The geometry of crime and crime pattern theory

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INTRODUCTION

Criminology tries to explain crime and criminal behavior. This poses long-standing questions: Why do only some people commit crimes? Why are some people re-victimized frequently while others rarely are victims? Why do some places experience a lot of crime while other places experience almost none? These questions seem, to us, to call for an understanding of crime patterns formed by the rich complexities of criminal events formed by law, offender motivation and target characteristic arrayed on an environmental backcloth. Each element in the criminal event has a historical trajectory shaped by past experience and future intention, by the routine activities and rhythms of life, and by the constraints of the environment. Patterns within these complexities, considered over many criminal events, should point us toward understandings of *crime* as a whole.

Crimes do not occur randomly or uniformly in time or space or society. Crimes do not occur randomly or uniformly across neighbourhoods, or social groups, or during an individual's daily activities or during an individual's lifetime. In fact, arguing for uniformity was once popular but now seems indefensible. There are hot spots and cold spots; there are high repeat offenders and high repeat victims. In fact, the two groups are frequently linked. While the numbers will continue to be debated depending on the definition and the population being tested, a very small proportion of people commit most of the known crimes (Carrington, Matarazzo and de Souza 2005; Farrington, Lambert and West 1998; Wolfgang, Figlio and Sellin 1972) and also account for a large proportion of victimizations (Fattah 1991). The argument for the complete randomness of targets and victims is no longer plausible. Bar fights occur with greater frequency on Friday or Saturday nights than on weekday afternoons; shoplifting occurs during a restricted set of hours in the day and more in some stores than others; and income tax evasions cluster around due dates. Understanding crime requires concepts and models that can be used to account for the patterned non-uniformity and non-randomness that characterizes real criminal events.

Understanding complex patterns requires a formalism in which simple rules are proposed and ways of combining the rules are described. Complex theoretical crime patterns are built by composing iterations and combinations of the rules. As complex theoretical patterns are built, they should be continuously compared with observed actual crime patterns derived through a variety of information sources. Observations of actual crime patterns contain noise and blurring that come from the processes

available for data gathering and the continual small transformations in the way things are done that are part of the dynamics of everyday living. The basic theoretical rules and the defined processes for combining those rules into formally structured patterns referenced to observations of actual crimes provides a cognitive structure for a much clearer understanding of those patterns and their implications for crime reduction.

Two theoretical perspectives are instructive for framing these rules: the geometry of crime and crime pattern theory. The geometry of crime relates the places in which we spend our time, and the pathways between them, to criminal offending and victimization; crime pattern theory is a meta-theory that integrates the three main theoretical perspectives within environmental criminology (routine activity theory, geometry of crime, and rational choice theory). Both the geometry of crime and crime pattern theory see crime as a complex phenomenon, but, even assuming high degrees of complexity, find discernible patterns both in criminal events and in the behaviour of criminals that are scale independent. That is, the rules behind the patterns can be found at both detailed and general levels of analysis. *Pattern* is a term used to describe recognizable inter-connectivity amongst objects, rules and processes. This inter-connectivity or linking may be physical or conceptual, but recognizing inter-connectivity involves the cognitive process of "seeing" similarity, of discerning prototypes or exemplars of interconnections within cases distorted by local conditions (Churchland 1989). A pattern is sometimes obvious, but sometimes is discernible only through an initial insight, particularly an insight that is embedded within the environment as a whole. Crimes are patterned; decisions to commit crimes are patterned; and the process of committing a crime is patterned.

This chapter is a summary of the geometry of crime and crime pattern theory. Guiding rules are presented for: 1) individual offenders; 2) networks of offenders; and 3) aggregations of individual offenders. These rules are placed within a spatio-temporal context. The result of placing the rules within a spatio-temporal context helps explain: 1) crime templates that reflect target/victim assessment; 2) crime locations in spatio-temporal activity spaces based on routine daily movement geographies; 3) crime concentrations that are found along paths to major nodes and are largely restricted to neighbourhood edges; and, 4) crime attractors and crime generators. The basics of crime pattern theory are then used to look at offender adaptation and offence displacement and abatement.

GEOMETRY OF CRIME

The geometry of crime is one of the three fundamental theories within environmental criminology: routine activity theory, geometry of crime, and rational choice theory. The geometry of crime emerged from the work of Paul and Patricia Brantingham (1981, 1993a) through the adaptation of the work of Kevin Lynch (1960) on the structure of cities for use in understanding crime patterns. Based on this understanding of the city we can understand that we move through and within a built and social environment that impacts everything that we do, resulting in Rule 1.

> **Rule 1.**: ***The Backcloth Matters***. All of our activities (including criminal activities) play out across a backcloth composed of social, economic, political, and physical dimensions.

Rule 1 simply states that the social, economic, political, and physical aspects of our society play a role in how we move through our environment (most often the urban environment). Social norms, economic realities, and political freedoms all impact our choices. Additionally, and consistent across all societies, our physical and built environments impact how we move from place to place. Because of the nature of our road networks and (mass) transportation systems, we are most often constrained as to how we can move through our environment; even if we have choices as to how we move through our environment, those choices are constrained by how different aspects of our environment are used. For example, we may choose to use side streets and alleys to drive from one location to another, but even in congested traffic, the major arterial roads will most often be faster and more direct.

This brings us to Rule 2. The daily movement pattern comprises nested movement patterns. That is, within broader routines and sets of activity nodes, such as the work week or the central business district, people have more constrained micro-activity and movement patterns. Within their homes, for instance, people spend time in various locations with more time spent in some rooms than others. Regular paths are used between these rooms. Within any one of the rooms there is a sub-pattern of movement. In preparing a meal in the kitchen, for example, there is probably a micro-movement pattern between the refrigerator, the stove and the sink. At other times of the day trips to kitchen may involve making tea or coffee: movement paths to some extent overlap but are different from those used in cooking a meal. Similar micro patterns exist at work and at school, when shopping in a grocery store; and within many other destination nodes.

> **Rule 2.**: **Upon the broader backcloth, individuals have a range of routine daily activities**. Usually these occur in different nodes of activity such as home,

> work, school, shopping, entertainment or friends' homes or favourite places, and along the normal pathways that connect these activity nodes.

At a broader scale of resolution, people develop normal daily routines. For one person it might involve going to the gym, then to work, then to visit a nearby set of shops at lunch, then to head straight home after work and then spend the evening with friends at a pub near home. For another person it could involve going to the university, spending time in classes and the library, meeting friends in the afternoon, eating at a restaurant near the university, and heading home to study for the rest of the evening. For each individual there will be variations but for everyone there is a starting point where that person spent the night, a trip to routine day time activities, occasional trips for shopping or to see friends in the evening, or to seek outside entertainment and finally a trip back to home for the night.

Going up to another level of resolution, people spend their work days in one pattern of activity and their leisure days in others. Weekend and holiday patterns are different, but for many people are largely repetitive. In fact, many have routine vacation spots or nodes and even vacation homes.[1]

This pattern of repetitive travel includes learning a route between activity nodes and settling into using it on a continuing basis. Use of that route becomes a routine decision requiring little consideration. Of course, people will try alternatives when there is difficulty following the routine path. Road construction, a traffic accident or unusually heavy traffic, for instance, will cause people adjust their route choice or modify their allocation of travel time if possible. The range of alternatives available depends on a person's general knowledge of an area and flexibility in the daily schedule.

Figure 1 illustrates a set of typical primary node and route choice patterns. For the purposes of this example, the nodes are home, work, and shopping and entertainment. Other individuals might well have different sets of primary nodes including, but not limited to, such activity places as a school, a gymnasium, or a probation office. The set of normal nodes and the normal paths between them is generally called an *activity space*. The area normally within visual range of the activity space is called the *awareness space*.

Figure 1. A set of typical primary node and route choice patterns

Criminals are likely to commit their initial crimes near these learned paths or activity nodes or near the paths and activity nodes of their friendship network.[2] Crimes are likely to cluster near these activity spaces, with a higher concentration near the activity nodes. Figure 2 shows a hypothetical pattern of offences for an individual.

> **Rule 3.**: **People who commit crimes have normal spatio-temporal movement patterns like everyone else. The likely location for a crime is near this normal activity and awareness space.**

Figure 2. A hypothetical pattern of offences for an individual

What is important to recognize here is that offenders behave, in most ways, like the non-offending population. Offenders will feel most comfortable committing criminal events within the areas they know. This is most often found in the journey-to-crime literature (see Townsley, this volume). Within the journey-to-crime literature, that dates at least back to the 1930s (White 1932), the journey-to-crime is found to be short (most often less than two kilometers) and is shorter for violent crime than property crime (Andresen et al. 2014). Though there are a number of methodological concerns regarding the journey-to-crime literature that are debated (Rengert 2004; Rengert et al. 1999; Townsley and Sidebottom 2010; van Koppen and De Keijser 1997), the results are generally consistent from both an empirical and theoretical standpoint: why travel further than you have to (Rhodes and Conly, 1991)? The structure of neighbourhoods and road networks shapes the directionality of the journey to crime (Frank, Andresen and Brantingham 2012) and creates both accessibility channels between offenders and targets and creates both social and physical barriers that limit the places where crimes concentrate. This is especially so of the edges between differing land uses. (Brantingham and Brantingham 2015; Clare, Fernandez and Morgan 2009; Song, Spicer and Brantingham 2013; Song et al. 2015)

Individual crime patterns

We will begin working towards understanding complex crime patterns by building on the individual activities discussed in Rules 1 to 3. In the first case it will be individual activities of people in general and then the special case of individuals who commit crimes. It should be remembered that people who commit crimes spend most of their day in non-criminal activities. What shapes non-criminal activities helps shape criminal activities as well.

> **Rule 4.**: **As individuals move through a series of activities they make decisions. When activities are repeated frequently, the decision process becomes regularized. This regularization creates an abstract guiding template. For decisions to commit a crime this is called a *crime template.***

Figure 3 provides a summary of Rule 4. Individuals develop routines and, once established, the routines have some stability. The routines may be viewed at many scales but the nature of the formation of routines is scale independent. We all develop routines when we wake up in the morning, make a morning tea or coffee, order our steps towards work or other daily activities. We develop routine travel routes between home, work/ school, entertainment, shopping and even special events. The process of the formation of the routine is a first, second, third, and continued repetition of a series of small decisions. Routines are disrupted when people move, or change jobs or schools, or when there are other major changes in a lifecycle, but routines are re-established in new locations and circumstances and the new routines are influenced by old routines.

The development of routine decision streams, both criminal and non-criminal, involves identification of a series of decisions that work. What works would not necessarily meet objective optimal standards, but satisfy what is wanted (Brantingham and Brantingham 1978; Clarke and Cornish 1985; Cornish and Clarke 1986; Cromwell, Olson and Avary 1991).

Figure 3. Creation of an abstract guiding template

In Figure 3, the term "individual" can be changed to "motivated offender" and the word "decisions" can be expanded to "crime decisions". The word "decision template" can be changed to "crime template".

The decision process can be expanded. Crime is an event or series of actions that occur when an individual with some criminal readiness level encounters a suitable target in a situation sufficient to activate that readiness potential, that is, finds that the expected benefits meet the expected costs or risks. When using such words it is important to step back from traditional economics. There is a range of reasons for committing or attempting a crime. Cusson (1983) describes this range in a way that makes it clear that crime can be triggered by anger, revenge, or desire for thrill as well

as for economic or emotional benefit. In particular it is important to distinguish between instrumental and affect crimes. In some situations, such as what are called acquisitive crimes for drug addicts and represent an immediate, short term need for cash to support a drug habit, the instrumental and the affect sides may merge.

Networks of individuals

Individual activity spaces and decision templates can be modified by a social network, because target choice locations can be modified by the activity space and awareness space of a network of friends. It is basically a two-step process. An individual's daily and weekly activity pattern and primary activity nodes are shaped or modified by a network of friends. This network changes over time, as do primary activity nodes like school or work, and with change comes modifications in activity and awareness spaces. Crime occurrence locations will cluster in the overlap of many activity spaces. For example, when youth going to the same school are not friends they still have an overlapping activity space that includes the school and probably other locations near the school or elsewhere in the community. Similarly, a regional shopping center attracts people from many different locations and the overlaps of their activity and awareness spaces define a major activity node.

> **Rule 5.**: **Most people do not function as individuals, but have a network of family, friends and acquaintances. These linkages have varying attributes and influence the decisions of others in the network.**

Figure 4a represents the knowledge and activity space exchanges that occur with the interaction of a network of friends. It should be noted that information exchange that modifies activity spaces and search locations for targets may come from other sources beyond friendship networks. Advertising in the media, verbal exchanges between people who know each other and second hand information are a few examples.

Figure 4b represents a similar hypothetical relationship between three individuals and how that that relationship can influence the decision process and the crime template. Friends can influence what someone recognizes as a criminal opportunity. This essentially simple rule, shown in Figure 4 for three individuals, becomes remarkably complex in real applications because all of its elements are variables. The number of persons in the network varies. The intensity of the relationship between members varies. Readiness to make the decision to commit a crime is not constant: it varies from person to person; and it varies for each individual person across time and space as the backcloth or context varies.

Figure 4. Changes in activity spaces and crime templates that occur with the interaction between a network of friends

1. Changes in activity space
Individual$_1$ Crime Template   Individual$_2$ Crime Template   Individual$_3$ Crime Template
2. Changes in crime templates
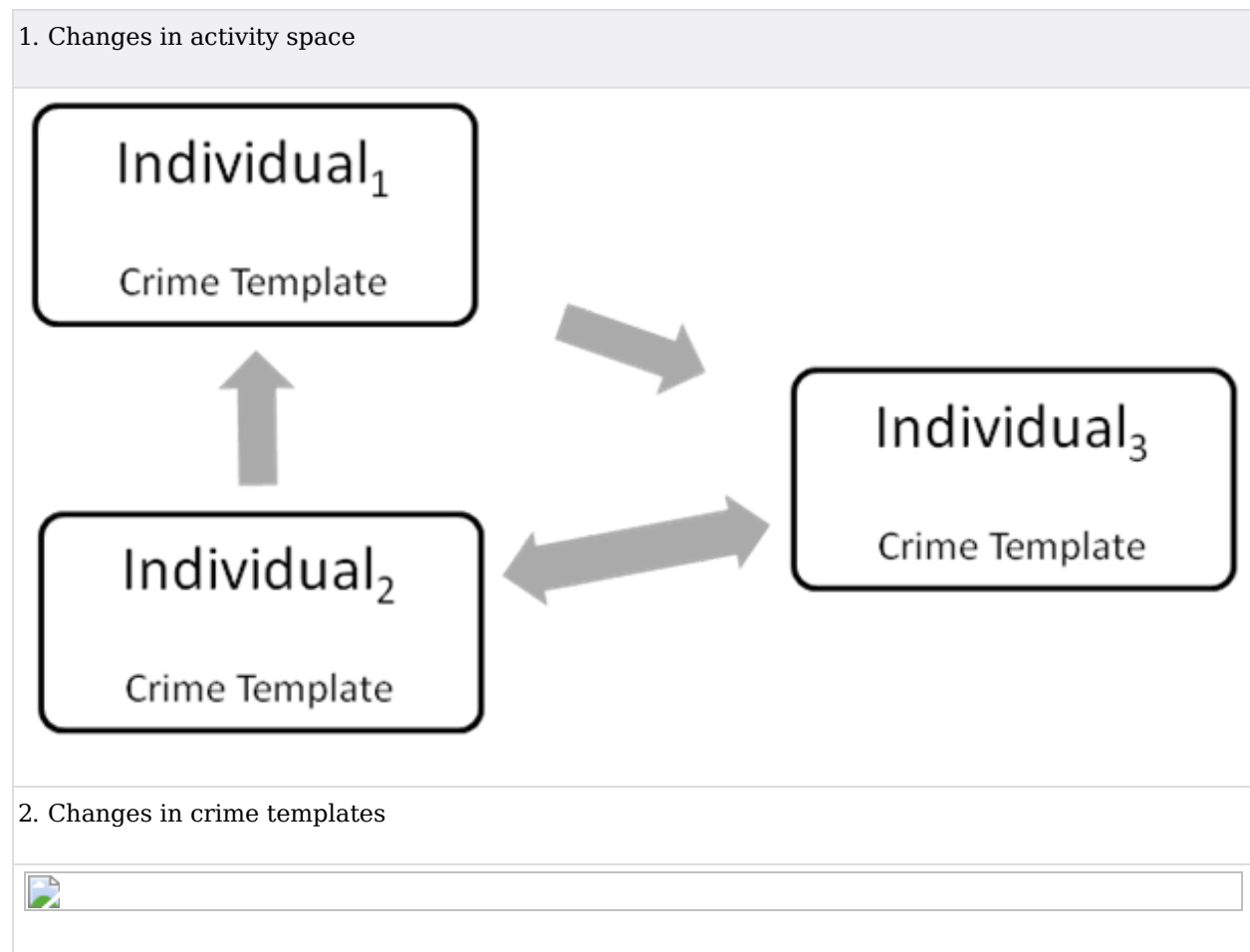
The linked network of affiliations between members has been and continues to be of interest to criminology. At one extreme the networks can be criminal gangs. At another, the network can be composed mostly of law-abiding members forming strong links as guardians, minders and managers of common space-time. Social disorganization theory (Shaw and McKay 1942); differential association theory (Sutherland 1937) and the collective efficacy movement (Bursik and Grasmick 1993; Sampson and Groves 1989; Sampson, Raudenbush and Earls 1997) are all grounded on strengthening the social network links that inhibit offending and all try to explain crime in terms of network links to other offenders in space and over time.

Rules will be added later in the chapter that place the simple individual and network models within the context of routine movement patterns and how the varying context of different cities influence the routine movement patterns. It is with these rules and

the associated compositional process that patterns begin to emerge that are similar to actual patterns of crime.

Bringing it all together: target and victim locations

Thus far, motivated offenders and suitable targets/victims have been discussed in isolation. However, one of the primary aspects of the geometry of crime is that it brings together aspects of motivated offenders and suitable targets such that we can understand crime patterns. The spatio-temporal movement of victims and targets is similar to the spatio-temporal movement patterns of offenders. Victims are mobile but are frequently victimized at or near one of their own activity nodes. Mobile targets such as cars or bicycles follow the mobility patterns of their owners. Crimes often occur at nodes where the victim's activity space and the offender's activity space intersect. Targets such as businesses or residences are stationary but have normal catchment areas from which they attract people. They can fall within the activity space of offenders because they are located at a general activity node or are located along a path between general activity nodes and fit a crime template. As such, it is where and when there is the overlap of the activity spaces of motivated offenders and suitable targets that crime patterns emerge.

> **Rule 6.**: **Potential targets and victims have passive or active locations or activity spaces that intersect the activity spaces of potential offenders. The potential targets and victims become actual targets or victims when the potential offender's willingness to commit a crime has been triggered and when the potential target or victim fits the offender's crime template.**

Victims and offenders need to cross in space and time for a crime to occur. There are situations in which an offender might search for a specific victim or target[3], but it is overlapping lifestyles or spatio-temporal movement patterns or use of a common node activity area that is more likely to be the reason that a person becomes a victim. The overlap in activity is clear when a victim of a personal crime is a family member or an acquaintance of an offender (or someone who is family or a friend of someone in an offender's network of friends). There is an overlap when the victim and offender are at the same nodal activity point at the same time period or when their routine paths cross.

Targets and offenders need to meet in space and time. This is much easier to understand because targets are often fixed in one location such as a residence or a business. In these situations, the offender's awareness space includes the target's

location. For a crime to occur the offender has to see the target and, with some additional decision steps, find the target suitable and within a crime template.

Just as offenders may commit several types of crimes, individuals and targets may be victims of multiple crimes and several types of crimes. This is a reflection of the overlap in the summative pathways and node activity locations for a range of offenders and the interactive activity spaces of networks of friends.

Urban backcloth

As discussed above, the backcloth impacts all of our activities, criminal and non-criminal. Consequently, crimes occur within a context created by the urban form. Roads, land use, the economic forces driving a city, the socio-economic status of residents and workers and the place of the city within a hierarchy of cities in the region are all elements of the backcloth. The urban backcloth is not static. A daytime city is different than a night time city. Entertainment areas sleep during the day and come alive in the evening and in particular on weekends (Bromley, Tallon and Thomas 2003; Felson and Poulsen 2003). Shopping areas have different high periods and low periods. Similarly, most residential areas have a quiet time during the day.

In all types of urban development forms there are some common components: There is an underlying street network that is often supplemented with walking paths and transit routes. There are a variety of land uses arrayed along these road networks and clustered together by city planning rules and zoning by-laws. Businesses are typically clustered within the commercially zoned areas. Factories and warehouses are clustered into industrial zones. Residential areas are often separated into single family home zones and multi-family housing areas. These basic elements, land uses and travel path networks, form the structure of the city and influence where activity nodes are created and which locations are likely to experience concentrations of crime.[4]

> **Rule 7.: *Crime generators* are created by high flows of people through and to nodal activity points. *Crime attractors* are created when targets are located at nodal activity points of individuals who have a greater willingness to commit crimes.**

The clustering of crime relates to the underlying road structure of a city. An area of mathematics called *network theory* provides a mechanism for analyzing the impact of the underlying road structures. Networks and network theory drive the internet. People (or messages) flow along certain paths to reach an end point or node. People in

cars and trucks and busses follow major roads. Traffic flows, composed of many independent agents, can be modeled using the flow of creeks into streams that flow into rivers. Road networks, like river systems, have quiet areas with smooth flows and congestion points with halting flows.

Figure 5 provides examples of alternative road networks. All the networks have centers that are likely to be in high activity areas. These are natural areas for commercial establishments. They also tend to be the areas where non-commercial businesses and government functions concentrate because of their easier access. City planning practice tends to concentrate higher density residential areas near these high activity nodes.

Figure 5. Examples of alternative road networks
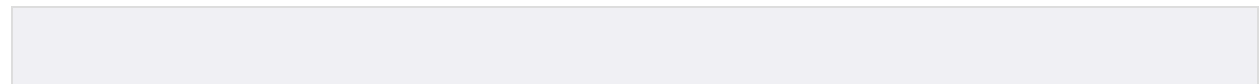
The actual patterning of crime depends on the location of potential offenders. Clustering of prior offenders would produce a nearby clustering of offences assuming that there are suitable targets near the home locations (Block, Galary and Brice 2007). In situations where the crime is related to a commercial business the crimes would be located in that area. For example, consider that the central locations shown in the four hypothetical street networks in Figure 5 are the commercial centres, then commercial crime would be located at the high activity areas.

Stated another way, following similar rules of target choice, offender and population mobility and assuming a similar number of motivated offenders, two cities could have crime patterns that appear to be very different if just viewed as points in space. The patterns are similar when the ways in which people move about in a city, where crime attractors and generators are located and how potential offenders make decisions are considered.

Crime generators and crime attractors are places that become crime hot spots as a result of the processes set out in rules one through eight. Crime generators are a result of the summative combination of awareness and activity spaces of large numbers of people acting in the course of daily routines. Crime attractors are a result of the cumulative impact of criminal experience and network communication.

Crime generators are particular nodal areas to which large numbers of people are attracted for reasons unrelated to any particular level of criminal motivation they might have or the particular crime they might end up committing. Typical examples might include shopping precincts; entertainment districts; office concentrations; or sports stadiums. Crime generators produce crime by creating particular times and places that provide appropriate concentrations of people and other targets in settings that are conducive to particular types of criminal acts. Mixed into the people gathered at generator locations are some potential offenders with sufficient general levels of criminal readiness that although they did not come to the area with the explicit intent of doing a crime, they notice and exploit criminal opportunities as presented (either immediately or on a subsequent occasion). Both local area insiders and area outsiders may be tempted into committing crimes at crime generator locations.

Crime attractors are particular places, areas, neighborhoods, districts which create well known criminal opportunities to which intending criminal offenders are attracted because of the known opportunities for particular types of crime. They become activity nodes for repeat offenders. Examples might include bar districts; prostitution strolls; drug markets; large shopping malls, particularly those near major public transit exchanges; large, insecure parking lots in business or commercial areas. Crime in such locations is often committed by area outsiders as well as people who live nearby. An accidental encounter or a transfer of knowledge about a target rich place can put a pull on an area, creating longer trips. Intending offenders will travel relatively long distances in search of a target at a known location. (When insiders commit crimes in such areas, they may have moved to those areas from elsewhere because of their crime attracting qualities; or, as in many cities, because poor areas are located near commercial areas thus creating many accessible targets near home.)

It is worth noting that there are also crime neutral areas in most cities. Crime neutral areas neither attract intending offenders because they expect to do a particular crime in the area, nor do they produce crimes by creating criminal opportunities that are too tempting to resist. Instead, they experience occasional crimes by local insiders. Simple distance decay and pathway models can describe the geography of crime in such locations. The offence mix is different from the offence mix at either crime attractor or crime generator locations (Brantingham and Brantingham 1994; Curman, Andresen and Brantingham 2015).

It is important to note that areas are unlikely to be pure attractors or pure generators or purely neutral. Most areas will be mixed, in the sense that they may be crime

attractors for some times of crimes or some individuals, crime generators for other types of crime or other individuals, and neutral with respect to still other types of crime

Hotspots and crime displacement

The interplay of the seven rules of geometry of crime discussed thus far also make it possible to make some broad statements about the general formation of hot spots (Brantingham and Brantingham 1999) and to project displacement potentials when crime control interventions occur at them (Brantingham and Brantingham 2003a).[5]

Hot spots can be predicted at specific locations by taking into account the convergence of eight key elements discussed in crime pattern theory: the residential and activity locations for predisposed offender populations; the residential and activity locations of vulnerable populations; the spatial and temporal distribution of other types of crime targets; the spatial and temporal distribution of different forms of security and guardianship; the broader residential and activity structures of the city; the mix of activity types and land uses; and, the modes of transport and the structure of the transport network; as well as the actual transportation flows of people through the city's landscape and timescape.

Displacement depends on the type of hot spot at which the intervention takes place. Intervention at crime generator hot spots is unlikely to result in crime displacement because the crimes that occur there are opportunistic. Displacements from crime attractor hot spots are much more likely and can be encapsulated in three limited statements: First, criminal activity at crime attractors is likely to be displaced, into the neighbourhood surrounding the attractor if there are nearby attractive targets or victims. Second, criminal activity that cannot displace to the neighbourhood surrounding the original attractor is likely to be displaced to other important attractor nodes. Third, criminal activity that cannot displace to the neighbourhood surrounding the original attractor, and does not displace to some other important crime attractor is likely to be displaced back into the offender's home neighbourhood rather than to neighbourhoods nearby and similar to the crime attractor neighbourhood. This is a function of the interplay of awareness spaces with urban form. The result is most likely some abatement and some displacement to a variety of locations. Considering the reverse of the summative awareness spaces that produce major activity nodes, research on displacement from high activity nodes needs to look at nearby areas with embedded targets, nearby similar activity areas, or expect that displacement could be spread over a large catchment area for the original attractor node.

CRIME PATTERN THEORY

Decision rules

Decision rules are the focus of much of the theory building and research in environmental criminology. This chapter will not go into depth about decision rules because that is more the realm of rational choice perspective (see Cornish and Clarke this volume). However, because the purpose of crime pattern theory is to show the connectedness, or pattern, within the theories of environmental criminology, decision rules are an important concept here. Basically, there are varying levels of motivation on the part of individuals and in their willingness to engage in different types of offences. Few offenders commit only one type of crime; frequent offenders engage in a variety of offences. What is important to understand is how an individual (or a group) decides that there is some value to be gained by committing a crime. What is particularly important to note is the centrality of opportunity combined with an absence of any formal or informal restrictions on action. *Opportunity Makes the Thief* (Felson and Clarke 1998) is a good summary of the relative availability of potential targets and victims. As Marcus Felson notes, there are situations where there are suitable targets, non-capable guardians and motivated offenders.

> **Rule 8. Individuals or networks of individuals commit crimes when there is a triggering event and a subsequent process by which an individual can locate a target or a victim that fits within a crime template.**

This is brought together considering Rule 8. Individuals are simply undertaking their current actions, most often routine activities, and they encounter a triggering event. This triggering event then leads to a minimal or broader search for some form of target. If the search is minimal, the triggering event is likely an individual or group of individuals who come across an opportunity, whereas a broader search will likely begin after an individual or group decision has been made to search for a target.

For the purposes of Crime Pattern Theory it is important to add a rule that reflects the cyclical nature of the process of committing crimes and how that focuses crime templates and routine activities.

> **Rule 9. The triggering event occurs when an individual is undertaking current actions that are most often routine activities. The outcome of the criminal event impacts both the crime template and the routine activities of individuals. Criminal actions change the bank of accumulated experience and alter future actions.**

Rule 9 shows that every person has a knowledge base that is always changing. Successfully committing crimes reinforces existing crime templates and patterns of offending. Lack of success is likely to have little effect the first time. But if lack of success persists, then something is likely to change. Individuals can adapt in a variety of ways: they can change the way they commit a crime to overcome factors that have made successful commission of the crime difficult; they can modify their crime template about the where or the when of a crime; or they can adapt by engaging in non-criminal activities instead. Similarly, the successful commission of a crime that was undertaken within routine activities will reinforce those routine activities; however, if non-routine activities were being undertaken, then those activities may become routine because of the successful commission of a crime. Figure 6 represents this pattern of reinforcement or change after a crime is attempted.

Figure 6. Crime template and routine activity reinforcement
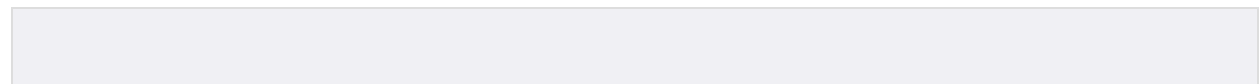
The final rule presented here, Rule 10, is really revisiting Rule 1, above, specifically in the context of criminal activity.

> **Rule 10 (Rule 1 redux). The structural backcloth impacts both the routine activities of individuals and the decision to commit crime.**

As discussed above, the backcloth is most easily seen as our built environment that constrains our movements and provides us with our opportunities. Because of its very nature, the backcloth structures our routine and non-routine activities. And because all of our activities are structured by the backcloth, so is crime.

Consider the four panels in Figure 7. The upper-left panel shows an area where the major streets are essentially placed at random and the points (criminal events) are also random. In the upper-right panel, there are two clearly defined clusters of criminal events that are dependent on the clustering of roads. The lower-left panel separates two crime clusters with a river. This crime pattern is likely the result of offenders staying on one side of the river, a very different crime pattern than shown in the upper-right panel. And the lower-right panel shows a crime pattern on a grid road network; given the nature of this road network, researchers should ask questions regarding the attractiveness for crime within these two areas. Perhaps, there are housing patterns or other land use patterns (all dimensions of the backcloth) that impact criminal opportunities.

This simple example based on a road network can also be extended to consider the social and/or psychological backcloth that goes along with the built environment. Different social backcloths provide different sets of opportunities that may lead motivated offenders to make different choices. This leads back to rational choice theory.

Figure 7. Road networks and crime
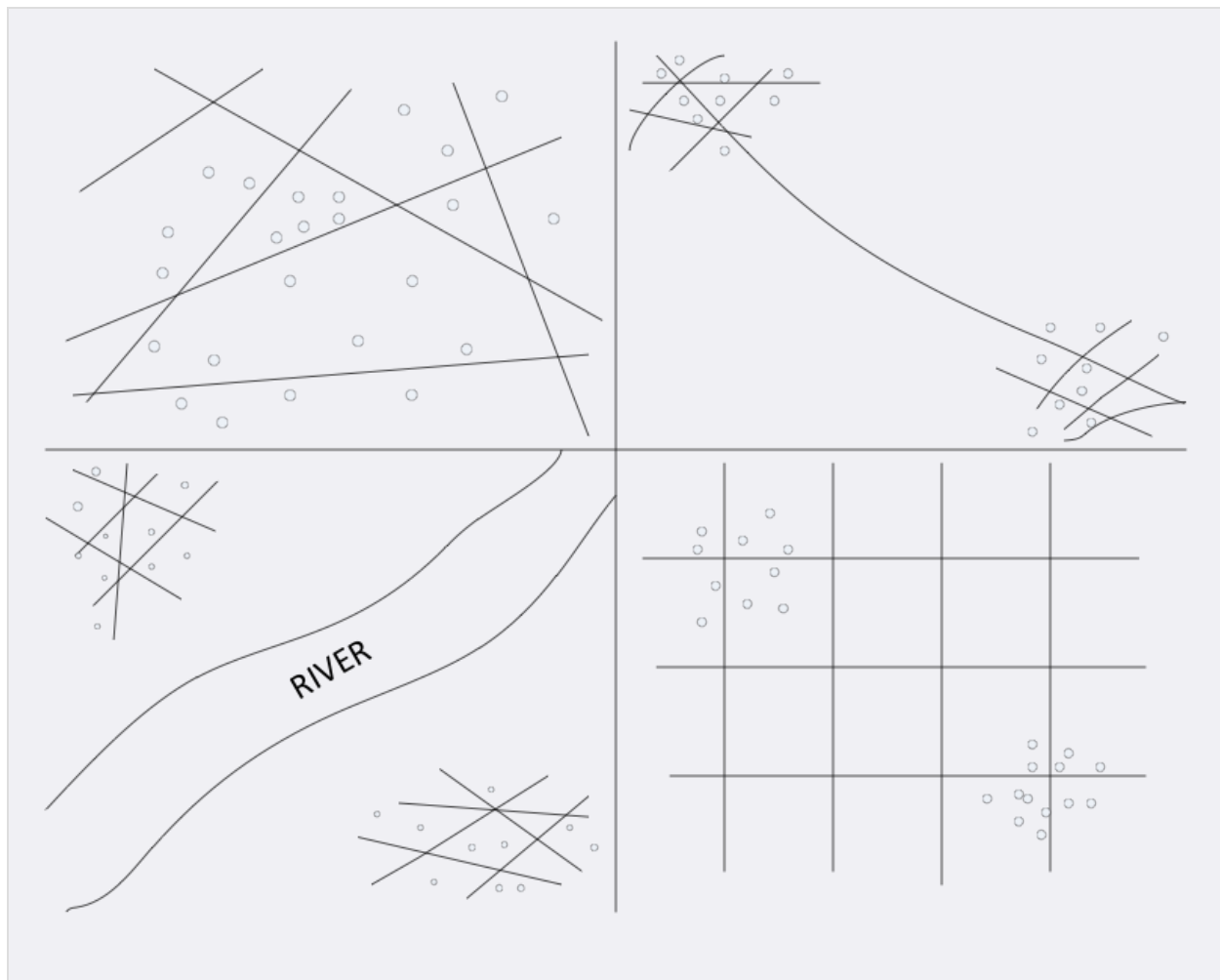
Understanding the nature of the backcloth becomes critical when considering the various crime patterns that emerge. For example, violent crimes (because they require the presence of at least two individuals) will occur more frequently in places that have greater ambient populations (Andresen 2011; Andresen and Jenion 2010; Boggs 1965) —similarly for housing density and residential burglary. Moreover, in our automobile-driven culture, the presence of people also indicates the presence of automobiles such

that the presence of automobile-related crimes. Commercial burglary can only occur in places that have commercial zoning, or some form of mixed use land use zoning. Consequently, if any of these factors are clustered in space and/or time (and we know that they are!) we have to expect concentrations of crime. So, the task for the environmental criminologist is not to identify patterns of crime, per se, but to understand why they emerge. Or, in other words, which of these rules discussed above are the most pertinent.

CONCLUSION

Crime is not randomly distributed in time and space. It is clustered, but the shape of the clustering is greatly influenced by where people live within a city, how and why they travel or move about a city, and how networks of people who know each other spend their time. There will be concentrations of overlapping activity nodes and within those nodes some situations that become crime generators and some that are crime attractors.

When looking at the representation of crime locations consider individual offenders and their routine activity spaces; consider networks of friends who engage in some crimes and their joint activity spaces; consider the location of stationary targets and the activity spaces of mobile victims and mobile targets and the catchment areas of fixed targets. The patterns are dynamic. Keeping that in mind will make it possible to understand crime patterns so that crime reduction interventions that produce levels of displacement can be designed.

CRITICAL THINKING AND APPLICATION REVIEW QUESTIONS

1. Why does where you spend your time impact crime patterns?
2. Create a map of your awareness space, considering all of your primary activity nodes and pathways. Use thicker lines to represent the pathways and nodes where you spend more time. How predictable are your activities?
3. What is the environmental backcloth? What is its significance? Why does it change?
4. Describe the environmental backcloth of a high crime area in your location of residence. Which aspects are static? Which aspects change?
5. Why is distance a factor when motivated offenders are searching for targets?

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Footnotes

1. The criminological potential of this is clearly illustrated in Wiles and Costello's (2000) study of Sheffield burglars and car thieves, showing the impact of both a new suburban shopping mall and the impact of a favored seaside resort on the locations of their routine activities and offences. See, also, Bromley and Nelson (2002). ↵

2. A remarkable older study illustrating this point is Shaw and Moore's (1931) *Natural History of a Delinquent Career* which illustrates, in passing, the changing location of the subject's crimes as his activity and awareness spaces expand as he grows up and expands his network of friends and associates. ↵

3. On general target search patterns, *see* Brantingham and Brantingham (1978). For a study demonstrating how time constraints can impose spatial constraints on a criminal's target search, see Ratcliffe (2006). ↵

4. There is a new pattern of mixing land uses in what is called the "New Urbanism." This planning practice will increase the activity in some nodes and is likely to produce a tight clustering of crime. ↵

5. For much more detailed treatments of displacement see Brantingham and Brantingham (2003a, 2003b) and Guerette (2009), as well as the empirical literature on the presence of displacement (Guerette and Bowers 2009). ↵