

# 1

## EXPLAINING THE CONTEXTS OF CRIME

### THE PATTERNS AND PERSISTENCE OF CRIME

Criminal behavior is best understood as a social product that occurs in a patterned fashion, rarely fluctuating wildly from time to time or place to place. This observation was first made 170 years ago by Quetelet (1984). We believe that this enduring pattern occurs because the underlying factors that increase or decrease the risk of crime are not quick to change and exert fairly consistent effects on the appearance, distribution, and persistence of crime by attracting illegal behavior. However, although this pattern appears to be fairly regular, if not chronic, over time at the aggregate level, there are many factors that contribute on the micro level to the ever-changing landscape of crime incidents. Of interest to us here are how these factors may combine to encourage crime to start, how they affect the momentum of crime events over time, and how they can be manipulated to make crime stop.

The ideas that were developed and discussed by Quetelet and others about the origins and persistence of crime took on new urgency with the massive growth of American cities at the turn of the twentieth century, due to large waves of immigrants who began to flow into the United States and other Western countries. These migrants brought about changes in urban areas that caught the attention of researchers who were concerned about the negative impact that this rapid growth was having on communities. The consequences for urban planning, social reform, and economic transactions were transformative. Accompanying these changes were new concerns about crime and

delinquency. In the heady days of urban research that ensued, Clifford Shaw and Henry McKay began to map urban areas and emphasized contextual factors related to delinquency. Shaw and McKay (1969) used this contextual mapping approach to document the areas in which crime had persisted over time.

Human ecologists (Park, McKenzie, & Burgess, 1925) talked about “natural areas,” a term that appeared in studies of delinquency in Chicago in the early twentieth century. Natural areas, according to these researchers, were settings that had certain characteristics that led to predictable behavioral outcomes. Shaw and McKay reported through methodical observation that “natural areas” in Chicago appeared constant over time. They plotted delinquency incidents in Chicago over many decades and found that they concentrated in “transitional” zones. In addition, they reported that crime declined as one moved from the inner-city areas to the (outer) suburbs. A key observation from their research was that community characteristics and problems (for example, cultural conflict, gang behavior, conflict with families) stayed the same despite the changing attributes of the inhabitants (Hatt, 1946). As people came from and went into these areas, the social disorder and delinquency remained high, despite changes in the ethnic composition of inhabitants. Oddly, despite the importance of Shaw and McKay’s finding that community characteristics matter for delinquency and its reduction and prevention, they overlooked it in their prescriptions for addressing the delinquency problems that interested them. They suggested instead that the behavior of people in these areas defined their qualities despite the physical characteristics that these areas exhibited. As Snodgrass points out:

To interpret their findings, Shaw and McKay relied most heavily upon the general concept of “social disorganization,” the breakdown of social controls in the “communities” located in the transitional zone. The invasion by business and industries from the center of the city into the former residential areas created a wake of social disorganization in its advance which disturbed social cohesion and disrupted traditional conduct norms. Shaw and McKay explicitly and repeatedly mentioned industrial invasion as a primary source of communal disorganization, although other sources, e.g. the influx of successive waves of highly mobile immigrant groups, were additional contributing factors, though not unrelated to business expansion. (Snodgrass, 1976, p. 9)

Their emphasis on social disorganization made sense to Shaw and McKay as social activists who believed that the causes of delinquency resided within the local traditions and cultural values of the inhabitants, even though, again, they were quick to point out that as different groups passed through these areas (particularly the zone of transition), the problems of delinquency and social disorder persisted. In other words, the factors that stayed consistent in these areas, that is, businesses and other physical features, were treated as tangential to the ways in which delinquency emerged and areas deteriorated.

As Snodgrass further points out:

A most striking aspect of Shaw and McKay's interpretation, then, is the absence of attempts to link business and industrial invasion with the causes of delinquency. The interpretation stayed at the communal level and turned inward to find the causes of delinquency in internal conditions and process within the socially disorganized area. Thus, their interpretation stopped abruptly at the point at which the relationship between industrial expansion and high delinquency areas could have gone beyond the depiction of the two as coincidentally adjacent to one another geographically. (p. 10)

In fact, Shaw and McKay did not see proximity to industry and commerce as causal but rather simply as an index of the areas where delinquency would be located. This failure to account for the effects of community characteristics, or environmental features, in attracting illegal behavior and spurring crime is surprising, given their huge effort in identifying spatial patterns of delinquency through mapping incidents, a project that went on for over 40 years.

Bursik (1988) points out that stability in ecological influence stayed constant before World War II in Chicago but changed thereafter, thus affording the opportunity to compare how these ecological factors influenced criminal behavior. In addition, generalizing the influence of environmental factors to the experience in other cities was hard to achieve and led to criticisms that Shaw and McKay's approach was not replicable (p. 526). But the observation that environmental factors can influence the nature of places is important and should not be lost in the disappointment concerning the inability to replicate Shaw and McKay's findings within Chicago over time or in another city in a predictable fashion. The external validity problem appears to originate not from the conceptualization of the importance of environment but from the limitations in the methodology used to measure its effects. It also derives from a fixation on the actors in crime rather than a consideration of them in the spatial contexts in which they operate, a divergence in approach since Shaw and McKay's time that has persisted in crime research until recently.

So, despite their reliance on maps and time series data to illustrate crime persistence, Shaw and McKay did not fully explicate how environment ties to crime emergence or outcome. There are conceptual and methodological reasons for this that we will explore below. It should be noted that Shaw and McKay's assumptions concerning the importance of the links between neighborhood characteristics and crime have been extensively studied using a social disorganization perspective that concentrates on the ways in which social control manifests itself in certain locations, typified by poverty and high levels of in-and-out migration. In particular, the work of Shevky and Bell (1955) examined the ways in which family status, socioeconomic characteristics, and ethnicity combined to influence behavioral outcomes using social area analysis. Social area analysis improved on the inflexibility of the idea of natural areas by combining community features through the way that they overlapped in different locations (Hatt, 1946; Heitgerd & Bursik, 1987; Janson, 1980). (See figure 1.) The areas of overlap were considered the locations in which crime problems would be greater.

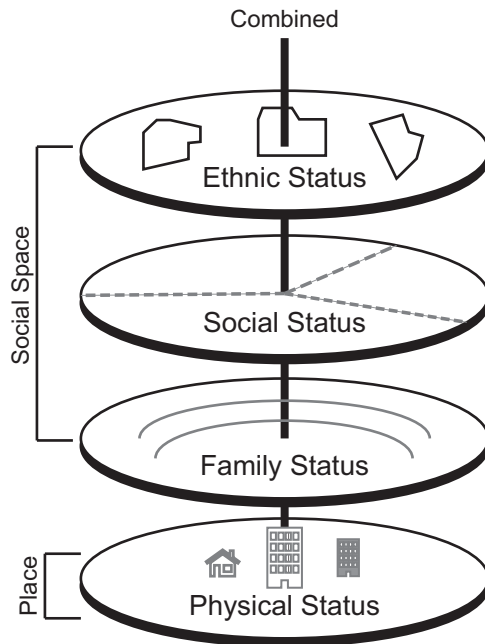


FIGURE 1  
 (Adapted from Murdie, 1969). Urban social space constructs and their territorial relationships to physical space. Social area analysts combined community features through the way they overlapped in space.

Unfortunately for social area analysts, as was the case with the ecologists who preceded them, they were unable to move beyond macrolevel explanations for delinquency outcomes in spatial terms based on the underlying characteristics in the study area. Their multilevel approach was novel, however, and was adopted by urban planners such as McHarg (1995) to help depict the concentration of features in a landscape.

Recent work on social disorganization has focused on the ways in which areas suffering from social and physical disorders respond through collective efficacy—the pooling together of efforts to extract resources to battle problems faced in neighborhoods (Morenoff, Sampson, & Raudenbush, 2001). This work has provided an important stimulus for community planners to think more broadly about how community empowerment can be used to combat serious consequences of disorganization. Operating at the community or neighborhood level allows for a comprehensive assessment of local well-being and elicits steps that can be taken to address inequality and social upheaval. However, this research still relies on aggregate statistics and tends not to account for the physical environment as a major factor, at the microlevel, in bringing about criminogenic conditions that regularly attract illegal behavior.

### THE GEOGRAPHY FOR CRIME

Helping to overcome the limitations outlined above, improvements in data collection and advanced mapping technology have opened up the possibility of better microlevel analysis of places and crime. However, with advances in geospatial approaches, the ways

that features of a landscape have been modeled in a geographic information system (GIS) are often contrary to how people experience and conceptualize their environments (Couclelis, 1992; Frank & Mark, 1991). Geographers suggest that regions, such as cities, are learned piecemeal rather than imagined whole by humans over time, an assertion that is grounded in views from psychology (Freundschuh & Egenhofer, 1997; Montello, 1993). So when assessing the likelihood or risk of crime occurring at conceivably any location throughout a city landscape, vector objects in a GIS (for example, points that are used to represent things such as bars, schools, or bus stops) are poor representations of criminogenic features on a map because they bear no particular relationship to the dynamic environments of which they are a part (Couclelis, 1992). “There are difficulties with this view of the world,” explained Couclelis (1992, p. 66), “mainly that points, lines, and polygons that define vector objects do not have naturally occurring counterparts in the real world.” They are approximations of environmental features, but without any theoretical or empirical link to their geographies (Freundschuh & Egenhofer, 1997).

Broad inattention to different spatial conceptualizations of criminogenic features by crime researchers has led to misrepresentations of these urban, suburban, and rural features in geographic information systems and resulting maps (Freundschuh & Egenhofer, 1997). The way people (for example, motivated offenders or suitable victims) conceptualize and operate in space is an important consideration for the mapping of the risk of crime throughout landscapes. Cartographically modeling these conceptualizations and the spatial influences of criminogenic features in a GIS in a way that reflects the actors’ views is an important part of what Freundschuh and Egenhofer (1997, p. 363) describe as “Naïve Geography, a set of theories of how people intuitively or spontaneously conceptualize geographic space and time” (Egenhofer & Mark, 1995). It can yield more meaningful inferences about criminal behavior and actionable spatial intelligence for use by public safety professionals (Frank, 1993; Mark, 1993; Freundschuh & Egenhofer, 1997). Spatial risks for crime must be considered in terms of how the environment forms behavior.

### CONCEPTUALIZING SPATIAL CRIME RISKS

We will use the concepts of “space,” “place,” and “area” (and variations thereof, for example, “spatial”) deliberately throughout this book. So to clarify: “Space” is defined as a continuous expanse within which things exist and move. “Place” is a particular portion of space where defined activities or functions may occur. A place is the microlevel unit of analysis for risk terrain modeling (RTM). An “area” is a part of space defined as two or more contingent places.

Examining places rather than people for crime analysis does not remove the importance of the human factor. It simply shifts the focus away from personal characteristics to personal preferences. How individual persons select and use the environments that

they occupy and the impact that this has on crime outcomes become the direct focus of the spatial risk perspective. This approach to crime analysis suggests a way of looking at behavioral outcomes less as deterministic and more as a function of a dynamic interaction among people that occurs at places. The attributes of places that we seek to identify are not constant, nor necessarily are the interactions set in place over time. However, the ways in which these factors combine can be studied to reveal consistent patterns of interaction that align with the view expressed by Brantingham and Brantingham (1981) in their development of crime pattern theory.

Risk provides a metric that can help tie different parts of a crime problem together and offers a probabilistic interpretation for crime analysis that allows us to suggest that certain things are likely to happen and others can be prevented according to our risk assessments (Kennedy & Van Brunschot, 2009, p. 11). Risk is based on a consideration of the probabilities of particular outcomes. When opportunity for crime is thought of in terms of “risk of crime,” places can be evaluated in terms of varying degrees of criminogenic risk relative to certain nearby or faraway features of the environment (Cohen, Kluegel, & Land, 1981; Caplan, 2011). Again, this directs attention away from a fixation on only the offender or victim in responses to crime and permits considerations of characteristics of places as well.

In their simplest form, place-based interventions lead to strategies that direct police to particular areas to use the tools most directly available to them to solve problems, such as arrests or summonses targeted at people located there. But this approach is incomplete. Problem-oriented policing has offered important clues on how we can change situations to make them less conducive to crime (Mastrofski, Weisburd, & Braga, 2010). In this regard it is important to address the collective influence of certain spatial features as a principal approach to crime prevention. In arguing for improving how we study crime events, Braga and Clarke (2014) present a compelling justification for studies of places that focus on risks associated with certain types of environmental features. These features can create opportunities for crime, attract offenders, enable illegal behavior, and confound agents of social control in containing or suppressing their negative effects. But, at the same time, an understanding of an environmental feature’s relative importance in creating risk of crime, as well as an understanding of how to target these features, can offer geographically focused strategies for crime prevention. The spatial risk perspective not only addresses the role that changing situational factors might have on a crime outcome, but also evaluates the overall effect of addressing the relative risks presented by features that have strong spatial influences on criminal behavior. With RTM, we can identify these features and their interaction with others in creating risky places. These places should be key targets for change and crime prevention.

Brantingham and Brantingham (1995) argue that spatial crime patterns, and their stability over time, are a function of the environmental backcloth of the area under study. The Brantinghams suggest that this backcloth is dotted with “crime attractors” and “crime generators.” Attractors include features of the environment that entice

offenders to places to commit crime. Generators, meanwhile, are represented by increased opportunities for crime that emerge from the collection of more people into areas following specific types of behavior, simply because of the increased volume of interaction taking place in these areas. This work by the Brantinghams reconnects an interest in physical environments to human criminal behavior. The recent works on crime places revisit this interest in environment and crime (see Weisburd, Groff, & Yang, 2012; Johnson, Bowers, Birks, & Pease, 2008), and the innovative view of “place as case” suggests that if crime can be seen as situationally located it is more likely to be mitigated and prevented (Lum & Koper, 2013). The interest in environmental effects on crime as presented in this literature reinforces the view that certain places are riskier than others. Testing how risk is distributed across spaces requires methods that accommodate the combined effects of many factors at once, as was the original intent of social area analysts. However, key to our current understanding of how factors combine are the concept of “spatial influence” and the advanced reasoning around the operationalization of this influence through measures of distance and density within a GIS (see Caplan, 2011).

Recent research on spatial crime risk has benefited from increased sophistication in the ways in which cartographic representations of crime incidents can be made with readily available data and GIS functionalities, overcoming the limitations of vector-based applications, discussed above (Tomlin, 1994). Geographic information systems have allowed analysts access to data that have been routinely acquired in cities for purposes other than crime analysis (for example, determining land use or plotting electoral maps). Combined, these data allow the development of composite views of landscapes that can be used to consider how places differ in terms of the risk they pose in fostering crime. But as Freundschuh and Egenhofer (1997) remind us, combining municipal features data regarding how they relate to human behavior is not straightforward because it is not simply the physical presence of features that defines risky places, but also their spatial influences.

## SPATIAL INFLUENCE

Spatial influence refers to the way in which features of an environment affect behaviors at or around the features themselves. It serves as the measurable link between features of a landscape and their impacts on people and the ways in which they use space. Spatial influence is, essentially, the articulation of perceptual cues observed from features and gleaned from personal opinions, experiences, and empirical knowledge about similar features or characteristics thereof under other similar circumstances (Downs & Stea, 1973; Fuhrmann, Huynh, & Scholz, 2013). Perceptual cues used to articulate spatial influences of features may be positive, negative, or something in between. Perceptions may differ between individuals, but collectively, in reference to certain times and settings, patterns emerge and can be operationalized in a GIS. For example, a sidewalk and

a bush might be considered benign features of any generic landscape. But a sidewalk located in an isolated and poorly lit section of a college campus that is lined on both sides by many tall bushes could be considered by students as a risky area (Fischer & Nasar, 1995; Furhmann et al., 2013; Hites et al., 2013; Tseng, Duane, & Hadipriono, 2004). Here, the spatial influence of sidewalks might be defined as “being within a certain distance from the sidewalk increases my risk of victimization because offenders presume that people are likely to travel on them.” The spatial influence of bushes could be defined as “being within a high concentration of tall bushes increases my risk of victimization because it allows many places for motivated offenders to hide.” In this way, sidewalks could be depicted in a GIS not as finite lines to represent paths, but as areas accounting for all places within, for example, 25 feet of sidewalks. Bushes could be depicted in a GIS according to kernel density calculations.

Operationalizing the spatial influences of features of a landscape to GIS maps complements what Freundschuh, Engenhofer, Couclelis, and other geographers advocated for when measuring the theoretical and behavioral links between people and their geographies. Most basically, it maximizes the construct validity of cartographic models and empirical measures used for statistical tests (Golledge & Stimson, 1997). It allows us to consistently evaluate places relative to one another with regard to the types of behaviors we would expect given the influences that certain features have on people located there.

We can infer that the risk of crime is exceptionally high at places where the spatial influences of particular features collocate, such as a secluded pedestrian corridor defined as an area within 25 feet of a sidewalk and a high density of bushy plants. Some students may prefer to avoid this area, while motivated offenders may be attracted to it (Lane, Gover, & Dahod, 2009; Woolnaugh, 2009). This is why lamps, “blue light” emergency call boxes, or CCTV cameras are directed by college administrators to these areas: because the positive spatial influences of these “protective” features are often intended to mitigate risk perceptions.

In other examples, how might a house’s proximity to high schools increase risk of residential burglary? Or what might be the spatial influence of bars on the risks of robbery? How would you operationalize the spatial influence of other features of the landscape, such as automated teller machines (ATMs), with regard to robbery risk? Spatial influence research suggests that in looking for the relationship between notable features of a landscape and crime, we should be aware that these features, or their effects, might differ by type of crime. The spatial influence of ATMs on robbery could be quite different than their spatial influence on bicycle theft, for instance. The existing empirical research literature should be reviewed to identify what features may be relevant to each crime type in the jurisdiction under study, and to inform decisions about how to operationalize spatial influences. As we said, there is an extensive literature on key factors that correlate with crime outcomes. Many of these studies and ways of accessing them will be discussed in this book. Professional practitioner insights also play a valuable role in this process.



So, spatial influence is the articulable affect of an environmental feature on human behavior (see Andresen, 2014, p. 180; Jacobs, 1961/1992; Alexiou, 2006). The relative risks that manifest spatial influences allow us to compute a probability of criminal behavior occurring. In other words, a place's vulnerability to crime is operationalized by the spatial influences of nearby features. This spatial vulnerability is based on the idea that everything relates to everything else, but things that are closer are more related (Tobler, 1970). If this is true (in terms of both promoting and discouraging certain types of behavior), then the cumulative effects of spatial influences should be such that certain places within the spatial influence of multiple criminogenic features would be more vulnerable to crime than places that are not influenced by one or more criminogenic features. RTM creates this composite model and related map of spatial vulnerabilities to crime at places throughout a landscape.

### **SPATIAL VULNERABILITIES AND CRIME**

Crime incidents could conceivably occur at any place throughout space since criminals do not generally offend with regard to census tracts or other common macrogeographic units. A victim who was shot at 123 Main Street could just as likely have been shot at 115 Main Street if he stopped to tie his shoe, walked slower, or was delayed for any number of other reasons. To model such a continuous surface of possible crime places, equally sized cells that compose a grid covering the entire study setting are the standard unit of analysis for RTM. Raster mapping in a GIS was specifically developed to model geographic spaces, or landscapes, in this way (Tomlin, 1991, 1994), and is ideally suited to capture the reality of how people operate within a landscape. It is very good for modeling how crime can occur at microlevel units (Groff & La Vigne, 2002). Cells of a raster grid can be the microlevel units of analysis for RTM.

Technically, cell sizes determine how coarse or smooth the raster map will appear: the smaller the cell size, the smoother the map (imagine pixels on a television screen). Conceptually, raster cells are the operational definition of "places." Their size is generally determined to be the smallest meaningful place for crime events to happen within. A cell size of half the mean block length in a city might be selected because it allows us to model places for crime occurrence at approximately one corner (or the other) of a block face. It is also likely to be the smallest spatial unit to which police could reasonably be deployed.

We developed RTM to identify and describe vulnerable places and to make forecasts of future crime incident locations that do not rely solely on the occurrence of past incidences. This is achieved by diagnosing the common environmental correlates of spatial crime patterns and identifying the risks that manifest these factors or features. RTM models how the spatial influences of criminogenic features colocate to create unique behavior settings for crime. With RTM we infer the risk of crime from the combined spatial influences of certain features of the landscape to produce actionable intelligence

for intervention strategies directed at the risk factors at places, with the goal of mitigating their spatial influences. Risk-based intervention strategies will be discussed in chapters 7 and 8.

Thus far in this book, you should understand that RTM is a framework for studying spatial crime vulnerability, and that spatial influence is a foundational concept for understanding and applying this framework. Spatial inference suggests that we are able to extract from a risk terrain model meaningful information for understanding criminal behavior patterns, for diagnosing attractors of existing crime clusters, and for forecasting places where new crimes are likely to emerge. Such information enables the production of spatial intelligence, which is the communication and application of spatial inferences for deliberate action. Detailed technical steps of RTM are discussed in the next chapter.