

Social Disorganization and Social Efficacy

CHAPTER

2

► ► LEARNING OBJECTIVES

As discussed in Chapter 1, crime mapping is not a new practice of crime analysts. The literature is rich with theoretical justifications of ecological influences upon crime. Chapters 2 and 3 examine many of these theories. This chapter discusses several of these early theoretical approaches beginning with the Chicago School and ending with a discussion of Wilson and Kelling's more recent "Broken Windows." After studying this chapter, you should be able to:

- Understand a brief history of criminology and how theories focused on social-level variables developed and fit within the larger discipline of criminology.
- Exhibit a solid understanding of the Chicago School and its contribution to the study of crime and crime mapping.
- Explain Burgess and Park's concentric zone theory.
- Explain how Shaw and McKay's Social Disorganization Theory expanded upon the concentric zone theory by adding social-level variables to explain how people interact with their environment.
- Discuss the key elements to social efficacy.
- Identify the key elements to Broken Windows Theory and critically analyze this approach through the lens of social and physical elements found in the theories discussed in this chapter.

► ► KEY TERMS

Broken Windows Theory
Cartographic School
of Criminology
Chicago School
of Criminology
Classical School
of Criminology
Collective Efficacy
Crime Fuse
Determinism
Differential Association
Theory
Ecological Fallacy
Gentrification
Heterogeneous
Positivist School
of Criminology
Social Disorganization
Theory
Utilitarianism

■ Introduction

At this point, you may be wondering why a textbook on crime mapping has several chapters dedicated to criminological theory. Theory is very important to the creation of crime maps. Theories provide useful suggestions about the types of variables and sources of data that should be included in maps of crime. Some examples might include measures of socioeconomic status and other social variables, population density, and land use types. As will be emphasized throughout this text, it is crucial that crime maps and analyses convey the whole picture.

Maps created without providing the accompanying environmental and social context are limited in their usefulness. Block (1998) emphasizes this point by stating that “The successful analysis of spatial patterns of crime requires that mapping technology be guided by theory that can link place to crime, can unravel the spatial characteristics of different types of crime, and can provide explanations and suggest prevention strategies for the high vulnerability of some neighborhoods or demographic groups” (p. 37).

Eck (1998) furthers this notion by suggesting that “everything displayed on a map should be of theoretical importance” (p. 381). In addition, “the choice of the features that describe the relevant context depends on the theory being examined. To interpret the dots we need a theory so we can display the relevant context and leave out the irrelevant context” (p. 383).

So let us begin with a *very* brief history of criminology. Theories of crime causation have come a long way since Cesare Beccaria published his classic essay “On Crimes and Punishments” (1764) and Jeremy Bentham put forth his *Introduction to the Principles of Morals and Legislation*. (1789). Prior to Beccaria and Bentham, crime was primarily viewed as a product of evil and demonic possession or inferior bloodlines. Punishments for committing crimes during the Middle Ages were barbaric and cruel and included various types of torture and execution. By the mid-18th century, however, the prevailing philosophy, rooted in **utilitarianism**, maintained that human behavior is, by and large, the result of reason and logic. Beccaria believed that people act on their own free will, and thus criminals make a conscious decision to commit crime. He advocated for humane forms of punishment and for punishment that “fit the crime.” Bentham, also believing in free will and rational thought, argued that punishment itself was harmful and that if it was to outweigh the harm it produced, it must achieve four main objectives:

- The primary goal is the prevention of crime.
- When punishment does not prevent crime, it must persuade the offender to choose to commit a less serious offense.
- Punishment must persuade future offenders to use the least amount of force in committing a crime.
- It must prevent crime at a cost-effective rate.

Termed the **Classical School of Criminology**, Beccaria, Bentham, and others believed that crime was a product of rational thought with the major premise that punishment should be swift, certain, and severe. If this goal was achieved and exhibited to the general population, rational criminals, weighing the costs and benefits of their actions,

would choose to commit either a lesser crime or no crime at all. Thus, criminals, under the classical view, were not inherently evil but were people with poor decision-making skills and weak morals. The classical perspective heavily influenced the development of the criminal justice system in America and is still very evident today. Modern initiatives designed to control crime, including mandatory sentencing and three strikes laws, are based on the rational offender model.

The **Positivist School of Criminology** gained prominence during the late 19th century and spurred new methods for studying crime. The scientific method heavily influenced the way positivist philosophers and researchers approached the study of human behavior and their immediate environment. Positivism holds two primary elements. First, human behavior is influenced by biology, psychology, and to some extent the larger environment (social positivists). Second, the only way criminologists can learn about human behavior and solve social problems is to embrace the scientific method. Theorists from the positivist perspective by and large have a deterministic view of the world (**determinism**), arguing that human behavior is largely pre-determined by psychological, biological, and environmental factors. A major assumption of positivist criminologists was that a criminal could be “cured” of some known or unknown biological and/or psychological defect. Crime control strategies stemming from this school of thought included sterilization (crime is genetic and thus can be propagated), lobotomies (to eliminate the “infected” part of the brain that causes criminal behavior), and various drug and chemical treatments to “fix” criminals. The Positivist School still retains influence today with modern research continuing to focus on biological and psychological factors and their relationship to criminal behavior. Contemporary positivists, however, would support less invasive methods than their earlier counterparts, including genetic counseling and drug therapies and community-based programs that could help offenders overcome psychological, biological, and environmental risks of crime. The most influential remnant from the Positivist School is the application of the scientific method to the study of crime (which is key to crime analysis).

Both the early classicalists and the positivists were primarily focused on the individual and to some extent ignored many of the environmental factors that impact human behavior. Another group of criminologists, sociological criminologists, emerged in the late-18th through mid-19th centuries. These criminologists began to pave the way for modern theorists and analysts who study crime in a social context. Recall from Chapter 1 that Quetelet and Guerry are credited

as being two of the first persons to use spatial analysis in their research and are thought to be the founders of the **Cartographic School of Criminology** (Levin & Lindesmith, 1971). Guerry, using several data sources, determined that crime in France was unevenly distributed across people and places. Property crimes were more prevalent in the northern regions of France (and occurred more often in the winter) while crimes against people were more prevalent in the southern regions (and occurred more frequently during the summer). Guerry also concluded that age, education, poverty, and population density were important in understanding the distribution of crime.

Quetelet also looked at how crime was distributed across France (Quetelet, 1842/1973). Using social and spatial variables in his analysis, he determined that crime was more heavily concentrated in the summer, in the southern regions, and among **heterogeneous** populations that, as a group, were uneducated and poor.

What Quetelet and Guerry discovered is that crime and other social problems are distributed unevenly across space and time, the fundamental justification for crime mapping. This is nothing new, even to the beginning criminal justice student and crime analyst. If crime was randomly distributed, there would be little need for crime mapping. So why study theory at all? The answer to this question is that criminological theory is instrumental in identifying the individual, social, and ecological factors that predict where and when crime will be clustered. Theory can also help identify which variables we should target in crime control strategies that will be most beneficial in yielding the greatest reduction in crime. That said, the following sections examine the key theoretical arguments from major sociological and ecological theories of crime causation. In addition to helping us understand theories of crime causation, an examination of theory also helps us identify important variables and data sources to use in crime analysis and crime mapping. We will begin with the Chicago School of Criminology.

■ The Chicago School of Criminology

Scholars from the **Chicago School of Criminology** began the arduous task of developing hypotheses and constructing theoretical models about how crime was related to and caused by various social and environmental factors. The Chicago School of Criminology, named because the prominent theorists of this school were scholars at the University of Chicago, includes the work of several prominent sociologists, including Robert Park and Ernest Burgess. (For a more detailed description of

this history, visit <http://sociology.uchicago.edu/departments/history.shtml>.) Park (1915) was interested in myriad social problems that existed in cities. He observed that cities were made up of individual divisions that were based on race and ethnicity, socioeconomic status and occupation, and the physical characteristics of structural components of the city, such as whether an area was used for business or residential purposes. Using concepts from the discipline of plant ecology, Park argued that cities grew from the inside out through a process of invasion, dominance, and succession. Burgess (1925), continuing the plant analogy, also studied the growth of cities. He argued that cities grow outward from the center in concentric circles starting with the inner loop (the business district in the center of a city), then the zone in transition (the zone characterized by high rates of crime and other social problems), and then several zones that contain the homes of people who commute varying distances into the city to work (modern day suburbs). He further argued that people who live in the loop immediately surrounding the business district (zone in transition) would experience the highest levels of social disorganization, including the uppermost crime and victimization rates of the city. Modern critics of the concentric zone theory make the very good point that this model does not explain all cities. Many cities in the West, for example, did not grow in concentric circles. In addition, modern changes to cities that once fit this model have changed through the processes of **gentrification**. Areas in the zone in transition once characterized by high rates of delinquency and disorder are now desirable high-rent areas that are affordable only by the wealthy. However, what can be taken from the concentric zone model that is still applicable today is that crime and disorder is not randomly distributed throughout a city and that the areas most plagued by these problems will also have high levels of poverty.

Two other Chicago scholars, Clifford Shaw and Henry McKay (1942), furthered Park's and Burgess's works by studying juvenile delinquency and social structure variables within the zone in transition. Using the term social disorganization, Shaw and McKay sought to study the processes responsible for creating higher rates of juvenile delinquency in this area. They determined that three primary dynamics exist in socially disorganized neighborhoods; these include high rates of residential turnover, a heterogeneous population, and high levels of poverty. Essentially, they argued that the constant turnover of people moving in and out of the neighborhood combined with self-segregation of ethnicities inhibited the neighborhood cohesion necessary to solve common problems associated with high levels of poverty. That said,

poverty is not the *cause* of crime, but it is correlated with other factors, such as high residential mobility and heterogeneity. When these factors are concentrated in a localized area, the likelihood of a high crime rate noticeably increases. Shaw and McKay also observed that this is true for *all* populations that live in socially disorganized neighborhoods. Thus, crime was not the product of a certain racial group of people but for any group living in high poverty areas with high diversity and turnover.

Edwin Sutherland (1947) furthered Shaw and McKay's work by suggesting that high crime areas were not socially disorganized, just organized differently than other areas, and thus the cultural values surrounding crime were different. That said, many juveniles who lived in these disorganized neighborhoods learned values and techniques *favorable* to committing crime via their peer associations. Termed **Differential Association Theory**, Sutherland focused on the social learning processes that aided in the cultural transmission of criminal values and argued that some neighborhoods are not disorganized but rather organized around different values. He argued that criminal behavior is learned amongst close-knit groups and that both the techniques needed to commit crime and the values favorable to committing crime are learned. Differential association theory is not meant to replace, but to supplement, Social Disorganization Theory, and both theoretical approaches are still being tested today by modern theorists. Modern theories of crime attempt to integrate both the characteristics of physical space and social relationships to explain why crime occurs more frequently in some areas than others.

■ Social Efficacy

Recent research that examined social disorganization has determined that crime is not necessarily the problem but rather a symptom of inadequate social networks (or lack of collective efficacy) that exist in these neighborhoods (Sampson, Morenoff, & Earls, 1999; Taylor, 2001; Sampson & Raudenbush, 2001; Reisig & Cancino, 2004). The lack of **collective efficacy** in a neighborhood (inhibited by neighborhood turnover, heterogeneity, and poverty) is a more difficult and complex problem for law enforcement to address. Programs designed to weed crime out of an area by police sweeps and neighborhood clean-up programs ultimately fail in the long run if they do not address the notion of collective, or social, efficacy. Sampson and Groves (1989) contend that the lack of supervision, lack of community involvement, and reduced friendship and other social networks are the primary cause of crime and disorder in a neighborhood. That is, residents in

socially disorganized neighborhoods do not know or trust one another, and thus the supervision of the neighborhood people and property is limited. In addition, when residents are aware of a problem, they are less likely to get involved in any collaborative efforts to develop a solution. Taylor (2001) studied neighborhoods he observed as having conditions of collective efficacy. These neighborhoods are characterized as having residents who hold common values about what is right and wrong, strong ties based on physical proximity, informal social control, and high levels of community participation in neighborhood programs. These neighborhoods typically have little to no crime problems. Neighborhoods without collective efficacy are more susceptible to crime and disorder and typically exhibit a host of social and physical incivilities signaling to motivated offenders that this is a good place to set up shop. For example, **Figure 2–1** shows an abandoned house in Providence, Rhode Island.

Abandoned houses such as this can signal to potential offenders that the owners are either unable or unwilling to care for the property. Abandoned houses also emit signals about the lack of social efficacy that is common in poverty-stricken areas, as well as areas where neighbors mind their own business and areas where people can act as they wish with little community disapproval. In addition, abandoned buildings serve as free housing for the homeless and act as places of business for drug activity, prostitution, gang activity, etc. In **Figure 2–2**, target hardening measures, such as barred windows, signal to potential customers (also potential witnesses) that this is not a safe store to shop at, decreasing the store owner's potential profits.

■ Broken Windows Theory: Can It Be That Simple?

An understanding of the relationship between community variables, such as social and physical disorder, and crime is not new to law enforcement. Within the last several decades, strategies based on the philosophy of community-oriented policing and problem-oriented policing have become very popular. Many of these strategies are geared toward social and physical incivilities within neighborhoods. The popularity of these strategies is often attributed to Wilson and Kelling's "Broken Windows" piece, which was published in 1982. However, most practitioners can tell you that community-oriented policing strategies were being implemented long before this work was even conceptualized, especially in rural law enforcement agencies where budgets are smaller, manpower is sparse, and officers or deputies are highly integrated into the community. The **Broken Windows** Theory is based on



Figure 2-1



Figure 2-2

an experiment conducted by Stanford psychologist Philip Zimbardo in 1969. In this now classic experiment, Zimbardo placed two unoccupied vehicles in two different neighborhoods: Palo Alto, California and Bronx, New York. Within just 10 minutes of its placement, the car in Bronx was vandalized, and within 24 hours, nothing of value remained inside the car. After it was stripped of its value, passersby continued to vandalize the car by ripping its upholstery and smashing its windows. The car in Palo Alto, however, was left alone for almost a week. It was only after Zimbardo smashed it with a sledgehammer that people began to vandalize the car. Within a few short hours, the car was completely destroyed.

What Zimbardo's experiment tells us is that when the "no one cares" cue is sent out, crime can occur in any neighborhood. Wilson and Kelling (1982) contend that the only reason the car in Bronx was vandalized so soon is because the social and physical structure of the neighborhood emitted the message to potential offenders that no one cared. In Palo Alto, it was the smashing of the car by the researcher that signaled no one cared about the car. This suggests that if the car in Palo Alto had been left intact by the researcher, it may have sat for a much longer period of time before it was vandalized. Community-oriented and problem-oriented police strategies seek to address neighborhood problems that are thought to be root causes of crime. For example, proponents of community policing maintain that a law enforcement concentration on "minor disorders" will, in turn, "lead to a reduction in serious crime" (Mastrofski, 1988, p. 48). That is (in broken windows lingo), minor disorders, when not addressed, often lead to more serious disorders and ultimately to community decay. Supporters of community policing claim that its application can help break this destructive cycle through the coproduction of order and greater community involvement.

However, can crime prevention be as simple as cleaning up the signs of neighborhood decay? The answer is complicated. An illustration of some of the complicated relationships between geographic and social variables can be found in movies. For example, in the popular movie *Boyz n the Hood*, Furious (Laurence Fishburne) takes his son Tre (Cuba Gooding, Jr.) and Trey's friend, Ricky (Morris Chestnut), for a drive in inner city Los Angeles. He stops at a residential neighborhood that could easily be described as a broken windows neighborhood (visible signs of both social and physical incivilities). Loud rap music plays in the background, and the audience can also hear a woman

yelling. As Tre and Ricky exit the car, they look around nervously, and Ricky expresses to Furious his level of anxiety about stopping in this neighborhood. Furious directs the boys toward a billboard sign that says “Cash for your home.” He explains to them the message that the sign displays, that of gentrification. He explains the process as one where “they” bring the property value of a certain area down, get all of the current residents out of the neighborhood, then raise the property value and sell it at a profit. At this point in the scene, a small crowd of people from the neighborhood gather around Furious and the boys and begin a dialog. An old man from the crowd exclaims that it isn’t people from *outside* the neighborhood bringing down the property value, but it is those *within* the neighborhood (specifically young black men) who do so by selling drugs and “shooting each other.”

Furious then asks why there are so many gun shops in this community. Furious contends that the reason that gun shops and liquor stores are so prevalent in this community is because “they want us to kill ourselves” making a very noticeable distinction between “us” and “them,” which can be interpreted in several ways, an important one to this discussion being the “haves” versus the “have nots.”

In this movie, Laurence Fishburne’s character touches upon several important ideas relevant to our discussion in this book. First, communities are set within a larger environment that must be understood when analyzing crime. Macro-level forces, such as economics, play a part in crime trends over time and must be factored into analyses that examine general crime trends. Ignoring macro-level influences in analyses presents an incomplete picture. Second, individual decisions and behaviors (for example, selling your home to move to a better neighborhood or putting bars on your windows to protect your property) may be beneficial for individuals but are detrimental to the neighborhood. Third, structural components of neighborhoods (density of liquor stores and gun shops, for example) are important in understanding the neighborhood’s social problems and how they impact the physical space. It is important to remember that relationships between geographic and social variables are complicated and in many ways reciprocal in nature. Fourth, incorporating the notion of a **crime fuse** (a theoretical concept that argues a society *allows* problems such as crime to exist in certain areas and not others), such as Furious alluded to in the “us” versus “them” statement, may help explain the source of some of the frustration in a neighborhood that can manifest itself as crime (Barr & Pease, 1990). Last, cultural components of violence (often escalated in heterogeneous neighborhoods) are not quickly or easily fixed by the criminal justice system. They require more com-

plicated approaches that demand community participation in both the development and implementation of crime-reduction strategies. Skogan (2008) argues that “we cannot arrest our way out of crime problems” and that effective problem solving for neighborhoods suffering from crime and social disorder problems “calls for examining patterns of incidents to reveal their causes and to help plan how to deal with them proactively” (p. 198). Furthermore, solutions will most certainly require the involvement of organizations inside and outside the criminal justice system and will depend upon community support and participation for their success.

The Chicago School did much to further our understanding of the relationship between crime and space, but it is not without criticism. First is the **ecological fallacy**, which, in simple terms, means it is inaccurate to make assumptions about individuals based on aggregate-level data. That is, there are plenty of people who happen to have characteristics that put them at a higher risk to become criminals, including living in socially disorganized neighborhoods. However, they do not always turn to a life of crime. They live under the same conditions with the same environmental cues and the same opportunities to commit crime, yet they do not.

A second problem with the Chicago School is that its approaches do not explain all crime types and are often tested using street crimes within urban areas. This, of course, is a problem with many criminological theories. A third problem has to do with misidentifying the causal order of the relationship between variables. For example, research on **Social Disorganization Theory** suggests that crime and social disorder have a reciprocal relationship (Markowitz, Bellair, Liska, & Liu, 2001) and thus crime control efforts must focus on *both* issues to be successful. Thus, simply cleaning up a neighborhood and not promoting activities to build social efficacy will only yield temporary results in crime reduction, giving the “Band-Aid on a bullet hole” analogy a whole new meaning.

A fourth problem with research on social disorganization is multicollinearity. This term will be discussed in Chapter 8, but essentially, when variables in an equation exhibit multicollinearity, it means that the concepts they are measuring overlap. Think about the social-level variables we discussed in this chapter, such as income and education. We know that both of these variables are associated strongly with crime. However, income and education, in what they represent, overlap at least partially. That is, to some extent, education level can be explained by income, and income is a function of education level. Another example might be overcrowding and substandard housing.

Overcrowded neighborhoods tend to contain a lot of substandard housing. Thus, these variables are not completely separated from one another. Multicollinearity is highly problematic in some of the analyses that are routinely run in crime analysis and theory testing. Analyses containing multicollinearity can produce inaccurate and misleading findings.

Finally, research on social disorganization suffers from imprecise measurements. The concept of social disorganization itself cannot be measured precisely, and researchers are forced to employ proxy variables that measure *indicators* of social disorganization, such as residential mobility. Gau and Pratt (2008) found that citizen perceptions of disorder and crime were highly correlated, suggesting that treating these concepts as separate constructs is inappropriate. Research on social efficacy and its measurement of friendship networks and neighborhood supervision is more promising in its operationalization of social disorganization; however, these can be difficult concepts to measure.

■ Conclusion

Regardless of these criticisms, understanding criminological theory is crucial to crime analysis and crime mapping. However, it is important to be aware of limitations of theory, just as it is important to be aware of the limitations of your data and analysis techniques. Eck (1998) sums it up best by stating:

If the police do not know much about the area then they cannot form a testable hypothesis. This is the case in most situations when the police look for fast-breaking crime patterns so they can focus enforcement activity on a troubled area—by means of saturation patrolling, decoy operations, surveillance, or other tactics. Though the crime maps and even cluster detection algorithms may be useful for these operations, these mapping techniques are probably more useful when officers already have a good understanding of the area in question. This suggests that the police, like researchers, should pay as much attention to criminological theories as they do to the data they examine (dots) and the methods they apply (maps). (p. 402-403)

The next chapter continues the exploration of crime causation but narrows the discussion to the individual characteristics and the physical properties of space, which are related to crime and victimization. It is important to note that the theories discussed in Chapter 3 do not conflict with the theories discussed in this chapter but supplement them. In some cases, they simply address crime at a different level and

in some cases integrate several theoretical approaches into a larger and more comprehensive paradigm.

■ Recommended Reading

Akers, R. L. (2000). *Criminological theories: Introduction, evaluation, and application*. Los Angeles: Roxbury.

Cullen, F. T., & Agnew, R. (Eds.). (1999). *Criminological theory, past to present: Essential readings*. Los Angeles: Roxbury.

Cullen, F. T., Wright, J. P., & Blevins, K. R. (Eds.). (2006). *Taking stock: The status of criminological theory*. New Brunswick, NJ: Transaction Publishers.

Kelling, G. L., & Coles, C. M. (1996). *Fixing broken windows: Restoring order and reducing crime in our communities*. New York: Martin Kessler Books.

Sampson, R. J., & Wilson, W. J. (1995). Toward a theory of race, crime, and urban inequality. In J. Hagan & R. D. Peterson (Eds.), *Crime and inequality*. Stanford, CA: Stanford University Press.

Taylor, R. B. (2001). *Breaking away from broken windows: Baltimore neighborhoods and the nationwide fight against crime, grime, fear, and decline*. Boulder, CO: Westview Press.

■ Questions for Review

1. Why is it important to consider theories of crime when creating maps of crime?
2. According to early Chicago School theorists, how is the structure of a city related to the spatial distribution of crime?
3. How has *gentrification* changed crime distributions in urban areas?
4. When examining crime in socially disorganized neighborhoods, why must the analyst include both social and physical variables in his or her analysis to get a more complete picture of crime?
5. What is *social* or *collective efficacy*, and how is it related to the prevalence of crime in a neighborhood?
6. What are some of the problems in researching and/or applying theoretical principles of Chicago School theories of crime?

■ Chapter Glossary

Broken Windows Theory Broken Windows Theory was introduced by James Q. Wilson and George L. Kelling in the early 1980s. Essentially, it argues that if police focus on social disorder and minor

crimes in neighborhoods that contribute to social disorder (for example, public drinking and street prostitution), they are likely to make an impact in reducing or preventing more serious crimes.

Cartographic School of Criminology Under this school, early 19th century researchers in Europe used demographic information to explain the spatial distribution of crime. Variables measuring population density and socioeconomic status, among others, were used to explain uneven distributions of crime.

Chicago School of Criminology Theories and research on crime classified in this school were developed by urban sociologists (primarily in Chicago) who were interested in the relationship between environmental conditions and crime. They studied social and physical variables to understand the distribution of crime in cities.

Classical School of Criminology Theories of crime in this school rested on the notion of “free will.” Classical theorists maintained that criminals were by and large rational and chose to commit crimes for personal gain. Thus, crime was best prevented by implementing criminal sanctions that were high enough to deter potential offenders from committing crimes.

Collective Efficacy Sometimes referred to as “social efficacy,” this term refers to the level of social control (supervision of neighborhood children, maintaining public order, etc.) wielded by communities. Collective efficacy is high in cohesive communities with mutual trust and is low in communities that are not cohesive and that do not have mutual trust.

Crime Fuse A theoretical concept that argues a society *allows* problems such as crime to exist in certain areas and not others.

Determinism The philosophy of determinism argues that human behavior is largely predetermined by psychological, biological, and environmental factors. In essence, people are victims of their own circumstances.

Differential Association Theory According to Sutherland (1947), criminal behavior is related to the extent offenders were exposed to antisocial attitudes and values. Sutherland outlined nine principles explaining how criminal behavior is learned through association.

Ecological Fallacy The problem that occurs when making assumptions about individuals based on aggregate-level data.

Gentrification In the process of gentrification, existing buildings in a neighborhood, typically in urban areas, are replaced or upgraded. As a result, property in these areas becomes more desirable and results

in a shift in population demographics of both residents and business owners. Usually, during gentrification, persons classified as having lower socioeconomic status move out of the neighborhood, and persons with higher levels of wealth move into the neighborhood.

Heterogeneous Heterogeneous is termed used to denote variation. In the context for which it is used in this text, it refers to populations that have high levels of diversity, primarily in culture and ethnicity.

Positivist School of Criminology The positivists used scientific methods to examine human behavior. Positivists maintained that crime was a result of biological, psychological, and social factors.

Social Disorganization Theory Under this theoretical approach, crime is more prevalent in neighborhoods that exhibit social and physical incivilities. In these neighborhoods levels of social control is low due to a breakdown in institutions such as the family and school.

Utilitarianism Attributed to Jeremy Bentham, utilitarianism refers to “benefit maximization.” Essentially, decisions are made (rationally) in favor of less pain and the greatest good for the greatest number of people. Thus people are motivated to avoid pain or to pursue pleasure.

■ Chapter Exercises

Exercise 3: Tables, Addresses, and Maps

Data Needed for This Exercise

- All layers to start are in EX3.mxd.

Lesson Objectives

- Open C:\CIA\Exercises\Exercise_3\EX3.mxd.
- Add data to the map display from shapefiles.
- Work with tables:
 - Summarize
 - Sort
 - Statistics
- View address files in ArcGIS.
- Make an address file to use in ArcGIS.
- Add fields.
- Calculate fields.
- Export selected data.

Task Description

- City Council wants to know if there are any sex offenders on probation who live within 1000 ft of a Glendale school. The

Crime Analysis Unit supervisor has assigned this project to you, and she wants to know a few things:

- Are there any sex offenders living within 1000 ft of any school, and if so, how many?
 - If any are found, what are the crime descriptions for which these offenders are on probation?
 - Provide a list of these offenders in Excel via e-mail.
 - Are there any sex offenders living within 1000 ft of any of the following schools? If so, how many?
 - Glendale Elementary
 - Glendale Landmark Elementary
 - Glen F. Burton Elementary
 - In addition to this work, the supervisor needs you to add the names of the City Council members to their respective council districts in a polygon data file.
 - She also needs you to create a new table of massage businesses in Glendale to be later geocoded and used for vice operations.
 - We will need to divide this work up into three or four different projects. Let's start with the last item and create a new list of businesses that offer massage within the city of Glendale. Hopefully there will not be too many and we can get this done fairly quickly. We will want to capture the name of the business, the address, the phone number if available, and, at a later date, maybe a field that indicates if they are candidates for vice operations based on their location. The easiest way to begin this assignment is to use the good old Dex online yellow pages.
1. Open the C:\CIA\Exercises\Exercise_3\EX3.mxd.
 2. Minimize ArcMap after it opens.
 3. Open Internet Explorer and browse to the **www.dexknows.com** Web site.
 4. In the What field, type in *Massage*, and in the Where field, type in *Glendale, AZ* and click **Search**.
 5. We want to "Search for businesses with 'massage' in the business info.
 6. You should notice a plethora of listings. We need to refine that search so that we see only those massage business inside Glendale.
 7. Select "Narrow my Search" near the top of the Web site listing your results. A dialogue box will appear giving you several options to refine your search. We want to use the one that says, Refine by

Location—City. Open the field and choose Glendale from the pop up. This just reduced the total number to just 2 pages instead of 18 or more.

8. If you are an Excel expert (if not, the DVD that came with this book includes a tutorial on Excel that you may find useful), you can cut and paste the listings directly from the Web site and then massage (pun intended) them, move them around, and clean them up to get your table. If not, you need to do it the old-fashioned way. Open Excel, create three new field names, and start typing, using the Web site as a reference.
9. There are several other Web sites to find massage businesses on the Internet. These other sources include:
 - a. Google maps: <http://maps.google.com/>
 - b. Yahoo! Maps: <http://maps.yahoo.com/>
 - c. Switchboard: www.switchboard.com (this site give you the less than upstanding ones)
 - d. Yellowpages.com: www.yellowpages.com
 - e. AnyWho: www.anywho.com
 - f. Addresses.com: www.addresses.com
10. None of these Web sites will let you download a table of the data, and the limitation is often that if the business does not advertise with that service it will not be listed, and the old-fashioned paper copy of the yellow pages or the white pages may have to be used. You can buy products that allow you to download lists of businesses based on a category (like www.hoovers.com, www.selectory.com, and many others). The prices range from \$100 to \$5000, and you get what you pay for. Another source of this kind of data is the business tax license department for your city. This office will often have a huge list of anyone that does business within the city. When you have gained access to this list, you will need to learn what the classification codes are for the business types, and in many cases the business address is where the City sends the bill for the annual license renewal, which may or may not be the actual address of the business. (The corporate headquarters are in Houston, Texas? That's not in Glendale, is it?)
11. For the purposes of this exercise, we'll just use the addresses and names from the Dex Web site and the paper copy of the yellow pages and call it good.
12. In a future lesson we will use this file you have diligently typed, so save and store it in the C:\CIA\Exercises\Exercise_3\ folder as Massageparlors.xls. The final table should look like a spreadsheet with

columns denoting the name, phone, address, city, state, and zip code, and the massage parlors listed in rows (see DVD Figure 3–1).

13. I found 34 listings. How many did you find? If you do not have all of these, for later geocoding exercises you can use the ones I found that are located in C:\CIA\Exercises\Other\Massage.xls.
14. Let us move on to adding the names of the City Council members to an already developed polygon shapefile.
15. Maximize the EX3.mxd project and click on the **Add Data** button. Find the C:\CIA\Exercises\Exercise_3\CCDistNames.shp data and add it into the project.
16. Right click the theme in the TOC, and open the attribute table for this polygon shapefile.
17. You will notice that there are six polygons listed in this attribute table, and each one represents a city council district in Glendale. Because you are likely unfamiliar with which council district member represents each section, we need to browse the Glendale Web site to find this information.
18. Open Internet Explorer and navigate to <http://www.glendaleaz.com/cityofficials/index.cfm>.
19. In the attribute table you have the name of the city council district for each polygon in a field named *c_district*. Now either write down the councilperson's name for each council district, or leave the Web browser open as we add the councilperson's name to the table.
20. First, we need to add a new field to hold the name values we are going to enter. To accomplish this, click on the **Option** button at the bottom of the attribute table window in our ArcMap document (you will have to switch from the Web page to ArcGIS to see this). Find the **Add Field** item in the dialog menu, and click on it.
21. You should now have the Add Field dialog box in front of you. In the Name box type in *Councilperson*. For the Field Type box, pick **text**. The field length for now will be fine at 50. Click the **OK** button to add the field to our attribute table.
22. An error message will pop up indicating that our field name is too long and will be truncated to *CouncilPer* for us. Click **Yes** to accept this change, and notice that the truncated field names can be no longer than 10 characters for a shapefile.
23. Now highlight any one of the fields between *C_District* and *CouncilPer* and right click on the field name. In the dialog box, choose **Turn Off Field**. Do this for each field between *C_District* and *CouncilPer* to make the table easier to use.

24. Now resize your attribute table so you can partially see the map display behind it and the table at the same time. You may also need to resize a few fields to be able to see both of them clearly.
25. At the very far right side of the attribute table is a small box to the left of the FID field value. Click on this little box next to the CHOLLA districts FID number 0. This will select the polygon on the map and in the table.
26. A blue line will now be around the polygon that is the farthest north in Glendale, and the record in the table is also blue.
27. Right click on the **CouncilPer** field name, and choose **Field Calculator** from the dialog box.
28. Click **Yes** to indicate that you wish to continue outside of an edit session.
29. In the Field Calculator dialog box, find the lower white box with CouncilPer= at the top and type in “*Vice Mayor Manny Martinez*” (or whoever is listed as the Cholla District’s councilperson on the Web site).
30. Because we are entering data for a text field, we need to make sure we include the quotation marks before and after the text string we enter.
31. Make sure that at the bottom of the dialog box, the check box that says Calculate Selected Records Only is checked.
32. Click **OK**, and you should now see the text you typed in the CouncilPer row for the Cholla District.
33. Notice that with text characters and spaces “Vice Mayor Manny Martinez” takes up about 25 spaces. If we had made our field length 25 or less, this name may not have fit and would have been truncated off the right hand side. When choosing text field lengths, find all of the values that will be entered, count the longest one’s total characters including spaces, add two to five spaces to it, and set the field length to that value. Because we used 50 characters, we don’t need to worry, but in real life you will want to keep your field lengths down to a minimum for the data you are going to enter, or ever anticipate entering, because this saves disk space and reduces the size of files.
34. Continue selecting council districts and calculating each of the councilperson’s names for that council district as we did in steps 25–33.
35. When you are done, close the attribute table, and save your project as MyEX3b.mxd in your student folder (but don’t close ArcMap). Before closing the attribute table, make sure to turn on all of the

fields you turned off so that they are available for the rest of the exercise. To do this, click the **Options** button, and choose **Turn All Fields On** from the dialog menu.

36. To use this new information, will we create a concatenated label for each council district using the labeling features in ArcMap.
37. First, let's change the colors for each district so they each have a different color.
38. Right click the **CCDistNames** layer in the TOC. Click **Properties** and go to the **Symbolology** tab in the Properties dialog box.
39. At the left in the Show section, choose **Categories** and **Unique Values**.
40. In the Value Field box, find and choose **C_District**.
41. In the color ramp section, choose the color ramp at the very top.
42. At the bottom of the Symbolology dialog section, click on the button **Add All Values**.
43. Now all of the unique values in the c_District field have populated the symbology area. Uncheck the box to the left of <all other values> because we don't want anything in our legend except for the data that is in our shapefile, and we do not want to see null values, etc. *(Even though we have none in this shapefile, it is important to remember to do this for the many times that null values exist.)*
44. Click the **Apply** button and close the Symbolology dialog.
45. Check out your fine work on the map and the TOC.
46. You may notice that one of your council districts still has light blue lines around it, indicating that it is still selected. To unselect everything, we can go up to the **Selection** choice in the menu bar, and then choose **Clear Selected Features** in the pop-up dialog. The blue lines around the polygon should now be gone.
47. Now let's create some labels for the council districts on our map.
48. Right click the **CCDistName** theme in the TOC again, and choose **Properties**.
49. Go to the tab named **Labels**.
50. Check the box that says **Label Features in This Layer**, and then make sure the Method box says **Label All the Features the Same Way**.
51. In the Label Field box you should see **Entity**. We want to change this to a combination of the district's name and the councilperson's

- name. To accomplish this, we need to click on the **Expression** button to the right of the Label Field box.
52. Highlight and delete [ENTITY] in the bottom white box. Go up to the top white box where all the fields are listed and double click on **C_DISTRICT** to bring it down to the bottom box. Now find the **CouncilPer** field we created and double click it. It will come down into the bottom box and right next to the C_District field. We need to enter a & symbol in between these two field names to avoid a syntax error. The & symbol, or ampersand, is a separator for field names in several programming languages (like SQL, Microsoft Access, etc.). Click in between the two fields and add an ampersand like the following: [C_DISTRICT] & [CouncilPer]. Click **OK** to view the result.
 53. You may not see all of the labels and the council district's and councilperson's names run together. We want the text to be a bit smaller, and we want the councilperson's name to appear below the council district name.
 54. Reopen the **Properties** → **Labels** dialog menu and change the font size to 6, and click on the **Label Styles** button to get font style options. Go to the bottom of the styles and choose **BANNER**. (*You may need to change the font size back to 6 again after completing this task.*) Click **Apply** to see the results.
 55. Reopen the **Properties** → **Labels** dialog again if you closed it, and go back up to the **Expressions** button and click it again. Click on the **Help** button and read about formatting text in the Help dialog. You will see that you have several options and capabilities to edit the way your text appears in this expression area. We will use some of this information to help our labels look nicer. In the Expression dialog where we currently have [C_DISTRICT] & [CouncilPer] listed, change it to: "CC DIST: " & [C_DISTRICT] & vbNewLine & [CouncilPer].
 56. Click **OK** and **Apply** to make the changes effective, and close the Properties dialog to see the result.
 57. This may still not be very pretty, but you can see the versatility you have with labeling features automatically using the Expression tools and a little bit of Visual Basic for Applications (VBA) code. You can also change many factors about the symbols being used (the yellow box and its outline) by clicking on the **Symbols** button and making various changes.

58. Now we come to the hardest assignments we were given today:
- Identifying if there are any sex offenders living within 1000 ft of any school, and if so, how many.
 - Providing the crime descriptions for those offenders on probation if any are found.
 - Providing a list of these offenders in Excel via e-mail.
 - Identifying if there are any sex offenders living within 1000 ft of any of the following schools, and if so, how many.
 - Glendale Elementary
 - Glendale Landmark Elementary
 - Glen F. Burton Elementary
59. First we need to define what the supervisor means by “sex offenders.” After interviewing her, we understand that she wants to know which adult probationers are on probation for indecent exposure, molesting, or sexual assault and who are reported to be living within 1000 ft of a school. She is not concerned with registered sex offenders from the Arizona Department of Public Safety Web site because the person who requested this information has already been to the site and acquired the needed information.
60. Now we need to see if we have probationer data with sex offender information. In EX3.mxd’s TOC, find the theme called **Probationers**. Right click this theme, go to **Properties**, and go to the **Definition Query** tab. You should already see a formula in this section that says ““DESCR” LIKE ‘%INDECENT%’ OR “DESCR” LIKE ‘%SEX%’ OR “DESCR” LIKE ‘%MOLEST%’”.
61. There is a field in the Probationers theme’s attributes called DESCR, which has the generic name of the Arizona Revised Statute Offense the person is on probation for. We are simply using that field to define the data we will see on our map and limiting it to just those who have “indecent,” “sex,” or “molest” in the offense description field. Isolating the adult probationers down to just those related sex offenses has already been done for you.
62. Click on the **Symbology** tab and notice that the legend has already been created for you as well.
63. Turn on the Probationers theme.
64. Expand the legend to see the symbol styles that are being used, and using the legend and the map get an idea of what kinds of sexual-related crimes our probationers are responsible for. Do you see any specific spatial patterns?

65. Now we need to see how the Area Schools layer compares with the adult sex offender probationers, so turn on the **Area Schools** layer in the TOC.
66. Now we need to know what 1000 ft around each of these schools looks like, and with some sort of polygon we can count or capture information about the probationers within. To do this, we will need to create a buffer of 1000 ft around each of the schools and find all the probationers within that range for the first question.
67. The easiest way to accomplish this task is with the Select by Location tool in the menu bar. Go up to the menu bar and choose **Selection** then click on **Set Selectable Layers** and make sure **Probationers** is checked. Click **OK**.
68. Now go back up to the **Selection** menu item, and this time choose **Select by Location**. In the Select by Location dialog menu, set the following fields as indicated:
I want to: Select features from
The following layer(s): Probationers
That: Are within a distance of
The features in this layer: Area_Schools
Check the box next to “Apply a buffer to the features of Area_Schools in: 1000 Feet.”
69. Click **Apply** and then **OK**.
70. You should notice that there are several blue dots shining brightly on your map.
71. To answer question number one, because we have bright blue dots (selected records), the answer is yes, there are sex offenders within 1000 ft of area schools, and the second answer is 9 out of 136. How did I get this answer? Think attribute table! Open the attribute table for the Probationers theme and look at the bottom of the Table view. Write this answer down here _____.
72. Now we need to export the data for these nine offenders to an Excel spreadsheet. Click the **Options** button on the attribute table view, and choose **Export**. We only want to export the selected records. We also want to put it in a location where we can find it later to e-mail it, so click the **Browse** button to the right of the Output Table box, put it in your student folder, and name it SexPO.dbf.
73. We will export this as a DBF file because this kind of file is easily read in Excel, and ArcMap won’t directly export the selected records to Excel. Click **OK** to export the nine records, and do not

add it to the map at this time. We will pick it up with Excel in a little while.

74. Question 2 will be answered when we make the DBF table we just exported into an Excel file and e-mail it to our boss.
75. For the last questions, we need to combine a few select routines to get to the answer we need. First we want to select the three schools using a Select by Attributes query on the Area_Schools theme, and then repeat our Select by Location query on the probationers again. To begin, let's first make sure no records are selected by choosing **Selection → Clear Selected Features**.
76. Now go to **Selection → Select by Attributes**.
77. Make sure Area_Schools is in the box at the top.
78. The method will be Create a New Selection.
79. Double click on the Business_N field to bring it down into the Select From "Gln_Schools Where:" section is located.
80. Click on the **Get Unique Values** button to see all the school names in this data layer.
81. Click on the **Equal Sign** button to bring the equals (=) sign down after the BUSINESS_N field name, so that we always have a field name, operator and value in our queries. Then double click on **Glendale Elem. School**, and click on the **Or** button. Repeat this process for the other two schools until your query section looks like this: "BUSINESS_N"='Glendale Elem. School' OR "BUSINESS_N"='Glendale Landmark Elem. School' OR "BUSINESS_N"='Glenn F Burton Elem. School'
82. Click the **Verify** button to see if there are any errors in your SQL code. If you've done it correctly, you should get a message indicating that the expression was successfully verified.
83. Now click **Apply** and then **Close**, and you should see three little bright blue dots on your map, which are the three schools.
84. Now go up to **Selection → Select by Location**, and if you did not close ArcMap since you last ran our 1000 ft radius for probationers, all your settings should be the same as shown in step 68.
85. Make sure the check box next to Use Selected Features (three features selected) is checked.
86. Click **Apply** and **OK**.
87. Open the attribute table for Probationers and see if you caught anyone.
88. The answer is _____.

89. You actually need to go out about 2500 ft to find five probationers living near one of these three schools.
90. Choose **Selection → Clear Selected Features**, save your project in your student folder, and then close ArcMap completely.
91. Open Excel.
92. Click on **File → Open** and browse to the location where you placed your SexPO.dbf table. You will need to change the file type to DBF 4 to be able to see the file in the Browse window. Open your DBF file of the nine probationers, and save it as a Excel file called SEX_PO.xls.
93. This concludes this massive exercise. When you are familiar with each of these functions and processes and you logically put the steps together in the right order, you can accomplish anything in ArcMap. Each of these steps would take between 2 and 10 min for a working analyst.

Exercise 4a: Address Locators and Find Addresses

Data Needed for This Exercise

- Street centerline file.
- Sonorita high-resolution aerial photo.

Lesson Objectives

- Learn what an address locator is and how to create one. Use the Find function in ArcMap to find addresses quickly and easily.

Task Description

- You are working in the City's emergency operation center (EOC) as the GIS analyst on call for a chemical spill. When you arrive, the commander directs you to find the address of the spill on the map and display the map with an aerial photo and streets on the screen while resources are directed to the area.
1. You will need to create a new ArcMap project from scratch for this project.
 2. Open ArcMap through the Start menu and begin adding layers to a new ArcMap project.
 3. Use the **Add** button to add in the GLN_Surrounding_Streets data from the C:\CIA\GIS_Data\Streets_Transportation folder.
 4. Also find and add the aerial photo for Sonorita in high resolution (C:\CIA\GIS_Data\AerialPhotos). This file may or may not be missing its spatial reference (you will receive an error message if it is missing this information). To define the projection for this file,

click on the **ArcToolbox** icon (it looks like a little red toolbox) and select **Data Management Tools**, then **Projections and Transformations**, and then **Define Projection**. At this point, a dialog box will appear, and you will need to select the file *Sonorita_higRez.tif* as the Input Data File or Feature Class by using the drop-down menu. For the Coordinate System, click on the icon to the right to get a Spatial Reference Properties box. Select **Import** and browse to the *CIA\GIS_Data\Boundaries\Glendale_City_Boundaries.shp* file. Click **Apply** and then **OK**, and you will see a coordinate system *NAD_1983_StatePlane_Arizona_Central_FIPS_0202_FEET* appear in the text box under Coordinate System. Select **OK**.

5. After loading these two sets of data, save your project as EX4a.mxd in your student folder.
6. The address where the chemical spill has occurred is 6023 W Ocotillo Rd.
7. We are going to use someone else's address locator that has already been created for this exercise, but we will create our own locator at a later time. Use the **Browse** button to find the address locator *U.S. Address Finder Tele Atlas*. (If you are unable to find this locator, skip to the directions for how to create your own (starting at step 14) and then return to this step.)
8. Click on the **Find** button in the Standard toolbar (it looks like black binoculars).
9. In the Find dialog box, click the **Addresses** tab. You should see a menu as shown in DVD Figure 4–1. Fill it out as follows:
 Choose an address locator: *U.S. Address Finder Tele Atlas*
 Country: *United States*
 Street or Intersection: *6023 W Ocotillo Rd*
 City: *Glendale*
 State: *AZ*
 Zip code: *85301*

When you click the **Find** button you should get back the two addresses that show in the bottom of the Find dialog in the example.

10. Right click on the 6023 W Ocotillo Rd, Glendale, AZ 85301 match and choose **Add Graphic**. Close the dialog or move it to the side to see that a black dot is not on your map. Right click on the **Sonorita_higRez** aerial layer in the TOC, and choose **Zoom to Layer** from the dialog box.
11. You can also right click the address match in the Find dialog and choose **Zoom To**.

12. Now close the Find dialog and click on the black dot to get the handles around it. Right click on the black dot to change the symbol properties for it. Make it a red triangle about 18 points in size. Make sure you change your tool to the black arrow (Select tool) before clicking on the black dot or the Find menu will pop back up again!
13. We have completed the assignment for the EOC manager at this point.
14. While we are waiting for further orders, we are going to create our own address locator that we can use with this ArcMap project instead of the one that comes from the ArcMap software and the Internet. We do this because we know that our streets are much more accurate than these free streets, and we want accuracy to be part of everything we do.
15. The ArcToolbox (looks like a little red toolbox) tools can be used for a variety of things. Click on this icon and open the ArcToolbox.
16. Find the Geocoding Tools section and expand it. Find the Create Address Locator tool and double click it.
17. In the dialog box, set up the fields as follows (see DVD Figure 4–2):

Address Locator Style: *US Streets with Zone*

Reference Data: *C:\CIA\GIS_Data\Streets_Transportation\GLN_Streets_Plus.shp*

Role: *Primary Table*

You should also have the following:

<u>Field Name</u>	<u>Alias Name</u>
House from Left	L_FROM_ADD
House to Left	L_TO_ADD
House from Right	R_FROM_ADD
House to Right	R_TO_ADD
Prefix Direction	STREET_PRE
Prefix Type	<None>
Street Name	STREET_NAM
Street Type	STREET_TYP
Suffix Direction	STREET_SUF
Left Zone	L_CITY_NAM
Right Zone	R_CITY_NAM

18. When we set up an address locator, we need to determine what address styles we will try to find. The two most commonly used in law enforcement in Maricopa County are US Streets and US

Streets with Zone. US Streets just requires input of an address or intersection. US Streets with Zone requires the address or intersection and a zone (in our case we are using a field called L_City_Nam and R_City_Nam for the names of the cities). This can often be a zip code if your data is kept up to date well enough with the correct zip codes for each street segment and you have the zip code stored in your RMS/CAD system.

19. In this case we are also using the Gln_Streets_Plus shapefile as our reference source or the data in the street centerline we wish to match against.
20. We also set the address ranges along the left and right sides of the street along with the street name prefixes, names, types, and suffixes.
21. When we click the **OK** button, ArcMap indexes all of these fields to optimize geocoding and address finding and then tells us that the creation effort was a success.
22. ArcMap also automatically saves the address locator in the same directory as the street centerline shapefile we used as the reference layer.
23. Now open ArcCatalog from inside ArcMap by clicking on the button that looks like a yellow filing cabinet.
24. In the directory tree, browse to the C:\CIA\GIS_Data\Streets_transportation folder and view the contents. You should now see three files listed:
 - GLN_STREETS_PLUS.shp
 - GLN_STREETS_PLUS_CreateAddre
 - GLN_SURROUNDING_STREETS.lyr
25. The middle one, GLN_STREETS_PLUS_CreateAddre, with the reddish symbol to the left is the address locator.
26. Double click this file to open a dialog about this address locator.
27. The first thing we will do is check the box indicating we want to save relative path names. This means that if we move all our data in the same directory structure to another drive, everything will work correctly. If we do not check this, then we would have to recreate the address locator if we move the data anywhere.
28. We also want to set the offset to 100 ft and make sure that we check the box next to Add the XY Coordinates so that the process will add them to the attribute table of our data for potential use in the future (see DVD Figure 4–3).

29. The reason we use 100 ft is because houses or businesses are not located right down the middle of the street. Most are shifted north, east, south, or west of the street by 50–250 ft. When we use 100 ft, we are simply telling ArcMap to avoid putting the point directly on the street but offset it north, east, south, or west 100 ft from the street centerline where the actual building might be more logically located. This is an arbitrary distance based on your own experience, but most analysts I know use 50, 75, or 100 ft. The 100 ft distance is based on the average of actual measurements of several homes and businesses in Phoenix. The average distance from the middle of the road to a residential home was about 55 ft, and it was about 175 ft for businesses. Combining them all together gave me an average of about 101 ft, or 100 ft for short. The real key is to pick a distance for the offset that fits your city the best and then stick with it and don't geocode 45 ft today, 65 ft tomorrow, and 250 ft the next day. Be consistent to assist with data quality and analysis efforts.
30. You should also be aware that an address along a street segment is found through a method of interpolation of the closest approximate point and not the actual address in some or most cases (see DVD Figure 4–4).
31. In this case we are exaggerating the addresses to some that are not even actual addresses, but we do get this kind of data all the time. The red dots may not even be near the front of the address if we used 5350 W Glendale Av, but it would be approximated based on the length of the street segment it matched and the address ranges on it. The address ranges on the Glendale segment for this example are probably: left side, 5101–5499; right side, 5102–5498.
32. Geocoding and the various nuances of address locator settings can be a 3-day class all by themselves. Practice makes perfect for this as you see how various geocoding settings affect the accuracy of your data and analysis needs.
33. Close ArcCatalog after you have made your changes to the address locator.
34. Return to ArcMap, and click on the **Find** button again. Go to the **Addresses** tab once more, and this time click the **Browse** button next to the Choose an Address locator box.
35. Find the address locator we have been editing, and add it to this ArcMap project.

36. You will see that because we chose US Streets with Zone, we are only being asked for the street address and the zone, and the fields for zip code and country have been replaced.
37. Enter *6023 W Ocotillo Rd* and *GLN* as the zone and find it as before.
38. Right click and add a new black dot to the map for this new location based on our street centerline file.
39. Close the Find dialog and see how the 100 ft offset has changed the location of the point. Zoom in really close to the two dots to see that the red triangle is in the middle of the intersection/street and the black dot from our new address locator is more near the center on the south side of Ocotillo Rd where we would expect to find 6023 W. This demonstrates that the offset setting changes where the point is placed on the map and is “offset” from the centerline to be closer to the actual address in the real world.
40. This concludes this exercise. Save your work and close ArcMap.

Exercise 4b: Adding Tables Part I

Data Needed for This Exercise

- Everything is included in the Exercise_4 folder.

Lesson Objectives

- Adding and working with tables in ArcMap.
- Knowing when you need to geocode, when you can add XY coordinate event tables, and when you just need a table to help look up or add information to your geographic data to make it better.

Task Description

- This exercise will help you to recognize that there are three classes of data in tables that you will need to be able to work with in ArcMap. The first is a table of addresses that we will need to geocode. The second is a table of addresses that have valid X and Y coordinates that we can add to our map using Add XY coordinates to create an event theme. The final type of tabular data is data we can use to enhance the information already within a GIS layer and use for additional analysis.
- The first practical exercise is to geocode those massage businesses we created in a previous exercise for the vice squad. They are going to do undercover spot checks of each business to see if they will solicit sex, and they need to know where each business is so they can divide up the workload for their six detectives as equally as possible.

- The second practical exercise involves putting a list of liquor licensed establishments on the map quickly by taking an export table from the database program that already has
 - XY coordinates in the table and making the dots appear on the map. The chief will use this map for a meeting with liquor control.
 - The final practical exercise involves adding tabular information to a current GIS layer that will enhance services and information about the data on the map. The exercise will involve adding modus operandi (MO) factors to several burglary events to help change the symbols based on adding multiple additional fields in the table to assist detectives in seeing problems in an area of the Foothills Patrol Division.
1. Open EX3.mxd and then save it in your student folder as EX4b.mxd.
 2. The address locator you created in the previous exercise should already be added to the Find button. If not, browse until you find it. Check to make sure your address locator has been added, and if not, add it to the Find button and find 8450 W San Juan Av.
 3. You should notice that you do not find an exact match and only find a close address, which matched at 63% of 8301–8399 W San Juan Rd. Add the graphic point to the map and then zoom into the area to see why it did not find the address at 100%. You should see that San Juan does not appear to extend to 8400 W, and this looks like open area.
 4. If you were to add and turn on the Central.tif aerial photo (found in the GIS Data folder), you would see that it shows that address to be in the middle of a farm field, which includes the streets we know are there between 8301 and 8399. This is another issue you will often run into if your city grows a great deal over time. The street centerline will not always keep up with the actual city growth depending on who in the city is editing it. You will have addresses and data that cannot be displayed on the map at times. Although this does not pose significant problems most of the time, you need to be aware of it and take steps to avoid it by making sure you are best of friends with whomever you get your street centerline from so you always have the latest copy and most up-to-date version.
 5. This will be our first practical exercise in geocoding. First, minimize (but do not close) ArcMap.

6. Find the *Messageparlors.xls* document you created in exercise 3. If you cannot find your Excel spreadsheet of addresses, you can use the copy in the *C:\CIA\Exercises\Other* folder.
7. We are going to open this Excel file and export it as a DBF 4 table. Before we can do that we need to name the data range and make sure our field widths are as wide as they can be to avoid any data truncation during the conversion.
8. Open the *Messageparlors.xls* file.
9. Highlight the entire range of data, and then go to the menu bar and choose **Insert → Name → Define**. Type in *database* in the name field area, and then click the **OK** button. You have just named this range of data and called it “database.”
10. Now resize all your field columns so that each one is slightly larger than it needs to be for the data in the rows.
11. Make column A (name) about 35–40 characters wide and the other columns at least 25 wide.
12. Now go to **File → Save As** and save the data as *Message.dbf*. You will need to change the Save As Type box to say *DBF 4 (Dbase IV) (*.DBF)*.
13. Close Excel and go back to your *EX4b.mxd* in ArcMap, then click on the **Add** button.
14. After adding the table to ArcMap, view the attributes of the table by right clicking it in the TOC and choosing **Open**. (Remember to click on the **Source** tab at the bottom of the table of contents to view the table you just added.) You will see that all the addresses should be intact, but there were a few really long business names that were slightly truncated here and there. Because the addresses are complete, we are okay and can proceed.
15. Look at the City field name values. They may have been truncated to *GLENDAL*. This doesn’t matter because we are going to calculate these all to say “*GLN*” anyway to match the *L_City_name* and *R_City_Name* values in our street centerline file. Make sure there are no records selected, and then right click the **City** field name. Choose **Field Calculator** and type in *GLN* in the white box in the field calculator. Click **OK** and **Apply**. Every row should now have *GLN* instead of *GLENDAL* in the rows.
16. After you have made sure that all your addresses are complete, close the attribute table. If any addresses are truncated, remove the DBF from ArcMap, reopen the Excel file, resize the address field wider, and save it as a DBF again. Keep doing this until your data in each field is not truncated or is acceptable.

17. Right click on the **Massage** table in the TOC, and this time choose **Geocode Addresses** from the pop-up menu.
18. A new dialog will open and ask you which address locator to use. Choose the only one in the dialog menu. If you do not see one there, you will have to click **Add** and add in the address locator we previously created, which is located in the C:\CIA\GIS_Data\Streets_Transportation folder.
19. Click **OK**.
20. In the Geocoding Addresses Dialog make the following settings:
Street or Intersection: *Address*
Zone: *City*
Output shapefile or feature class: Call it *MassBiz.shp* and put it in your student folder
21. Click **OK** to begin automatic geocoding.
22. You should get about 30 addresses that geocoded at above 80%, 1 at 60–80%, and 3 unmatched. You should also find two matches that tied.
23. Click on the **Match Interactively** button.
24. Our first address is entered as 55th & Acoma if you used the sample data and not your own.
25. To make this address geocode better, we need to change it to say N 55th Av & W Acoma Dr. Change the address in the box and press **Enter**. You should now see a 100% match in the white box at the bottom. Double click on this match to interactively match this record.
26. The next one has a similar problem and can be handled the same way as N 71st Av & W Maryland Av.
27. The last error says 7200 W Bell Av. We need to change it to 7200 W Bell Rd and then match it.
28. It is a very good idea to always check the ties like this as well to make sure that an address of 18234 N 59th Av is not accidentally geocoding to 18234 N 55th Dr or 18234 N 55th St. These are all valid addresses, but they're not the ones we want, and thus ties can be tricky sometimes unless you verify them.
29. When you have finished matching interactively, click the **Done** button, and you should see your points appear like magic on your map. You would then logically create a layout of the points with other themes to help the detectives find them and probably give them a list of all of the massage businesses in Excel so they can assign them for follow-up.

30. Save and close your project.
31. Open Windows Explorer and navigate to where you saved exercise 4b. Find and double click EX4b.mxd and watch while it reopens for you. Save the exercise as EX4C.mxd in the same folder, and continue this second portion of our practical exercise.
32. Liquor control is going to assist our officers with some liquor enforcement, and we need to give the chief a list and a map of all of the liquor license establishments in Glendale. He would like to know which ones may be bars and taverns versus markets and grocery stores.
33. You contact the city business license office and obtain a TXT file of the liquor license businesses in Glendale. This file is located in C:\CIA\Exercises\Exercise_4\liquor.txt. We need to open this file and check out the file structure before we bring it into to ArcMap.
34. Click **Start → Programs → Accessories → WordPad** (this may also be called “Notepad”).
35. When you open the data, you can see that this is a comma delimited file (commas are between each column value, and each record is in its own row). There are also text items surrounded by quotation marks. A DBF file and a comma delimited text file are data sources we can bring directly into ArcMap.
36. Add the Liquor.txt file to your ArcMap project just like you previously did with the DBF table.
37. Review the data attributes and make sure that everything looks good and the fields are not messed up.
38. Close the table and right click on the **Liquor** table in ArcMap.
39. Choose **Display XY Data**.
40. In the dialog box, make sure that the following fields are set as:
 - a. XField: *X_Coord*
 - b. YField: *Y_Coord*
 - c. Coordinate System of Input Coordinates: Make the following changes:
 - i. Click the **Edit** button
 - ii. Click the **Select** button in the next dialog menu
 - iii. Choose **Projected Coordinate Systems** in the Browse for Coordinate System dialog menu
 - iv. Choose **State Plane**
 - v. Choose **NAD 1983 (Feet)**
 - vi. Choose **NAD 1983 StatePlane Arizona Central FIPS 0202 (Feet).prj**

- vii. Click **Add**
 - viii. Click **Apply**
 - ix. Click **OK**
 - x. Click **OK** to generate the XY Coordinate data layer
41. You may be wondering, Where are my 271 liquor establishments? Click on the little world icon in the Standard toolbar and see that your liquor points are about 35–40 mi west of where they should be. This little tricky and sticky situation happened because we forgot to ask the database folks what projection their data is in when we got it from them. A projection is a set of mathematical formulas that attempt to take the 3-D surface of the Earth and project it onto a 2-D piece of paper. If you imagine the Earth as a big light bulb with a piece of paper wrapped around it, the places where the paper is farthest away from the Earth's surface would be distorted, and the places where it touches would be more accurate. This is what projections do. State plane coordinates use a single reference point on the Earth's surface. A very detailed explanation of projections in general can be found at: http://www.colorado.edu/geography/gcraft/notes/mapproj/mapproj_f.html.
42. There are many other places on the Internet where you can find out more about projections. The key factor is knowing what projection is used for the data when you receive it from other persons and, of course, what data projection you use every day. You can still share data, even if it is not in the same projection, because you can specify the correct projection when you import the data, and the software will know how to line it up.
43. Let's go back to the drawing board and remove the liquor XY event theme from our project, and instead of using NAD 1983 State Plane, we'll use NAD 1927 as follows:
- a. XField: *X_Coord*
 - b. YField: *Y_Coord*
 - c. Coordinate System of Input Coordinates: Make the following changes:
 - i. Click the **Edit** button
 - ii. Click the **Select** button in the next dialog menu
 - iii. Choose **Projected Coordinate Systems** in the Browse for Coordinate System dialog menu
 - iv. Choose **State Plane**
 - v. Choose **NAD 1927**
 - vi. Choose **NAD 1927 StatePlane Arizona Central FIPS 0202.prj**

- vii. Click **Add**
 - viii. Click **Apply**
 - ix. Click **OK**
 - x. Click **OK** to generate the XY Coordinate data layer
44. Our points are now where they are supposed to be, and we can be very proud of ourselves. This is currently just a temporary GIS layer that is displaying the dots and acts much like a shapefile. Some things may be out of our reach with an event theme like this because it is not a true GIS layer but is mimicking one. We can now easily make this into a shapefile that has all the bells and whistles by right clicking the event theme layer and choosing **Data → Export Data** and saving it as LiquorBizAll.shp in our student directory.
45. Say **Yes** to adding it to the ArcMap project, and then remove the event theme and table from the project because we no longer need this data. They are just duplicates of the shapefile information, and we need to keep our work space uncluttered.
46. Now we need to see if we can determine which businesses are bars and taverns and which are other types. A sweet little field called Sic_Code_D should help us with that item.
47. Create a new legend for the liquorBizAll.shp layer that uses the Sic_Code_D as the Categories → Value field. (*Hint: Go to Properties for this layer and click on the **Symbology** tab.*) Add all of the unique values to the legend and apply it.
48. We want to see only those liquor licensed businesses that are like bars or taverns or drinking places. To accomplish this, remove from the legend all of the values that are not one of these types.
49. Right click the **Liquor theme → Properties → Symbology** and go into the little window where the individual symbols are located for each Sic_Code_D value.
50. We are going to remove any field names we don't want. To do this we click on a field or field names and then click the **Remove** button.
51. I left just the Drinking Places, Eating and Drinking Places, Liquor Stores, and Membership Sports_Recreation Clubs values of Sic_Code_D in the legend. You can uncheck <all other values> to avoid showing the other types if you want, or you can leave it checked, but make that individual symbol a very small blue dot (size 2–3 points) and still show it on the map. (Make sure to uncheck the other layers with points displayed on the map so you can see your results more clearly.)

52. Based on just your visual observation of the bars and other establishments, where do you think the majority of them are located?
-
53. This map and a list of the locations in Excel would provide adequate information to the chief for this new project with the liquor enforcement folks at the State level. Save the changes to your map and close ArcMap.
54. Our final little assignment is to make a pin map for burglaries in 2004 for the detectives. They want to have the pins show point of entry (POE), type of entry (TYPEENT), and premise type (residential, etc.).
55. Open EX4C.mxd in the C:\CIA\exercises\exercise_4 folder.
56. In addition to the MXD, open the Access database in C:\CIA\Exercises\Exercise_4\Burg_MO_Data.mdb.
57. There is only one table in the Access database called BURGWMO. Open this table and browse through the contents. You will see that it has fields called ObjectID, Rptnum, POE (point of entry), POEX (point of exit), Tool (tool used to commit burglary), TypeEnt (type of entry made with tool), Premise (residential, business, etc.), and Property (the type of property taken).
58. Make the ArcMap project active, and view the attributes of the Burglaries theme. (If this theme is not added to your map already, add it now. You will find it in the exercise 4 folder.) You will notice that in this attribute table there are similar ObjectID and Report number fields, but none of the MO information stored in the Access table is in the attributes of the points on your map.
59. We need to get the information out of the Access table for MO characteristics and into ArcMap, and we need to join it up with the attributes that are already known about these points. We will accomplish this through what is called an attribute join.
60. In Access, click on the **BURGWMO** table and then go to **File → Export → Save As**. Type *DBF 5 (*.DBF)* and save this exported DBF table of the MO information to your student folder as BURGMOTBL.
61. Close Access when this has been completed successfully.
62. Go to ArcMap and use the **Add** button to add this new DBF table to your project.
63. Click on the **Burglaries** theme in the TOC, and then right click it.
64. Find **Joins and Relates** in the pop-up dialog menu and click it.

65. Click **Join** and enter information as follows:

What do you want to join to this layer? *Join attributes from a table*

Choose the field in this layer that the join will be based on: *OBJECTID*

Choose the table to join to this layer: *BURGMOTBL* (your file)

Choose the field in this table to base the join on: *OBJECTID*

66. Then click **OK** to join the BURGMOTBL data to the end of the attribute table of the Burglaries theme.

67. If a message comes up asking if you want to create an index, answer **Yes** and continue.

68. Reopen the attribute table for Burglaries and view the contents. You should now see extra fields added at the far right that represent all of the MO information for each burglary from the table we found in Access.

69. Close the attribute table.

70. We need to change the legend from a single field, categories-type legend to a *multiple* field, categories legend.

71. Right click on the **Burglaries** theme in the TOC and choose **Properties**.

72. Go to the **Symbology** tab.

73. Under the Show Categories section on the left, you will see that Unique Values is currently chosen. Change this to Unique Values, **Many** fields.

74. You will now see three value fields instead of one to the right. In the top value field box, choose **Premise**; in the second, choose **POE**; and in the third, choose **TYPEENT**.

75. Now click on the **Add All Values** button.

76. Click **Apply** and **OK**, then view your accomplishment.

77. Expand the TOC legend for burglaries as needed to view your new multiple category legend that shows MO factors for each burglary.

78. You may wish to go back to the symbology menu and uncheck the <all other values> section and reapply the legend.

79. Change each symbol type and color until you think the symbols do a decent job of showing the various burglary types. See DVD Figure 4–5 to compare your map to mine.

80. We almost forgot that we only want to see those burglaries that occurred in 2004 in this map, so we will create a theme definition in which only those burglaries that occurred in 2004 will be visible.
81. Right click the **Burglaries** theme again and choose **Properties**. Go to the **Definition Query** tab.
82. Click on the **Query Builder** button and double click on the **Burglaries.MIDPOINT** field name in the left box. This places it in the white box at the bottom of the Query Builder menu. Without clicking on any other field names, click the **Get Unique Values** button.
83. Click on the **>=** sign button to add it to the query window at the bottom and after the MIDPOINT field name.
84. Double click on the value item date '2004-01-01' and add it to the query window. Your completed query string should now be: "Burglaries.MIDPOINT" >= date '2004-01-01'
85. Click **Verify** to make sure you built the query correctly. If this indicates it worked okay, click **OK** and then **Apply** and **OK** again to close all the menus
86. See DVD Figure 4–6 to compare your map to mine.
87. Do you see any patterns of criminal behavior in this data? Do you think the detectives could also use any charts or tables to go along with the map to make the data easier to digest?
88. Save a copy of this project in your student folder and close it.

Exercise 4c: Adding Tables Part II

Data Needed for This Exercise

- Everything is included in the student's copy of Exercise 4c.

Lesson Objectives

- Learn how to make ODBC/OLE DB connections to data in Excel and Access directly to ArcMap. ODBC stands for "open database connectivity" and is a method developed by programmers to share information across database and programming platforms. OLE DB is another method or standard like ODBC. OLE stands for "object linking and embedding." A more detailed explanation of ODBC and OLE DB can be found at http://en.wikipedia.org/wiki/OLE_DB or http://en.wikipedia.org/wiki/Open_Database_Connectivity. Suffice it to say that this is the way ArcGIS

and Microsoft Access communicate and pass data and information back and forth.

Task Description

- This exercise will take you through the process of adding data tables to ArcMap via an ODBC/OLE DB database connection. You will use the data that you have already developed or used in previous exercises in Excel or Access. Instead of creating DBFs or comma delimited exports from those programs, you will connect directly to those database sources and tables.
1. Open the EX4C.mxd project from your student folder that you saved in your last exercise. If you forgot where you put this file, or if it has been lost, use the EX4C.mxd file in the C:\CIA\Exercises\Exercise_4 folder instead.
 2. The data we will connect to will come from the following two sources:
 - C:\CIA\Exercises\Other\Massage.Parlors.xls
 - C:\CIA\Exercises\Exercise_4\Burg_MO_Data.mdb
 3. The Massage.xls spreadsheet already has the range of cells named “Addresses.”
 4. In ArcMap, click the **Add** button like you have done in the past to add data.
 5. In the **Look In** box, browse to find the Database Connections (see DVD Figure 4–7)
 6. Click on **Add OLE DB Connection**.
 7. In the Data Link Properties dialog menu, choose **Microsoft OLE DB Provider for ODBC Drivers item**. (Note: If you are connecting to an Oracle Database 10g, you would use the Oracle Provider for OLE DB instead or else the link may not perform adequately.) We are doing this to create and open a path or connection to the data in Access so that it can be used in ArcGIS (see DVD Figure 4–8).
 8. Click the **Next** button.
 9. Under 1. Specify the source of the data section, choose **Use Connection String**, and click the **Build** button (see DVD Figure 4–9)
 10. A new dialog menu called Select Data Source will come up (see DVD Figure 4–10) You will have the option to choose a file data-source (DSN) or a machine datasource. If you want the data to be available to just you when you log on to this machine, you will choose the tab labeled File Datasource. If you want the connection to be available to anyone who logs on to the machine you will use

the Machine Datasource tab instead. For our purposes, we are going to use the File Datasource tab.

11. Where the DSN Name box is shown, leave this blank and then click the **New** button.
12. In the Create New Data Source dialog menu that comes up, choose the item in the window that says **Microsoft Excel Driver (*.XLS)** (see DVD Figure 4–11)
13. Click **Next**.
14. In the next portion click the **Browse** button and call this new DSN connection *Message* and then click **Save**.
15. Now click on the **Next** button again.
16. Click **Finish** in the next screen.
17. In the ODBC Microsoft Excel Setup dialog menu (see DVD Figure 4–12) we need to point to the *Message.xls* file, which is located in the C:\CIA\Exercises\Other\ folder.
18. Click on **Select Workbook** and navigate to C:\CIA\Exercises\Other\ folder and click on **Message.xls** and then click **OK**.
19. Click **OK** again in the Microsoft ODBC Excel Setup dialog to get back to the DSN name menu.
20. Click **OK** and **OK** in the next menus.
21. In the Data Link Properties menu (see DVD Figure 4–13), click on the **Test Connection** button, and you should get a message that says Test Connection Succeeded. If you get anything else, consult the instructor.
22. Now you will be returned to the Database Connections dialog menu, and a new item named OLE DB Connection.odc (or something similar, like OLE DB Connection(2).odc) will be added.
23. In the white box that lists all these choices, click once on the new OLE DB connection name, and then once again about a second later. You should now be able to edit the name of this connection, so rename it *Message.odc*.
24. Click on any other item to save the name change, then double click on the **Message.odc OLE DB** connection item.
25. You should now see a named range within this Excel spreadsheet called *Addresses*. Click once on **Addresses** to choose it.
26. This adds it to the name box below.
27. Click **Add** to add this data to the ArcMap project.
28. Note: *You cannot have the Excel spreadsheet or Access database you are trying to connect to already open in those software applications.*

Windows “locks” the data files when they are in use by their native programs. An error message will indicate that the files are locked by some other user, and the data addition will fail.

29. In addition, for some reason you generally get an SQL connection string error message if you use the default name of “database” that Excel often uses to name ranges in a spreadsheet. If you have a named range called “database” when you go in to define a file, you can leave it there with no issues, but make sure to use the file you named instead when importing through this process into ArcMap.
30. Now the data table for massage businesses is part of the TOC, and we can geocode the addresses as we did with the DBF file.
31. Open the Addresses table and see that no data is truncated with this method. Unlike the DBF table, however, we cannot edit the City field to GLN where we see GLENDAL because OLE DB connections can only be edited in their source files and not in ArcMap (right click the field name and see that field calculator is grayed out). To correct this issue, you would remove the Addresses table, reopen the original Excel spreadsheet, make the changes, save and close Excel, and then reconnect to the data in ArcMap.
32. The same procedure is used to create a DSN OLE DB connection to an Access table.
33. Click the **Add** button.
34. Add a new OLE DB data source.
35. Choose **Microsoft OLE DB Provider for ODBC Drivers** again.
36. Choose **Microsoft Access Driver (*.MDB)** instead of the Excel driver.
37. Save this new DSN as *BURGMO*.
38. In the ODBC Microsoft Access Setup dialog, browse to the CIA\Exercises\Exercise_4\Burg_MO_Data.mdb file and select it.
39. Rename the new ODC record to *BURGMO.odc*, and then double click it.
40. You should see only one table called *BURGWMO* (see DVD Figure 4–14), so add it.
41. The table is now in ArcMap and can be joined to the Burglaries theme as it was in the previous exercise.
42. You do not need to save this exercise, so just close it and exit ArcMap.
43. Practice this exercise often because it is easy to forget the correct steps. You will find that your data is cleaner and often has fewer problems with truncated data when you use this process.

References

1. Barr, R., & Pease, K. (1990). Crime placement, displacement, and deflection. In M. Tonry & N. Morris (Eds.), *Crime and justice* (Vol. 12). Chicago: University of Chicago Press.
2. Block, C. R. (1998). The geoarchive: An information foundation for community policing. In D. Weisburd & T. McEwen (Eds.), *Crime mapping and crime prevention: Crime prevention studies* (Vol. 8, pp. 27–81). Monsey, NY: Criminal Justice Press.
3. Burgess, E. (1925). The growth of a city. In R. Park, E. Burgess, & D. McKenzie (Eds.), *The city*. Chicago: University of Chicago Press.
4. Eck, J. E. (1998). What do those dots mean? Mapping theories with data. In D. Weisburd & T. McEwen (Eds.), *Crime mapping and crime prevention: Crime prevention studies* (Vol. 8, pp. 379–406). Monsey, NY: Criminal Justice Press.
5. Gau, J., & Pratt, T. (2008). Broken windows or window dressing? Citizens' inability to tell the difference between disorder and crime. *Criminology & Public Policy*, 7(2), 163–194.
6. Levin, Y., & Lindesmith, A. (1971). English ecology and criminology of the past century. *Journal of Criminology and Criminal Law*, 27, 801–816.
7. Markowitz, F., Bellair, P., Liska, A., & Liu, J. (2001). Extending social disorganization theory: Modeling the relationships between cohesion, disorder, and fear. *Criminology*, 39(2), 293–320.
8. Mastrofski, S. D. (1988). Community policing as reform: A cautionary tale. In J. R. Greene & S. D. Mastrofski (Eds.), *Community policing: Rhetoric or reality?* (pp. 47–68). New York: Praeger Publishers.
9. Park, R. (1915). The city: Suggestions for the investigation of human behavior in the urban environment. *American Journal of Sociology*, 20, 577–612.
10. Quetelet, M. A. (1973). A treatise on man. In *Comparative statistics in the nineteenth century* (pp. 25–75). Germany: Gregg International. (Reprinted from *A treatise on man*, by M. A. Quetelet, 1842, Edinburgh, Scotland: William and Robert Chambers)
11. Reisig, M., & Cancino, J. M. (2004). Incivilities in nonmetropolitan communities: The effects of structural constraints, social conditions, and crime. *Journal of Criminal Justice*, 32, 15–29.

12. Sampson, R., & Groves, W. B. (1989). Community structure and crime: Testing social disorganization theory. *American Journal of Sociology*, 94, 774–802.
13. Sampson, R., Morenoff, J., & Earls, F. (1999). Beyond social capital: Spatial dynamics of collective efficacy for children. *American Sociological Review*, 64, 633–660.
14. Sampson, R., & Raudenbush, S. W. (2001). *Disorder in urban neighborhoods: Does it lead to crime?* Washington, DC: National Institute of Justice.
15. Shaw, C. R., & McKay, H. (1942). *Juvenile delinquency and urban areas* (5th ed.). Chicago: University of Chicago Press.
16. Skogan, W. G. (2008). Broken windows: Why—and how—we should take them seriously. *Criminology & Public Policy*, 7(2), 163–194.
17. Sutherland, E. (1947). *Principles of criminology* (4th ed.). Philadelphia: J.B. Lippincott.
18. Taylor, R. (2001). The ecology of crime, fear, and delinquency: Social disorganization versus social efficacy. In R. Paternoster & R. Bachman (Eds.), *Explaining crime and criminals*. Los Angeles: Roxbury.
19. Wilson, J. Q., & Kelling, G. (1982, March). Broken windows: The police and neighborhood safety. *Atlantic Monthly*, 29–38.