**-2.028**	.0428
Employment Rate	.0907	.0325	**2.794**	.0053
Nonwhite %	.7303	.7094	1.029	.3035
Age 15-24 %	.1196	1.4808	.081	.9357
Per Capita Income	-.0016	.0006	**-2.709**	.0068
Rape (Rate 1990)	-.3095	.0402	-7.699	.0000
Rape Change (90-93)	-.6755	.0656	-10.293	.0000
R-Square	.464			
R-Square Change	.015			

N=868 Significant items (p<.10) in bold print.

Murder

Although none of the summative policing indexes were associated with significant reductions in murder rates among jurisdictions across the nation, two of the 80 individual policing practice variables were associated with small but significant reductions in this offense. Implementation of mobile, neighborhood-based police stations was associated with a reduction of about one murder annually per 100,000 population (-.95). In this regard it is noteworthy that implementation of mobile -- but not permanent -- neighborhood based stations was associated with murder reduction. The implementation of mobile neighborhood based stations was also associated with reduction in aggravated assault, a closely related criminal offense that often leads to murder. Additionally implementation of a crime analysis unit also demonstrated a small but significant statistical effect (-.80).

With regard to the influence of control variables, only youth population was significantly related to rates of murder. A one percentage increase in population aged 15 to 24 was associated with a approximately 1 additional murder per 100,000 citizens.

Overall, the policing variables explained 1.0% of the reduction in murder rates between 1993 and 1997.

Table 42. Regression Results of Murder and Individual Policing Practices - Final Model.

Murder	Coef	Robust S.E.	t	Prob
V29. Neighborhood Stations	-.9475	.4631	**-2.046**	.0410
V43. Crime Analysis Unit	-.7850	.4353	**-1.803**	.0716
Employment Rate	-.0106	.0110	-.959	.3380
Nonwhite %	.1913	.2308	.829	.4073
Age 15-24 %	1.0059	.4691	**2.144**	.0322
Per Capita Income	-.0001	.0002	-.305	.7606
Murder (Rate 1990)	-.3122	.0359	-8.707	.0000
Murder Change (90-93)	-.5824	.0509	-11.454	.0000
R-Square	.602			
R-Square Change	.010			

N=868 Significant items (p<.10) in bold print.

Summary of Results - Individual Policing Tactics - Hypothesis 4

Hypothesis 4 asserts that increases in the implementation of specific tactics and strategies pertaining to Collaboration Efforts, Problem Solving, Citizen Involvement, Code Enforcement, Community Policing Policies, Crime Analysis, Place Oriented Strategies and Efficiency Efforts contributed to reductions in crime. This hypothesis was fully supported. At least one individual policing tactic within each of the broader categories was associated with reductions in all seven of the offense types.

With regard to the size of the relative effects that were associated with specific policing practices, the influences of individual items were typically equal to or greater than any of the summative indexes or changes in officer rates. For example, the implementation of citizen prepared work agreements was associated with a decline of more than 31 robberies and 48 burglaries. In contrast, however, the combined effect of both problem solving indexes was associated with only 11 fewer robberies and 18 fewer

burglaries. Further, in order to obtain an equivalent reduction in robbery, 806 minor drug arrests, or 1,426 minor disorder arrests would be required. In order to obtain an equivalent reduction in burglary, 576 minor drug arrests, or additional 624 officers would be required, based on Granger analyses.

These variations in crimes that were associated with specific, individual policing practices also suggested that a variety of policing tactics resulted in equivalent crime effects from a statistical standpoint. For example, implementation of a crime analysis function was associated with 44 fewer burglaries and more than 16 fewer robberies. Additionally, enforcement of civil and regulatory code violations by most patrol officers was associated with 44 fewer burglaries and 23 fewer robberies. These effect sizes reflect crime changes over a four year period and are not inordinately high in terms of credibility or believability. Furthermore, the relative effects of individual policing practices were not substantially altered by the inclusion of variables pertaining to officer and minor arrest rates (Tables 43-46). They were also robust to the removal of large and small agencies from regression models (Tables 45-46).

The total amount of variation in crime that was explained by specific policing practices varied by offense category. In contrast to the summative indexes, these specific policing practices were associated with reductions of all seven offenses, including murder, rape and aggravated assault. The total combined effect of individual items after the data reduction procedure as indicated by the change in the value of the R-square statistic suggested that 5.7% of the change in robbery rates nationwide was associated with their implementation. Additionally, these individual policing practices were associated with 4.2% of the reduction in burglary, 6.5% of vehicle theft, 7.7% of larceny,

2.3% of aggravated assault, 1.5% of rape and 1.0% of murder rates nationwide from 1993 to 1997.

Perhaps equally important, however, these analyses of individual tactics facilitated further assessment of the nature or types practices that were most associated with each offense. For example, Table 34 clearly suggests that the vast majority of problem solving items were associated with reduction in vehicle theft. Nevertheless, although using the index categories to analyze policing practices is useful, it relies upon a priori categorization of tactics and strategies. Analyses of patterns or trends among policing practices that were associated with specific offenses may also include more complicated constructs, such as collective efficacy or fear reduction techniques. Consequently, the discussion that follows pertaining to individual policing practices and crime will include observations regarding the nature of practices that were associated with each type of offense without reference to the a priori index categories.

Robustness Checks

Previous analyses indicated that changes in the number of officers per capita, as well as drug and disorder arrests rates were not significantly correlated with changes in problem-solving, citizen involvement, or community collaboration index measures. Thus, their inclusion in regression models should not substantially alter relationships pertaining to policing practices and crime. However, to test this assertion, changes in officer rates, along with drug and disorder arrests rates were included in regressions of both the summative policing indexes and individual policing practice items.

Table 43 below indicates that the number of officers per capita, drug arrest and disorder arrests rates were not significantly associated with robbery reduction in the two-

wave National Survey of Community Policing Strategies sample. More importantly however, as expected, the inclusion of these variables did not substantially alter the influence of the problem-solving index. Thus, the problem-solving index was robust to the inclusion of these additional policing variables.

Table 43. Robustness Check - Adding Officers, Arrests to Policing Index Regression of Robbery

Robbery	Coef	Robust S.E.	t	Prob
Officer Rate	.7446	.9691	.768	.4424
Disorder Arrest Rate	1.3523	2.6339	.513	.6077
Drug Arrest Rate	.4265	1.0914	.391	.6960
Problem Solving	-9.0777	3.3421	**-2.716**	.0067
Employment Rate	-.0168	.2512	-.067	.9467
Nonwhite %	19.7172	6.9494	**2.837**	.0046
Age 15-24 %	17.7498	7.5466	**2.352**	.0188
Per Capita Income	-.0078	.0043	**-1.837**	.0664
Robbery Rate (1990)	-.3854	.0268	-14.400	.0000
Robbery Change (90-93)	-.4679	.0754	-6.209	.0000

N=868 Significant items (p<.10) in bold print.

As indicated in Table 44 below, the number of officers per capita, drug arrest and disorder arrests rates were also added to a regression of individual policing practices. The number of officers per capita, drug arrest and disorder arrests rates were not significantly associated with larceny reduction in the two-wave National Survey of Community Policing Strategies sample. Additionally, as expected, the inclusion of these variables did not substantially alter the influence of the individual policing practice items. The implementation of a drug task force, civil code enforcement by officers, and citizen involvement variables remained significant and robust to the inclusion of these additional policing variables.

Table 44. Robustness Check - Adding Officers, Arrests to Individual Policing Practice Regression of Larceny

Larceny	Coef	Robust S.E.	t	Prob
Officer Rate	14.9596	8.9333	**1.675**	.0942
Disorder Arrest Rate	-7.4842	7.2922	-1.026	.3049
Drug Arrest Rate	10.3822	6.9901	1.485	.1377
V36. Drug Task Force	-210.5028	90.8077	**-2.318**	.0206
V56. Ofc. Enforce Civil Codes	-211.3682	57.5699	**-3.672**	.0002
V70. Citizens Hire Officers	-153.5360	85.1993	**-1.802**	.0717
V73. Citizen Police Academy	-129.5309	63.0498	**-2.054**	.0401
Employment Rate	3.9916	1.6746	**2.384**	.0173
Nonwhite %	49.8792	26.2889	**1.897**	.0580
Age 15-24 %	141.1548	73.0338	**1.933**	.0534
Per Capita Income	-.0315	.0230	-1.373	.1697
Larceny Rate (1990)	-.1036	.0223	-4.640	.0000
Larceny Change (90-93)	-.1103	.0731	-1.509	.1314

N=868 Significant items (p<.10) in bold print.

To ensure that the regressions of policing practices were not driven solely by large or small agencies (or sample size), additional robustness checks shown in Tables 45 and 46 below were conducted by removing all responding jurisdictions from the largest and smallest population categories. That is, all jurisdictions with over 250,000 population were removed and all jurisdictions with populations of smaller than 25,000 were removed from the analysis. Regression of the problem-solving and citizen involvement of indexes were again conducted to determine whether the relationship between these variables and crime would substantially change. Tables 45 and 46 below clearly indicate that both problem-solving and citizen involvement indexes were robust to the removal of large and small agencies as well as the resulting decline in sample size.

Table 45. Robustness Check - Removing Agencies With Over 250,000 and Less Than 25,000 Population - Regression of Robbery and Problem Solving Index

Robbery	Coef	Robust S.E.	t	Prob
Problem Solving	-18.4168	5.6658	**-3.251**	.0015
Employment Rate	-.3173	.9541	-.333	.7400
Nonwhite %	19.7009	11.7821	**1.672**	.0970
Age 15-24 %	69.2044	21.9159	**3.158**	.0020
Per Capita Income	.0003	.0101	.027	.9784
Robbery Rate (1990)	-.3373	.0347	-9.712	.0000
Robbery Change (90-93)	-.3758	.1411	-2.664	.0087

N=567 Significant items (p<.10) in bold print.

Table 46. Robustness Check - Removing Agencies With Over 250,000 and Less Than 25,000 Population - Regression of Larceny and Citizen Involvement Index

Larceny	Coef	Robust S.E.	t	Prob
Citizen Involvement	-75.0950	32.7389	**-2.294**	.0235
Employment Rate	8.1626	5.2101	1.567	.1197
Nonwhite %	55.2938	53.5163	1.033	.3035
Age 15-24 %	358.7265	199.8768	**1.795**	.0751
Per Capita Income	-.0674	.0619	-1.089	.2783
Larceny Rate (1990)	-.1735	.0574	-3.021	.0030
Larceny Change (90-93)	-.0857	.1679	-.510	.6107

N=567 Significant items (p<.10) in bold print.

CHAPTER 6

DISCUSSION

Officers and Crime - Connections to Prior Empirical Findings

After an extensive review of studies conducted prior to 1995, Eck and Maguire (2000) concluded that there was little evidence showing reductions in crime rates due to marginal increases in officers. However, other researchers have noted that most prior analyses failed to utilize methodologies to address the reciprocal nature of police force strength and crime rates (Kovandzic & Sloan, 2002; Marvel & Moody, 1996). Recent research suggests that the number of officers per capita increased nationwide during the 1990s (Roth et al., 2000) and three recent analyses have found support for the relationship between the number of officers within jurisdictions and crime rates (Kovandzic & Sloan, 2002; Marvell & Moody, 1996; Levitt, 1997). Nevertheless, prior analyses of the effects of officers on crime included only large jurisdictions or regional subsamples. The analyses in this study include jurisdictions of all sizes from all regions of the nation and indicate that the nationwide average officer rate increased by more than 16 percent from 1990 to 2000. Moreover, these data are generally supportive of assertions that increases in the number of police officers per capita were associated with crime reduction.

However, when jurisdictions of all sizes were included in analyses, the "officer effects"[12] for the nation as a whole were somewhat smaller than in previous studies. For example, Marvell and Moody (1996) analyzed data from cities with over 250,000 population, finding that the addition each new officer resulted in a reduction of 5.3

[12] The term "effect" as utilized here refers to the strength of the beta coefficient and is not intended to suggest that a cause-effect relationship has been established.

burglaries, 12.5 larcenies and 4.5 vehicle thefts. In contrast, these more comprehensive data indicated that each additional officer per 10,000 citizens resulted in a reduction of 2.5 burglaries, 8.1 larcenies, and 2.9 vehicle thefts for each 100,000 citizens nationwide when no other explanatory variables were included in regression models.

The types of crime offenses that were found to be significantly impacted by increases in officers in previous research have varied substantially. Marvell and Moody (1996) found significant effects for all index offenses other than rape. Levitt (1997) primarily focused on generic violent and property indexes but included robustness checks indicating that vehicle theft, larceny, aggravated assault, and rape were not consistently reduced. Finally, in a county level analysis of Florida jurisdictions, Kovandzic and Sloan (2002) found significant officer effects for burglary, larceny, and robbery but not murder, rape or aggravated assault. Thus, with the exception of rape, which has not demonstrated statistical significance in any of these studies, findings have been more consistent with regard to property crime than violent offenses. These nationwide data support previous findings regarding the officer related crime reducing effects of each of the property offense categories. Additionally, consistent with previous findings no officer effect was found with regard to rape.

A noteworthy critique of these recent studies, however, is that none of them included variables pertaining to rival explanations concerning what it is that the police actually do or the tactics that are employed (Skogan & Frydl, 2004). An objective of this study, therefore, was to address this concern by entering minor drug and disorder arrests as well as other policing practices into models along with changes in officer force strength. When information pertaining to minor drug and disorder arrests was included,

the officer effect was further reduced for all categories and the apparent relationship between officer increases and robbery rates was eliminated. More specifically, the decline in robbery rates nationwide was more closely associated with minor drug and disorder arrest rates than changes in officers. This finding is of particular interest given that all three recent studies have indicated a significant relationship with regard to robbery. This finding also lends support to assertions by criminal justice researchers (Nagin, 1998; Skogan & Frydl, 2004) that apparent crime reducing effects may in fact depend on the actions or assertiveness of officers.

Final Granger regression models that included minor drug and disorder arrests along with control variables indicated that each additional officer per 10,000 citizens resulted in a reduction of less than one burglary (.78), 5.4 larcenies, 1.2 vehicle thefts, and 1.1 aggravated assaults per 100,000 citizens. Stated another way, in order to reduce one burglary per 100,000 citizens, 13 additional officers were required. A reduction of one larceny required nearly two additional officers, and the reduction of one vehicle theft or aggravated assault required more than eight additional officers. Consequently, the amount of crime reduction nationwide due to increases in officers during the 1990s was small. Nevertheless, these data also suggest that a portion of the "officer effect" originated through increases in minor drug and disorder arrests that coincided with increases in officers.

Increases in the number of officers per capita within jurisdictions were correlated with increases minor drug and disorder arrests. The correlation between officer rate and minor drug arrests was quite high (.60). This finding provides some support for assertions that sustainable anti-drug crackdowns may require increases force strength

(Scott, 2004; Sherman & Weisburd, 1995; Weisburd & Green, 1995). However, it is also a noteworthy that the correlation between officer rates and disorder arrests was much weaker (.19), suggesting that increased enforcement of minor disorder offenses may not necessarily require a substantial increase in officer strength.

Drug Arrests - Connections to Prior Empirical Findings

One recent econometric analysis of policing data from the state of Florida during the 1980s suggested that increased police efforts toward drug enforcement resulted in a counterbalancing increase in property offending as a result of the drain on police resources (Benson, Sebastian & Rasmussen, 2001). However, these data from agencies across the nation suggest that increases in minor drug arrests were not significantly associated with larceny or vehicle theft and were inversely related to burglary, robbery, and aggravated assault. That is to say, increases in arrests for minor drug offenses were associated with decreases in burglary, robbery and aggravated assault. Thus, these data do not support the assertion that increased attention to minor drug offenses necessitate an increase in property offending. It is also important to note, however, that substantial federal funding for additional officers occurred during the 1990s and this may have offset the potential resource drain that was asserted during the 1980s.

Among the 9,362 reporting agencies during the 1990s, the mean number of minor drug arrests per 1,000 citizens increased by more than 106 percent. Based on the nationwide average, Granger regression analyses in this study suggested that in a city of size 100,000 population, a reduction of one burglary was associated with an increase of only 12 minor drug arrests and that a reduction of one robbery was associated with an increase of 26 minor drug arrests. These effect sizes are substantial relative to the annual

arrest count of approximately 485 to 1,000 in jurisdictions of this size during the 1990s. Stated another way, an increase of a single drug arrest per month jurisdiction-wide was associated with the elimination of one burglary and an increase of slightly more than two minor drug arrests per month was associated with the reduction of one robbery. Additionally, minor drug arrests were weakly associated with aggravated assault such that increases of around five arrests per month were associated with the reduction of one offense.

This finding pertaining to sustained (i.e. annual) increases in arrests for minor drug offenses stands in stark contrast to a different approach -- drug raids-- which involve intensive short-term policing efforts that have recently been listed in the "what doesn't work" category of a prominent report to the National Institute of Justice (Sherman et al., 1998). Targeted, short-term raids on drug areas have typically failed to produce sustainable reductions in violent crime or disorder (Sherman et al., 1998).

Nevertheless, continuous or longer-term enforcement of drug offenses has been associated with the reduction of violent crime and disorder. An analysis of the rise and decline of drugs and violence in New York City over a forty-year period found that strong law enforcement and increasing intolerance of drug offenses were associated with significant reductions in violence (Golub, Johonson & Dunlap, 2000). Additionally, in Oakland California the implementation of a Specialized Multi-Agency Response Team (SMART) that coordinated with other city agencies to inspect and identify drug/problem properties resulted in reduced calls regarding drug offenses. Finally, a randomized experiment that involved a drug law enforcement strategy was conducted in 56 "hot spots" of drug activity in Jersey City, NJ and a seven-month follow-up indicated that calls

pertaining to disorder and emergency police services were reduced (Wiesburd & Green, 1995). Researchers from both of these studies also reported a diffusion of benefits effect to neighboring areas that were not specifically targeted (Green, 1996; Wiesburd & Green, 1995).

Disorder Arrests - Connections to Prior Empirical Findings

Recent literature suggests that the popularity of community policing increased substantially during the 1990s (Roth et al., 2000). Further, given that an integral part of the community policing concept includes an increased focus on issues of "quality of life" and minor but routine disorder, one would expect to find a corresponding increase in arrests for minor misdemeanor offenses among responding agencies. However, contrary to this expectation, these data clearly indicate that arrests for minor disorder declined substantially, nationwide. A summative index of minor disorder arrests was created by combining curfew, disorderly conduct, drunkenness, prostitution, runaway and vagrancy arrests. Nationwide, among the 9,362 jurisdictions that reported data, a 22 percent overall decline in the disorder arrest index occurred between 1990 and 2000.

Despite this decline in enforcement activity, Granger regression analyses indicated an inverse relationship between minor disorder arrests and burglary, vehicle theft and robbery when modeled without covariates. Nationwide, jurisdictions that decreased their rates of arrests for minor disorder offenses experienced higher levels of burglary, vehicle theft and robbery when compared with jurisdictions where disorder enforcement remained stable or increased. Although this finding lends some support to advocates of the "broken windows perspective," the relationship between disorder arrests and burglary and vehicle theft was weak. When the disorder arrest variable was entered

into models along with changes in drug arrest and officer rates, only the relationship with robbery retained significance.

These data indicate that, on average, an increase of 3.5 minor disorder arrests per month (or 41.6 arrests per year) was associated with a decline in one robbery per 100,000 citizens. Given that the average jurisdiction of 100,000 population reported 1,041 disorder arrests in 1990, the effects of an additional 41.6 annual arrests are fairly substantial. These findings are consistent with those from a panel data assessment among 75 large precincts in New York City during the 1990s, which found a highly significant relationship between misdemeanor arrests and violent crime (Kelling & Sousa, 2001). Moreover, with regard to the offenses of robbery and burglary, the findings from this analysis are strikingly similar to those in two other studies.

Wilson and Boland (1978), found that cities with a high ratio of traffic citations per officer (a proxy measure of a legalistic or aggressive policing approach) had lower levels of robbery. Approximately, ten years later, Sampson and Cohen (1988) replicated and extended this work in a study of 171 cities with population greater than 100,000. Their study utilized the number of arrests per officer for disorderly conduct and drunk driving as a proxy for aggressive policing. This measure of aggressive policing was employed as an instrumental variable to identify the crime function and statistical results supported their assertion of an aggregate-level effect with regard to robbery. Additionally, consistent with the Granger analyses in this current study, Sampson and Cohen found weak effects with regard to burglary.

In recent years an intense debate among criminal justice researchers has emerged with regard to the ethics and utility of increased enforcement of minor disorder

infractions. In this regard, it has been asserted that during the 1990s a number of large police agencies implemented so-called "zero-tolerance" strategies along with community policing practices (Green, 1999; Sherman et al., 1998). New York City Police, for example, targeted graffiti artists, public drunkenness and other disorderly activities such as panhandling and public urination (Green, 1999; Kelling & Sousa, 2001). After an in-depth analysis of New York's order maintenance tactics during the 1990s, some researchers concluded that this policing approach had a direct effect on crime reduction (Kelling & Sousa, 2001; Sousa, 2003). However, Green (1999) argued that the number of citizen complaints against police officers in New York increased substantially during this period and that the problem oriented policing approach was better for citizens and more efficient than aggressive policing of disorder.

Nevertheless, given the substantial nationwide decline in minor disorder arrest rates during the 1990s, concerns that "zero-tolerance" policies may supplant community policing practices appear to be unfounded. However, it is also noteworthy that the nationwide decline in minor disorder arrests was accompanied by a substantial increase in minor drug arrests. At present, it is unknown whether these trends are indicative of a substitution effect (from enforcement of general disorder toward drug offenses) or these changes are being driven by external factors. It was noted, however, that despite the different trend trajectories, both levels and changes of minor drug and disorder arrest rates were positively correlated during the 1990s. Thus, if these trends were the result of a substitution effect, a negative or inverse relationship might have been expected.

These data indicate that the combined or net total of arrests for minor offenses nationwide increased. The comparative efficacy of arrests for minor offenses versus

problem-solving, community collaboration, or other community policing practices will be discussed in the following sections pertaining to policing practices such as problem solving and crime analysis. However, to inform that comparison, the theory and mechanisms by which officers and minor arrests may reduce crime are discussed below.

Theory and Mechanisms of the Effects of Officers and Minor Arrests on Crime

Enforcement Based Perspectives (Deterrence and Incapacitation)

What are the mechanisms through which officers and minor arrests affect more serious felony offenses? The primary mechanism of crime control under professional model of American policing was to seek the arrest of more serious offenders after a crime was committed (Peterson et al., 1982; Skogan & Frydl, 2004; Visher, 2000). Thus, objectives under this approach included incapacitation of offenders and deterrence of future acts among observers who became aware of responses by the justice system. In this study, findings of an inverse relationship between officer rates and aggravated assault, burglary, larceny, and vehicle theft lend support to the deterrence and incapacitation perspectives.

Previous studies that assessed the crime effects of relatively small increases in officer rates during the traditional era, when randomized patrol was the standard, often found nonsignificant results (Eck & Maguire, 2000). Thus, it has been asserted that jurisdiction-wide increases in officer presence are generally not effective with regard to crime (Eck & Maguire, 2000). However, increased police presence in high crime areas has been associated with crime reduction in more recent studies (Sherman, 1998; Sherman & Rogan, 1995) and these findings are suggestive of a deterrent effect at neighborhood, "hot spot" or other aggregate levels. Temporary increases in police

presence, however, have typically resulted in only temporary reductions in crime (Sherman, 1998). Nevertheless, one study found that intermittent police presence of only 10 minutes in high crime areas resulted in sustained crime reduction. Thus, continuous police efforts may be required in order to result in a long-term deterrent effect.

A recent panel data analysis indicated that the addition of officers to force strength also typically leads to increases in arrest (Zhao, Scheider & Thurman, 2003) and the finding of a positive correlation between officer rates and minor drug and disorder arrest rates in the current study is consistent with this previous research. Sustained increases in arrests for minor drug and disorder offenses may have a deterrent effect at aggregate levels by signaling to potential offenders that criminal behavior will not be tolerated.

Nevertheless, potential incapacitation effects of sustained increases in minor arrests have been overlooked by many policing researchers. Continuous police efforts to address minor drug and disorder offenses will likely lead to repeated arrests of frequent offenders. Consequently, judicial action against frequent offenders in the community may be more likely to result in increased jail time. For example, a typical sentence for disorderly conduct may be one week in jail. However, individuals with multiple recent disorderly conduct convictions may be sentenced to substantially longer time in jail (e.g. 6 to 12 months) by community judges that grow weary of their repeated offenses. Thus, sustained increases in minor arrests may result in a cumulative incapacitation effect that is substantially greater than the average penalty for any single offense.

Findings from recent studies also suggest that the combined effect of increased officers, drug and disorder arrests may assist police in locating more serious offenders.

Recent analyses of ADAM (Arrestee Drug Abuse Monitoring) data, for example, indicated that heavy drug users were typically frequent offenders and that individuals with expensive habits were often persistent offenders (Kleiman, 1997). Another study indicated that most frequent serious offenders also deal drugs in high volume (Chaiken & Chaiken, 1982). These frequent and persistent offenders may be more likely to be detected by increased officer presence and enforcement of minor drug offenses. Additionally, recent data indicate that a substantial portion of high frequency, persistent offenders commit robbery and burglary at rates of two to four per week, 20 to 40 times as frequently as the median offender (Visher, 2000). Thus, the location and incapacitation of these more serious offenders may also be enhanced through increased officer presence and enforcement in high crime areas.

Given previous analyses, which suggest that frequent, persistent offenders often commit serious offenses an exceptionally high rate, the finding in the current study that 12 additional drug arrests per year (jurisdiction-wide) were associated with elimination of one burglary is noteworthy. When viewed in the most narrow perspective, this finding might suggest that 1 in 12 individuals arrested for a minor drug offense were also likely to commit a burglary. However, a similar result would also possible if the pool of individuals arrested for minor drug offenses included a small number of persons that were frequent burglary offenders. Additionally, a broader perspective of this finding might incorporate analyses of the effects of mediating or moderating factors, such as perceptions of social disorder. A discussion of broader theoretical perspectives can be found in the following section.

Community Crime Theory and Ecological Perspectives

The traditional or professional model of policing has been criticized as fundamentally reactive in nature and tends to provide a narrow, enforcement oriented view of the officer function (Trojanowicz et al., 1998). However, ecological and social disorganization perspectives suggest that the role of officers in addressing fear of victimization may also be important (Field, 2002; Shaw & McKay, 1942; Skogan & Frydl, 2004). Models of social disorganization suggest that fear leads individuals to physically and psychologically withdraw from community life (Shaw & McKay, 1942). This withdrawal may lead to a weakening of the informal social control processes that inhibit crime and disorder, resulting in further deterioration of the neighborhood. In this regard, an increased officer presence may serve to reduce citizen fear of victimization, particularly if the increase in this combined with community policing efforts. Assessments of the impact of foot patrols in both New Jersey and Michigan, for example, suggest that citizen fear was reduced (Braga, 2002).

Another noteworthy finding with regard to the relationship between fear and disorder is that community fear may arise from observations of physical signs or cues such as abandoned cars, trash or graffiti (Perkins & Taylor, 1996). During the 1990s, a central tenet of the community policing movement involved the expansion of the functional role of police to include efforts to address "quality of life" issues in communities (Trojanowicz et al., 1998). Much of the motivation behind this broadened policing role emanated from the "broken windows" thesis, which asserted that signs of disorder and decay in the visible environment (e.g. litter, graffiti, abandoned automobiles, boarded-up buildings, and other signs of physical disorder) serve as cues to residents and

passers by that residents in the neighborhood do not care about disorder, cleanliness and upkeep (Wilson & Kelling, 1982). An extension of this thesis further suggests that "behavioral incivilities" such as aggressive panhandling, public urination and defecation, prostitution, loitering, public intoxication and other signs of social disorder increase perceptions that personal victimization may be likely, causing law-abiding citizens to fear for their safety and thus, attempt to avoid the area (Field, 2002; Kelling & Coles 1996; Skogan, 1990).

The arrest indexes pertaining to minor drug and disorder offenses in the current study were designed to provide a test of "broken windows" and "behavioral incivilities" assertions. In this regard, the finding of an effect of a broad array of disorder arrests with regard to robbery in the current study is interesting. Officer rates were included in regression models along with disorder arrests, reducing the likelihood of influences due to changes in police force size. Additionally, the inclusion of drug arrest rates in the model reduced the influence of changes in the level of police assertiveness as well as drug offending. Thus, results indicated that increases in minor disorder arrests were associated with reductions in robbery while controlling for changes in officer levels and drug arrest rates. Moreover, it is noteworthy that the nationwide average with regard to disorder arrests declined substantially during the 1990s, reducing the possibility that significant effects would be found due to general upward trends in the independent variable and downward trends in the dependent variable.

Does this finding support the broken windows thesis? Unfortunately, the answer to this question is somewhat unclear. The minor disorder arrest index was not associated with declines in any offense category other than robbery when covariates and control

variables were included. Based on arguments pertaining to disorder and behavioral incivilities, one would expect that other felony offenses would be affected as well. It was noted, however, that burglary and vehicle theft were weakly related to minor disorder arrests rates when officer and drug arrest rates were not included in the model. Additionally, it is possible that increases in arrests for minor disorder offenses were associated with reductions in robbery because frequent, persistent offenders are more likely to commit serious offenses and were detected through the increased scrutiny (Visher, 2000). Nevertheless, the finding of a strong relationship between disorder arrest rates and only one of the seven offense types raises questions about the specific mechanisms by which minor disorder arrests may effect robbery rates. Further research may be helpful to determine which specific offenses (e.g. prostitution, curfew, runaway) in the disorder index were most closely associated with crime reduction.

Changes in Officers and Minor Arrests in the Two Wave Panel

The second portion of this discussion pertains to changes in policing practices that occurred between 1993 and 1997 as reported to the National Survey of Community Policing Strategies. It is noteworthy that neither officer rates nor minor drug and disorder arrest rates demonstrated a significant relationship with crime in regressions that involved policing survey data. However, the Granger methodology that was previously discussed involving 12 annual waves of data was not feasible with only two waves of data. Additionally, although the reporting agencies in the policing survey represented nearly one half of all reported crime during 1993 and 1997, the sample size was substantially smaller. Consequently, these differences may account for the lack of significant findings

with regard to officers and minor arrests in the two wave panel. Further discussion of this issue can be found in the limitations section.

Is also important to note, however, that changes in officer rates, minor drug and disorder arrests were generally not correlated with changes in policing tactics and strategies as indicated by the eight policing practice indexes. Further, when variables pertaining to officer rates, minor drug and disorder arrests were entered into regression models, the policing practice items continued to demonstrate significant relationships with regard to crime reduction. The inclusion of data pertaining to changes in officers and minor arrests did not reduce or significantly alter the relationships between policing practices and crime. Consequently, the variation in crime that is explained by policing practices in the two wave panel is not the same variation that is explained by changes in officer rates and minor arrests. Thus, statistical effects of changes in policing practices may be thought of as separate from and supplementary to (i.e. in addition to) the effects of changes in officers and minor arrests with regard to crime reduction. [13]

Policing Practice Indexes - Connections to Prior Empirical Findings

Recent literature pertaining to policing practices during the 1990s suggests a general trend toward policies that support community oriented policing as well as increases in collaborative efforts by police organizations and reported citizen involvements in daily activities (Roth et al., 2000). Data from the National Survey of Community Policing Strategies, implemented in 1993 and 1997 are supportive of these assertions and indicate that policing practices in each of these areas increased substantially.

[13] See Table 47 on page 194 for estimates of strength of the policing-crime relationship.

Broadening Community Policing Policies

A summative index that assessed the breadth or increase in number of specific types of policing practices indicated that community policing policies increased approximately 77 percent by 1997 as compared with 1993 among responding agencies. In the policing survey, question items that were included in this index pertained to whether the agency was currently implementing community policing, had published community policing goals, and whether new policies or ordinances had been connected to support these objectives. Most prior research concerning the effectiveness of adopting a community policing approach or implementation of generic community policing policies has not found a significant relationship with crime (Weisburd & Eck, 2004). Additionally, a recent systematic review of policing practices listed community policing efforts with no clear crime focus under the "what doesn't work" category (Sherman et al., 1998). Results from regression analyses in this study are consistent with these previous findings and indicate that increases in community policing policies were not related to larceny, burglary, vehicle theft, robbery, aggravated assault, rape or murder.

Broadening Community Collaboration Practices

A nationwide survey of over 1,800 agencies, conducted in 1998 indicated that efforts by police officials to collaborate with citizens were less likely to be fully implemented than other components of community policing ideology such as problem-solving or changes in policy (Mastrofski, Parks & Wilson, 2003). These data are consistent with this previous finding and although the index of collaboration efforts indicated an increase of 16.7 percent, this increase was substantially lower than indexes pertaining to problem solving, citizen involvement, or community policing policies. The

collaboration efforts index was comprised of questionnaire items pertaining to efforts by police officials to increase routine citizen interaction or feedback.

Although the collaboration attribute has not previously been empirically tested with regard to crime reduction, criminal justice researchers have suggested that increased feedback from citizens may assist police in identifying community concerns (Carter, 1995; Trojanowicz et al., 1998). In this study, the number of reported collaborative efforts by police organizations was associated with significant reductions in vehicle theft. However, when problem-solving indexes were included in regression models, the collaboration efforts variable became nonsignificant. This result is most likely due to the substantial correlation between collaboration efforts and problem-solving (.40). Nevertheless, from a theoretical standpoint, collaboration efforts and problem-solving should be correlated since a primary objective of increasing citizen feedback is to address neighborhood problems.

Broadening Citizen Involvement Practices

The index of citizen involvement differs from the collaboration efforts index in two important respects. First, questionnaire items in the citizen involvement category reflect actual implementation concerning police activities, whereas the collaboration index is simply oriented toward organizational efforts or objectives. Second, citizen involvement index items need not be initiated by police officials. Indeed, citizen review boards and neighborhood advisory councils may result from dissatisfaction or lack of collaborative efforts. Consistent with findings in previous literature (Roth et al., 2000; Trojanowicz et al., 1998), the index of citizen involvement showed a substantial increase

of more than 36 percent with regard to the number of policing procedures in which citizens were actively involved.

Criminal justice researchers have asserted that increased citizen involvement should lead to reductions in crime that result from efforts by individuals to assert informal social controls and increase information to police regarding criminal activities (Trojanowicz et al., 1998). Regression results from the current study are supportive of this assertion and indicate that increases in citizen involvement were associated with significant declines in burglary, larceny and vehicle theft. Similar to the collaboration efforts index, however, when entered into a regression model with problem-solving, the relationship with burglary and vehicle theft became non-significant. Nevertheless, although citizen involvement and problem-solving were correlated, citizen involvement demonstrated a stronger relationship than problem solving with regard to larceny. This finding may indicate that citizens are in a better position than police to address this relatively high frequency and widely dispersed type of offense.

Broadening Problem Solving Practices

Problem-solving is a general class of policing activities that involves systematic efforts to address intermediate recurring mechanisms that encourage crime. Criminal justice literature indicates that problem-solving was among the more popular innovations across police agencies nationwide during the 1990s (Roth et al., 2000). Data from this study are supportive of this assertion as indicated by the 29 percent increase in problem-solving activities from 1993 to 1997.

A recent econometric analysis of problem-solving among 164 large cities did not find a relationship with regard to homicide or robbery (MacDonald, 2002). Nevertheless,

this study included serious methodological weaknesses, such as the failure to adjust for heteroskedasticity and an assumption that problem-solving efforts were not in place among large jurisdictions in 1993. Additionally, other studies have found that problem-solving can reduce violent crime. A quasi experiment in 24 high crime locations in New Jersey found significant reductions in calls for police service regarding robbery and property crime (Braga et al., 1999). Problem-solving approaches were also utilized to reduce gun related homicide by gang members in Boston (Kennedy, 1998) and another quasi-experiment resulted in decreased citizen complaints about crime and disorder in Santa Ana, CA (Jesilow, Meyer, Parsons, et al., 1998).

Results from regression analyses in this study are supportive of a relationship between increases in problem-solving approaches and crime declines. Increases in problem-solving activities were associated with significant reductions in robbery, burglary, larceny and vehicle theft rates. Additionally, when other policing indexes were included in regression models, problem-solving activities remained the strongest predictor of declines in each of these offense types with the exception of larceny. As previously mentioned, declines in larceny were best explained by increases in citizen involvement. It is also noteworthy that problem-solving activities at both line (i.e. patrol officers and sergeants) and organization levels demonstrated effectiveness. Nevertheless, actions at the organization level, such as efforts to redesign the organization to deal with specific problems, were most strongly associated with declines robbery, burglary, larceny and vehicle theft.

Broadening Crime Analysis Techniques

Crime analysis has been utilized to support problem-solving efforts by identifying locations where frequent calls for police service occur. Additionally, due to increases in the availability of microcomputers during the 1990s, it was expected that an increase in crime analysis techniques would be detected. However, the crime analysis index indicated only a 6 percent increase among responding agencies, the smallest overall increase among any of the policing indexes. It is possible that this small change in the broadening of crime analysis practices indicates that current organizational needs were being met through existing practices.

In terms of prior research, there is anecdotal evidence regarding the effectiveness of crime analysis in New York City and New Jersey (Braga et al., 1999; Seaskate, 1998; Sousa, 2001). However, no rigorous national evaluation has previously been conducted. Regression analyses in this study did not detect a significant relationship between broadened crime analysis techniques and any of the seven UCR crime categories. Coefficients were, however, in the expected direction (i.e. negative) and the values pertaining to robbery were nearly significant. Nevertheless, the adoption of a crime analysis function among agencies where none previously existed was associated with crime reduction. Further discussion of this finding can be found in the analyses of individual policing techniques that follows.

Broadening Place Oriented Practices

Place oriented policing practices are a specific type of problem-solving technique that involves efforts to increase police presence, enforcement, and oversight in areas with frequent criminal activity. Criminal justice literature suggests that police awareness of

the importance of the immediate environment in problematic places increased substantially during the 1990s. In 1995, researcher John Eck advanced a "general model of illicit retail marketplaces," noting that routine activities theory suggests that sellers of illegal goods and services will strive to limit the distance that they move in order to maximize profits. Data from this study are supportive of assertions that place oriented tactics increased during the 1990s as indicated by the 40 percent overall increase in the place oriented index.

Recent studies suggest that place oriented tactics can be effective in reducing crime. Dallas police department, for example, dramatically increased patrols in areas with high gang violence in 1996 and results from a one-year quasi-experiment indicated 64 to 73 percent reductions in gang-related offenses among targeted areas (Fritsch, Caeti & Taylor, 2003). A similar approach was also implemented by Detroit police department between 1995 and 1998, yielding promising but less spectacular results (Bynum & Varano, 2003). Consistent with these previous findings, regression results from this study suggest that the broadened or increased number of place oriented practices among responding jurisdictions was associated with reductions in robbery and vehicle theft. However, when these policing practices were entered into a combined model with other indexes, regressions indicated that place oriented practices did not explain a significant amount of unique variation in crime beyond that of problem-solving and citizen involvement.

Broadening Civil Code Enforcement Practices

Criminal justice literature suggests that the use of civil and regulatory code enforcement increased substantially during the 1990s among police jurisdictions

(Mazerolle & Roehl, 1998). Civil and regulatory codes have been utilized as a means of decreasing social disorganization and dealing with recurring crime problems. They have also been utilized in conjunction with place oriented strategies as a means to persuade or coerce law abiding individuals and non-offending third parties to take responsibility and action to prevent or end criminal or nuisance behavior (Mazerolle & Roehl, 1998). Consistent with these assertions in criminal justice literature, data in the current study indicate that the number of civil code enforcement techniques utilized by responding jurisdictions increased approximately 30 percent.

A number of recent studies have suggested that the use of civil and regulatory code enforcement can be effective in combating crime. One such study, involved the creation of a special team known as SMART or Specialized Multi-Agency Response team which coordinated with other city agencies to inspect and identify properties that failed to comply with civil ordinances and where frequent calls for police service occurred (Green, 1995). The team utilized regulatory codes and drug abatement laws, resulting in a decline of observable disorder and drug offenses (Green, 1995).

Civil and regulatory code enforcement tactics have also been utilized in conjunction with training for landlords and property managers, fines for non-compliance, and property forfeiture to deal with residences with a long history of criminal activities. In a recent study of 121 rental properties that had been recent targets of drug enforcement, landlords were contacted by a narcotics detective and a city code enforcement official who inspected the property and worked with the property owner to devise a plan to remove or reduce the drug problem (Eck & Wartell, 1998). A 30 month review indicated that crime declined by approximately 60% in places where landlords

were met by city officials while crime in places that had received a letter of warning declined by 13% when compared with a control group.

Civil remedies have also expanded to specifically target offending parties such as gangs, domestic batterers, and delinquent youth. In Southern California, police and legal officials sought gang injunctions that would allow civil fines or arrest of certain individuals that were identified as gang members (Maxson, Hennigan & Sloan, 2003). Two cities that utilized this approach reported substantial decreases in gang related crime (Maxson, Hennigan & Sloan, 2003).

In the current study, regression results pertaining to broadening or increasing the number of civil code enforcement techniques were not associated with reductions in any of the criminal offense categories. However, jurisdictions that reported that civil code enforcement was not utilized by most patrol officers in 1993 and later began utilizing this approach reported significant reductions in murder, robbery, burglary, larceny and vehicle theft. The enforcement of civil and regulatory codes by most police officers within jurisdictions was among the strongest and most broadly effective crime reduction strategies in the policing survey. Further discussion of results pertaining to civil code enforcement as an individual tactic may be found in a following section.

Broadening Efficiency Oriented Practices

During the past 30 years, law enforcement officials made efforts to shorten response time to criminal incidents and implement single-officer vehicular patrols with the goal of increasing efficiency (Sparrow, Moore & Kennedy, 1990). Additionally, in recent years, a number of technological advances occurred among electronic devices that supported this objective. However, community policing ideology, which also increased

during the 1990s, emphasizes relations with citizens and quality police services to a greater extent than efficiency (Trojanowicz et al., 1998). Thus, criminal justice literature offered little guidance with regard to expectations pertaining to organizational efficiency. Nevertheless, data from this study indicate a modest 12 percent increase in organizational efficiency related efforts.

Questionnaire items that comprise the efficiency index include implementation of a drug tip or crime hotline, prioritization of calls to increase officer time, providing agency access to other city or county databases, and a variety of other techniques. Very little empirical work has been conducted with regard to efficiency and technology. However, the implementation of in-car computers and mobile data terminals was the subject of one study, which indicated that even among the smallest agencies (i.e. those with fewer than 20 sworn officers), nearly 1 in 5 reported utilizing mobile data terminals by the year 2000 (Eastern Kentucky University, 2003). Another study in Forth Worth, Texas during the early 1990s analysis indicated that vehicle recovery rates (but not arrest rates) were improved after the implementation of mobile data terminals (Nunn, 2001). Nevertheless, efforts to improve officer response time have generally not been found to be effective with regard to crime reduction (Sparrow, Moore & Kennedy, 1990).

Consistent with assertions by criminal justice researchers and community policing advocates, regression analyses in the current study did not detect any significant relationships pertaining to the number of efficiency related efforts and crime. However, a number of individual items that fell under this classification were associated with reductions in crime. For example, agency implementation of a specialized crime prevention unit and participation in an interagency drug task force were associated with

declines in robbery, burglary and larceny. Additionally, implementation of a drug or crime tip hotline was associated with reductions and aggravated assault. These individual policing practices will be further discussed in a following section.

Individual Policing Practices - Connections to Crime Theory

Although analyses of policing practice indexes can provide information regarding the breadth or expansion of broad categories of policing tactics, this approach offers little information regarding the potential crime reduction effects of specific tactics and strategies. As previously noted, for example, police organizations that expanded existing crime analysis techniques did not experience significant declines in crime. However, agencies that first began conducting crime analysis after 1993 did report substantial crime reductions.[14] Consequently, analyses of each of the 80 individual survey items pertaining to tactics and strategies that comprise the indexes were also conducted. These individual analyses provided additional detail regarding the specific types of problem-solving practices that were most closely associated with crime reductions as well as the effectiveness of specific types of collaboration, place oriented, and other tactics and strategies.

Another advantage of analyses of individual items is that they provide further information regarding the types of policing practices that tended to affect specific offenses such as larceny when compared with practices that affected burglary, robbery and each of the other offense categories. A qualitative assessment of similarities and patterns among policing practices may suggest that the majority of effective practices involved increasing police presence in high crime locations, for example. The primary objectives of these analyses were to provide a starting point for further research by

identifying the types of policing practices that were associated with declines in crime as well as to identify potential mechanisms through which crime effects may have occurred.

Larceny and Individual Policing Practices

Overall, 11 of the 80 individual policing practice items were associated with reductions in larceny rates (Appendix C, Table 1). In this regard, the majority of significant items described citizen actions or police efforts to gain the assistance of citizens. These items included implementation of citizen patrols, citizen prepared work agreements specifying work to be done by police, and implementation of a citizens police academy. The significance of these items may emanate from the fact that larceny is a fairly pervasive and frequent offense such that police are heavily reliant upon the observation and intervention of individuals in order to reduce occurrences. Additionally, this finding is consistent with assertions by Hunter (1985) who argued that informal and formal social mechanisms can be classified into three levels of control (private, parochial, public). Private control is the most basic level and involves interactions among intimate groups (e.g. family and close friends). However, parochialism comprises the second level of social control via interpersonal networks and connections with local institutions such as churches, stores and schools. Thus, police efforts to gain the assistance of citizens may also result in increased informal social controls.

Survey items describing citizen input regarding the performance and selection of officers as well as citizen review of complaints against police comprised another theme with regard to larceny. These types of citizen actions likely increase scrutiny of police services, potentially leading to increased efforts on the part of officers to pursue investigative leads and recover property. However, community policing advocates have

[14] See Appendix D for details regarding the changes of each of the 80 policing practices.

also argued that increased citizen input regarding police activities leads to improved relationships between police and citizens. There is evidence, for example, that citizen trust and perceptions of legitimacy increased in Chicago after police implemented a community policing approach (Skogan & Hartnett, 1997). Moreover, findings from Carr (2003) indicated that many Chicago area residents changed how they responded to youths whose families were unwilling or unable to exert sufficient private control. Under this "new parochialism," many residents in this five-year ethnographic study contacted community police officers who intervened on their behalf, rather than contacting the families of disorderly youths directly.

A final theme with regard to individual policing practices that were associated with larceny reduction involved organizational adaptability and enforcement activities. In this regard, a significant portion of jurisdictions that experienced a decline in larceny had recently begun aggressive civil and regulatory code enforcement as well as participation in an anti drug task force. However, data indicate that these enforcement activities were often supplemented by new authorities for middle-management to redesign the organization to support problem-solving efforts as well as implementation of mobile, neighborhood based police stations. The statistical significance of these policing practices pertaining to enforcement with adaptability is supportive of recent assertions by criminal justice researchers that targeted and focused enforcement activities are more likely to result in crime reduction than broadly applied or undirected enforcement actions (Skogan & Frydl, 2004).

Burglary and Individual Policing Practices

A total of 15 policing practices were associated with reductions in burglary rates and a number of these were also associated with reductions in larceny (Appendix C, Table 2). The offenses of burglary and larceny are similar in nature and it is not surprising that similar policing practices would affect both types of offenses. Nevertheless, the majority of policing practices that were associated with reductions in burglary were not associated with larceny and thus the patterns of effective policing practices also differed somewhat. Although citizen involvements with regard to preparing work agreements and attending a citizens police academy were significant, the primary pattern among policing practices pertaining to burglary involved the long term assignment of police officers to specific neighborhoods and efforts to assist citizens in community organization. In this regard, the fixed assignment of patrol officers to specific areas and designation of patrol routes that coincide with neighborhood boundaries were both influential. Nevertheless, jurisdictions that reported conducting citizen surveys and where officers worked directly with citizens in their patrol areas to identify and resolve problems also experienced declines in burglary along with agencies that provided specific problem-solving training to citizens.

The finding that neighborhood based community building efforts were associated with reductions in burglary is consistent with recent studies pertaining to the importance of collective efficacy with regard to community social control. In this regard, one study implemented a systematic social observation of urban neighborhoods finding that collective efficacy was linked to lower rates of violent crime (Sampson & Raudenbush, 1999). Additionally, data from a survey of 2,482 Illinois residents suggested an

interaction-effect between fear and social ties (Ross & Jang, 2000). The authors of this study concluded that interpersonal social connections decreased fear of victimization and that participation in neighborhood organizations also provided a "buffering effect" with regard to fear and perceptions of disorder (Ross & Jang, 2000). Consequently, police efforts to contact and train citizens with regard to problem-solving may also result in a decrease in fear among citizens.

A final trend among policing practices that were associated with reductions in burglary concerns enforcement efforts in high crime areas. Jurisdictions that began aggressively enforcing civil and regulatory codes, initiated a crime prevention function, and participated in multi-jurisdictional drug task forces experienced significant reductions in burglary. The combination of these items suggests that enforcement activities in these jurisdictions may have been targeted to specific crime problem areas. These findings are consistent with assertions by criminal justice researchers that place or "hot spot" oriented enforcement activities may result in crime decreases (Eck, 1995). It is also noteworthy that participation in a drug task force was associated with reduction in burglary because previous analyses in this study indicated that increases in minor drug arrests were also associated with reductions in burglary. Thus, both data sources (i.e. arrest and policing practice data) in this study suggest that there is a relationship between drug activity and rates of burglary.

Vehicle Theft and Individual Policing Practices

Overall 21 individual policing practices were associated with reductions in vehicle theft (Appendix C, Table 3). In this regard, the primary pattern with regard to policing practices was clearly related to problem-solving activities and new authorities

for middle managers. Eight of the significant policing practices involved problem-solving efforts. Additionally, five of these survey items indicated active participation by middle managers with regard to problem-solving, such as seeking the input of patrol officers, determining how resources should be utilized and structuring organizational procedures to deal with problems. These findings provide support for assertions by criminal justice researchers that increases in the level of input and decision making of personnel at all levels of the organization may improve quality of policing (Trojanowicz et al., 1998). They also provide support for assertions by problem-solving advocates that the dedication and focus of agency resources may increase chances for success with regard to crime (Braga, 1999).

Another trend with regard to significant policing practices pertaining to vehicle theft involved effort to increased feedback and support from citizens. In this regard, conducting citizen surveys, implementing regular community meetings, allowing citizens to prepare work agreements pertaining to neighborhood problems, and providing problem-solving training to citizens were important. However, unlike the citizen related involvements pertaining to larceny and burglary, which tended to be oriented toward community self-help, significant policing practices with regard to vehicle theft were directed more toward enabling police officials. In this regard, citizen involvement practices were supplemented with the implementation of foot patrol, fixed assignment of officers and the implementation of crime analysis, specialized crime prevention units and increased civil code enforcement. These findings support assertions that improved police-community relations may be necessary to enable increased police enforcement action in high crime areas (Trojanowicz et al., 1998).

Robbery and Individual Policing Practices

Overall 14 policing practices were significantly associated with reductions in robbery (Appendix C, Table 4). However, practices pertaining to citizen involvement played a much smaller role with regard to this offense. Not a single tactic or strategy from the collaboration efforts index demonstrated statistical significance in relation to robbery. Additionally, it was noted that the distribution of significant policing practices was much less concentrated for robbery than for the other offense types (Table 34), suggesting that fewer of the practices found in the community policing survey were effective. There was a small cluster of problem solving activities that demonstrated significance. However, effective policing practices with regard to robbery were most often related to neighborhood oriented enforcement activities.

Neighborhood oriented enforcement activities included implementation of neighborhood or community-based decision making, fixed assignment of patrol officers to specific beats or areas, mobile neighborhood-based stations, implementation of crime analysis and participation in a drug task force. Recall also that previous findings in this study pertaining to minor drug and disorder arrests also demonstrated strong relationships with robbery rates. Consequently, these findings are consistent with prior studies that indicated that aggressive enforcement activity is associated with declines in rates of robbery (Sampson & Cohen, 1988; Wilson and Boland, 1978).

Rape and Individual Policing Practices

The patterns among policing practices pertaining to the offense of rape were very different than for any of the other offense categories (Appendix C, Table 5). First, only six of the 80 policing practices demonstrated statistical significance when assessed

individually. Policing practices that were weakly related to reported rates of rape include implementation of a drug education program in schools, physical decentralization of investigations and citizen cooperation with police regarding neighborhood problems. However, when all six items were entered into the regression together, three policing practices demonstrated stronger relationships with rates of rape. These items include the implementation of multidisciplinary teams to deal with special problems, increased efforts by patrol officers to work with other city agencies, and interagency involvement in problem identification and resolution.

It is noteworthy that all three of these policing practices involve coordination with other agencies. The theoretical basis for these statistical relationships is unknown and should be explored more closely. However, given that reported rates of rape did not substantially decline in most jurisdiction during the 1990s, the likelihood that these practices, which are similar in nature are spuriously related to rape is reduced. It was also noted that during the 1990s, the Office on Violence Against Women provided substantial grant funding and training to local police agencies. Thus, it is possible that the formation of multidisciplinary teams and increased coordination with other agencies resulted from these efforts.

Aggravated Assault and Individual Policing Practices

Six policing practices were associated with reductions in aggravated assault when items were assessed individually (Appendix C, Table 6). In this regard, patterns among significant policing practices suggest that police efforts to aid citizens in regaining control of their communities were important. For example, significant items pertaining to implementation of a drug or crime tip hotline, as well as mobile, neighborhood-based

stations and drug-free zones around schools parks or churches each provide mechanisms for citizens to report suspicious activities. Additionally, reported increases in efforts by patrol officers to help communities organize and increased efforts to teach residents how to address community problems may have result improved the ability of the community to help itself recover from crime and disorder problems. Thus, these findings are supportive of work by Greenberg et al. (1982) who identified three forums that are dedicated to community self-regulation including informal surveillance, movement-governing rules and direct intervention or questioning of strangers and residents in the neighborhood about suspicious activities.

Murder and Individual Policing Practices

Overall five policing practices were associated with reductions in murder (Appendix C, Table 7). When all five policing practices were entered together into a regression, the two that were most strongly related to murder rates were implementation of a crime analysis function and implementation of mobile neighborhood-based offices or stations. Given that a substantial portion of murder occurs as a result of gang and drug activity, the combination of crime analysis and mobile police stations suggest that agencies may have strategically increased their presence wherever crime problems emerged. However, it is also noteworthy that increases in efforts by patrol officers to make door-to-door contacts with citizens in their patrol area, increased civil code enforcement and citizen prepared work agreements regarding neighborhood problems were also weakly associated with murder rates. Taken together, these practices are indicative of police efforts to become a part of the neighborhood social fabric in high crime areas. Consequently, these findings are consistent with the assertions by criminal

justice researchers regarding the importance in social networks (Bursik & Grasmick, 1997) and the emergence of a new form of parochialism (Carr, 2003).

Discussion Summary and Conclusions

Policing Practices

Changes in policing tactics and strategies during the 1990s were associated with reductions in each of the seven felony index offenses. However, although the number or breadth of reported problem solving techniques and areas of citizen involvement were associated with relatively small declines in crime ranging from 1.6 to 3.1 percent, implementation of specific individual policing practices were generally associated with more substantial crime reductions. For example, the combined effects of policing practices pertaining to citizen involvement, civil code enforcement and participation in a drug task force were associated with a 7.7 percent decline in larcenies from 1993 to 1997. Additionally, the combined effects of similar policing practices were associated with declines in robbery, burglary and vehicle theft of 5.7%, 4.2% and 6.5% respectively. However, it was also noted that individual policing practices were associated with smaller declines in the offenses of murder (1%) and rape (1.5%).

An assessment of a broad spectrum of 80 individual policing tactics and strategies indicated that increased enforcement of civil and regulatory code violations and implementation of a crime analysis function were the most broadly influential practices in terms of the number of crime declines with which they were associated. However, policing practices pertaining to increased citizen involvement were most important with regard to burglary and larceny. Additionally, various individual problem solving tactics

were associated with substantial reductions in every offense category with the exception of larceny.

The types of specific policing practices that were associated with crime reduction varied for each offense category. For example, reductions in aggravated assault were associated with police efforts to aid citizens in regaining control of their communities, such as implementation of a drug or crime tip hotline and mobile, neighborhood-based stations. In contrast, reductions in rates of robbery were more closely associated with targeted enforcement activities. Finally, jurisdictions that initiated multidisciplinary teams to deal with special problems and that worked closely with other agencies reported greater decreases in rates of rape.

Changes in Officer and Minor Arrest Rates

During the 1990s, changes in the number of officers per capita and minor arrests for drug and disorder offenses were also associated with declines in most offenses categories with the exception of murder and rape. However, in contrast to changes in policing practices, the amount of crime declines that were explained by officers and minor arrests were small, ranging from zero to 2.3 percent. Nationwide rates of drug arrests increased substantially during the 1990s and these increases were associated with reductions in robbery, burglary, and aggravated assault. However, although the nationwide average number of arrests for minor disorder declined, jurisdictions that did not follow this national trend and that increased minor disorder arrest rates reported significant reductions in rates of robbery. Finally, the number of officers per capita nationwide also increased substantially this decade and these increases were associated with decreases in larceny, burglary, vehicle theft and aggravated assault.

The Relationship Between Policing Changes and Crime During the 1990s

Prior to the 1990s, a number of criminal justice researchers asserted that police actions could not affect jurisdiction-wide crime rates (Bayley, 1994; Walker, 1984). There were both theoretical and empirical reasons supporting this assertion. From a theoretical standpoint, criminologists had argued that a substantial portion of crimes were committed as consequences of extreme poverty (Cullen & Agnew, 2003). Consequently, since police could do little to address this causal factor, it was assumed that little could be done to reduce crime rates. Additionally, studies regarding incarceration suggested that "nothing worked" with regard to recidivism. Finally, in the policing arena, studies regarding randomized patrol and shorter response time to criminal incidents failed to demonstrate effectiveness (Kelling et al., 1974; Sparrow, Moore & Kennedy, 1990).

During the late 1980s and early 1990s, however, research findings increasingly suggested that specific types of police activities, such as directed patrol of high crime areas could reduce the number of criminal incidents (Sherman & Rogan, 1995). Additionally, the emergence of community policing and problem solving approaches increasingly suggested that efforts to identify and reduce aggravating intermediate causal mechanisms in neighborhoods and small geographic places could be successful in reducing crime under certain conditions.

Despite the advancement in knowledge resulting from recent studies which suggested that a narrow range policing efforts could impact crime, little prior research had been conducted to determine the specific types of practices that may be effective in reducing specific types of crime. Additionally, prior to the implementation of this study very little was known regarding the effects of policing tactics and strategies among

jurisdictions of all sizes and from all regions of the nation. Nevertheless, this assessment of data from two large national samples clearly suggests that a wide array of policing practices may result in crime reduction and were, in fact, associated with substantial reductions in crime during the 1990s.

In terms of the broader overall policing effect, Table 47 (next page) contains estimates of the nationwide crime declines that were associated with policing changes during the 1990s. The data utilized in this study indicate that approximately 10 percent of the reduction in larceny was associated with policing changes. The vast majority of this relationship between policing and reported rates of larceny was associated with changes in tactics (7.7%), rather than increases in officers or minor arrests. Estimated policing changes associated with declines in robbery, aggravated assault, burglary, and vehicle theft ranged from 4.5 to 8.1 percent nationwide as well. However, corresponding declines in rape (1.5%) and murder (1%) were very small and were associated with a only a few types of policing tactics (see Tables 34 and 35).

Table 47. Estimated Percentages of National Crime Declines Associated with Policing Changes

Policing Changes	Larceny %	Burglary %	Vehicle %	Robbery %	Assualt %	Rape %	Murder %
Tactics and Strategies [1]	7.7	4.2	6.5	5.7	2.3	1.5	1.0
Officers and Minor Arrests [2]	2.3	1.9	1.6	1.1	2.2	n.s.	n.s.
Total Estimated Policing Effect	10.0	6.1	8.1	6.8	4.5	1.5	1.0

[1] Based on data from a national survey of agencies representing 49% of officially reported crime in 1993 and 1997.
[2] Based on UCR data representing 89% of officially reported crime (1990-2001).

Limitations

The analyses of policing practices in this study emphasized change rather than levels. As such, an objective of this methodology was to identify potential policing practices that may have been associated with crime reduction while minimizing the impact of omitted variable bias. However, given that the implementation of some policing practices did not substantially change or increase during the 1990s, this approach cannot be utilized to determine that a specific policing tactic or strategy is ineffective with regard to crime reduction. For example, if implementation of black and white patrol cars was a proven crime reduction technique such that all police departments utilized this approach, the resulting change in implementation during the 1990s would be zero. Although statistical analyses of the implementation of black and white patrol cars would result in nonsignificant findings, this lack of statistical significance (due to the lack of change in the population) would not mean that the tactic was ineffective. Consequently, although the primary research topic in this study involved an assessment of whether policing changes during the 1990s were associated with crime reductions, nonsignificant findings for specific individual policing practices are not necessarily indicative of ineffectiveness.

The primary statistical analyses pertaining to changes in per capita officers and minor arrests were conducted via a Granger causality model and demonstrated significant relationships with regard to a variety of reported offenses. However, it was noted that officers and minor arrests did not demonstrate statistical significance with regard to crime in the smaller, two-wave survey subsample. As previously discussed, these nonsignificant findings may have resulted from the fact that a Granger approach cannot

be utilized with a two-wave panel. Nevertheless, these nonsignificant findings may also indicate that relationships between officers, minor arrests, and crime are weak or not very robust to changes in sample size. However, as previously mentioned, no less than three prior studies have also found relationships between changes in per capita officers and crime (Kovandzic & Sloan, 2002; Levitt, 1997; Marvell & Moody, 1996). Thus, there is reason for some measure of confidence with regard to this relationship.

It was noted in the methodology section that 278 agencies that responded to the National Survey of Community Policing Strategies did not report complete crime data in both 1993 and 1997. Consequently, the fact that nearly three quarters of these agencies police populations of less than 50,000 citizens indicates that the policing survey data in this study underrepresented smaller jurisdictions. However, given that the variable of interest in this study is crime and that the vast majority of crime occurs in larger jurisdictions this underrepresentation is not highly problematic. Jurisdictions that were included in analyses pertaining to the policing survey subsample represented nearly one half (49%) of all reported crime in 1993 and 1997.

It was also noted in the methodology that although the policing survey subsample was generally consistent with the crime demographics of the UCR population, the proportion of total crime in the Northeastern region was approximately 6% below that of the UCR population. This underrepresentation of crime from the Northeast is a minor data limitation. The Northeastern region represents the smallest geographic area and reports the smallest portion of crime nationwide. Thus, although inferences to the Northeastern region are not as strong as for other regions of the nation, there is little reason to believe that the effectiveness of policing practices in the Northeast is

substantially different than in other regions. Consequently, the overall representation of crime among the policing survey subsample is sufficiently similar to allow reasoned inferences to the broader UCR population.

Policy Recommendations

Given that findings from this study suggest that policing activities have been associated with reductions in crime, a logical question arises as to which specific practices are most advisable. In this regard, readers should be cautioned that analyses pertaining to individual policing practices (e.g. implementation of a citizens academy) were largely exploratory in nature. However, data in this study clearly indicate that a variety of policing practices were associated with crime reductions across a wide array of places, environments and organizational contexts and thus merit further scrutiny. Nevertheless, with regard to current policing policies, potential costs and benefits must be considered.

Although formal cost-benefit analyses are beyond the scope of this study, three classifications were utilized as a framework for recommendations. The first classification pertains to practices that were associated with crime reduction and that may be implemented with relative ease and at low cost. The second classification involves practices that were associated with reductions of multiple (i.e. 3 or more) offense categories. And, the final classification pertains to practices that were strongly associated with the reduction of a specific offense when entered into regression models along with an array of other policing tactics and strategies.

Practices That Are Low Cost and Easy to Implement

Broadened implementation of problem solving was associated with reductions in nearly every offense category and may be among the least expensive policing strategies. Among the individual policing survey items pertaining to problem solving, virtually all were associated with reductions of at least one type of crime. Thus, the specific method of problem solving that is utilized may not be as important as increased organizational effort to address problems in a more general sense.

Nevertheless, analyses in this study indicated that three specific problem solving practices were associated with substantial reductions in multiple offenses. Police efforts to encourage citizens to become involved in neighborhood problems, coordination with other organizations,[15] and increased authority of middle managers to restructure organizational processes were associated with substantial reductions in at least three types of offenses. Although these specific problem solving strategies may require a fair amount of time to initiate, their implementation is not costly from a monetary perspective. Additionally, similar arguments are applicable with regard to broadening efforts to encourage citizen involvement in other aspects of police activities. Police administrators should consider increasing organizational efforts to address problems and to improve citizen involvement as potentially effective and low cost generalized approaches to crime reduction.

Analyses in this study also suggested that increased enforcement of civil and regulatory codes by patrol officers was among the strongest and most broadly applicable techniques that were associated with crime reduction. Jurisdictions that reported that

[15] Including both law enforcement and non-law enforcement agencies.

most officers enforced civil and regulatory codes in an effort to reduce crime reported significant reductions in murder, robbery, burglary, larceny and vehicle theft. However, it should be noted that the code enforcement questionnaire item does not provide details regarding the extent of enforcement by individual officers. Rather, data indicate that a change with regard to the number of patrol officers that utilize this technique was associated with crime reduction. That is to say, agencies that reported in 1993 that few or none of their patrol officers enforced regulatory codes and then reported that most did so in 1997, experienced substantial crime decreases. This policing practice may also be combined with problem solving and citizen involvement techniques at little monetary cost since incarceration or physical apprehension of the offender is generally not required with enforcement of civil and regulatory codes.

The fixed assignment of patrol officers to specific neighborhoods was another relatively low cost and easily implemented practice that was associated with substantial reductions in robbery, burglary and vehicle theft. Community policing advocates have argued that when officers become familiar with individuals and routines in their districts they may become more effective in their patrol efforts (Trojanowicz et al., 1998). Given the serious nature of the robbery and home invasion as well as the substantial monetary losses associated with vehicle theft, police managers should seriously consider the fixed assignment of patrol officers to geographic areas.

A final low cost strategy involves the implementation of foot patrol as a specific assignment for some patrol officers. Although only one offense category, vehicle theft, was associated with the implementation of foot patrol, the ease of implementation of this approach makes it an attractive recommendation. However, it is also noteworthy that a

substantial number of jurisdictions implemented foot patrol along with crime analysis, which suggests that the timing and location of these efforts must be carefully considered. Nevertheless, this policing practice was associated with reductions in vehicle theft in another recent study (Di Tella & Schargrodsky, 2004). Therefore, officials in jurisdictions that experience episodic problems with vehicle theft in specific areas should consider the implementation of foot patrol during times of peak occurrence.

Practices that were Associated with Reductions of Multiple (3 or more) Offense Categories

Increases in the number of officers per capita among jurisdictions nationwide were associated with declines in rates of aggravated assault, burglary, larceny and vehicle theft. However, the addition of patrol officers may be among the most costly of policing practices that were analyzed in this study. Findings indicate that, based on nationwide averages during the 1990s, the addition of two police officers was required to eliminate one larceny per 100,000 citizens. Furthermore, an increase of more than eight officers was associated with the reduction of one vehicle theft or aggravated assault. Consequently, increases to police force size may be most appropriate for jurisdictions that are understaffed such that benefits will result in other aspects of the organization in addition to the potential for crime reduction.

It is also noteworthy that increases in arrests for minor drug offenses were associated with declines in robbery, burglary and aggravated assault. When compared with the monetary costs associated with the addition of police personnel, increased enforcement of drug use or possession may be an attractive alternative. Analyses in this study suggest that an increase of only 12 arrests per year was associated with the

elimination of one burglary per 100,000 citizens. However, increased drug enforcement may be time-consuming if officers are required to take physical custody of offenders, rather than issuing a citation. Additionally, laboratory testing of controlled substances or trace blood levels may be required, increasing the monetary cost of enforcement. Finally, this approach may not be feasible in jurisdictions where police community relations are strained unless efforts to increase citizen support are also implemented.

Implementation of a process whereby citizens prepare work agreements or contracts specify work to be done by police concerning neighborhood problems was associated with reductions in murder, robbery, burglary, larceny and vehicle theft. Thus, this approach offers a less costly and potentially effective alternative to increased officer and drug arrest rates. The initial steps toward citizen prepared work agreements may require substantial administrative time to ensure that procedures are appropriate and useful. Nevertheless, if implemented properly, this approach may be among the most broadly effective practices with regard to crime reduction.

The final policing practice that was associated with reductions in multiple offense categories pertains to crime analysis. The implementation of a crime analysis unit or function was associated with reductions in murder, robbery, burglary and vehicle theft. It should be noted, however, that the current study does not provide a clear indication as to whether the national average of the statistical crime analysis effects apply equally to smaller jurisdictions where crime rates are low. Therefore, the potential monetary cost of this approach should be carefully considered. Nevertheless, crime analysis may be a linchpin with regard to the proper application of problem solving and place or "hot spot" oriented strategies in large jurisdictions.

Practices that were Strongly Associated with the Reduction of a Specific Offense

Although the national trend with regard to minor disorder arrests was downward, jurisdictions that increased their enforcement of prostitution, curfew violation, disorderly conduct and similar offenses experienced substantial declines in rates of robbery. Based on the nationwide average, increases of approximately 3.5 minor disorder arrests per month were associated with the elimination of one robbery per 100,000 citizens. However, as with drug arrests, police-community relations should be carefully considered if this practice is implemented. Additionally, police organizations may experience increased costs pertaining to enforcement if subjects resist police intervention for minor infractions and physical custody of offenders is required (rather than simple issuance of a ticket or summons). Nevertheless, if implemented properly, increased enforcement of disorder related offenses may result in declines in robbery in some jurisdictions.

Citizen input into police hiring was strongly associated with reductions in robbery and larceny. Additionally, citizen review of complaints against police was strongly associated with reductions in larceny. Additional research is needed to determine the mechanisms by which increased citizen involvement in police personnel processes were associated with crime reduction. It is possible, for example, that increased citizen involvement results in the hiring of officers that are more attentive to community needs. Alternatively, increased review of police conduct may result in improved attention to community problems or minor infractions. Nevertheless, increased citizen input into these routine police processes may be appropriate for some jurisdictions and should be considered by police administrators.

A final policing practice that was strongly associated with crime reduction was the implementation of a citizens police academy. This practice was strongly associated with reductions in burglary and larceny. However, this approach may be somewhat costly and time-consuming with regard to administrative requirements. Additionally, the precise mechanisms of property crime reduction associated with this practice are unknown. It is possible that academies increase the motivation of individuals to act as place managers and to report disorderly conduct in problematic locations. Nevertheless, citizens academies offer a unique method for police officials to have extensive one-on-one contact with persons who are concerned with neighborhood problems and wish greater community involvement. Additionally, this approach may provide an opportunity for police organizations to build a foundation of support within the community. Therefore, it is recommended that police administrators consider the implementation of a citizens police academy, especially where community-relations have been strained.

Concluding Remarks

Although the preceding policy recommendations detail 12 types of policing practices that may lead to crime reduction in police jurisdictions, the most effective implementation of any of these methods may result from a process that begins with a comprehensive assessment of organizational strengths and community needs. At present, the extent to which these policing practices are interdependent is currently unknown. Consequently, police administrators should make an effort to select practices that complement one another. For example, aggressive enforcement approaches may best be accompanied by efforts to increase citizen involvement to ensure that community-relations are not damaged. Research pertaining to the situations and contexts in which

specific practices may be most effective is just beginning. However, analyses in the current study clearly suggest that the future role of the police in crime reduction is promising.

APPENDIX A

National Crime Trends (Summed Rates)

Figure 1. Murder/Manslaughter

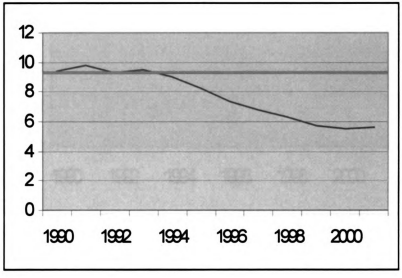


Figure 2. Robbery

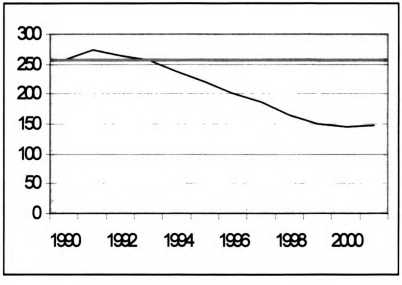


Figure 3. Aggravated Assault

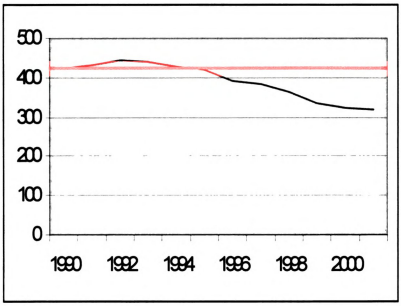


Figure 4. Rape

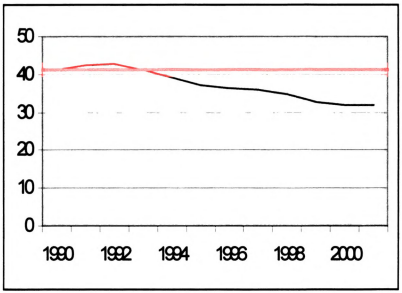


Figure 5. Burglary

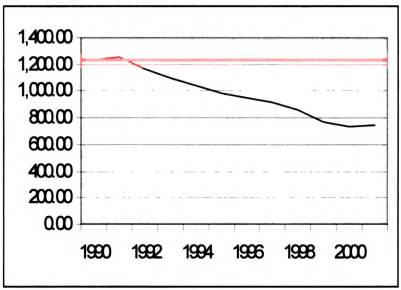
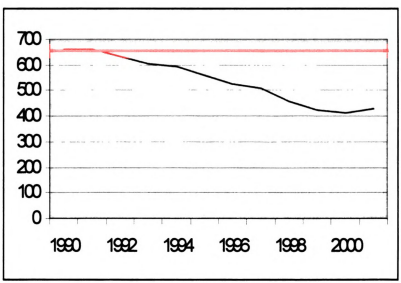


Figure 6. Auto Theft



APPENDIX B

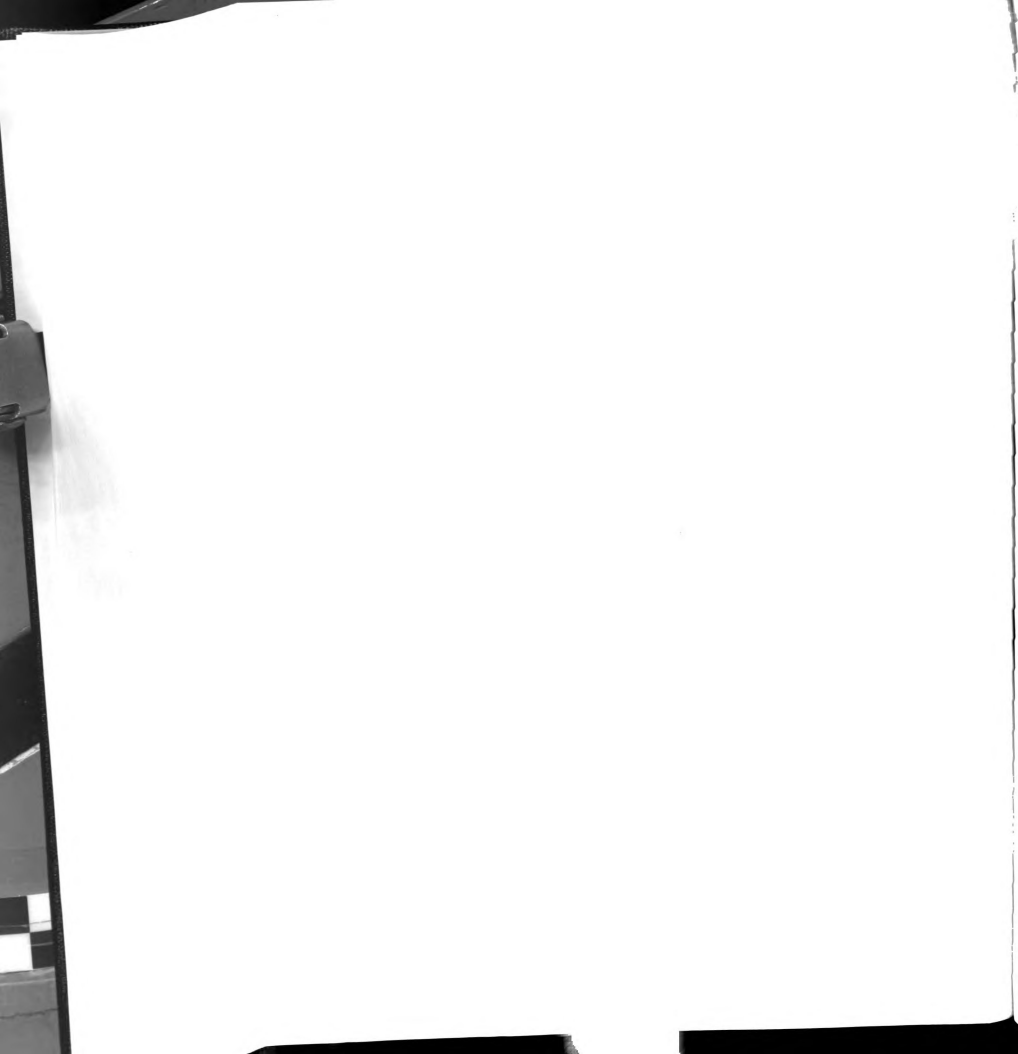
Complete List of 80 Policing Tactics from the National Survey of Community Policing Strategies

Table 1. National Survey of Community Policing Strategies. Complete List of 80 Policing Tactics from Questionnaires

Var. ID	Summarized Survey Question Item	Index Category
67.	Citizens help develop policing policies	Citizen involv
68.	Citizens help evaluate officer performance	Citizen involv
69.	Citizens help review complaints against police	Citizen involv
70.	Citizens participate in selection process for new officers	Citizen involv
71.	Citizens participate in promotional process	Citizen involv
72.	Citizens serve as volunteers within the police agency	Citizen involv
73.	Citizens attend citizen police academy	Citizen involv
75.	Citizens serve on citizen advisory councils at NEIGHBORHOOD LEVEL	Citizen involv
76.	Citizens serve on citizen advisory councils at CITY-WIDE LEVEL	Citizen involv
77.	Citizens participate in court watch program	Citizen involv
78.	Citizens serve on advisory group for chief or other agency managers	Citizen involv
19.	Agency uses building code enforcement to help remove crime	Civil codes
20.	Agency uses regulatory codes to combat drugs and crime	Civil codes
37.	Organization does interagency code enforcement	Civil codes
56.	Most officers enforce civil and code violations in their areas	Civil codes
7.	Agency conducts drug education program in schools	Collaboration
11.	Agency used foot patrol as a specific assignment	Collaboration
12.	Agency uses foot patrol as a periodic expectation for officers	Collaboration
13.	Agency holds regularly scheduled meetings with community groups	Collaboration
25.	Agency conducts citizen surveys to determine community needs	Collaboration
26.	Agency conducts citizen surveys to evaluate police service	Collaboration
31.	Agency conducts police/youth programs	Collaboration
33.	Agency has a specialized community relations unit	Collaboration
46.	Most officers make door-to-door contacts in neighborhoods	Collaboration
48.	Most officers conduct surveys in area of assignment	Collaboration
49.	Most officers develop familiarity with community leaders in area	Collaboration
51.	Most officers assist in organizing community	Collaboration
55.	Most officers meet regularly with community groups	Collaboration

58.	Cpt or Lt maintain regular contact with community leaders	Collaboration
65.	Agency has a neighborhood watch program	Collaboration
74.	Agency coordinates citizen patrols	Collaboration
1.	New policy: Police interactions with other government agencies	CP policy
2.	New policy: Police interactions with citizens, citizen groups	CP policy
4.	New ordinances: To support community policing objectives	CP policy
5.	Agency published goals for community policing	CP policy
80.	Agency is currently implementing community policing	CP policy
21.	Geographically based crime analysis made available to officers	Crime analysis
43.	Agency has a centralized crime analysis unit/function	Crime analysis
44.	Agency has a decentralized crime analysis unit/ function	Crime analysis
54.	Most officers conduct crime analysis for area of assignment	Crime analysis
64.	Cpt or Lt manage crime analysis for geographic area of responsibility	Crime analysis
6.	Classification and prioritization of calls to increase officer time	Efficiency
8.	Drug tip hot line or Crime Stoppers program	Efficiency
17.	Alternative response methods for calls (e.g., telephone reports)	Efficiency
23.	Agency integration with community corrections programs	Efficiency
24.	Agency integration with alternative dispute resolution (ADL)	Efficiency
27.	Agency has a victim assistance program	Efficiency
34.	Agency has a specialized crime prevention unit	Efficiency
36.	Agency participates in an interagency drug task force	Efficiency
41.	Agency has a means of accessing other city or county data bases	Efficiency
42.	Agency uses fixed shifts (changing no more often than annually)	Efficiency
53.	Most officers work regularly with detectives on cases in area	Efficiency
59.	Cpt or Lt establish inter-agency relationships	Efficiency
16.	Agency uses regular radio or television programs or "spots" to inform	Misc
9.	Fixed assignment of patrol officers to specific beats or areas	Place
10.	Designation of some officers as "community" or "neighborhood	Place
18.	Agency has landlord/manager training programs for order maintenance	Place
28.	Permanent, neighborhood-based offices or stations	Place
29.	Mobile, neighborhood-based offices or stations	Place

30.	Agency uses drug-free zones around schools, parks, or churches	Place
32.	Command or decision-making responsibility is tied to neighborhoods	Place
38.	Patrol boundaries coincide with neighborhood boundaries	Place
39.	Physical decentralization of field services	Place
40.	Physical decentralization of investigations	Place
3.	Agency revised procedures to deal with neighborhood problems	Problem Solving
14.	Agency provides specific training for problem solving	Problem Solving
15.	Agency trains citizens in problem identification or resolution	Problem Solving
22.	Interagency involvement in problem identification and resolution	Problem Solving
35.	Multidisciplinary teams to deal with special problems	Problem Solving
45.	Agency has a specialized problem solving unit	Problem Solving
47.	Most officers work with other city agencies to solve neighb. problems	Problem Solving
50.	Most officers work with citizens to identify and resolve area problems	Problem Solving
52.	Most officers teach residents how to address community problems	Problem Solving
57.	Cpt or Lt can redesign organization to support problem solving	Problem Solving
60.	Cpt or Lt make final decision about which problems will be addressed	Problem Solving
61.	Cpt or Lt make final decision about how to handle most comm. problems	Problem Solving
62.	Cpt or Lt make final decision about agency resources to solve problem	Problem Solving
63.	Cpt or Lt elicit input from officers/deputies about solutions to prob	Problem Solving
66.	Citizens work with police to resolve neighborhood problems	Problem Solving
79.	Citizens prepare agreements specifying work to be done on problems	Problem Solving



APPENDIX C

Individual Policing Survey Items - Significantly Related to Crime Reduction.

Table 1. Larceny

Var. ID	Summarized Survey Question Item
68.	Citizens help evaluate officer performance
69.	Citizens review complaints against police
70.	Citizens participate in selection process
73.	Citizens attend citizens police academy
74.	Agency coordinates citizen patrols
79.	Citizens prepare work agreements
56.	Most officers enforce civil and regulatory codes
57.	Managers can redesign organization to support problem-solving
29.	Mobile, neighborhood based offices or stations
34.	Agency has specialized crime prevention unit
36.	Agency participates in interagency drug task force

Table 2. Burglary

Var. ID	Summarized Survey Question Item
68.	Citizens help evaluate officer performance
73.	Citizens attend citizens police academy
38.	Patrol boundaries coincide with neighborhood boundaries
9.	Fixed assignment of patrol officers to specific beats or areas
26.	Agency conducts citizen surveys to evaluate police service
14.	Agency provides specific training for problem-solving
15.	Agency trains and citizens in problem identification and resolution
50.	Most officers work with citizens to identify and resolve area problems
57.	Managers can redesign organization to support problem-solving
66.	Citizens work with police to resolve neighborhood problems
79.	Citizens prepare agreements specifying work to be done on problems
56.	Most officers enforce civil and regulatory codes
34.	Agency has specialized crime prevention unit
36.	Agency participates in interagency drug task force
43.	Centralized crime analysis function

Table 3. Vehicle Theft

Var. ID	Summarized Survey Question Item
56.	Most officers enforce civil and code violations in their areas
43.	Agency has a centralized crime analysis function/function
34.	Agency has a specialized crime prevention unit
53.	Most officers work regularly with detectives on cases in area
9.	Fixed assignment of patrol officers to specific beats or areas
10.	Designation of some officers as "community" or "neighborhood
38.	Patrol boundaries coincide with neighborhood boundaries
39.	Physical decentralization of field services
11.	Agency used foot patrol as a specific assignment
13.	Agency holds regularly scheduled meetings with community groups
25.	Agency conducts citizen surveys to determine community needs
51.	Most officers assist in organizing community
52.	Most officers teach residents how to address community problems
22.	Interagency involvement in problem identification and resolution
57.	Cpt or Lt can redesign organization to support problem solving
60.	Cpt or Lt make final decision about which problems will be addressed
61.	Cpt or Lt make final decision about how to handle most comm. problems
62.	Cpt or Lt make final decision about agency resources to solve problem
63.	Cpt or Lt elicit input from officers/deputies about solutions to prob
66.	Citizens work with police to resolve neighborhood problems
79.	Citizens prepare agreements specifying work to be done on problems

Table 4. Robbery

Var. ID	Summarized Survey Question Item
70.	Citizens participate in selection process
22.	Interagency involvement in problem identification and resolution
57.	Cpt or Lt can redesign organization to support problem solving
60.	Cpt or Lt make final decision about which problems will be addressed
61.	Cpt or Lt make final decision about how to handle most comm. problems
79.	Citizens prepare agreements specifying work to be done on problems
56.	Most officers enforce civil and regulatory codes
34.	Agency has specialized crime prevention unit
36.	Agency participates in interagency drug task force
43.	Agency has a centralized crime analysis function/function
9.	Fixed assignment of patrol officers to specific beats or areas
29.	Mobile, neighborhood based offices or stations
1.	New policy: Police interactions with other government agencies
32.	Command or decision-making responsibility is tied to neighborhoods

Table 5. Rape

Var. ID	Summarized Survey Question Item
7.	Agency conducts drug education program in schools
40.	Physical decentralization of investigations
66.	Citizens work with police to resolve neighborhood problems
22.	Interagency involvement in problem identification and resolution
35.	Multidisciplinary teams to deal with special problems
47.	Most officers work with other city agencies to solve neighb. problems

Table 6. Aggravated Assault

Var. ID	Summarized Survey Question Item
51.	Most officers assist in organizing community
8.	Drug tip hot line or Crime Stoppers program
53.	Most officers work regularly with detectives on cases in area
29.	Mobile, neighborhood-based offices or stations
30.	Agency uses drug-free zones around schools, parks, or churches
52.	Most officers teach residents how to address community problems

Table 7. Murder

Var. ID	Summarized Survey Question Item
56.	Most officers enforce civil and code violations in their areas
46.	Most officers make door-to-door contacts in neighborhoods
43.	Agency has a centralized crime analysis function/function
29.	Mobile, neighborhood-based offices or stations
79.	Citizens prepare agreements specifying work to be done on problems

APPENDIX D

Reported Changes in Policing Tactics from 1993 to 1997

Table 1. Changes in Each of the 80 Policing Practices

Variable	Value	Frequency	Percent	Total	Tot Pct
1	Policy - Interactions with other agencies				
	-1	144	16.59	144	16.59
	0	528	60.83	672	77.42
	1	196	22.58	868	100
2	Policy - Interactions with citizens				
	-1	146	16.82	146	16.82
	0	511	58.87	657	75.69
	1	211	24.31	868	100
3	Policy - Procedures to deal with neighborhood problems				
	-1	148	17.05	148	17.05
	0	517	59.56	665	76.61
	1	203	23.39	868	100
4	Policy - To support community policing goals				
	-1	50	5.76	50	5.76
	0	569	65.55	619	71.31
	1	249	28.69	868	100
5	Policy - Community policing goals published				
	-1	73	8.41	73	8.41
	0	532	61.29	605	69.7
	1	263	30.3	868	100
6	Calls prioritized to increase officer time				
	-1	117	13.48	117	13.48
	0	526	60.6	643	74.08
	1	225	25.92	868	100
7	Drug education program in schools				
	-1	23	2.65	23	2.65
	0	795	91.59	818	94.24
	1	50	5.76	868	100
8	Drug tip hotline or crime stoppers program				
	-1	81	9.33	81	9.33
	0	668	76.96	749	86.29
	1	119	13.71	868	100
9	Fixed assignment of patrol officers				
	-1	76	8.76	76	8.76
	0	621	71.54	697	80.3
	1	171	19.7	868	100
10	Assign some officers as "community" officers				
	-1	71	8.18	71	8.18
	0	480	55.3	551	63.48
	1	317	36.52	868	100

Variable	Value	Frequency	Percent	Total	Tot Pct
11	Foot patrol as a specific assignment				
	-1	112	12.9	112	12.9
	0	631	72.7	743	85.6
	1	125	14.4	868	100
12	Foot patrol as periodic expectation for patrol officers				
	-1	112	12.9	112	12.9
	0	549	63.25	661	76.15
	1	207	23.85	868	100
13	Regularly scheduled meetings with community groups				
	-1	77	8.87	77	8.87
	0	583	67.17	660	76.04
	1	208	23.96	868	100
14	Function - Specific training for problem solving				
	-1	68	7.83	68	7.83
	0	451	51.96	519	59.79
	1	349	40.21	868	100
15	Function - Problem Solving training for citizens				
	-1	89	10.25	89	10.25
	0	467	53.8	556	64.06
	1	312	35.94	868	100
16	Regular radio or television "spots" to inform				
	-1	150	17.28	150	17.28
	0	535	61.64	685	78.92
	1	183	21.08	868	100
17	Alternative response methods for calls				
	-1	92	10.6	92	10.6
	0	588	67.74	680	78.34
	1	188	21.66	868	100
18	Function - Landlord/Mgr. training for order maint.				
	-1	66	7.6	66	7.6
	0	606	69.82	672	77.42
	1	196	22.58	868	100
19	Function - Building code enforcement to remove crime				
	-1	76	8.76	76	8.76
	0	559	64.4	635	73.16
	1	233	26.84	868	100
20	Function - Use of regulatory codes to combat crime				
	-1	108	12.44	108	12.44
	0	530	61.06	638	73.5
	1	230	26.5	868	100

Variable	Value	Frequency	Percent	Total	Tot Pct
21	Function - Geographically based crime analysis				
	-1	148	17.05	148	17.05
	0	534	61.52	682	78.57
	1	186	21.43	868	100
22	Interagency involvement in problem resolution				
	-1	111	12.79	111	12.79
	0	517	59.56	628	72.35
	1	240	27.65	868	100
23	Function - Integration with community corrections				
	-1	115	13.25	115	13.25
	0	561	64.63	676	77.88
	1	192	22.12	868	100
24	Function - Integration with alternative dispute resolution				
	-1	84	9.68	84	9.68
	0	636	73.27	720	82.95
	1	148	17.05	868	100
25	Citizen surveys to determine needs and priorities				
	-1	59	6.8	59	6.8
	0	530	61.06	589	67.86
	1	279	32.14	868	100
26	Citizen surveys to evaluate police services				
	-1	56	6.45	56	6.45
	0	577	66.47	633	72.93
	1	235	27.07	868	100
27	Victim assistance program				
	-1	95	10.94	95	10.94
	0	576	66.36	671	77.3
	1	197	22.7	868	100
28	Permanent neighborhood based offices or stations				
	-1	45	5.18	45	5.18
	0	592	68.2	637	73.39
	1	231	26.61	868	100
29	Mobile, neighborhood based offices or stations				
	-1	45	5.18	45	5.18
	0	701	80.76	746	85.94
	1	122	14.06	868	100
30	Drug free zones around schools, parks, or churches				
	-1	71	8.18	71	8.18
	0	610	70.28	681	78.46
	1	187	21.54	868	100

Variable	Value	Frequency	Percent	Total	Tot Pct
31	Police/youth programs (PAL, School liaison etc.)				
	-1	73	8.41	73	8.41
	0	616	70.97	689	79.38
	1	179	20.62	868	100
32	Command or decision making tied to neighborhoods				
	-1	135	15.55	135	15.55
	0	508	58.53	643	74.08
	1	225	25.92	868	100
33	Specialized community relations unit				
	-1	116	13.36	116	13.36
	0	560	64.52	676	77.88
	1	192	22.12	868	100
34	Specialized crime prevention unit				
	-1	107	12.33	107	12.33
	0	637	73.39	744	85.71
	1	124	14.29	868	100
35	Multidisciplinary teams to deal with special problems				
	-1	135	15.55	135	15.55
	0	531	61.18	666	76.73
	1	202	23.27	868	100
36	Interagency drug task force				
	-1	87	10.02	87	10.02
	0	696	80.18	783	90.21
	1	85	9.79	868	100
37	Function - Interagency code enforcement				
	-1	114	13.13	114	13.13
	0	525	60.48	639	73.62
	1	229	26.38	868	100
38	Patrol boundaries coincide with neighborhoods				
	-1	128	14.75	128	14.75
	0	523	60.25	651	75
	1	217	25	868	100
39	Physical decentralization of field services				
	-1	67	7.72	67	7.72
	0	622	71.66	689	79.38
	1	179	20.62	868	100
40	Physical decentralization of investigations				
	-1	61	7.03	61	7.03
	0	710	81.8	771	88.82
	1	97	11.18	868	100

Variable	Value	Frequency	Percent	Total	Tot Pct
41	Fixed shifts (changing no more often than annually)				
	-1	163	18.78	163	18.78
	0	476	54.84	639	73.62
	1	229	26.38	868	100
42	Access to other city or county databases				
	-1	70	8.06	70	8.06
	0	654	75.35	724	83.41
	1	144	16.59	868	100
43	Centralized crime analysis unit/function				
	-1	140	16.13	140	16.13
	0	573	66.01	713	82.14
	1	155	17.86	868	100
44	Decentralized crime analysis unit/function				
	-1	45	5.18	45	5.18
	0	765	88.13	810	93.32
	1	58	6.68	868	100
45	Specialized problem solving unit				
	-1	104	11.98	104	11.98
	0	541	62.33	645	74.31
	1	223	25.69	868	100
46	Patrol - Make door-to-door contacts in neighborhoods				
	-1	161	18.55	161	18.55
	0	573	66.01	734	84.56
	1	134	15.44	868	100
47	Patrol - Work with other city agencies on problems				
	-1	163	18.78	163	18.78
	0	549	63.25	712	82.03
	1	156	17.97	868	100
48	Patrol - Conduct surveys in area of assignment				
	-1	68	7.83	68	7.83
	0	750	86.41	818	94.24
	1	50	5.76	868	100
49	Patrol - Develop familiarity with community leaders				
	-1	175	20.16	175	20.16
	0	535	61.64	710	81.8
	1	158	18.2	868	100
50	Patrol - Work with citizens to resolve problems				
	-1	165	19.01	165	19.01
	0	525	60.48	690	79.49
	1	178	20.51	868	100

Variable	Value	Frequency	Percent	Total	Tot Pct
51	Patrol - Assist in organizing the community				
	-1	83	9.56	83	9.56
	0	704	81.11	787	90.67
	1	81	9.33	868	100
52	Patrol - Teach residents problem solving				
	-1	99	11.41	99	11.41
	0	666	76.73	765	88.13
	1	103	11.87	868	100
53	Patrol - Work regularly with detectives in neighborhood				
	-1	201	23.16	201	23.16
	0	495	57.03	696	80.18
	1	172	19.82	868	100
54	Patrol - Conduct crime analysis for area of assignment				
	-1	87	10.02	87	10.02
	0	722	83.18	809	93.2
	1	59	6.8	868	100
55	Patrol - Meet regularly with community groups				
	-1	81	9.33	81	9.33
	0	711	81.91	792	91.24
	1	76	8.76	868	100
56	Patrol - Enforce civil and code violations in area				
	-1	175	20.16	175	20.16
	0	521	60.02	696	80.18
	1	172	19.82	868	100
57	Managers - Redesign organization for problem solving				
	-1	96	11.06	96	11.06
	0	464	53.46	560	64.52
	1	308	35.48	868	100
58	Managers - Regular contact with community leaders				
	-1	127	14.63	127	14.63
	0	534	61.52	661	76.15
	1	207	23.85	868	100
59	Managers - Establish interagency relationships				
	-1	108	12.44	108	12.44
	0	592	68.2	700	80.65
	1	168	19.35	868	100
60	Managers - Final decision, problems to be addressed				
	-1	136	15.67	136	15.67
	0	495	57.03	631	72.7
	1	237	27.3	868	100

Variable	Value	Frequency	Percent	Total	Tot Pct
61	Managers - Final decision, how to handle problems				
	-1	131	15.09	131	15.09
	0	491	56.57	622	71.66
	1	246	28.34	868	100
62	Managers - Final decision, agency resources, problems				
	-1	109	12.56	109	12.56
	0	463	53.34	572	65.9
	1	296	34.1	868	100
63	Managers - Elicit input from deputies, problem solving				
	-1	189	21.77	189	21.77
	0	550	63.36	739	85.14
	1	129	14.86	868	100
64	Managers - Crime analysis for area of assignment				
	-1	192	22.12	192	22.12
	0	478	55.07	670	77.19
	1	198	22.81	868	100
65	Citizens - Participate in neighborhood watch program				
	-1	38	4.38	38	4.38
	0	758	87.33	796	91.71
	1	72	8.29	868	100
66	Citizens - Work to resolve neighborhood problems				
	-1	59	6.8	59	6.8
	0	574	66.13	633	72.93
	1	235	27.07	868	100
67	Citizens - Help develop policing policies				
	-1	85	9.79	85	9.79
	0	653	75.23	738	85.02
	1	130	14.98	868	100
68	Citizens - Help evaluate officer performance				
	-1	59	6.8	59	6.8
	0	721	83.06	780	89.86
	1	88	10.14	868	100
69	Citizens - Help review complaints against police				
	-1	57	6.57	57	6.57
	0	741	85.37	798	91.94
	1	70	8.06	868	100
70	Citizens - Participate in selection process for officers				
	-1	71	8.18	71	8.18
	0	688	79.26	759	87.44
	1	109	12.56	868	100

Variable	Value	Frequency	Percent	Total	Tot Pct
71	Citizens - Participate in promotion process for officers				
	-1	79	9.1	79	9.1
	0	690	79.49	769	88.59
	1	99	11.41	868	100
72	Citizens - Serve as volunteers within the agency				
	-1	100	11.52	100	11.52
	0	582	67.05	682	78.57
	1	186	21.43	868	100
73	Citizens - Attend citizens police academy				
	-1	35	4.03	35	4.03
	0	523	60.25	558	64.29
	1	310	35.71	868	100
74	Citizens - Serve in coordinated citizens patrols				
	-1	75	8.64	75	8.64
	0	598	68.89	673	77.53
	1	195	22.47	868	100
75	Citizens - Advisory councils at neighborhood level				
	-1	149	17.17	149	17.17
	0	505	58.18	654	75.35
	1	214	24.65	868	100
76	Citizens - Advisory councils at city-wide level				
	-1	117	13.48	117	13.48
	0	516	59.45	633	72.93
	1	235	27.07	868	100
77	Citizens - Participate in court watch program				
	-1	72	8.29	72	8.29
	0	731	84.22	803	92.51
	1	65	7.49	868	100
78	Citizens - Advisory group for chief or other managers				
	-1	121	13.94	121	13.94
	0	538	61.98	659	75.92
	1	209	24.08	868	100
79	Citizens - Prepare work agreements, police problem solv				
	-1	94	10.83	94	10.83
	0	655	75.46	749	86.29
	1	119	13.71	868	100
80	Policy - Currently implementing community policing				
	-1	44	5.07	44	5.07
	0	446	51.38	490	56.45
	1	378	43.55	868	100

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