



## CHAPTER 1

# The key theories underpinning the geographic analysis of crime

## Objectives

In this chapter, we introduce the main theories that underpin the geographic analysis of crime. It is useful to be familiar with these theoretical principles, as they can help us understand the spatial and temporal patterns we observe in our data. In each of the following chapters, we will draw from these theoretical principles to illustrate how they can help us interpret crime patterns. The main theories discussed are social disorganization, collective efficacy and social capital, the routine-activity perspective, rational choice, crime pattern theory, the least-effort principle, crime generators, and crime attractors.

## Key learning points

- Recognize the value of theory in interpreting the patterns observed in the analysis of data.
- Become familiar with key theoretical principles for interpreting patterns in crime data.
- Be able to draw from these theoretical principles in the chapters that follow to help determine how analysis techniques can be used to better understand patterns of crime.

## Introduction

The starting point for using any type of geographic analysis output is to consider the theoretical principles that can be used to interpret what the analysis outputs are telling us. If we can interpret the patterns in terms of how offenders have behaved, we can then use the results to help determine

the types of activities to implement that may counter or prevent this type of behavior. Several theories relating to the geography of crime have been developed over the years. In this chapter, we bring these theories together to help explain why spatial and temporal patterns of crime are not random.

The theoretical perspectives that are introduced in this chapter include meso-geographic explanations for crime (i.e., at the neighborhood level) and micro-geographic explanations of crime (i.e., at the street, or specific location, level). By drawing together the principal geographic theories of crime, we create a foundation that permits a continual assessment throughout the book on how different analysis techniques can be used in a practical manner for informing operational, investigative, and strategic policing and crime prevention activity.

If analysis outputs of crime are to be used effectively, the interpretation of the analysis outputs must be based on clear theoretical principles. If it is not clear why a crime issue is likely to be present, it makes it difficult to determine what can be done to effectively tackle the crime issue. If the crime patterns can be interpreted effectively, this in turn will help identify the specific activities that could be introduced to counter the observed patterns. Theory can help us interpret crime patterns.

As a starting point, a useful theoretical principle to recognize is that crime has an inherently geographic quality. When a crime occurs, it happens at a place with a geographic location (Chainey and Ratcliffe 2005). This can be observed in Brantingham and Brantingham's (1981) description of the four dimensions of every crime:

- The legal dimension (a law must be broken).
- The victim dimension (someone or something must be targeted).
- The offender dimension (someone must do the crime).
- The spatial dimension (the crime must happen somewhere).

Crimes do not occur randomly. If crimes were random occurrences that had an equal chance of happening anywhere at any time, there would be little point in attempting to observe patterns and consider what could be done to address crime issues.

The main theoretical discipline that underpins the geography of crime is the practical subset of mainstream criminology known as *environmental criminology*. Environmental criminology involves the study of criminal activity and victimization, and how factors of space influence the behavior of offenders and the victimization of people or other types of targets (Bottoms and Wiles 2002). The next section in this chapter begins by describing how the importance of this geographic influence on people came to be recognized, before examining the geographic dynamics of offenders and the interaction of offenders and victims in space. The progression in theoretical development that has taken place over time also helps illustrate the evolution and relationship from a meso-level consideration of crime toward micro-level geographic explanations of crime. We also illustrate that these theories tend not to work in isolation but typically in a complementary manner.

Researchers long have known there is variation in the spatial arrangement of crime. Although spatial studies of crime have been recorded for nearly 200 years, many key research periods have

punctuated the history. Although these periods have overlapped across time, for convenience they can be thought of, as defined by Chainey and Ratcliffe (2005), as three distinct schools of thought: the Cartographic School, the Chicago School, and the GIS School. The theoretical developments associated with the Cartographic and Chicago Schools provide a useful foundation for the meso-level examination of crime patterns. In the more modern era, the focus of the GIS School has been toward micro-level geographic explanations of crime.

## The Cartographic School

Some of the earliest maps of crime originate from France and were published in 1833 by Andre-Michel Guerry (1833), who showed, among other features, the distribution of violent and property crime across the jurisdictional divisions of France. These maps indicated that not only was there spatial variation in crime but that the risk of property crime and violent crime was often different in the same areas (Brantingham and Brantingham 1981). Analyzing French data at about the same time was Adolphe Quetelet (1842), who supplemented his maps with statistics showing spatial variations across France, and between social groups. These early pioneers are credited with founding what is termed the Cartographic School (Chainey and Ratcliffe 2005), and they inspired other studies into patterns of crime, such as Mayhew's (1862) study of offending patterns in London. These early studies set the foundation for illustrating that spatial patterns of crime were not random and prompted discussion on the factors that influenced these spatial variations in crime.

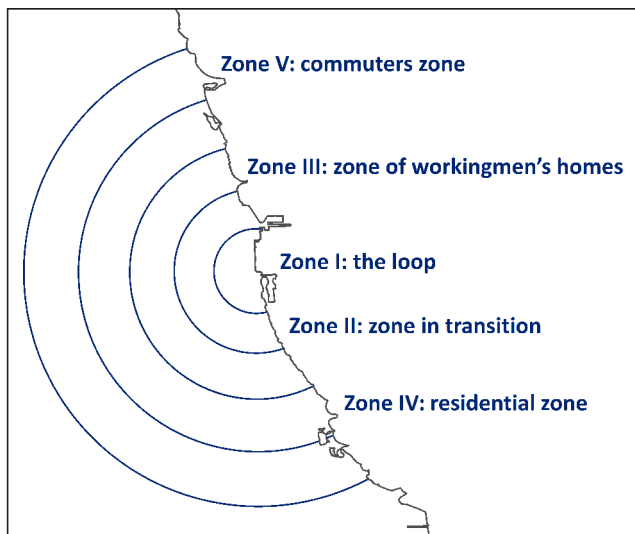
## The Chicago School

### The sociocultural triggers of crime and models for urban development

In the 20th century, more innovation followed with the research conducted by the Chicago School. This group of researchers included Clifford Shaw and Henry McKay, who drew on the spatial and temporal ideas of social ecology, forged by their predecessors, notably Ernest Burgess (1916). Shaw and McKay (1942) mapped, by hand, the residences of juvenile delinquents across Chicago. This pioneering mapping examined the sociocultural triggers of crime as Chicago expanded during a period of great economic growth. Shaw and McKay drew on Burgess's work by comparing socioeconomic and physical factors in different zones across the city.

Burgess introduced the zonal (or concentric) model of urban development in 1925. Burgess's idealized model, as shown in figure 1.1, had concentric zones radiating outward in bands from the city center, with each band representing a different stage of the city's development. The innermost zone (zone I), termed *the loop*, contained the central business district and had little residential

development. Adjoining this was the *zone in transition* (zone II), an area taken over by business and light manufacturing industries, and which included the *factory zone*. The third zone (*zone of workingmen's homes*) was occupied by factory workers who had managed to escape the zone in transition but who were still tied to the city because of the need to work in the factories. Travel cost and time was a factor for these workers, so they lived in this third zone. The *residential zone* (IV) comprised high-class apartments or single-family suburban dwellings where the occupants accepted the higher costs of travel as the price of a better quality of life. Beyond the city limits was the *commuters zone* (zone V), where people lived in suburban areas or satellite towns, with a commute of up to an hour (Burgess 1925). To demonstrate the model, Burgess charted 1920s Chicago and overlaid his model onto this city's expanding and vibrant landscape.



**Figure 1.1.** Burgess's concentric (zonal) circle model.

From a criminological perspective, the zone in transition was the area of most initial interest. Here, mobility was greatest, the availability of stimulus peaked, and there was a concentration of “juvenile delinquency, boys’ gangs, crime, poverty, wife desertion, divorce, abandoned infants, [and] vice” (Burgess 1925, 59). Shaw and McKay (1942) went on to map the concentric zones using different bandwidths for different cities (e.g., in Chicago, the bandwidths were two miles, whereas in Philadelphia, they were one and a half miles). Their work spanned decades and formed the basis for much of American criminological thought into the latter half of the 20th century, especially in terms of explaining how delinquent areas become established (Brantingham and Brantingham 1981). In a meso sense, these studies led to the suggestion that as well as crime not being random in its spatial distribution, crime concentrates in certain areas. The studies also suggested that these high-crime areas persisted for some time, influenced by demographic and social mobility, and the availability and concentration of certain stimuli in these locations.

**Why is crime likely to persist in certain areas?**

If the concentration of the factors that influence why crime takes place in some locations and not in others remains unchanged, crime is likely to continue in these areas. In addition, if the factors that create favorable conditions for crime to occur can be identified, these may act as useful variables for determining where crime is most likely to occur.

The Burgess model worked well for North American cities in the 20th century but was less applicable outside this area. The development of North American cities took place over a fairly short time, whereas European urban development occurred over a considerably longer time. In more recent decades, cities in Latin America, Africa, the Middle East, and Asian countries have seen even more rapid development than experienced in North American cities during the 20th century. Urban geographers since have developed models that better explain the mosaic pattern of development in urban areas outside North America.

Knox (1994) describes an urban geography model of city expansion more fitting for a wider range of urban developments. This model includes stages of infilling after initial urbanization (in areas of the city where vacant land remains), downgrading when the housing stock ages, a thinning-out phase (characterized by rapid population turnover), and a final stage of rehabilitation or gentrification. From a crime perspective, the initial urbanization brings in many young families, which in turn may result in children in these areas reaching their teenage (and highest crime risk) years at the same time. The downgrading and thinning-out stages may also result in increases in crime because of social and structural neglect accelerating opportunities for crime, and the breakdown of social cohesion in the area because of population turnover. These points further strengthen the argument that if the specific theoretical conditions that give rise to crime can be identified, determining where these conditions exist may offer value in determining where crime is more likely to occur. The rehabilitation or gentrification stages may result in a reduction in crime, caused by the reintroduction of a more affluent population that can afford upgraded security features on their homes and other property (Knox 1994).

**Social disorganization and collective efficacy**

A theory that grew from the Chicago School was social disorganization. Social disorganization theory posits the idea that increased levels of delinquency, especially juvenile delinquency, exist because of the lack of a local social fabric in which the structure and culture of the community are not strong enough to provide a concerted influence over local residents (Shaw and McKay 1942). For example, social disorganization theory suggests that if there is a high degree of cultural heterogeneity and a high turnover of residents, the community is unlikely to agree to a common standard for behavior on the street, and that few residents are likely to know the young people on the street who are causing

trouble, or know their families. With no clear rules of acceptable behavior and few sanctions available to curb adolescent exuberance (i.e., you cannot tell a child to stop misbehaving or you'll tell his parents, if you and the child both know that you do not know his parents), juvenile delinquency increases.

The practical testing of social organization theory has had its challenges because it can be difficult to construct variables that directly measure social disorganization (Chainey and Ratcliffe 2005). For example, it is unlikely that a household survey would be successful if it asked local residents to rate from 1 to 10 the level of social disorganization in their neighborhood, because few people would have a clear notion of what social disorganization is. Additionally, even if social disorganization could directly or indirectly be measured (using proxy variables), organizing a police response activity to affect this issue and improve the crime situation would be a challenge. Policing strategies are often limited when faced with these more systemic causes of crime and instead require contributions from other agencies involved in supporting social and community development.

In response to the difficulties in measuring social disorganization, some researchers have tried to measure its reverse, collective efficacy (sometimes referred to as *social efficacy*). Collective efficacy can be defined as the "social cohesion among neighbors combined with their willingness to intervene on behalf of the common good" (Sampson, Raudenbush, and Earls 1997, 918). Collective efficacy can be found in areas in which neighbors cooperate on issues of mutual interest, share some areas of agreement with the people who live around them, and are prepared to intervene if local youths behave in a manner unacceptable to local norms. Such levels of cooperation require enough implicit or explicit communication between neighbors to define and agree on the standard for local normative behavior. It is, therefore, argued that areas high in collective efficacy are well suited to resisting crime because some control can be exercised when confronted with the threat of crime or delinquent behavior.

Collective efficacy has been measured directly using community-based surveys that attempt to measure social and institutional neighborhood processes. Collective efficacy is related to the notion of *social capital*, a feature that some researchers have operationalized as the number of interactions that take place between neighbors. Social capital is a measure of the skills and social position that a person possesses that provide the power to effect a positive social change on the local environment. Sampson and his colleagues have led the research in this area, actively seeking to measure collective efficacy. Their survey of more than 8,000 Chicagoans included asking the respondents if they believed it was likely that neighbors could be counted on to intervene if children were spray-painting a local building or if a fight broke out (Sampson, Raudenbush, and Earls 1997). Their study also included census measures of race, poverty, and immigration, home ownership, and residential stability (among others) and concluded that collective efficacy could be reliably measured and could help residents control the level of violent crime. Sampson (2012) has built on these studies by further illustrating the relationships between crime and social conditions in Chicago.

### Meso-level explanations of crime

Meso-level (neighborhood) explanations for crime from the Cartographic and Chicago Schools suggest that crime patterns can be interpreted if the factors that create favorable conditions for crime to occur are identified. Although some difficulties may exist in measuring some of the variables that have emerged from the thinking in the Chicago School (and more latterly, social disorganization, collective efficacy, and social capital), the identification of these factors may help inform the options for directing strategic policy that has a long-term, sustainable impact on reducing crime in the areas where crime endures. In the chapters that follow, spatial analytical techniques are presented that can help determine the factors that create favorable conditions for crime to occur.

## The GIS School

Between the 1970s and 2000s, interest increased in environmental criminology, spatial crime analysis, and the investigation of offender patterns using geographic tools. The catalyst for this enthusiasm has been attributed to the development of the theory around defensible space, and the related principles associated with Crime Prevention through Environmental Design (CPTED) (Brantingham and Brantingham 1981, Jeffery 1971, Newman 1972). Building on the framework of CPTED and defensible space, several important advances were made during the early stages of this period, most notably:

- The theoretical developments of routine activity from Cohen and Felson (1979)
- The advances in crime pattern theory made by Brantingham and Brantingham (1981; 1984)
- The early application of spatiotemporal analysis techniques to crime by LeBeau (1987; 1992)
- The examination of crime across different spatial scales by Harries (1980)

These advancements helped fortify the theoretical principles of environmental criminology. However, it was the development of affordable geographic information systems (GIS) and the increasing technological developments in policing (such as the digitization and geocoding of crime records) that have allowed crime researchers and analysts to use the wealth of data recorded by police agencies and examine spatial patterns in this data. The next section examines the theoretical developments from environmental criminologists, a group referred to as the GIS School (Chainey and Ratcliffe 2005). These developments include the routine-activity approach, the rational-choice perspective, crime pattern theory, the least-effort principle, and the concepts of crime generators and attractors.



The theoretical approaches developed by environmental criminologists was a break from much of the criminology that came before, in which the theoretical focus had been toward explaining why people became involved in crime. Instead, environmental criminology was more oriented to the crime event, considering the nature of the crime offense, the offender's behavior, the risk of victimization, and the place where the crime event occurred. An environmental criminology approach encouraged the need for empirical examination of crime events, following the notion that the behavior of offenders was not random, their choice of victims was not random, and the risk of being a victim was unlikely to be random. These nonrandom features would then suggest that certain individuals or groups of people act in a manner that makes them more vulnerable to crime. In turn, this vulnerability means that the patterns observed in crime data can be used in some way to help better understand offending behavior, victimization, and why crimes take place at certain locations rather than others.

### The routine-activity perspective

The routine-activity perspective originally started as a macro-level explanation of predatory crime (Cohen and Felson 1979) but has progressed over the years to provide a worthwhile mechanism to consider criminal opportunity more widely. The original work examined changing patterns of employment and the criminal opportunities that were created when fewer people stayed home during the day because they were out at their places of work.

The routine-activity perspective is based on the simple idea that for a crime to occur, three components are necessary: the presence of a likely offender, the presence of a suitable target, and the absence of a capable guardian. The target does not necessarily have to be a person, but instead could be buildings, vehicles, or other property and objects. Similarly, a guardian may not be just a person, such as a police officer, security guard, or even a neighbor, but could include closed-circuit television surveillance systems or a car alarm. The three components—offender, target, and lack of a guardian—must meet in time and space to provide the necessary chemistry for crime (Felson 1998). This meeting in time and space is not random but is dictated by the natural rhythm of daily life, involving people going about their routine activities.

The routine-activity perspective does not discuss only offenders, targets, and guardians, but adds important qualifiers to each of these components. That is, not all offenders are *likely* offenders, as some will lack the technical knowledge and skill to attack certain types of targets. Similarly, not all targets are *suitable* targets, as they may be inaccessible (such as a car parked in a locked garage) or too well defended. And although many objects and people can be guardians, at different times they may not be *capable* guardians. The routine-activity approach can be summarized by the following simple equation, (1.1):

$$\text{Likely offender} + \text{suitable target} - \text{capable guardian} = \text{a crime opportunity} \quad (1.1)$$



The combination of these three components and their qualifiers then dictates that the risk of crime changes over time with the movement of people throughout the daily activities of their lives. That is, as these meetings in space and time are not random, the patterns observed in data could be considered in relation to these routine-activity principles.

Since Cohen and Felson's original work, Eck (1995) recast the concepts of the routine-activity approach into the crime problem analysis triangle (figure 1.2). The crime triangle introduced place as the third side of the triangle, with offenders and targets/victims forming the other two sides. This recasting of the routine-activity approach also led to the expansion of the original concept of guardianship by introducing the general term of *controller*. The concept of controllers is illustrated in figure 1.2 by the positioning of guardians in relation to victims and targets. Controllers were then added to the offender and place sides of the crime problem analysis triangle. For offenders, Felson (1995) introduced the concept of *handlers*. A handler is a person, a third party, who can influence the behavior of the offender. For example, a parent may be a handler, as may a teacher or any other person who knows or who could determine the name and identity of the person, and whose respect the offender might not want to lose. For the place side of the crime triangle, the concept of *place managers* was introduced (Eck 1995). Place managers are those who can control a place, even if they are not formally in charge of the area. In figure 1.2, the concept of place manager is redefined instead as *place management*. This redefinition is suggested because controlling a place need not be determined by the presence of a person (a place manager) but instead can be controlled by the better management of that place. For example, changing the physical design of an area (such as implementing security barriers in a parking lot or parking garage that make it more difficult for cars to be stolen) can make it less conducive to crime by improving the controls that make the place easier to manage.



**Figure 1.2.** The crime problem analysis triangle and associated controllers.