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Rachel Boba Santos¹

Abstract

Many researchers and police chiefs have asked the question, “Does crime analysis reduce crime?” This question is a difficult one because the link between crime analysis and crime reduction is not direct. Just like the use of MRI results does not cure an illness, crime analysis is the process of using examining data and making conclusions; it is not a crime reduction strategy (cure) by itself. The connection between crime analysis and crime reduction is only through an effective police strategy that uses crime analysis. So, instead of evaluating whether crime analysis reduces crime, this article examines the role of crime analysis as a component in specific police crime reduction strategies. The evidence presented is not based on research of effectiveness of crime analysis, since there is none, but on the effectiveness research of police approaches, such as the standard model of policing, community policing, disorder policing, problem-oriented policing, hot spots policing, and the “pulling levers” focused deterrence approach, as well as popular and new approaches, such as Compstat, intelligence-led policing (ILP), and predictive policing, and the level at which crime analysis plays a role in each. Through a qualitative assessment, the author concludes that there is a clear pattern that crime analysis plays a significant role in police approaches that are effective, and just as apparent, crime analysis plays a very limited role in policing approaches that are ineffective. In addition, assessment of the policing approaches that have not been systematically evaluated, but have been widely adopted (i.e., Compstat) or are relatively new (i.e., ILP and predictive policing), reveals that crime analysis plays a central and visible role. This article shows that crime analysis is a key component in successful crime reduction efforts. Because this

¹Florida Atlantic University, Boca Raton, FL, USA

Corresponding Author:

Rachel Boba Santos, School of Criminology and Criminal Justice, Florida Atlantic University, 777 Glades Road, Boca Raton, FL 33431, USA.
Email: rboba@fau.edu

is a qualitative assessment from a fairly broad perspective, several recommendations are made for future research that will more fully understand the relationship between crime analysis and police effectiveness.

Keywords

crime analysis, crime reduction, police effectiveness, evaluation

Introduction

The articles in this special issue all address how police can use analysis and data to be more effective in reducing crime. The contribution of this article is to discuss the relationship between crime analysis conducted within police departments and policing strategies that have shown to be effective. Many researchers and practitioners have asked the question, "Does crime analysis reduce crime?" But none has found an answer. One of the reasons this question is a difficult one is because the link between crime analysis and crime reduction is not direct. Crime analysis is the process of examining data and making conclusions; it is not a crime reduction strategy by itself.

Consequently, this article will not attempt to determine whether crime analysis reduces crime, but instead, will examine the role of crime analysis as a component in police crime reduction efforts. Thus, the evidence presented is not based on research of effectiveness of crime analysis, as there is none, but it will focus on the effectiveness of research results of police approaches and the level at which crime analysis plays a role in the successful approaches as well as the unsuccessful ones. These policing approaches include the standard model of policing, community policing, disorder policing, problem-oriented policing (POP), hot spots policing, and the "pulling levers" focused deterrence approach, all of which have been intensely researched over the last several decades. In addition, the article will consider the role of crime analysis in popular and some newer approaches that have not been systematically evaluated, such as Compstat, intelligence-led policing (ILP), and predictive policing.

The goal of this article, then, is to examine the crime reduction effectiveness evidence together with the role crime analysis plays in each one of these policing approaches to determine whether there is a relationship between the level at which and how crime analysis is used and the effectiveness of a particular strategy. Thus, the question here is not whether crime analysis reduces crime but whether crime analysis is a *necessary* component in the police approaches that are effective in reducing crime.

The article begins with the definition of crime analysis, discusses the relationship between crime analysis and crime reduction, and presents how crime analysis will be assessed within the policing strategies. Then, an assessment will be made about the crime reduction effectiveness and the role of crime analysis within each strategy. The article concludes with a discussion of the assessments as a whole, the patterns that emerge, and considerations for future research on crime analysis.

Crime Analysis Definition

First, it is important to define crime analysis for the context of this article. Crime analysis is the practice of examining crime, disorder, and other data by personnel within a police department. The formal widely accepted definition is as follows:

Crime analysis is the systematic study of crime and disorder problems as well as other police-related issues—including sociodemographic, spatial, and temporal factors—to assist the police in criminal apprehension, crime and disorder reduction, crime prevention, and evaluation. (R. B. Santos, 2012, p. 2)

Although the “analysis of crime” has existed for a very long period of time, the professional adoption of individuals being assigned specifically to conduct crime analysis within police departments did not become recognizable until the 1970s (Emig, Heck, & Kravitz, 1980) and did not become common, at least in large agencies (i.e., 100 or more officers), until the 1990s (O’Shea & Nicholls, 2003). A confluence of factors in the 1990s initiated a significant number of agencies to establish a crime analysis function and position (R. B. Santos, 2012). These factors included the advanced development of desktop computers, more robust data collection and warehousing hardware and software (i.e., records management systems and computer-aided dispatch systems; Pattavina, 2005), the widely acclaimed success of New York City Police Department’s (NYPD) Compstat program (Silverman, 2006) in which statistics and analysis were central mechanisms, as well as federal funding for crime mapping software and equipment through a program called MORE (Making Officer Redeployment Effective; Zhao, Scheider, & Thurman, 2002).

After nearly 20 years of significant funding and a push for crime analysis by the police profession, a question that is often raised is whether crime analysis reduces crime. That is, one of the first questions police chiefs ask when being encouraged to request or reallocate funding to hire a new crime analyst is, “Will hiring a crime analyst reduce crime in my city?” This is an elusive question that is explored in the next section.

The Relationship of Crime Analysis and Crime Reduction

A review of crime analysis research reveals a growing body of knowledge about crime analysis, very little of which is focused on the relationship between crime analysis and crime reduction. Two national surveys of crime analysis (O’Shea & Nicholls, 2003) and crime mapping (Mamalian & LaVigne, 1999) sought to understand the prevalence and nature of crime analysis practice in police agencies. A more recent national survey conducted by the Police Executive Research Forum focused on the level of integration of crime analysis into patrol work (R. B. Santos & Taylor, in press; Taylor & Boba, 2011).

These national studies have found that crime analysis and crime mapping are becoming more common, but that they are primarily implemented in larger police

agencies (Mamalian & LaVigne, 1999; Taylor & Boba, 2011). An examination of the 2007 Law Enforcement Management and Administrative Statistics (LEMAS) by this author shows these findings hold true (Bureau of Justice Statistics, 2013). Of the 2,875 agencies surveyed, 55.7% (1,600) use computers for crime analysis and 47.5% (1,366) use computers for crime mapping. The overwhelming majority of those agencies that do not use computers for crime analysis (80.2%) and crime mapping (78.2%) are agencies with fewer than 50 officers, and those that do use computers for these purposes are mostly agencies with 50 or more officers (66.9% for crime analysis and 71.8% for crime mapping).

In addition, 557 (20.0%) agencies said they have a specialized unit with personnel assigned full-time to crime analysis, 144 (5%) do not have a specialized unit but designate personnel to crime analysis, and 117 (4%) said they do crime analysis but do not have designated personnel. Interestingly, though not surprising, nearly all of the agencies in these three categories have more than 100 officers (i.e., ranging from 99.5% to 100% in each category). Notably 69.3% of the sample did not answer these questions, 97.6% of which were agencies with fewer than 100 officers. Thus, crime analysis implementation appears to be a function of size.

Looking at what crime analysts do in police agencies, O'Shea and Nicholls (2003) found that crime analysis was focused primarily on tactical issues of identifying offenders, on identifying hot spots for short-term responses, and supporting traditional investigative strategies. They were surprised to find the lack of analysis in a broader range of strategic and problem analysis. R. B. Santos and Taylor (in press) found in their examination of who uses crime analysis (i.e., officers, first-line supervisors, and management) and what they use crime analysis for (i.e., directed patrol, arresting offenders, information, and crime prevention) that even though three quarters of the agencies surveyed had a crime analysis capacity, the level of integration of crime analysis in patrol work was fairly low overall. When crime analysis was used in agencies, managers used it the most for tactical purposes, and directed patrol was the main response informed by all types of analysis (i.e., short-term to long-term products; R. B. Santos & Taylor, in press).

Studies on crime analysis with a smaller focus include research by Chamard (2003) and Sever, Garcia, and Tsiandi (2008) who conducted statewide surveys in New Jersey at different times examining the use and implementation of crime analysis in the local police agencies. Chamard examined 347 agencies and their adoption of crime analysis (i.e., crime mapping). She found that a small number of agencies utilized crime analysis and that adoption and continued use of crime analysis was a function of agency size in that larger agencies were more likely to adopt and maintain a crime analysis function (Chamard, 2003). Further evidence of sporadic use of crime analysis in police agencies was seen in a survey conducted by Sever et al. who found that although crime analysis strategies were used in New Jersey police agencies, the level was varied and most agencies did not use advanced methods.

Giblin (2006), who examined the structural incorporation of crime analysis into the police organization, found in a small sample of departments (160) that larger agencies are more likely to have structures established for crime analysis and that accreditation

standards played an important role in implementation. Two other studies examined the corresponding perspectives of police and crime analysis on the police/analyst relationship and analysis products (Cope, 2004; Taylor, Kowalyk, & Boba, 2007). Nina Cope (2004) found through interviews with crime analysts and sworn supervisors in the United Kingdom that a self-fulfilling prophecy existed in the relationship. She found that the requests for analysis made by police managers were not meaningful or action-oriented, so when they received the product, developed to their specifications, it was not helpful for directing police crime reduction efforts. Importantly, the managers in the study subsequently blamed the irrelevance of the analysis and the crime analyst for the results not being helpful. In an exploratory survey, Taylor et al. (2007) found that analysts had very positive attitudes toward sworn personnel, but they felt as though the sworn personnel, particularly the police officers, were not as supportive of them and crime analysis. These two studies conclude that there appears to be a cultural disconnect between crime analysts and the sworn personnel they are attempting to assist.

Notably, the studies discussed thus far have sought to understand the prevalence and nature of crime analysis implementation in police agencies. Most of the research is descriptive and exploratory, which is likely due to the recent adoption of crime analysis and the need to understand the basic characteristics of crime analysis in policing. None of these studies examines the direct relationship between crime analysis and crime reduction but their findings suggest that there are many issues to resolve in the implementation and use of crime analysis.

In terms of research on the impact of crime analysis on crime reduction, only two studies have attempted to examine this issue. These two studies, both dissertations, examined the question of whether crime analysis reduces crime by examining crime analysis characteristics of police agencies and their Part I crime and clearance rates. The first study by Demir (2009) used data from the national survey conducted by the Crime Mapping Research Center (CMRC) of the National Institute of Justice (NIJ) in 1997 to examine the relationship of more than 2,000 agencies' crime analysis and crime mapping functions with their clearance rates. The researcher examined a range of issues finding that agencies proximate to others with crime mapping were more likely to adopt the technology and that when analysis was used for decision making, it was fairly simple and straightforward. Demir also found some evidence that agencies participating in more crime analysis and crime mapping had lower clearance rates.

The second dissertation by Baltaci (2010) used the national survey data collected by O'Shea and Nicholls in 2000 (O'Shea & Nicholls, 2003) to examine the effect of crime analysis activity measured by 22 items on crime and clearance rates of police agencies. The results from a sample of around 800 agencies (all with more than 100 officers) showed that the broader the crime analysis activities of an agency, the lower the violent crime rates and the higher the violent, property, and total clearance rates.

Although these two studies examined crime analysis' effect on crime reduction, they present weak evidence because they are both correlational studies and look at the issue from a very broad view (i.e., unit of analysis was the police agency). That is, although the studies showed a relationship between crime analysis and crime

clearance rates, there is no evidence of the causality of this relationship or whether other more important variables explained the difference in crime and clearance rates of the agencies.

Yet, I would argue that the dearth of research about the relationship between crime analysis and crime reduction does not result from the lack of interest in the question itself. I would assert that the question of whether crime analysis directly results in the reduction of crime is very challenging to answer. I will use an analogy to the medical field to illustrate this assertion.

A magnetic resonance imaging (MRI) machine is used to conduct an analysis of the entire body or a particular body part to diagnose a particular injury or illness. The data are the body itself, and the MRI technician produces a series of images from the machine's software that projects the data in a number of different ways (i.e., the data analysis). The report is then given to the radiologist who interprets the images determining whether there are any problems or issues that need to be addressed. Finally, the patient's doctor reads the radiologist's report, conducts one more level of analysis after conversations with the patient, and decides upon a strategy to address the patient's illness. Thus, while the MRI itself and the analysis reports may be accurate and of high quality, the success of the strategy (i.e., treatment) selected by the patient's doctor depends on the doctor's understanding of the MRI data analysis, the quality of the radiologists report, the treatment's appropriateness, and, importantly, the proper implementation of the treatment.

Is it a reasonable question then to ask whether an MRI analysis cures an illness? Or even whether the radiologist cures an illness? I would argue no. Yes, an MRI is important and necessary for doctors as a diagnostic tool, as an MRI can catch an illness in the early stages and point to a particular treatment to cure the illness. However, the technology, data, and radiologists' role in the choice of the cure or its successful implementation is by design extremely limited. Thus, we cannot say the MRI diagnostic process cures any illness or disease, only that it is an important and, in some cases, a *necessary* component.

Crime analysis is analogous to the MRI process. Let us take the ideal scenario. A crime analyst (i.e., radiologist) has valid and reliable data to conduct techniques that are evidence-based to develop a "diagnosis" of a particular crime problem in a city. The selection of the response, though ideally informed by the analysis, is not generally made by the analyst, but by sworn personnel. More importantly, the implementation of the response and assuring the needed resources for the response are available lies squarely on the shoulders of those responsible for responding, in most cases sworn personnel as well. Albeit, there are a handful of crime analysts working today who play a larger role in response selection and overseeing its implementation (e.g., Eisenberg, Hunter, & Schmerler, 2009); however, this is not typical nor it is what is expected of the crime analysis function in policing (R. B. Santos, 2012).

Accordingly, Figure 1 depicts the relationship between crime analysis and crime reduction. The first box represents the end product of the crime analysis product (i.e., the radiologists report), which is then passed to sworn personnel in the police agency who select the response and subsequently oversee and provide resources of the

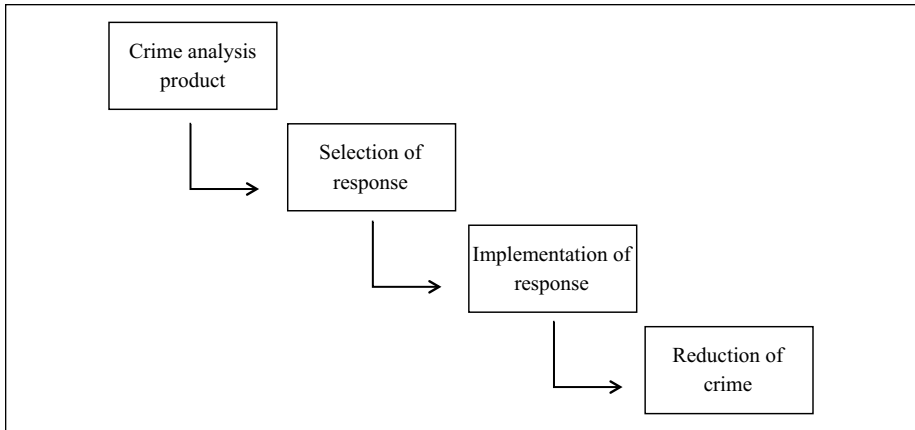


Figure 1. Relationship between crime analysis and crime reduction.

response (i.e., selecting and carrying out the treatment). Finally, the outcome of the response in the ideal situation is crime reduction (i.e., cure). This effect, of course, requires close scrutiny and rigorous evaluation methods to determine if, in fact, it was the police response and not other factors that caused the crime to go down. Thus, because there is not a direct link, or even a secondary link, between crime analysis and crime reduction, the question of whether crime analysis reduces crime is very difficult to answer on a broad scale, or even on a more focused case-by-case basis.

Although there can and should be more research conducted on the prevalence of crime analysis in policing, the accuracy and reliability of specific crime analysis techniques (e.g., hot spot and pattern identification, trend analysis), the knowledge and skills of crime analysts, and the integration of crime analysis into the police agency, a more appropriate question relating to crime reduction is whether crime analysis is a *necessary component* of policing for police to be effective in reducing crime. Answering this question gets to the heart of what police chiefs want to know, which is whether investing in crime analysis will result in a more effective means to reduce crime or can the agency be as successful without crime analysis. In other words, do doctors really need the MRI and the radiologists' diagnosis to be effective or can they be just as effective without them?

This article examines what we know about police effectiveness in reducing crime and the role of crime analysis within the various police approaches to determine whether there is a pattern from which we can conclude whether or not proven effective police approaches do need crime analysis. The argument becomes not whether an agency should adopt crime analysis because it has a direct link to crime reduction, but whether a police agency needs crime analysis to successfully implement policing approaches that are proven to reduce crime. It seems as though this is splitting hairs, but in the end, it is important that we put crime analysis with its technology and software in the correct perspective, as too many people, both in policing and in the private

sector, tout crime analysis as the panacea for crime reduction. The difference then would be saying that MRI analysis is important as part of the diagnosis that leads to successful selection and implementation of a cure, instead of the MRI and the radiologist cure illnesses.

In crafting this argument, there is an assumption that is made to examine the research on police effectiveness, which is that at this point we cannot clearly define the role of the “crime analyst” in each of the policing studies or in the meta-analyses of those studies. Also, as the previous review of crime analysis research shows, there are issues and concerns with the adoption and integration of crime analysis within everyday policing. As much of the research on police effectiveness comes from studies conducted by researchers in which the analysis is conducted or guided by the researcher, the analysis presented here is not an examination of the role of the individual crime analyst (i.e., an employee within the police department), but the role that crime analysis (i.e., an analysis result) plays in a particular approach.

The supposition is that the analysis that was conducted by the researcher as part of a police strategy in these studies would be conducted by a crime analyst if the agency were to adopt that particular strategy. This assessment also ignores the issues and concerns of implementation of crime analysis within a police agency as that would be worthy of another article at the least. Thus, this article assesses the role of crime analysis in each approach based on an ideal implementation (i.e., the crime analysis that is produced is appropriate and high quality and is used without question by the agency for the strategy).

The Role of Crime Analysis in Police Approaches

The policing approaches that are discussed here are those that are discussed at length by David Weisburd both in his review of police effectiveness published with John Eck in 2004 (Weisburd & Eck, 2004) and his more recent update of that work with Cody Telep in 2012 (Telep & Weisburd, 2012). The individual meta-analysis results produced through the Campbell Collaboration are used for hot spots policing (Braga, Papachristos, & Hureau, 2012), POP (Weisburd, Telep, Hinkle, & Eck, 2010), and “pulling levers” focused deterrence strategies (Braga & Weisburd, 2012). Currently, there are Campbell reviews taking place for community policing and disorder policing, but as of the writing of this article, they are not available, so the assessment of these is based on the general reviews (i.e., Telep & Weisburd, 2012; Weisburd & Eck, 2004). Finally, although there is no systematic research to date on Compstat, ILP, or predictive policing, these approaches will be examined as far as they rely on crime analysis but not on their effectiveness.

The methodology of this analysis is qualitative and is based on my experience, knowledge of crime analysis, and previous work (R. B. Boba & Santos, 2011; R. B. Santos, 2012; Taylor & Boba, 2011). Assessment of the use of crime analysis in policing approaches is conducted in a general way with the goal of briefly describing how crime analysis supports the approach and determining to what extent crime analysis is necessary. That is, the assessment will attempt to identify the link between crime

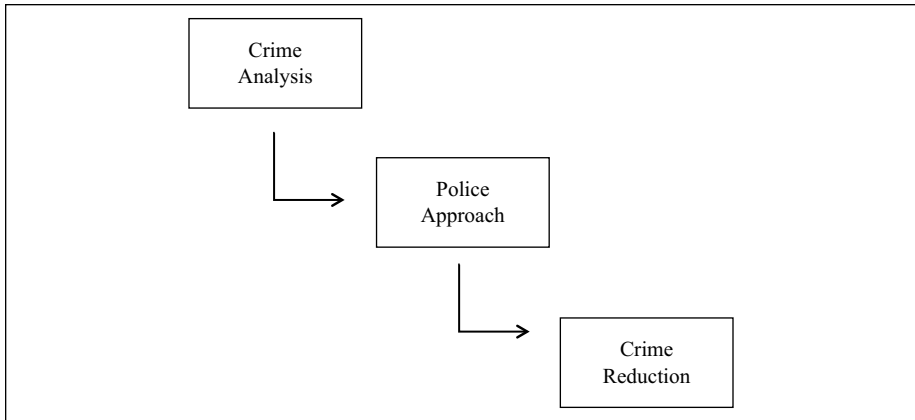


Figure 2. Relationship among crime analysis, a police approach, and crime reduction.

analysis and crime reduction *through* the relationship of both to a given police approach. Figure 2 illustrates the potential relationship. The hypothesis is that crime analysis plays a central role in police approaches that are effective and is necessary in those successful approaches.

Standard Model of Policing

The standard model of policing involves enforcing the law in a general and reactive way, primarily using police resources (Weisburd & Eck, 2004). The strategies used in the standard model of policing include increasing the number of officers, rapid response to calls for service, conducting unfocused random motorized patrol, and general reactive arrest strategies (Sherman et al., 1997; Weisburd & Eck, 2004). The general consensus of the research on effectiveness of these strategies is that each one of these generally applied enforcement efforts has been of limited effectiveness (Sherman et al., 1997; Skogan & Frydl, 2004; Telep & Weisburd, 2012; Weisburd & Eck, 2004).

Crime analysis is used within the standard model of policing to help assess how many officers may be needed to staff the requisite number of calls for service and crimes and to determine future optimal staffing levels. This is a specific type of crime analysis called “operations analysis” (Bruce, 2008) and is the process of assessing the police agency’s own practices such as allocation of personnel, money, equipment, and other resources, geographically, organizationally, and temporally. O’Shea and Nicholls (2003) concluded from their national study that the short-term and tactical focus of crime analysis primarily supports the professional policing model. That is, much of crime analysis in policing focuses on identifying individual offenders and conducting investigative support (O’Shea & Nicholls, 2003). The standard model also uses operations analysis to assess and improve the rapid response to calls for service by

examining the types of calls, priorities, geographic routes officers take to answer calls, and geographic assignment of officers.

In addition, within the standard model of policing, crime statistics that are produced by crime analysis are used to determine the overall amount of crime and whether crime has increased or decreased. However, in most situations, these statistics are not used for crime reduction purposes, specifically, because components of the standard model—random patrol and reactive arrests—are used in response to a community's demand and are generally applied. Thus, crime analysis is used primarily as information so that sworn personnel, from patrol officers to the chief, have an idea of when and where crime has occurred, and overall how much has occurred, but it does not directly inform their proactive crime reduction strategies because in the standard model proactivity is extremely limited (Weisburd & Eck, 2004).

Assessment: The standard model of policing has limited effectiveness in reducing crime. In this approach, crime analysis is used for internal operations decision making and statistics but does not contribute to specific crime reduction activities.

Community Policing

Police scholars have recognized that community policing is one of the most widely adopted ideas in policing in the last several decades (Weisburd & Eck, 2004). Yet, in recent years, the definition of community policing has transitioned from a police strategy to a policing philosophy. According to the U.S. Department of Justice's Office of Community Oriented Policing Services (COPS Office; 2013), community policing is "a philosophy that promotes organizational strategies, which support the systematic use of partnerships and problem-solving techniques, to proactively address the immediate conditions that give rise to public safety issues such as crime, social disorder, and fear of crime."

The first key component of community policing is developing partnerships and relationships with the community to understand and respond to problems as well as to engender cooperation and legitimacy of the police, so that partnerships are meaningful (COPS Office, 2013). Although there has not been a systematic evaluation of community policing because the definition and focus of the approach has historically been vague (Weisburd & Eck, 2004), there are research results on specific programs that fall under the umbrella of community policing. Notably, the second key component of community policing, the process of problem solving (i.e., Scanning, Analysis, Response, and Assessment [SARA]), will be discussed in the context of POP as that is where most of the research on the effectiveness of problem solving has focused (Weisburd et al., 2010).

The results of evaluations of community policing programs show that neighborhood watch, drug awareness programs, community meetings, storefront offices, and newsletters do not reduce crime (Telep & Weisburd, 2012; Weisburd & Eck, 2004).

While door-to-door visits by the police have been found to reduce crime, providing information about crime to the public has not been shown to prevent crime either (Sherman et al., 1997; Weisburd & Eck, 2004).

The primary role of crime analysis in these community policing strategies is to provide information to citizens as part of transparency and to take collective responsibility for crime in the community. Crime analysts have historically played a central role in providing crime statistical information about crime to community groups, neighborhood and block watch organizations, businesses, and for newsletters with the goal of communicating crime information to the public. Over the last 15 to 20 years, the distribution of crime and disorder information has shifted to the Internet (Wartell & McEwen, 2001) and is not necessarily created or distributed by crime analysts, but through public Internet companies to which the police agency provides data that are accessed by citizens through web software tools to search the data themselves. Although analysts do not play a central role in this process, the process itself is considered a crime analysis function of a police department.

Assessment: The majority of community policing programs are limited in their effectiveness in reducing crime and do not require crime analysis. When crime analysis is used, it is used primarily for providing general statistics and information on crime and disorder to the community.

Disorder Policing

Disorder policing, also called “broken windows policing,” is based on a practical theory developed in the 1980s (Wilson & Kelling, 1982). Its strategies are strict enforcement of laws against disorderly behavior and minor offenses to prevent more serious crimes from happening (Sousa & Kelling, 2006). The research results of the effectiveness of broken windows policing have been mixed (Weisburd & Eck, 2004). A summary of studies in seven cities (Skogan, 1990, 1992) found no evidence that the strict enforcement of disorder ordinances reduced additional disorder or more serious crimes. Another more recent study (Kelling & Sousa, 2001) found a direct link between misdemeanor arrests and a reduction in more serious crime, but data limitations raised questions about the study’s conclusions. New York City (NYC) used this type of policing intensively in the 1990s, and many NYC officials have concluded it was the reason why the crime rate dropped during that time. However, researchers have not rigorously evaluated these claims, and many cite other reasons for NYC’s crime decrease (Weisburd & Eck, 2004).

In much of the research, it is difficult to discern the specific role of crime analysis in this policing approach, so it is inferred from the nature of the implementation of the approach. That is, if disorder policing is applied in an unfocused way in that police enforce all lower level offenses within the jurisdiction (i.e., zero tolerance), the role of crime analysis is limited to the ex post facto evaluation of the responses because it is not necessary in the implementation of any response that is generally applied. On

the contrary, if disorder policing responses are applied to specific areas with higher crime levels at specific times, then crime analysis plays a central role in determining when and where efforts are deployed for the purpose of reducing crime and disorder.

Assessment: At this time, disorder policing has an unclear effect on crime which corresponds to its uncertain use of crime analysis. Thus, an assessment, even a relatively shallow one, cannot be reasonably made at this time. The future results of the Campbell Collaboration review of disorder policing will provide conclusions about effectiveness and possibly shed some light on the role of crime analysis.

POP

In short, POP advocates proactively identifying problems within the community and developing thoughtful, tailored responses to address underlying causes of the problems to develop meaningful and effective solutions (Goldstein, 1990). The core component of POP is the problem-solving process which is also an important component of community policing. Problem solving has been operationalized by John Eck and William Spelman (1987) as the SARA model, which includes scanning for problems in the community and prioritizing them for response, analyzing data to understand the opportunities that create the problem, responding to the problem with both police and non-police methods that are tailored to the problem and the community, and assessing whether the response was implemented correctly and whether it worked (Center for Problem-Oriented Policing, 2013).

The Campbell review of POP found that of the limited number of studies that met the criteria for the review, this strategy had a modest, but significant, effect on crime reduction (Weisburd et al., 2010). The review also found that even studies that did not meet the review's strict criteria, but were pre-/post-evaluations, also revealed positive results of effectiveness in reducing crime. Researchers conclude that even addressing problems somewhat superficially using the problem-solving process is enough to impact crime and disorder levels (Braga & Weisburd, 2006; Telep & Weisburd, 2012). Although more rigorous research needs to be conducted on POP efforts, the evidence so far shows that it is the most promising of the police strategies (Skogan & Frydl, 2004; Weisburd & Eck, 2004; Weisburd et al., 2010).

Crime analysis has a very clear role in problem solving for crime reduction. Notably, crime analysis plays an integral role in all phases of problem solving, not only in the two As of SARA—analysis and assess—which are obvious but also in the S and R—scan and respond. That is, scanning requires analysis that helps to identify and prioritize problems for selection. In the response stage of problem solving, the responses are not only selected based on the analysis, but the specific deployment of responses depends on additional analysis (R. B. Santos, 2012). Thus, crime analysis is necessary for all stages of the SARA process and fundamentally, problem solving cannot occur without crime analysis, which is also called “problem analysis” (Boba, 2003).

Assessment: POP shows the most promise for reducing crime. Crime analysis is absolutely essential in this approach as it is necessary in all stages of the problem-solving process.

Hot Spots Policing

Hot spots policing is a place-based policing approach in which traditional police strategies, such as increased police presence and arrests, are implemented in areas or “hot spots” that have disproportionately more crime than other areas within a jurisdiction (Braga et al., 2012; Telep & Weisburd, 2012; Weisburd & Eck, 2004). The research on the effectiveness of hot spots policing is rigorous and plentiful. The results show that police response to hot spots, whether they are individual or clusters of addresses, street segments, or blocks is effective in reducing crime (Braga et al., 2012; Telep & Weisburd, 2012; Weisburd & Eck, 2004). Although the research shows that displacement of crime does not often occur and more often diffusion of benefits is the result of the interventions (Braga et al., 2012), the sustainability of crime reduction is limited in that the results are primarily short term (Braga et al., 2012). However, Braga and Weisburd (2010) asserted that when hot spots policing is coupled with more in-depth problem solving (i.e., not just identifying the hot spots but also understanding why they are “hot”), the strategy can be effective in the long term as well.

Crime analysis, particularly the use of crime mapping and spatial analysis, has an important role in identifying the hot spots where the policing strategies are best implemented. Analysis is an important facet of properly identifying hot spots because many researchers have found that police do not accurately identify hot spots or regularly agree on what is a hot spot in their respective areas of responsibility (Bichler & Gaines, 2005; McLaughlin, Johnson, Bowers, Birks, & Pease, 2006; Ratcliffe & McCullagh, 2001). When hot spots policing is coupled with in-depth problem solving, crime analysis plays an even more central role in identifying and understanding the nature of the hot spot to implement appropriate responses, as noted earlier in the discussion of POP. In both hot spots policing with traditional responses and when coupled with problem solving, crime analysis also plays an important role determining whether there is an effect on crime and whether the strategies result in displacement of crime or diffusion of benefits (Braga et al., 2012; Telep & Weisburd, 2012).

Finally, in his dissertation, Roberto G. Santos (2013) found through a robust quasi-experimental design that responding to micro-time hot spots (i.e., hot spots that “flare up” in the short term) was effective in reducing residential burglary and theft from vehicle without displacement. In this study, crime analysis played a clear and significant role in that over 5 years, the same two police-employed crime analysts identified the micro-time hot spots on which all the hot spots responses were based. Although the study did not examine the role of the crime analysis specifically, it is a clear example of how crime analysis produced by police crime analysts as part of their everyday responsibilities was systematically used by police to reduce crime.

Assessment: Hot spots policing is effective in reducing crime. Crime analysis is central in the typical implementation of hot spots policing and essential when it is coupled with problem solving.

“Pulling Levers” Focused Deterrence

The “pulling levers” strategy is essentially a very specific problem-solving approach to address serious violent offenders in high crime areas of a city (Braga & Weisburd, 2012). The focus of the responses, based in deterrence theory, is that they be certain, severe, and swift (Braga & Weisburd, 2012). This strategy was first implemented as a POP project in Boston in the 1990s but has been implemented in many different communities across the country. In each community, a problem-solving approach is taken in which the specific deterrence strategies are implemented based on the nature of the violent crime and offending in that community (Braga & Weisburd, 2012; Telep & Weisburd, 2012).

The results of Campbell Collaboration review for the “pulling levers” strategy are positive in that they are shown to reduce crime at a significant level (Braga & Weisburd, 2012). Although the authors are concerned that there is a lack of systematic rigorous experimental studies to support this conclusion (Braga & Weisburd, 2012), the less rigorous studies that met the criteria for the review showed large effect sizes, thus they conclude the approach is promising.

As with POP, the problem-solving process is central in this approach, thus crime analysis is also central (Telep & Weisburd, 2012). Although the responses within this approach focus on individuals, the process of identifying the appropriate individuals involves identifying areas of disproportionately high crime (i.e., hot spots; Kennedy, Braga, & Piehl, 1998) and understanding the nature of crime and the relationship of the offenders to crime (Kennedy, Braga, & Piehl, 2001), both of which require crime analysis.

Assessment: The pulling levers strategy is effective and shows promise. Crime analysis is essential as part of the problem-solving approach that is fundamental in this strategy.

Compstat

Compstat was created and implemented in the NYPD in 1994 (Silverman, 2006), but its rapid and widespread adoption by police agencies around the United States has moved it beyond being an isolated strategy used by one agency (Police Executive Research Forum, 2013; Weisburd, Mastrofski, McNally, Greenspan, & Willis, 2003). The Compstat model is an attempt to synthesize an accountability structure and strategic problem solving (Weisburd et al., 2003), and many police departments have implemented it because of pressure to appear progressive and successful in reducing crime (Willis, Mastrofski, & Weisburd, 2007).

Ideally, the Compstat process is centered on four principles that are directly correlated to the four steps of the SARA problem-solving process. Compstat's first step of "accurate and timely intelligence" shares its purpose with the scanning and analysis processes of SARA in analyzing crime and disorder data to provide an understanding about when activity is occurring, as well as how, where, to whom, and by whom. Compstat's "effective tactics" and "rapid deployment of personnel and resources" shares a similar purpose with the response stage of SARA. Finally, "relentless follow up and assessment" is akin to the assessment stage of SARA. Although the implementation of Compstat has not been as strategic or as in depth as Goldstein has laid out for problem solving (Boba & Crank, 2008), both the problem-solving and the Compstat processes provide a framework for a dynamic process to address problems with Compstat's contribution and uniqueness being the development of a formal structure of accountability to ensure the process is carried out (Weisburd et al., 2003).

Although many attribute the notable reduction in crime in NYC to Compstat, there has been no systematic evaluation of Compstat's effectiveness. One case study of Compstat implemented in Fort Worth, Texas, showed reductions in property crime but not in violent crime (Jang, Hoover, & Joo, 2010). One might argue that the rapid and comprehensive adoption of "Compstat-like" programs in police agencies in the United States and around the world (Weisburd, Mastrofski, Willis, & Greenspan, 2006) might represent success, but again this provides no evidence on its effectiveness in crime reduction. Similar to the research on crime analysis, most of the research on Compstat thus far has focused on its prevalence and nature of its implementation (e.g., Dabney, 2010; Willis, 2011; Willis, Mastrofski, & Kochel, 2010).

The role of crime analysis in Compstat is significant. Importantly, not all police agencies have implemented the management model as NYPD has, but in most implementations of "Compstat-like" programs, crime analysis is the core component (Boba & Santos, 2011; Weisburd et al., 2003). In addition to the routine analysis produced by crime analysts that are used to direct resources and hold managers accountable, crime mapping is the central mechanism of communication in Compstat meetings (Ratcliffe, 2004). In fact, many police agencies today have crime analysis and crime mapping technology simply because they implemented a "Compstat-like" program.

Assessment: Although little can be said about the effectiveness of Compstat in reducing crime, crime analysis is central to its components that coincide with the problem-solving process.

ILP

ILP is a contemporary police management model in which the intelligence or analysis function is central in police agency's crime reduction and prevention efforts

(Ratcliffe, 2008). As a top-down management philosophy and business model, the gathering of intelligence and dissemination of analysis products directly inform decision makers (Ratcliffe, 2008). Focused on prolific and serious offenders, ILP combines traditional intelligence analysis within a problem-solving approach (Ratcliffe, 2008).

Although a fairly new policing approach, many agencies around the United States and around the world have begun to implement ILP. To date, there have been no systematic evaluations of its effectiveness on crime reduction and most of the research, as with Compstat, is concerned with aspects of implementation of the model (Darroch & Mazerolle, 2013; McGarrell, Freilich, & Chermak, 2007; Ratcliffe, & Guidetti, 2008; Schaible & Sheffield, 2012).

As the name implies, analysis, especially of intelligence data, is central to the ILP model. Crime analysts serve a central role in producing and disseminating analysis for crime reduction responses and decision making (Ratcliffe, 2008). Problem solving is a key component in ILP, thus analysis, in that context, is important as well.

Assessment: Although little can be said about the effectiveness of ILP in reducing crime, crime analysis is central within the business model as well as in its implementation of problem solving.

Predictive Policing

A working definition presented in 2010 by John Morgan is that “predictive policing refers to any policing strategy or tactic that develops and uses information and advanced analysis to inform forward-thinking crime prevention” (Uchida, 2010, p. 10). In a recent presentation by the Rand Corporation, predictive policing is defined as “the process of using computer models, supported by prior crime and environmental data, to anticipate risks of crime and inform actions to prevent crime” (Hollywood, Smith, Price, McInnis, & Perry, 2012, Slide 2). Because of its recent development, there is not a clear operationalization of these definitions in practice, and it is unclear as to the specific police strategies used beyond traditional strategies (e.g., directed patrol and arrests). However, deduced from both of these definitions, predictive policing is, in fact, not a policing approach in that it requires specific responses like hot spots policing or the “pulling levers” approach or that it presents a process by which police agencies identify, analyze, respond to, and assess crime problems like POP or Compstat. As the definitions indicate, it is an “advanced” analytical approach to inform “any” policing or crime prevention strategy.

In my experience, the police departments claiming to use “predictive analytics” do so with analysis of variable sophistication typically with the purpose to deploy officers in the short term (e.g., for one shift or 1 week). Some agencies simply call the results of traditional crime analysis techniques “predictive” where others use

very sophisticated statistical models (Uchida, 2010). For example, some researchers are using sophisticated statistics and algorithms taken from other disciplines (Mohler & Short, 2012; Mohler, Short, Brantingham, Schoenberg, & Tita, 2011) in the place of simpler crime analysis techniques to understand when and where crime has occurred and to anticipate where it might continue or emerge to direct police resources.

Because of its relative newness and vagueness in terms of what police strategies it encompasses, there have been no evaluations of the effectiveness of predictive policing in reducing crime. However, there are many newspaper articles, TV commercials, and testimonials that tout the crime reduction effects of using particular “predictive” software and technology by both police agencies and software companies. Irrespective of the lack of evaluations, the role of analysis is central, and arguably synonymous, with the term “predictive policing.”

Assessment: No research has been done on the relationship between predictive policing and crime reduction. Crime analysis is synonymous with predictive policing, as it appears to be an analysis strategy instead of a police approach.

Discussion and Conclusion

Consequently, from the last 30 years of policing research, researchers conclude that for policing approaches to be effective, they must be focused and approached in a systematic way through the problem-solving approach (Sherman et al., 1997; Telep & Weisburd, 2012; Braga & Weisburd, 2006; Weisburd & Eck, 2004; Weisburd et al., 2010). Table 1 is a summary of the assessments of the role of crime analysis in each policing approach examined here. It is clear from the discussion and the summary table that in the most effective strategies (i.e., POP, hot spots policing, and pulling levers), crime analysis is essential in the implementation of the approach.

Table 1. Summary of Crime Analysis Assessment.

Policing approach	Effectiveness	Role of crime analysis
Standard model	Not effective	Limited
Community policing	Not effective	Limited
Disorder policing	Mixed results	Unclear
Problem-oriented policing	Shows promise	Essential
Hot spots policing	Effective	Essential
Pulling levers	Shows promise	Essential
Compstat	No evidence	Essential
Intelligence-led policing	No evidence	Essential
Predictive policing	No evidence	Synonymous

Importantly, in those approaches that are not effective (i.e., the standard model and community policing), crime analysis plays a role, although a limited one, but the analysis is not focused on supporting crime reduction efforts of the police, but providing information about crime to a variety of audiences. In disorder policing where the research on effectiveness is mixed, the role of crime analysis is unclear. Looking at the three recently developed approaches, Compstat, ILP, and predictive policing, although there is no systematic research on their effectiveness, the role of crime analysis is quite clear in that it is significant, to the point that it is absolutely necessary for the crime reduction efforts.

Thus, there is a clear pattern in that crime analysis plays a significant role in effective police approaches. Just as apparent, there is a pattern of crime analysis' limited role in ineffective policing approaches. The policing approaches that have been widely adopted (i.e., Compstat) or that are newer (i.e., ILP and predictive policing) but have not been evaluated together reveal a pattern that the trend in policing is that crime analysis plays a central and visible role.

The discussion here has examined crime analysis in relatively ideal settings as most of the studies examined were experiments and/or research projects facilitated by grants that were lead and administered by researchers. In most of the research, it is not clear how the crime analysis was created or by whom, and it is likely that researchers either conducted the research themselves or guided crime analysts to be sure the analysis was thorough and of high quality.

So, have I answered the question whether crime analysis reduces crime? In other words, is it a cure? No, but that was not the point. The question was whether crime analysis is a necessary component (i.e., diagnostic tool) within effective police approaches. The results show that it is. So, to the chief's question of whether he or she should implement crime analysis to be more effective in reducing crime, the answer is a resounding, YES! However, it is not as simple as just "getting a crime analyst" or buying a piece of technology or software (i.e., the MRI). The process by which a chief would begin to reduce crime would be *first* to select one of the effective policing approaches that best suits the community's problems and then immediately hire a crime analyst because having effective and capable "diagnosis" capacity is an important and necessary component of "curing" crime. Notably, hiring a crime analyst to simply provide information and statistics to the agency and the community without implementing a successful crime reduction approach is just not enough.

Yet, this article has only touched the surface of how crime analysis contributes to crime reduction through the various police approaches, because it has looked at the role of crime analysis in a broad way. Therefore, a key recommendation is that in policing effectiveness studies, researchers pay closer attention to the specific role crime analysis and crime analysts play in the implementation of the approaches, especially in those studies in which the crime analyst, not the researcher, is conducting the analysis that directs the responses as part of the normal operations of the police agency (i.e., practice-based research; see Boba, 2010). Highlighting crime analysis in experimental and

applied research will provide data for those who conduct meta-analysis to develop empirical generalizations about the contribution of crime analysis in each approach.

Finally, although not directly addressed in this article, another key recommendation is to conduct more research on the accuracy and reliability of specific crime analysis techniques and their ability to properly “diagnose” crime and disorder problems. Although I am aware of a current effort at the federal level to evaluate the various software programs that currently claim to conduct predictive policing analytics, this too is a significant gap in the research on the use of crime analysis in policing.

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Author Biography

Rachel Boba Santos is an associate professor and graduate coordinator. She conducts research in policing, crime analysis, and problem solving, and has developed a comprehensive police organizational model for implementing evidence-based strategies for crime reduction that is used by police agencies around the US.