Crime Analysis With Crime Mapping, Fourth Edition provides students and practitioners with a solid foundation for understanding the conceptual nature and practice of crime analysis to assist police in preventing and reducing crime and disorder. Author Rachel Boba Santos offers an in-depth description of this emerging field, as well as guidelines and techniques for conducting crime analysis supported by evidence-based research, real-world application, and recent innovations in the field. As the only introductory core text for crime analysis, this must-have resource presents readers with opportunities to apply theory, research methods, and statistics to careers that support and enhance the effectiveness of modern policing.

New to the Fourth Edition

- **New definitions of crime analysis published by the International Association of Crime Analysts** have been incorporated throughout to ensure readers have crime analysis knowledge established by the profession itself, which is also needed for crime analyst certification.
- **Throughout the book, new perspectives of international crime analysts** illustrate to readers how crime analysis is conducted and discussed globally.
- **A new chapter about accountability** (Ch. 16) explores a stratified framework and specific crime analysis products that support police agencies in their crime reduction accountability processes and meetings (i.e., Compstat and Compstat-like programs).
- **Updated pattern bulletins, products, and literature** reflect the current research and best practices in crime analysis and crime reduction.

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CRIME ANALYSIS WITH CRIME MAPPING
FOURTH EDITION

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RACHEL BOBA SANTOS

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CRIME ANALYSIS With CRIME MAPPING

SAGE was founded in 1965 by Sara Miller McCune to support the dissemination of usable knowledge by publishing innovative and high-quality research and teaching content. Today, we publish over 900 journals, including those of more than 400 learned societies, more than 800 new books per year, and a growing range of library products including archives, data, case studies, reports, and video. SAGE remains majority-owned by our founder, and after Sara's lifetime will become owned by a charitable trust that secures our continued independence.

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CRIME ANALYSIS With CRIME MAPPING

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Preface

Crime analysis is a field of study and practice in criminal justice that uses systematic research methods and data, supports the mission of police agencies, and provides information to a range of audiences. Crime mapping is a subset of crime analysis that focuses on understanding the geographic nature of crime and other activity. Crime analysis is a relatively new topic in criminal justice education, and this book is one of the first to bring crime analysis and crime mapping to an undergraduate audience. A class in crime analysis provides students with opportunities to apply theory, research methods, and statistics learned in other courses, as well as presents information on a viable career path for criminal justice majors.

My purpose in this book is to provide an introduction to crime analysis with crime mapping through discussion of the concepts, theories, practices, data, analysis techniques, and the role of crime analysis in policing associated with this field of study. My purpose is not to cover current general or specific crime analysis software products or technology. This is because the rate of change of software products and technology is high, even though the foundations and fundamentals of crime analysis practice have remained the same over time.

In this fourth edition, I have updated and added to the content, so the book reflects current crime analysis practice in the United States and internationally. New to this edition are perspectives from crime analysts from countries outside the United States, from North America, Europe, and South America. These international crime analysts provide insight into crime analysis practices as they are conducted across the world. This book will not serve all purposes for the growing field of undergraduate education in crime analysis, but it is necessary for classes in which an overview of the field and fundamental techniques are taught. The book's website [**http://www.sagepub.com/bobasantos4e**] provides students with a plethora of practical examples contributed by working crime analysts, as well as opportunities to conduct crime analyses themselves through a variety of exercises.

The book is divided into five parts. Part I covers the foundations of crime analysis, including key definitions, a description of the crime analysis profession and its future, theoretical foundations of crime analysis, and the role of crime analysis in evidence-based policing strategies. Part II addresses the data and processes used in crime analysis, geographic data and crime mapping techniques, and the purpose of crime analysis products. Part III covers the methods and techniques of tactical crime analysis. Part IV looks at the methods and techniques of strategic crime analysis. Part V includes a chapter on crime analysis for crime reduction accountability–an important topic within administrative crime analysis.

The chapters in Part I lay the foundation for the rest of the book. Chapter 1 presents definitions of crime analysis and discusses the history and future of crime analysis and crime mapping; it also includes information on crime analysis career opportunities. In 2014, the International Association of Crime Analysts (IACA) developed a standardized definition of crime analysis as well as its types, so those are new to this edition. Chapter 2 provides an overview of the criminological theories that help to guide the practice of crime analysis. The illustration in Chapter 3 of the policing context in which crime analysis is conducted and the discussion of the role of crime analysis in effective policing strategies has been updated with current research in this edition.

The four chapters that make up Part II are devoted to the topics of the data and processes used in crime analysis, geographic data and crime mapping techniques, and a typology for crime analysis results. Chapter 4 discusses the crime analysis process and the different types of crime analysis (which were standardized by IACA in 2014). Chapter 5 provides a review of key terms, a discussion of the kinds of data commonly used and databases commonly accessed in crime analysis (e.g., crime, arrests, calls for service, traffic crashes, and primary data), information on what analysts must consider when using different kinds of data for analysis, and a brief overview of some of the hardware and software commonly used in crime analysis. Chapter 6 covers, in more detail, geographic data, types of geographic features, geocoding, descriptive crime mapping methods, and density mapping. Chapter 7 outlines a typology that categorizes crime analysis results by type of problem examined, purpose of the analysis, and type of audience for which the analysis results are produced.

The chapters in Part III describe the data, methodologies, techniques, and products of tactical crime analysis. Chapter 8 contains details of data and analysis of repeat incidents as well as data collected specifically for tactical crime analysis and pattern identification. Chapter 9 covers the methodologies analysts employ in identifying and finalizing patterns. Chapter 10 discusses how police respond to patterns and provides current examples of commonly identified patterns of persons and property crime. Chapter 11 highlights specific analytic, temporal, and spatial techniques that analysts use to identify and understand crime patterns. The chapter closes with guidelines for creating pattern bulletins and a bulletin template example.

The chapters in Part IV concentrate on the techniques that analysts use in analyzing long-term crime and disorder problems and provide case examples of how the techniques have been used in practice. Chapter 12 is an overview of the problem-solving process and covers the key statistics used in strategic crime analysis. Chapters 13 and 14 illustrate the strategic analysis of problems by demonstrating various techniques that answer key analysis questions. Chapter 15 discusses the types of strategic crime

analysis products and provides guidelines for the substantive and formative development of such products.

Finally, Part V has been significantly changed in this edition. It contains one new chapter that covers one aspect of administrative crime analysis: crime analysis for crime reduction accountability. Chapter 16 focuses on the foundation of and products that support a police department's accountability structure, which ensures that crime reduction activities are taking place and are effective.

By no means does this book cover all facets of crime analysis; however, it does lay a solid foundation for students' understanding of the conceptual nature and practice of crime analysis that assists police in preventing and reducing crime and disorder. It provides an in-depth description of this emerging field and guidelines for the practice of crime analysis that are based on research, practice, and recent innovations, as well as previously available and new information. It also provides opportunities for students to explore possible future careers that support and enhance the effectiveness of modern policing.

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This free student study site provides additional support to students using *Crime Analysis With Crime Mapping, 4th Edition*. Practical crime analysis products, exercises, suggested web resources, and SAGE journal articles with discussion questions are included on this site to provide students with additional information and support and to get students into original research. Visit the study site at **http://www.sagepub.com/bobasantos4e**.

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This set of instructor's resources provides a number of helpful teaching aids for professors to use *Crime Analysis With Crime Mapping, 4th Edition*. Included on this site are PowerPoint slides, chapter outlines, test questions and answers, a sample syllabus, and suggested web resources for each part of the text.

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About the Author

Rachel Boba Santos is a professor at Radford University in the Department of Criminal Justice. She works with police departments around the world assisting them in improving their crime reduction efforts, data and crime analysis, accountability, and community partnerships. Her research focuses on environmental criminology, the effectiveness of crime reduction efforts by police, police accountability, and crime analysis.

PART

I

Foundations of Crime Analysis

Part I contains three chapters that provide a practical and theoretical foundation for the field of crime analysis. Chapter 1 defines *crime analysis* as well as *crime mapping* and *geographic information systems* (GIS), describes the history of the crime analysis profession, and ends with specifics about crime analysis as a career track. Chapter 2 outlines the theoretical concepts that are most relevant for crime analysis by focusing on understanding the opportunities for crime in immediate crime settings. Chapter 3 provides the policing context in which crime analysis is conducted by reviewing the research on effective strategies of policing for preventing and controlling crime, discussing the role of crime analysis in each strategy, and providing a stratified structure for implementing crime analysis, problem solving, and accountability in police departments.

CHAPTER 1

Crime Analysis and the Profession

This chapter serves as a foundation for the discipline of crime analysis by providing definitions of crime analysis and crime mapping, along with an overview of the crime analysis profession in the United States. The overview includes the profession's history, the current research findings about crime analysis, descriptions of potential career paths for crime analysts, and ways to develop and improve a crime analysis unit. Finally, the chapter ends with crime analysis profiles and discussion of the future of crime analysis.

Definition of Crime Analysis

In 2011, the International Association of Crime Analysts (IACA) created a series of committees under the umbrella of the Standards, Methods, and Technology Committee (SMT) for the purpose of defining "analytical methodologies, technologies, and core concepts relevant to the profession of crime analysis" ("The SMT Mission," n.d.). This quote comes from the mission statement as written in the initial Standards, Methods, and Technology Strategic Plan completed April 2011. The purpose of the Standards Committee is to produce definitions that are used as the "standard" for the crime analysis profession. The methodology for formulating these standards includes the 1) creation of a draft paper through in-depth meetings and discussions of subject matter experts; 2) review and feedback by the IACA Executive Board; 3) review and feedback from an independent editor with knowledge of crime analysis; and 4) review and feedback by IACA members facilitated through the IACA website. In 2014, I was a member of the subject matter expert committee that produced the white paper titled "Definition and Types of Crime Analysis" (IACA, 2014b). Because of this development, the definitions of crime analysis and the types of crime analysis have been updated in Chapter 1 and Chapter 4 of this edition to the new IACA definitions. The following discussion has been adapted from the white paper (IACA, 2014b).

Foundation of the Definition

It is important to understand that the field of "crime analysis" includes much more than the analysis of crime. That is, crime analysis examines much more than crime, including many types of information that are relevant to police, such as disorder, calls for service, quality-of-life issues, traffic crashes, critical incidents, and, less often, fire and emergency medical incidents. Because the term *crime analysis* has been used historically, IACA has kept it as the

standard, but it is important to understand that its processes and types of crime analysis apply to more than just crime.

The discussion of crime analysis throughout this book refers to crime analysts as serving *police agencies*. This term encompasses agencies with general law enforcement authority (i.e., with patrol, investigative, emergency response, prevention, and community service functions). These types of agencies include municipal and local police departments, metropolitan police departments, county police departments, county sheriff offices, state police agencies, and university police agencies within the United States. It also includes national, provincial, and regional police agencies with local-level police responsibilities internationally. While state and federal investigative agencies, intelligence agencies, researchers, statistical analysis centers, and corporate security departments might use aspects of crime analysis, they will not systematically use the majority of types and techniques of crime analysis discussed in this book.

Crime Analysis Definition

According to the IACA (2014b, p. 2), **crime analysis** is defined as the following:

> A profession and process in which a set of quantitative and qualitative techniques are used to analyze data valuable to police agencies and their communities. It includes the analysis of crime and criminals, crime victims, disorder, quality of life issues, traffic issues, and internal police operations, and its results support criminal investigation and prosecution, patrol activities, crime prevention and reduction strategies, problem solving, and the evaluation of police efforts.

In addition, the IACA (2014b) defines crime analysis as all types of analysis performed within a police agency, with the exception of evidence analysis (e.g., DNA, stolen property), human resources–related administrative analysis (e.g., budgeting, overtime, sick and vacation leave, salary), and analysis of supplies and equipment. Importantly, the IACA does not distinguish between crime analysis and crime intelligence analysis performed within a police organization. The term *intelligence* is one that is used in a variety of contexts in the crime analysis profession with some inconsistency. The term is used to describe information about an enemy, typically gathered covertly, resulting in more specific terms such as *military intelligence*, *criminal intelligence*, and *intelligence analysis*. More recently, the term has been used to describe information of operational value—for example, as a product rather than a source of analysis. Thus, the IACA adopts a definition of *crime intelligence analysis* (discussed in Chapter 4) to reflect a focus on criminal offenders as opposed to crime information in general. While certain analysts may specialize in particular functions, the IACA defines crime intelligence analysis as a set of techniques performed by crime analysts.

Crime analysis is not haphazard or anecdotal; rather, it is based in theory and involves the application of social science data collection procedures, analytical methods, and statistical techniques. More specifically, crime analysis employs both qualitative and quantitative data and methods. Crime analysts use **qualitative data and methods** when they examine nonnumerical data for the purpose of discovering underlying causes of crime. The qualitative methods specific to crime analysis include field research (such as observing characteristics of locations and talking to individuals with specific knowledge about a particular type of crime) and content analysis (such as examining police report narratives). Crime analysts use **quantitative data and methods** when they conduct statistical analyses of numerical or categorical data. Although much of the work in crime analysis is quantitative, crime analysts primarily use fundamental statistical methods, such as frequencies, percentages, means, and rates.

The central focus of crime analysis is the study of crime (e.g., rape, robbery, and burglary) and disorder problems (e.g., noise complaints, burglar alarms, and suspicious activity) and information related to the nature of incidents, offenders, and victims or targets (i.e., inanimate objects, such as buildings or property) of these problems. Crime analysts also study other police-related operational issues, such as staffing needs and areas of police service. Although many different characteristics of crime and disorder are relevant in crime analysis, three key types of information that crime analysts use are sociodemographic, spatial, and temporal. Sociodemographic information consists of the personal characteristics of individuals and groups, such as sex, race, income, age, and education. On an individual level, crime analysts use sociodemographic information to search for and identify crime suspects and victims. On a broader level, they use such information to determine the characteristics of groups and how these group characteristics are related to crime. For example, analysts may use sociodemographic information to answer the question "Is there a white, male suspect, 30 to 35 years of age, with brown hair and brown eyes to link to a particular robbery?" or "Can demographic characteristics explain why the people in one group are victimized more often than people in another group in a particular area?"

The spatial nature of crime, disorder, and other police-related issues is central to understanding the nature of a problem. Advanced computer technology and the availability of electronic data have facilitated a large role for spatial analysis in crime analysis. Visual displays of crime and disorder locations (maps) and their relationship to other events and geographic features are essential to understanding the nature of crime and disorder. In addition, results from criminological research within an area called "crime and place" (Eck & Weisburd, 1995) encourage crime analysts to focus on geographic patterns of crime by examining situations in which victims and offenders come together in time and space.

The temporal nature of crime, disorder, and other police-related issues is a major component of crime analysis. Crime analysts conduct several levels of

temporal analysis, including examination of long-term trends of crime and disorder over several years, by season, and by day of week and time of day. This book will take a close look at specific analysis techniques used to examine the temporal nature of crime at each of these levels.

The primary purpose of crime analysis is to support redundant the operations of a police department. These functions include criminal investigation, apprehension, and prosecution; patrol activities; crime prevention and reduction strategies; problem solving; and the evaluation and accountability of police efforts. Without police, crime analysis would not exist. Although general, the definition encompasses a wide range of activities in which crime analysts assist police. A publication by the Bureau of Justice Assistance (BJA) provides an overview of how an analytical function benefits law enforcement agencies in nine ways (Bureau of Justice Assistance, 2005, p.1):

1. *Helps solve criminal investigations.* The analytical function develops a variety of intelligence products to assist investigators in detecting, preventing, and responding to criminal and terrorism activities. Analytical personnel initiate inquiries, conduct information searches, and act as a central point for information gathered.
2. *Increases the ability to prosecute criminals.* Personnel assigned to the analytical function develop summary tables, charts, maps, and other graphics for use in a grand jury or trial. Analysts provide factual and expert testimony and organize evidence for presentation in court.
3. *Supports the chief executive and the agency's mission.* By maximizing the analytical function, the chief executive can obtain important information and intelligence to possibly prevent future criminal activities. Personnel can prepare materials to assist in allocating resources; developing budget and resource requests; and preparing departmental reports, investigative briefings, and press releases.
4. *Proactively informs law enforcement officers of crime trends and develops threat, vulnerability, and risk assessments.* The analytical function provides support to tactical and strategic operations. Personnel analyze crime reports, identify crime hot spots, develop crime bulletins and summaries, study serial crime data, and forecast future crime. The analytical function develops proactive intelligence products that assess the potential threats of crime groups or criminal activities and recommends methods to intervene in these threats.

5. *Trains law enforcement and other intelligence personnel.* Staff develop course modules on intelligence and analytic methods and provide awareness and methodology training to agency members, executives, and managers.
6. *Assists in the development of computerized databases to organize information and intelligence.* Personnel within the analytical function help in the development and maintenance of systems that collect, collate, retrieve, and disseminate information. Analytical staff participate in departmental testing and acquisition of investigative, intelligence, and analytical software.
7. *Fosters meaningful relationships with other law enforcement personnel.* Analytical staff interact with other law enforcement agencies and build relationships with peers, allowing them to quickly obtain information and efficiently assist in multijurisdictional or complex cases. Through contact with national programs and professional associations, personnel are able to ascertain national issues that may affect local agencies.
8. *Ensures compliance with local, state, tribal, and federal laws and regulations.* Analytical personnel provide expertise and knowledge in the development of protocols to ensure compliance with local, state, tribal, and federal laws and rules that govern intelligence sharing, privacy, and civil liberties.
9. *Provides support to fusion centers.* Personnel provide support to local, state, or regional fusion centers by performing intelligence services such as crime pattern, association, telephone toll, and financial analysis. They create intelligence reports, briefs, threat assessments, and other intelligence products to aid in the prevention and deterrence of crime, including terrorism.

Definitions of GIS and Crime Mapping

Ever since maps have been available that depict the geographic features of communities, such as streets and city boundaries, police departments have used such maps to determine patrol areas and emergency routes and to assist patrol officers in finding specific addresses. Police and crime analysts also use maps as a key tool for crime analysis, a process that, historically, involved the manual placement of pins on hand-drawn wall maps. Since the 1990s, significant improvements in technology, software, electronic databases, and the Internet along with police innovation have made crime mapping by police departments extremely common. Every crime analyst uses a mapping program to visualize the spatial nature of crime. Because of this, crime mapping plays

a key role in this book as an important tool used in crime analysis; thus, it is important to define key terms before proceeding.

A **geographic information system (GIS)** is a combination of software tools that allow the crime analyst to map crime in many different ways, from a simple point map to a three-dimensional visualization of spatial or temporal data. For the purposes of this book, the definition of a *GIS* is as follows:

> A GIS is a set of computer-based tools that allows the user to modify, visualize, query, and analyze geographic and tabular data.

A GIS is similar to a spreadsheet or word processing program in that the software provides a framework and templates for data collection, collation, and analysis. It is up to the user to decide what parts of the system to use and how to use them. A GIS does more than enable users to produce paper maps; it also allows them to view the data behind geographic features, combine various features, manipulate the data and maps, and perform statistical functions.

Crime mapping is a term used in policing to refer to the process of conducting spatial analysis within crime analysis. For the purposes of this book, the definition of *crime mapping* is as follows:

> Crime mapping is the process of using a geographic information system to conduct spatial analysis of crime and disorder problems as well as other police-related issues.

Clarifying where different types of crime and other types of incidents occur is one of the many important functions of crime analysis. Because of the unique nature of the software used and the prominence of geographic data in crime mapping, many people often discuss this type of analysis as though it is distinct from crime analysis; in reality, however, crime mapping is a technique used along with other techniques in crime analysis. Crime mapping serves three main functions within crime analysis:

1. It facilitates visual and statistical analyses of the spatial nature of crime and other types of events.
2. It allows analysts to link unlike data sources based on common geographic variables (e.g., linking census information, school information, and crime data for a common area).
3. It provides maps that help to communicate analysis results.

History of Crime Analysis

Human beings have analyzed crime and criminal behavior throughout history. That is, humans have always made observations about crime and other problematic events (i.e., collected data) and have identified relationships among

those observations (i.e., conducted analysis). For example, in the old American West, a rancher may have noticed that he was losing one or two head of cattle from his grazing land every week. He also may have noticed that the cattle went missing only at night and only from a certain field. These observations and his analysis of them may have led him to respond either by sitting and watching the cattle in that field overnight or by moving the cattle to another field. The rancher's thoughts and actions constitute a simple form of crime analysis. Similarly, police officers have historically conducted crime analysis by using memory to link key suspects and property to specific relationships among crime incidents.

The present-day discipline of crime analysis represents an evolution of the kinds of crime analysis illustrated by this example. It is a systematic process in which data about crime and other related factors are collected and stored for long periods of time. Where earlier "crime analysts" relied mostly on their own observations and their own memories of crime incidents, modern crime analysts use complex computer systems to apply various analytic techniques, ranging from simple pattern analysis to complex statistical analysis.

Beginnings of Crime Analysis

The history of the analysis of crime is long, but the history of crime analysis as a discipline begins with the first modern police force, which was created in London in the early 19th century. This makes sense, given that the main purpose of crime analysis is to assist the police. Through the Metropolitan Police Act, passed in the 1820s, England organized about a thousand men to form a London police force. In 1842, this force created a detective bureau, which was given the responsibility of identifying crime patterns to help solve crimes. According to London's Metropolitan Police Service (2016), by 1844 the detective bureau's officers were collecting, collating, and analyzing police information. An example follows:

> 1844: Richard Mayne, Commissioner [was] called to give evidence to the Select Committee on Dogs. He stated that in the Metropolis there were a rising number of lost or stolen dogs. In the preceding year over 600 dogs were lost and 60 stolen. He declared the law to be in a very unsatisfactory state as people paid money for restoration of dogs. "People pay monies to parties whom they have reason to believe have either stolen or enticed them away in order to get the reward. . . ." Mayne believed it to be organised crime. (para. 17)

Additionally, the Metropolitan Police Service (2016) notes that aggregate crime statistics were available for the city of London as early as 1847; that year there were "14,091 robberies; 62,181 people taken in charge, 24,689 of these were summarily dealt with; 5,920 stood trial and 4,551 were convicted and sentenced; 31,572 people were discharged by the magistrates."

United States: 1900 to 1970

Although many large cities in the United States began to create police departments in the mid-1850s, corruption within these departments as well as a lack of organization and technology prevented them from conducting crime analysis systematically. The first indication of an instance of formal crime analysis in the United States is found in the early 1900s. August Vollmer, the most famous police reformer, in addition to instituting the innovations of vehicle patrol, radio communication, and fingerprinting, encouraged the use of pin mapping, the regular review of police reports, and the formation of patrol districts based on crime volume (Reiner, Greenlee, & Gibbens, 1976).

O. W. Wilson, who worked with Vollmer and created an advanced training program for officers, was the first to mention and define the term *crime analysis* in the second edition of his book *Police Administration* in 1963. In the fourth edition of that book, Wilson and McLaren (1977) distinguish between "operations" analysis and "crime" analysis, asserting that crime analysis is the "process of the identification of crime trends and patterns through statistical treatment of information and through examination of actual investigative reports" (p. 175).

From Wilson's writings, it appears that crime analysis was being conducted in (or at least was recommended to) police departments in the 1950s and 1960s; however, no evidence of crime analysis is available from that period. In his lesser-known book, *Police Planning,* which was first published in 1952, Wilson discusses crime mapping and crime analysis, although he does not use those terms. In the second edition of that volume, he outlines the structure of police planning to include a "cartography unit," which among other things "provides technical advice . . . in depicting crime trends or occurrences . . . in located places of arrest" and a "statistics unit," which includes many of the functions of crime analysis that are still practiced today, such as "interpreting and disseminating crime statistics and other related material to be used as aids for more effective and efficient operation of the department; preparing statistical charts, graphs, and artwork as needed by other department units" and "maintaining and operating the modus operandi files" (Wilson, 1957, p. 10).

United States: 1970 to 2000

The 1968 Omnibus Crime Control and Safe Streets Act brought about increased awareness of the use of analysis and evaluation in policing throughout the 1970s. The act allowed the allocation of federal grants to assist state and local police agencies with any purpose associated with reducing crime. The U.S. Bureau of Justice Administration, established by the act for the general purpose of supporting police agencies, provided extensive assistance, helping police departments establish evaluation programs and providing training, technical assistance, and information to support the work funded by the grants (Omnibus Crime Control and Safe Streets Act of 1968; Pomrenke, 1969).

As a result, publications from the 1970s about crime analysis techniques as well as evaluations of crime analysis functions indicate that police departments had begun to take Vollmer's and Wilson's advice to formalize crime analysis. In an annotated bibliography prepared for the National Institute of Justice, Emig, Heck, and Kravitz (1980) provide information on crime analysis publications and products of the 1970s. The bibliography includes entries for many handbooks devoted to the techniques of tactical and strategic crime analysis that were produced by various nonprofit organizations and funded by the U.S. government (e.g., *Police Crime Analysis Unit Handbook* [Austin et al., 1973]; "Management Function of a Crime Analysis Unit" [Booth, 1979]; *Crime Analysis System Support: Descriptive Report of Manual and Automated Crime Analysis Functions* [Chang, Simms, Makres, & Bodnar, 1979]).

During the 1970s, the U.S. government held several symposia on crime analysis and brought academics and practitioners together to work on specific technical assistance projects aimed at increasing the crime analysis capabilities of police agencies (Emig et al., 1980). Popular media sources also provide evidence that formal crime analysis units existed during this period. For example, an article from *The New York Times* published in 1972 mentions crime analysis: "Crime analysts at NYC Police Hq say on July 21 that record 57 homicides in 7-day period that ended at midnight July 20 is attributed partly to hot weather in met area" (Pace, 1972).

In the mid- to late 1970s, a small group of academics began to emphasize the importance of the characteristics of criminal events, where they take place (locations), and the geographic analysis of crime (discussed in Chapter 2; Brantingham & Brantingham, 1981). Also in the late 1970s, Herman Goldstein (1979) suggested another focus, which he called problem-oriented policing (discussed in Chapter 3). This shifted the focus of the police from administrative and political concerns to an emphasis on addressing crime and disorder problems. Ideally, *problem solving,* a systematic process within problem-oriented policing, involves the use of formal analysis to provide a comprehensive understanding of crime problems and to develop baseline measures and methodology to enable the evaluation of police responses to problems (Scott, 2000). Goldstein and other scholars who were working with police agencies began to demonstrate the analysis of crime and disorder problems.

Growing recognition of crime analysis in the police practitioner community around this time is evidenced by the creation of the **Commission on Accreditation for Law Enforcement Agencies (CALEA)** in 1979.[1] To receive CALEA accreditation, police agencies were required to have crime analysis capabilities. In fact, CALEA accreditation increased the likelihood of having a formal crime analysis unit (Giblin, 2006) since agencies began to designate personnel to crime analysis and created new positions to meet the CALEA standards.

Crime analysis practitioners began to organize in the 1980s and early 1990s. The Colorado Crime Analysis Association, the first state association on record, was formed in 1982. It consisted of an active group of professionals who benefited

from the sharing of tools and techniques, according to Dale Harris (personal communication, November 2, 2003), a founding member of the association and its first president. In 1989, the California Crime Analysis Association was founded; it is currently the largest state crime analysis organization in the United States, with more than 350 members. The **International Association of Crime Analysts (IACA)** was created in 1990 by a small group of established analysts from Colorado, Texas, Oklahoma, Georgia, Missouri, and Ontario.

In the early to mid-1990s, the discipline of crime analysis grew slowly in the United States. In his 1990 book, *Problem-Oriented Policing,* Herman Goldstein further specified the role of crime analysis that he described in his 1979 article, outlining the importance of police agencies using data and research to identify problems, understand their underlying causes, and evaluate crime prevention programs.

A number of other events that occurred in the mid-1990s fostered the expansion of crime analysis. The philosophy of community policing (discussed in Chapter 3), which was being adopted by departments across the country, emphasized problem solving (the process described by Herman Goldstein) as well as partnerships between police departments and the citizens they serve; in many cases, such partnerships involved the sharing of crime analysis information and statistics. The 1994 Violent Crime Control and Safe Streets Act, which amended the 1968 Omnibus Crime Control and Safe Streets Act, provided significant funding for new police officers ("100,000 new cops on the street") and created the Office of Community Oriented Policing Services (known as the COPS Office) to administer the hiring of police officers.

In 1997, the COPS Office included crime analysis and crime mapping in its focus, with grants aimed at providing substantive as well as technological support of crime analysis and community policing. Finally, in 1994 the New York City Police Department's conception and implementation of Compstat (discussed in more detail in Chapter 3), a data-driven and mapping-driven police management strategy also used in other departments in subsequent years, increased both awareness of crime analysis and its incorporation into the everyday functions of the police (Weisburd, Mastrofski, McNally, Greenspan, & Willis, 2003).

Coinciding with and facilitating the events described previously were vast improvements in computer technology. In the 1990s, enormous increases were seen in the speed and memory of computers, and the creation of the Windows operating system had a significant impact on crime analysis practices. These changes made it much easier for police to house official information electronically and analysts to examine large amounts of data using desktop statistical programs and crime mapping software to clean data and to generate reports.

In the 1980s and early 1990s, practitioners focused on providing police agencies with statistical information about long-term trends as well as recommendations

for organizational procedures stemming from the work of policing planning units (i.e., strategic crime analysis). Although the identification of short-term crime trends and patterns (i.e., tactical crime analysis) was conducted during this time, it became more widespread in medium- to small-sized agencies during the mid-1990s. This was in part a result of the decentralization of crime analysis units (i.e., the shift toward having individual crime analysts operate in police precincts out in the field rather than together at headquarters), the teaching of specific techniques in crime analysis training at the time, and a renewed emphasis on the police goal of apprehending criminals.[2]

History of Crime Mapping

Even though crime mapping plays a significant role in crime analysis today, conducting spatial analysis and creating crime maps for distribution have become common over the last 2 decades in policing and crime analysis, thanks to advancements in technology. The history of crime mapping is somewhat distinct from that of crime analysis, which is why it is presented separately in this chapter. The history of crime mapping begins not with the establishment of the first police force, but with the work of researchers long before the invention of computers.

Beginnings of Crime Mapping

In the 1800s, European researchers who adhered to the school of thought known as the cartographic school of criminology examined the levels of crime within different areas (regions) and the relationship of these levels to sociological factors, such as socioeconomic status (Groff & La Vigne, 2002). For example, in 1829 Adriano Balbi, an ethnographer and geographer, and André-Michel Guerry, a lawyer, created the first maps of crime using criminal statistics for the years 1825 to 1827 and demographic data from the census. They examined crimes against property, crimes against persons, and levels of education in France and found that areas with high levels of crimes against property had a low incidence of crimes against people and that higher numbers of educated people lived in areas with more property crime (Weisburd & McEwen, 1997). Also during this period, the Belgian astronomer and statistician Quételet used maps to examine correlations between crime and transportation routes, education levels, and ethnic and cultural variations (Weisburd & McEwen, 1997).

United States: 1900 to 1970

In the United States, the use of crime mapping began a little later than it did in Europe. Because the United States was a relatively new country in the 1800s, reliable maps were not readily available and census data were not regularly collected as they were in France and England at that time. The first substantive spatial analysis of crime in the United States was conducted in the 1920s and 1930s by urban sociologists in Chicago (Shaw & McKay, 1969). Their crime

research and related crime maps linked crime and delinquency to factors such as social disorganization and poverty. In fact, these scholars' spatial analysis of juvenile delinquency and social conditions in Chicago is considered to be one of the foremost examples of crime mapping in the first half of the 20th century (Groff & La Vigne, 2002).

Crime mapping was a theoretical component in the development of the concentric zone model, which contends that in an urban setting different types of zones (areas with different purposes) form around a central business district and that some of these zones are more prone to crime and disorder than are others. Researchers who analyzed the locations and distribution of gangs in Chicago based on the concentric zone concept found that gangs were concentrated in parts of the city where social control was weak and social disorganization was high (Weisburd & McEwen, 1997). Most of the early crime mapping conducted in both Europe and the United States examined aggregate levels of crime by area. However, evidence exists of a map that was created by hand in 1929 by Chicago school researchers on which the home addresses of more than 9,000 delinquents were clustered in particular areas of Chicago (Weisburd & McEwen, 1997).

Through the 1950s, 1960s, and 1970s, sociologists and others who were interested in crime and its causes continued to examine the sociological factors associated with crime. The explanations and geographic methods of analysis used remained fairly uncomplicated during this period, possibly owing to the researchers' focus on sociological factors and the lack of adequate technology (Groff & La Vigne, 2002). In the late 1960s, scholars began conducting spatial analysis of crime with the help of large computer systems and unsophisticated visualization methods (Weisburd & McEwen, 1997).

United States: 1970 to 2000

From the late 1960s through the early 1980s, a group of researchers in England, Canada, and the United States shifted their focus of the study of crime away from what traditional criminology examined—the criminal offender—and toward the criminal event and its context, including the physical and social environments that create opportunities for crime (Brantingham & Brantingham, 1981; Clarke, 1980, 1983; Cornish & Clarke, 1986). This movement affected crime mapping, as researchers shifted from aggregate analysis of crime and social factors to the analysis of discrete criminal events and their locations (discussed in Chapter 2). Consequently, researchers began to incorporate information about geography and environment into their study of crime problems and related issues, such as rape (LeBeau, 1987) and a host of other crimes (Harries, 1980) as well as distribution of police personnel (Rengert & Wasilchick, 1985).

In the early 1980s, client server technology made geographic information systems more accessible, and this enabled a number of police departments to experiment with crime mapping in their everyday work (Groff & La Vigne, 2002). A project

funded by the National Institute of Justice called DMAP (Drug Market Analysis Program) partnered researchers and practitioners in five U.S. cities (Jersey City, New Jersey; Hartford, Connecticut; San Diego, California; Pittsburgh, Pennsylvania; and Kansas City, Missouri) to use innovative analytic techniques in studying drug markets and tracking their movements over time (Groff & La Vigne, 2002). These projects led the way for crime mapping partnerships between practitioners and researchers and demonstrated how communities could use GIS tools as a central part of crime control initiatives. The program focused primarily on the use of geographic police data, but the participants found that examining other geographically based data contributed to their ability to target problem-solving strategies, brought together key partners with different perspectives, and facilitated the assessment of their joint efforts (Taxman & McEwen, 1997).

In the early to mid-1990s, significant improvements in computer technology and police data systems made electronic crime mapping a much more practical tool for police and researchers. GIS software became available for desktop computers as these computers became capable of processing large amounts of data quickly. In addition, police data on crimes, arrests, traffic crashes, and calls for service became available electronically through computer-aided dispatch systems as well as through electronic records management systems (discussed in Chapter 6). Geographic data such as street and census information became widely available in electronic format and were provided free or at minimal cost by a variety of government agencies and commercial organizations. All of these developments helped to advance the field of crime mapping beyond manual methods and the use of large, costly mainframe mapping systems.

In 1993, the Illinois Criminal Justice Information Authority and the Sociology Department of Loyola University Chicago joined forces to present a computer crime mapping workshop in Chicago. In a publication resulting from the workshop titled *Crime Analysis Through Computer Mapping* (Block, Dabdoub, & Fregly, 1995), participants—many of whom are top researchers and analysts in the field today—described spatial analytic techniques and offered practical advice for both police professionals interested in implementing computer mapping in their agencies and students of spatial analysis. This workshop was one of the first efforts to bring practitioners and researchers together to discuss crime mapping.

During the mid-1990s, the federal government, in a movement spearheaded by Vice President Al Gore, provided increased support for crime mapping technology and methods. Police agencies received federal funding to obtain crime mapping technology, and several programs were developed specifically to assist police agencies with the implementation of crime mapping. The COPS Office allocated a significant amount of funding for crime mapping software and equipment through a program called MORE (Making Officer Redeployment Effective). From 1995 to 2002, just over $53 million (90 individual grants) of MORE funding was allocated directly to crime mapping technology and staff (M. Scheider, personal communication, November 10, 2003).

The Crime Mapping Research Center, now called the Mapping and Analysis for Public Safety (MAPS) program, was formed within the Department of Justice's National Institute of Justice in 1997. Its goal is to support research that helps criminal justice agencies by examining how to use maps to analyze crime, how to analyze spatial data, how maps can help researchers evaluate programs and policies, and how to develop mapping, data sharing, and spatial analysis tools. Since its creation, the MAPS program has held annual conferences at which practitioners and researchers come together to discuss research and spatial analytic techniques. Other activities have included funding spatial analysis research and fellowships, a national survey of crime mapping, developing training curricula, publishing books on crime mapping, and bringing together police professionals and researchers in a technical working group to discuss spatial analysis of crime issues. With the program's help, the United States has seen interest in and development of crime mapping and crime analysis techniques increase significantly among police departments and researchers. From 1998 to 2007, the National Institute of Justice also funded the Crime Mapping and Analysis Program (CMAP), the mission of which was to provide technical assistance and introductory and advanced training to local and state agencies in the areas of crime and intelligence analysis and GIS. CMAP has also provided training to a significant number of crime analysts and officers in the field.

An important influence in the use of crime mapping in policing was Compstat, the data- and mapping-driven police management strategy created by the New York City Police Department in 1994 and adopted by other police agencies across the United States (Henry, 2002; Weisburd et al., 2003). A core component of Compstat is police officials' use of crime mapping software and analysis in weekly meetings to understand local patterns of crime and disorder incidents. Crime mapping is such an integral part of the Compstat program that during the 2001 television season, CBS's *The District,* a show based on New York's Compstat experience, highlighted crime mapping in every episode (Theodore, 2001).

David Weisburd, a distinguished professor in the field of crime and place, has examined the rate of adoption of crime mapping in the 1990s through a number of surveys and a pilot study of his own and found that "crime mapping was widely diffused among police agencies, that the diffusion process began in the late 1980s to early 1990s, it gained momentum in the mid-1990s, and that the adoption of crime mapping appears to follow the standard 's' curve of diffusion of innovation" (Weisburd & Lum, 2005).

Research on Crime Analysis and Crime Mapping: 2000 to Present

Since 2000, many researchers have begun examining crime analysis and crime analysts to begin understanding the prevalence and nature of how it is practiced. A national survey conducted by the Police Executive Research Forum focused on the level of integration of crime analysis into patrol work

(Santos & Taylor, 2014; Taylor & Boba, 2011). The study of 600 randomly selected local police agencies stratified by agency size, type, and geography found that 89% either employed a full-time crime analyst or had a staff member whose secondary responsibility was conducting crime analysis, while only 11% of the agencies reported not conducting any crime analysis. Also, of those agencies with crime analysts, most commonly employed two analysts (Taylor & Boba, 2011). An examination of the 2013 Law Enforcement Management and Administrative Statistics (LEMAS) shows that larger agencies are more likely to employ crime analysts (Bureau of Justice Statistics, 2016). Of the 2,528 agencies surveyed that employed civilian staff, 40% (1,130) had civilian employees who performed research, statistics, or crime analysis duties. The overwhelming majority of those agencies with civilian employees performing these duties are agencies with more than 50 officers (847 of 1,130, 75%), whereas 73.4% (1,022 of 1,393) of agencies with fewer than 50 officers did not have civilians performing these duties. Thus, crime analysis is becoming common, particularly in medium and large agencies.

In addition, a systematic study conducted in 2000 by the University of South Alabama's Center for Public Policy (O'Shea & Nicholls, 2003) examined the data collected in two national surveys—one of all U.S. police agencies with more than 100 sworn personnel and a second of a random stratified sample (by size and region) of 800 agencies with fewer than 100 sworn personnel—and conducted site visits of large agencies that were specifically selected for the quality of their crime analysis operations. They found that most crime analysts were being asked by the agencies in which they worked to focus on criminal apprehension (pattern identification) or on identifying areas with high crime levels. These findings suggest that crime analysts as well as police managers place high value on tactical analysis, which supports short-range planning and is primarily interested in activities aimed at crime control. They seem less interested in strategic analysis, which supports long-range planning and is primarily interested in more complex organizational issues (such as departmental strengths, weaknesses, opportunities, and threats), or even problem analysis (O'Shea & Nicholls, 2003).

Santos and Taylor (2014) 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.

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 used 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. Further evidence of sporadic use of crime analysis in police agencies was seen in a survey conducted by Sever et al. (2008), 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 (i.e., CALEA) 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.

The discipline of crime analysis with crime mapping is recognized today as important by government, policing, and academic communities; however, it is still being developed. Although these findings may not be surprising, given that short-term pattern analysis and real-time data analysis support a core function of police agencies, they indicate that most U.S. police agencies are not using crime analysis to its full potential. Crime analysts and police leaders alike are focusing crime analysis efforts on short-term pattern and long-term hot spot identification and have not yet expanded the focus to long-term, in-depth analysis of crime and disorder problems to seek solutions for these problems. This may be due partly to a lack of communication and knowledge of the capabilities and usefulness of crime analysis. Notably, research has sought to understand the prevalence and nature of crime analysis implementation. Most of the research is descriptive and exploratory, which is likely due to the relative newness 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, and their findings suggest that there are many issues still to resolve in the implementation and use of crime analysis in policing.

INTERNATIONAL CRIME ANALYST PERSPECTIVE

Chisen Goto

Crime Analyst

Royal Canadian Mounted Police

Canada

My role as a crime analyst in an urban detachment requires me to be comfortable in various types of analysis. Strategic analysis, including trend analysis and problem area analysis, indicated that my jurisdiction was experiencing an above-average increase in incidents of property crime in an area generally not associated to high incidents of crime. Tactical crime analysis techniques were used in order to assist with identifying potential individual(s) responsible for the incidents in the area. I used the intelligence cycle to develop an actionable report. Since known individuals were being examined by investigators as potential suspects, it was my job as the analyst to explore and identify any other individuals who might be responsible for the increase.

Planning/Collection: In consultation with the investigators, keeping in mind the feasibility and timeliness of the required analysis, a determination was made that information will be collected and analyzed from the records management system (RMS). The collection process included obtaining information on location, time, and the modus operandi (MO) from files, as well as gathering information from police checks in the area of concern. Sourced photos that could be used to enhance the analytical product were also collected during this process.

Analysis/Reporting/Dissemination: A detailed analysis of the files and street checks for patterns, trends, and other relationships of within and between dates, start times, and MO of the incidents and known offenders were conducted using geospatial and analytical software. Link analysis of associates and any suspicious persons from the information of the file was completed. In addition, specific individuals were linked (or tentatively linked) to various property crimes. Through analysis, I was able to identify potential suspects who were previously unknown to the enforcement units. I prepared a summary report of the analysis with an association link chart, complete with photographs of the individuals of interest. The report was disseminated in a very timely manner, included incidents as recent as the previous evening, and was presented in a concise, comprehensive, and actionable format. Through targeted enforcement action, the individuals, as identified through analysis, were observed and apprehended while committing a residential break and enter. The individuals admitted to committing numerous property crimes in the area and were subsequently charged and sentenced accordingly. Their arrest restored the number of property crimes in the area within the normal range.

Crime Analysis as a Career Track

Opinions differ somewhat concerning what makes a "good" crime analyst, and usually the opinions that people hold on this subject mirror their own experiences. That is, a crime analyst who is a police officer is likely to believe that all crime analysts should be police officers, and a crime analyst with an advanced degree is likely to feel that all crime analysts should have such degrees. Although this is a simplification, debate continues about what experience and education crime analysts need in order to do their jobs. Is it necessary for a crime analyst to have been an officer so that he or she knows the ins and outs of a police department, or is an advanced degree in statistics more valuable? In addition, because so much of modern crime analysis relies on computers and software technology, some argue that crime analysts should be computer experts as well.

Ideally, a crime analyst should have police knowledge, research skills, and technological capabilities. One person is not likely to have all of these qualifications at the beginning of a career in crime analysis; rather, he or she may have a particular strength in one of these areas and will need to cultivate the others over time. A crime analyst's capabilities should represent a balance of knowledge and skills in these three areas. One individual may have a relatively academic slant but be able to relate to the everyday work of policing and effectively explain crime analysis information. Another person who is lacking in formal education may have street-level knowledge of crime and police activity as well as skills in technology and statistical analysis.

The current trend in police agencies is to hire civilian crime analysts. Officers tend to change positions every few years, and agencies do not want to risk losing the investment that intensive crime analysis training represents when officers move. In addition, civilians are less expensive than officers (in terms of salary and retirement benefits) for police agencies to employ. Although this makes the position of crime analyst a good entry-level job, the position lacks opportunity for career track advancement. In many police agencies, especially small to medium-sized police departments, the crime analyst is one of only a few professional support positions, and the only way an analyst can advance is to go to a larger department or move to a different position in the city government.

That being said, police agencies vary greatly in how they fill crime analyst positions with both civilians and sworn officers. Generally, successful analysts are experts in data collection, data manipulation, statistics, theory, and research methods. The analyst is the authority in examination, research, and assisting other police personnel in doing their jobs more effectively. Successful crime analysts also have knowledge about policing in general, about police culture, and about the characteristics of the community in which they work. Crime analysts have their own style of dealing with people, but to be successful, an analyst must be able to explain complex ideas clearly to many different types of individuals (e.g., police officers, managers, city officials, citizens) in a way that is not condescending. In addition, crime analysts must be able to relate to police officers (even if they have

never been one), work within police culture, think clearly under pressure, defend their views on important issues, and keep a sense of humor. At the end of this chapter, several profiles of current crime analysts are presented to illustrate the varying degree of experience, skill, education, and responsibilities that different analysts have.

Crime Analyst Qualifications and Job Descriptions

Police departments have many different types of crime analysis positions. Some employ only one crime analyst, whereas others have several who function in what is typically called a **crime analysis unit**, or **CAU**. The following text provides general descriptions of several crime analysis–related positions and their roles within CAUs to show the range of levels and activities in the profession of crime analysis as well as the qualifications necessary for employment at various levels.

Interns/Volunteers Police agencies have used volunteers to conduct crime analysis for many years. During the 1970s and 1980s, many police departments employed volunteers for this purpose because few crime analysis professionals were available or because they lacked the resources to hire professionals. Today, police departments typically use volunteers and interns to support and/or enhance their crime analysis resources and productivity. **Volunteers** are people who work for the police department without pay; they tend to be students or retired persons. **Interns** are undergraduate or graduate students who work in a police department to obtain practical work experience and college credit. An internship can often serve as a proverbial foot in the door, gaining the intern access to future career opportunities.

Internship programs can be extremely beneficial to both police departments and their interns. Interns not only help departments by performing crime analysis duties, but they also learn the skills they need to become crime analysts and gain practical experience. Police departments recruit student interns from many disciplines, including criminal justice, sociology, political science, geography, English, psychology, and computer science, depending on the needs of their crime analysis units and the availability of students. For example, a police department that is instituting a geographic information system might recruit geography students, whereas a department looking to conduct tactical analysis might recruit students majoring in criminal justice.

Individual academic programs typically administer the internship programs through which student interns are placed. These programs usually require that students work as an intern for a minimum of one semester (the number of hours per week varies with the number of course credits given), document their experiences through field notes, and write a final paper for a grade. Internships can be paid or unpaid, depending on the resources of the police agency. Volunteers and interns handle many different tasks within CAUs, including

tactical data entry, data analysis, production of monthly strategic reports, and the writing of requests to participate in complex analysis projects.

One note of caution about internships: Even though student interns are not becoming police officers, some police departments put applicants for internships through a screening process similar to that used for applicants for police officer training and other police department personnel (e.g., lie detector test, extensive background checks, drug testing) because interns have the same access officers have to department areas and records. Students applying for police department internships should be aware that any illegal behavior in which they have taken part might have a significant impact on their being accepted and, subsequently, on their ability to work in a police agency as a volunteer, an intern, or at all.

Crime Analysis Assistant/Technician A **crime analysis assistant** or **technician** is an administrative support person who answers the phone, conducts data entry, makes copies, keeps files, produces simple standardized reports, and does anything else that arises administratively in the CAU. This position normally requires a high school diploma and 1 to 2 years of secretarial/data entry experience. It is typically filled by someone who has been a secretary or by an individual just beginning in the profession of crime analysis (e.g., a student). In some cases, crime analysis assistants are able to move up in the CAU as they obtain additional education and experience.

Entry-Level Crime Analyst When a police agency has multiple levels of crime analysis positions, one of these is often described as **entry-level crime analyst.** Analysts in this position usually conduct relatively routine crime analysis duties, as they are likely to be new to the field, have limited experience, and obtain a significant amount of training in their first years on the job. Typically, this position requires an undergraduate degree in criminal justice, political science, sociology, or a related field that includes statistics and research methodology in its curriculum and 1 year of analytic experience, although not necessarily crime analysis experience (a master's degree is often seen as the equivalent of a year of experience). Some police departments require that applicants for the position of entry-level crime analyst have crime analysis certification (offered in several states) when they are hired or that they obtain such certification within a specific period after they begin working in the position.

Experienced Crime Analyst An **experienced crime analyst** may be part of the structure of a CAU or may be a solo practitioner of crime analysis in a police agency. In departments that employ a number of analysts, this level exists to create career advancement opportunities for analysts. Compared with the entry-level crime analyst, the experienced crime analyst holds more responsibility and is expected to conduct more advanced analyses. An individual in this position may also have the duty of supervising lower-level personnel, such as crime analysis assistants/technicians, volunteers, and interns. Typically, the position of experienced crime analyst requires at minimum a

bachelor's degree in criminal justice, political science, sociology, or other related field that includes statistics and research methodology in its curriculum and 2 years of crime analysis experience.

Specialty Crime Analyst A **specialty crime analyst** is an analyst who is hired to conduct a particular type of crime analysis. An agency with a relatively large CAU may prefer to employ crime analysts who are specialists (i.e., who have their own individual sets of specialized skills and knowledge) rather than generalists (i.e., who are cross-trained so that all members of the unit have similar skills and knowledge). In some cases, agencies may receive grant funding that requires crime analysts to analyze particular types of crime or other activity. For police agencies, the advantage of having specialty crime analysts available is that these individuals have substantial skills and knowledge in their particular areas of crime analysis; the disadvantage is that their work cannot be shared easily with other analysts, so if a specialty analyst resigns, no one else can conduct the work until another analyst with the same specialty is hired.

There are numerous types of specialty crime analysts, and the education and experience required for these positions varies by specialty. In general, however, the position of specialty crime analyst is typically considered to be equivalent to the experienced crime analyst level, as both positions require proficiencies in particular areas. The following are some examples of types of specialty crime analysts:

- *Tactical crime analyst:* This type of analyst conducts only tactical crime analysis and does not produce long-term reports or statistics.
- *Problem analyst:* This type of analyst conducts analysis within the context of understanding long-term problems only.
- *Sex crime analyst:* This type of analyst conducts tactical, strategic, and administrative crime analysis having to do with sex crimes and is likely to work closely with detectives. The position of sex crime analyst might exist in a large agency that has developed a long-term task force to address sex crimes. (Other types of crime analysts also specialize in particular kinds of crime; these include violent crime analysts, property crime analysts, and robbery crime analysts.)
- *School safety analyst:* This type of analyst conducts analysis on the safety in and around schools, working directly with school administrators and school resource officers.
- *Repeat offender analyst:* This type of analyst would focus on analyzing arrest and offender data to produce repeat/chronic offender lists and in-depth analysis of chronic offenders' criminal histories. These analysts often work with

the criminal investigations division and/or support repeat offender or intelligence-led policing (see Chapter 3) units.

- *Geographic information systems analyst:* This type of analyst specializes in the use of geographic information systems and conducts spatial analysis of crime and various types of police activity. Salaries for GIS analysts are typically higher than those for crime analysts because of the specialized technical skills required and because police agencies must compete for qualified analysts with private companies offering high salaries. Compared with crime analyst positions, significantly fewer GIS analyst positions are available, for a number of reasons: (a) Smaller departments that conduct crime analysis typically have only one crime analyst position, and that is not a specialist position; (b) many police officials do not feel that filling a position with a person who works only on spatial analysis of crime is warranted; and (c) the number of potential applicants for GIS analyst positions (i.e., individuals who have both geography and criminal justice backgrounds) is relatively small.

Crime Analysis Supervisor The **crime analysis supervisor** is a person with substantial crime analysis knowledge and experience who supervises a crime analysis unit. This job title is not applied to police managers (sworn personnel) who supervise the crime analysis function as part of their other duties. The position of crime analysis supervisor is considered to be a "working" position because it involves hands-on crime analysis work. The key responsibilities of a crime analysis supervisor are to represent the interests of the CAU at high-level organizational meetings (such as command staff and patrol or investigations operations meetings), to lead the development of CAU goals and objectives, and to be knowledgeable about the crime analysis discipline regionally, nationally, and internationally. Typically, this position requires a master's degree in criminal justice, political science, sociology, or other related field, 2 years of crime analysis experience, and at least 1 year of supervisory experience.

Embedded Criminologist The **embedded criminologist** is a person with a doctorate degree and/or who is a researcher who is not working *with* the police agency but is working *within* the police agency as an independent, unbiased full-time employee with expertise in criminology, criminal justice practices, analysis, statistics, research methodology, and evaluation (Braga, 2013; Petersilia, 2008). Embedded criminologists carry out independent research and analysis that support a police agency's mission as well as collaborate on the development of programs by introducing and implementing evidence-based practices. While embedded criminologists are not crime analysts, they might assist with large-level crime analysis projects and work closely with the agency's crime analyst personnel.

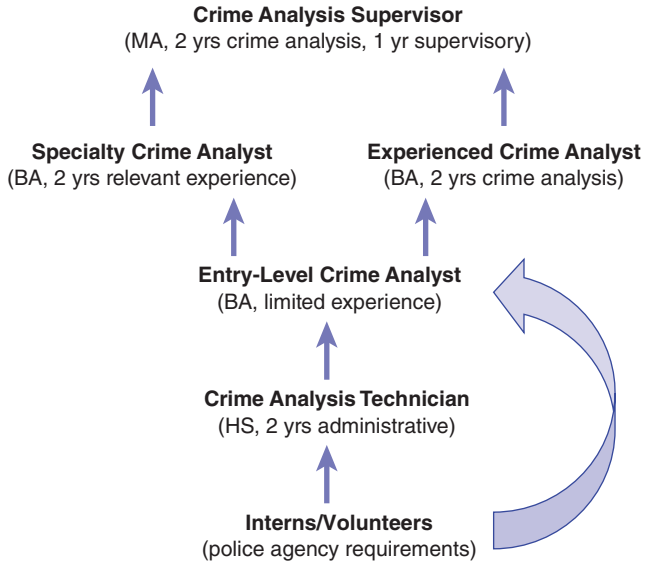
CAU Organizational Chart

Figure 1.1 depicts a hypothetical CAU organizational chart, including the positions discussed in the previous section and their minimum requirements. The arrows in the figure indicate potential routes for career advancement.

Developing and Improving a Crime Analysis Unit

A **strategic plan** for any type of organization, division, or unit outlines strategies and direction, lays out expectations, and helps guide decisions about how work is done and how to allocate resources. When developing a new crime analysis unit or improving the capabilities of an existing CAU, the formulation of a strategic plan is important because it is a formal mechanism that describes the function and purpose of the CAU within the specific agency. Therefore, this section of the book is a brief discussion of how a strategic plan might be developed either for a new or an existing CAU. Although this information may not be immediately relevant for college students, it provides a foundation for understanding how crime analysis units are developed and the role they serve within a police agency. For practitioners, the section provides information that can be used to guide the development of their own strategic plans. In general, the strategic plan for a CAU should be developed in line with the agency's strategic goals, should include specific short- and long-term goals for the CAU itself, should be realistic in terms of allocating resources (e.g., funding, time, personnel capabilities), and should describe the future needs as well as discuss the substantive areas of work of the CAU.

Figure 1.1 Sample Crime Analysis Unit Organizational Chart



The first step in developing a strategic plan for a CAU is to understand the current state of the agency and its crime analysis capabilities. For agencies without a crime analysis function, one would consider the strategic goals of the agency, available data sources and their accessibility, and available hardware and software that might be used for crime analysis. For agencies with an existing CAU, the previous issues would be considered in addition to the number of current crime analysis personnel, their capabilities, and how their time is spent, as well as the types of crime analysis products that are produced and their uses.

The second step in developing a strategic plan for a CAU is to determine the crime analysis "needs" of the agency. This would be accomplished through a triangulation of methods. A review of literature on crime analysis (which would include this book and others) would provide an overview of what the field's standards are and what is effective. Specific to each agency, information would be gathered informally from personnel by talking to individuals in the agency, conducting "ride-alongs," and attending departmental meetings. Formal methods of inquiry would include conducting a departmental survey and creating a committee that is brought together to specifically discuss crime analysis needs. Questions that might be asked in interviews and in the survey might include the following: How might current products be improved? What additional information is needed? What new products are needed? Observation conducted on ride-alongs and in meetings would focus on determining the level of understanding of crime analysis by sworn personnel in the agency and on what type of crime reduction/prevention strategies are being employed.

Once this information is gathered and analyzed, the third step is to write the strategic plan. Overall, the plan would describe the current state of the CAU or of the agency (based on information collected in the first two steps), prioritize the needs of the CAU, and list both short- (1 year) and long-term (5 years) goals. More specifically, the plan might include the following parts:

- *Structure:* This part would detail the number and type (e.g., civilian, officer, volunteer, student) of personnel conducting crime analysis full or part time and their positions (e.g., crime analysis technician, entry-level crime analyst, specialty analyst, crime analysis supervisor). It would also include job duties and responsibilities for each position and the location of the unit within the organizational chart (i.e., within the chain of command), as well as whether the unit is centralized or decentralized.
- *Functions/products:* The function (i.e., what type of analyses are conducted) would be determined through collaboration with agency executives who would help prioritize the type of analysis. This part would also describe any standardized products such as reports and bulletins and would lay out the dissemination strategy for each.

- *Data issues:* This part would describe the quality of current data in terms of timeliness, accuracy, and completeness and would include any limitations imposed by the current data. It would also specify what improvements would be needed to conduct the analysis needed by the agency and identify any new data sources that the agency might pursue.
- *Technology:* This part would describe the hardware and software used for crime analysis, detail replacement and update plans, and list any additional needs.
- *Training and promotion*: In terms of training, this part would discuss the local and national training opportunities for the analysts and develop a schedule based on the current budget and personnel needs. In terms of promotion, this part would lay out a structure for advancement (e.g., from crime analysis technician to crime analyst to supervisor) and provide suggestions for realizing the structure if it was not already in place.
- *Policies and procedures:* Because it is important to have formal policies that are not only followed by crime analysts but also are adhered to by customers of crime analysis, this part of the plan would contain each policy and procedure (i.e., methodology). Examples of policies include a citizen request policy, an internal-personnel request policy, and a media request policy. Examples of procedures include standardizing product format, methodology for data entry and cleaning, conducting a staffing analysis, and disseminating crime analysis products. Importantly, policies should be developed in collaboration with sworn personnel and approved by the chief or the command staff.
- *Goals:* This section would indicate the achievements the CAU will work toward and would summarize the suggestions for improvements made in each of the previous parts categorized by short-term (e.g., 1 year) and long-term (e.g., 3 to 5 years) goals. It would also include goals focused on the substantive work of the CAU that would include improving the quality and usefulness of crime analysis for crime reduction, prevention, and evaluation.
- *Placement in the organizational structure:* An important consideration for crime analysis is the placement of the crime analysis function in the organizational structure of the agency. When an agency uses analysis to enact crime reduction strategies and hold personnel responsible for these activities, the crime analysts become vulnerable to undue influence by commanding officers who may seek

to manage their own workload and success. For this reason, the crime analysis function should be housed in an "accountability-neutral" division (i.e., administrative bureau), where it is supervised by personnel outside the accountability structure for crime reduction activities that occur in the patrol and criminal investigations bureaus. The crime analysts will, of course, provide products for patrol, criminal investigations, and other operational divisions, but their priorities must be set by supervision outside the operational structure and accountable to the chief of police.

Obviously, the detailed information for each of the parts described would be tailored to the agency for which the plan was developed. In addition, there are many different ways to prepare the written strategic plan, but by using this information as a guide, a strategic plan provides a CAU with a formal set of guidelines for the operation and improvement of the crime analysis capabilities, functions, and personnel.

Crime Analysis Profiles

Analysts from around the country have provided information on their own backgrounds, skills, responsibilities, and thoughts about their careers as analysts. These are provided for students to get a sense of who crime analysts are and what they do. For definitions of tactical, strategic, and administrative crime analysis, refer to the glossary or see Chapter 4.

Detective Dan Benz

Seattle (Washington) Police Department

Crime Analyst

Education and Crime Analysis Experience

- Bachelor of science, criminal justice studies
- 7 years as a crime analyst
- 20 years as a sworn police officer/detective

Previous Related Work Experience

- 3 years as an all-source intelligence officer, U.S. Army

Breakdown of Responsibilities

70% tactical analysis

20% strategic analysis

10% investigative analysis

Dan's Thoughts on Being a Crime Analyst

I believe that an effective crime analyst is a pivotal component to the crime fighting mission. You can *truly* have an impact on your community by providing timely, accurate, and actionable information to patrol resources on a regular basis. It is very rewarding to see crime numbers drop as a result of series bulletins, hot-spot maps, or other products you have provided to the officers out there. I particularly enjoy "putting the pieces together" in terms of digging through data and reports and discovering patterns and series. This job also provides the ability to be creative in many ways and to continually be learning new skills. It is especially rewarding to be actively involved with the command staff and have an impact on the decision-making process in your organization. I was a patrol officer in my organization for many years prior to becoming an analyst. From that experience, I discovered a greater appreciation for the importance of accurate data and thorough report writing. The quality you put in will likely yield better products coming back out that will benefit everybody.

Michelle Wentz

Port St. Lucie (Florida) Police Department

Crime and Intelligence Analyst

Education and Crime Analysis Experience

- Bachelor of applied science, organizational management
- 5 years as crime analyst, Florida Department of Law Enforcement
- 1 year and 4 months as crime analyst, Palm Beach Regional Fusion Center
- Law Enforcement Analyst certification, Florida Department of Law Enforcement

Previous Related Work Experience

- 8 years as education coordinator, Healthy Start of St. Lucie County

Breakdown of Responsibilities

30% investigative analysis (support criminal investigations)

50% tactical analysis

15% strategic analysis

5% administrative analysis

Michelle's Thoughts on Being a Crime Analyst

I have found crime analysis to be a perfect career choice for me. I enjoy the challenges that are presented by the ever-changing landscape of this profession. While each day there are tasks to be met and a regiment to the work, you truly never know exactly what new challenge you will face to help your department and community stay safe. Working with the Port St. Lucie (Florida) Police Department on the research grant and continuing to work and develop our repeat offender program is some of the most interesting work I have done in my career. This work has enriched my skills and tradecraft greatly as I collaborate with experts in the field of crime analysis and strategic policy. The professionalism and dedication of the individuals I work with makes my job rewarding and enjoyable while we take pride in the keeping our city safe.

Brandon Inscore, GISP

Greensboro (North Carolina) Police Department

Crime Analysis Supervisor

Education and Crime Analysis Experience

- Bachelor of arts, secondary social science education, Elon University
- Master of arts, applied geography, University of North Carolina at Greensboro
- Master of business administration, Liberty University
- 2 years as crime analysis supervisor, Greensboro Police Department

Previous Related Work Experience

- 4 years as social studies teacher, Guilford County Schools
- 6 months as GIS technician, City of Greensboro Water Resources Department
- 7 years as GIS analyst, City of Greensboro Field Operations Department

Breakdown of Responsibilities

25% investigative crime analysis

25% tactical crime analysis

25% strategic crime analysis

25% administrative crime analysis

Brandon's Thoughts on Being a Crime Analyst

Crime analysts have the ability to help command staff and front-line supervisors to make smarter decisions about the deployment of resources. While technology helps to make our identification of trends and patterns more efficient, I never

cease to be amazed by the human intelligence factor our analysts bring to the table. Our analysts connect seemingly disparate pieces of information to create actionable intelligence on a regular basis. Crime analysts make a huge difference to our internal response and serve to improve the quality of life of our residents.

Dawn Clausius

Olathe (Kansas) Police Department

Police Intelligence Analyst

Education and Crime Analysis Experience

- Master of science, criminal justice from Boston University
- Bachelor of general science, psychology, from University of Kansas
- 10 years as a police intelligence analyst
- 8 years as a police officer

Previous Related Work Experience

- 6 years as secretary on the executive board for the International Association of Crime Analysts (IACA)
- 2 years as president on the executive board for the Mid-America Regional Crime Analysis Network (MARCAN)

Breakdown of Responsibilities

80% criminal intelligence analysis

10% tactical analysis

10% strategic and administrative analysis

Dawn's Thoughts on Being a Crime Analyst

I was introduced to the profession of crime analysis while I was a crime prevention officer for a small Midwest police agency. At that time, crime analysts were primarily seen in larger police agencies around the area and not in small agencies such as the one I worked in. When an opportunity to pursue the profession of crime analysis at the Olathe Police Department opened up, I jumped at it and moved to a larger, more progressive department to develop their crime analysis program. Pursuing the profession of crime analysis was a great decision and to this day continues to be. The profession has changed and developed from being considered a luxury item to a necessity item in law enforcement. Through tactical, strategic, administrative, and criminal intelligence analysis, a crime analyst has the opportunity to impact every area of the department and city. If implemented and used appropriately, crime analysis is a powerful tool for any size of department to leverage to be more efficient and effective. Simply stated: I loved being a police officer, but I love being a crime analyst even more!

Challenges and the Future of Crime Analysis

There are a number of challenges facing the crime analysis discipline, many of which are a result of the discipline's relative infancy. They include the following:

- The availability of relevant training and education
- The availability of data that are adequate in both quantity and quality
- The effective use of crime analysis products by police
- The ability to communicate with other crime analysts in neighboring jurisdictions

From a broader standpoint, the challenge for the field of crime analysis is developing a cadre of qualified individuals to assume crime analyst positions and providing individuals with adequate career advancement once they are hired within a police agency. Once a person is hired as an analyst, there is often little opportunity for promotion and for lateral movement (O'Shea & Nicholls, 2003) in the majority of agencies. Some police agencies create a new crime analysis position without a clear sense of what the qualifications and responsibilities should be. Many analysts have obtained their positions more through chance than through standardized training and education because there is not a clear path to becoming a crime analyst (i.e., college degree or standardized certification).

In terms of crime analysis practice itself, the discipline is continually challenged with proving its usefulness to police personnel. Although research has shown that crime analysis is worthwhile and important for effective policing, line-level police and supervisors who work alongside crime analysts are harder to convince. Analysts often produce reports and statistics that support the essentially reactive nature of the police because that is what is asked of them, and the data on which analysis is based is often subpar (i.e., police officers do not write acceptable crime reports). However, the primary challenge of crime analysis may not rest on the training of analysts or on enabling them to provide better products but rather on the actual structure and operations of the police organization. That is, accountability for the quality and use of crime analysis must be focused on police managers, who must, in turn, hold others accountable to produce better data and implement strategies based on the crime analysis they are provided.

Crime analysis has existed as long as police have existed, but it is only in the last 25 years that crime analysis with crime mapping has become common practice in mid-sized to large police departments in the United States. The discipline can still be considered to be "young," but the future of crime analysis seems extremely bright, especially with the results of the comprehensive policing research that indicates analysis is the key to understanding and preventing crime. In response to the challenges already discussed, the major

areas of future growth and development for crime analysis are in the areas of crime analysis education, regional initiatives, and improvements in policing.

As noted, the central challenge is creating a pool of potential crime analysts who are specifically trained and educated for this career, as well as standards for crime analysis knowledge and skills. The best way to address the issue of creating a pool of crime analysts is to provide undergraduate and graduate education and training in crime analysis. College courses and degree programs (e.g., certification programs and area concentrations at both the undergraduate and graduate levels) provide instruction in crime analysis techniques to encourage the pursuit of the profession of crime analysis. The field is also challenged in the areas of compensation and career development. One purpose of this book is to help create standards in analysis definitions and techniques as well as in job descriptions and qualifications. The International Association of Crime Analysts has and continues to work to develop standards for crime analysis as a career and its practice. They have developed a national certification process and a handbook that provides basic crime analysis knowledge needed for certification, as well as a certification training (IACA, 2011a). The IACA has initiated a standards, methods, and technology committee with the purpose of defining analytical methodologies, technologies, and core concepts relevant to the profession of crime analysis from which the new definition for crime analysis in this chapter has resulted.

An effort to overcome the challenge of standardization of skills and knowledge is the development of a body of crime analysis literature. Academic journals such as *Police Practice and Research, Policing: An International Journal of Police Strategies and Management*, *Security Journal*, *Crime Science*, and *Crime Mapping Research and Practice* as well as others include articles about crime analysis written by practitioners and researchers. An increasing number of books about crime analysis and crime mapping are being published, and formal communication networks for crime analysts, such as Listservs, have been established.

If we look outside the borders of the United States into the international policing community, we find evidence that standardization and development of crime analysis as a profession is also growing in other countries. Most European countries have formal crime analysis functions within their national or state police agencies, as do Japan, Australia, Brazil, South Africa, and other nations. Police agencies in the United Kingdom also have seen a significant push for crime analysis, both within the problem-solving process and tactically. The concerns of crime analysts in the United Kingdom mirror those of their counterparts in the United States, revolving around issues of data integrity, effectiveness of techniques, usefulness of crime analysis products, and staffing and resources.

Another area of growth in crime analysis is related to regional data sharing and analysis. Over the last decade or so and with the increased focus on counterterrorism, police agencies are discovering that analysis of data within their own agency's borders is not sufficient. They are beginning to share

data with neighboring police agencies as well as nonpolice agencies, such as probation/parole offices, health and social services, and educational institutions. Fusion centers, as they are called, enable the police agencies to collaborate and widen their scope of knowledge to provide a more comprehensive picture of local problems and a better foundation for effective cross-jurisdiction. Specifically, geographic information systems and the Internet have become important tools within law enforcement for sharing data and facilitating analysis across disciplines and agencies (Hollywood & Winkelman, 2015).

Lastly, the future of crime analysis sits squarely on the shoulders of policing. Crime analysis exists to support police, so it follows that its usefulness will depend on its acceptance and inclusion into the police organization and its practices. It will not be enough for academics, researchers, and crime analysts themselves to help improve the tools and techniques of crime analysts. Police leaders will have to understand and appreciate the value of crime analysis and incorporate it into their standard operational practices.

The discipline of crime analysis is fairly young, even internationally, and is steadily being incorporated into police practice. Current research results support crime analysis and its importance in focused and effective police approaches. The future of crime analysis lies in its increased adoption and effective integration to police practice. By developing training programs, providing education, creating a body of literature, testing analytic techniques, and evaluating their effectiveness, scholars and practitioners also contribute to the future of crime analysis. As a dynamic and growing profession, crime analysis offers significant opportunities to individuals who enter the field.

SUMMARY POINTS

This chapter defines crime analysis, crime mapping, and GIS; describes the history of the profession; and discusses crime analysis as a career track. The following are the key points addressed in this chapter:

- Crime analysis is a profession and process in which a set of quantitative and qualitative techniques are used to analyze data valuable to police agencies and their communities. It includes the analysis of crime and criminals, crime victims, disorder, quality of life issues, traffic issues, and internal police operations, and its results support criminal investigation and prosecution, patrol activities, crime prevention and reduction strategies, problem solving, and the evaluation of police efforts.

- Temporal, spatial (crime mapping), and sociodemographic factors are key areas of focus in crime analysts' examinations of crime, disorder, and other police-related issues.