

# Crime and Place: Rapidly Evolving Research Methods in the 21st Century

Patricia Brantingham  
Simon Fraser University

The symposium in this issue of *Cityscape* focuses on understanding crime and the urban environment, particularly how people live in and interact with the landscape (buildings, people, roads, and activities) that surrounds them. It advances understanding of crime within the urban landscape. Ronald E. Wilson describes crime and the urban environment in the guest editor's introduction:

Crime changes with urban development patterns. Opportunities for criminal activity emerge, disappear, or move as geography changes across the urban landscape. Patterns emerge, dissipate, or persist... crimes are far more predictable by place of occurrence than by a particular offender...

Exploration of crime and place is a rapidly evolving area of research in the 21st century. Some of my early work in the 1970s examined a topological structure of neighborhoods, identifying a way to measure the permeability of edges of the neighborhood, allowing crime committed by nonresidents to drift away from the usual location along major streets into roads toward the centers of neighborhoods. The computationally intensive simulation loop underpinning this research was possible only in the 1970s because I was working on a very large Cray-like standalone computer. Most people in the social sciences did not have access to such machines at that time. The movement toward personal computers that followed further limited the technical ability of researchers to take geographic ideas of a city and try finely woven analysis. Researchers were forced into data aggregation to census tracts or larger areas or were limited to the use of very small samples of cases primarily based on interviews.

The times have changed. We are now in a period of rapid advancement in computing power and the development of new algorithms. Tools and techniques are developing very rapidly. We are moving, with appropriate security and privacy in place, into a new research world. Our research laboratory, the Institute for Canadian Urban Research Studies (ICURS) at Simon Fraser University, has, for example, one data set of 9 million records of people involved in some way with 5 million criminal events that occurred during a multiple year period. Individuals, with their identity fully encrypted, included in the data set range from people who called the police to people who were victims and the people who were arrested in the criminal events. Although names are encrypted, records are linked to indicate co-offending, repeat offending, victimization, and time and place.

The data and computing power available to researchers in the ICURS laboratory is still a fairly new phenomenon in the social sciences; it will not be in a few years (see articles in this issue for examples of the future). New algorithms are now developed routinely, making it possible to explore crime and place at increasing levels of detail and complexity. Electronic data storage is now routinely available in terabytes and will soon be available in petabytes. Increases in computing power now make analysis of these large data sets increasingly tractable and agreeably fast.

The enhanced analytical capabilities that are enabled in the new computer world have brought about the increase in availability of data, the use of innovative techniques, and the linking of research in criminology to policy questions. Linking research with policy and practice leads to advances in decision support. This computational power is not yet available to researchers in general, but the direction of the field is moving toward improved access and analysis.

Theory and method are now entwined. Theory drives analysis; analysis guides theory. In particular, theory, research, and data work together to advance the knowledge of the relationship between crime and place in ways that can be used in policymaking and planning. The geographic way of thinking becomes increasingly important. The *why* and the *where* of crime require linking people to time and space. Linking people with place leads to a better understanding of how and why people move around and identifies the places that pull people in, push people away, or entrap them.

This way of thinking shapes research but is also fundamental to strategic policy formation and to designing tactical operations. Linking research, strategic policy, and tactical operations is particularly important for understanding persistent problems—especially when researchers address what some call “wicked problems.” Wicked problems do not have an easy solution. These problems require innovative ideas and research methodologies to provide clarity and assess the effects of programmatic efforts. Past research indicates that advancement can be made with careful thinking and with innovation.

Understanding the pervasiveness of crime and disorder in specific places draws us into looking at human activity. Crime is the product of human activity. We need to look at daily living and the repetition of routine patterns. We know that crime and disorder can cluster heavily in certain small areas of a city and persist. We see other areas where crime can increase for short bursts but recede. We see still other areas where crime and disorder remain low. Crime patterns reflect movement and activity patterns of people. For a serial offender, the pattern would be unique to that individual and shaped by his or her knowledge of and attraction to particular places within a city. For more common crimes, aggregate crime patterns reflect aggregate pulls, pushes, and areas of entrapment within a city. But our growing computer power means that, with spatial and temporal geographic information systems (GIS) and data mining, we can begin to understand classes of pushes and pulls and build better place-based predictive models.

Think of water flow as a visual analogy of how people move around in a city and how crime hot spots form. Imagine small streams of water flowing across a flat delta toward the ocean. During periods of heavier rain, new streams and pockets or deep pools of water form. The new streams or pools make different patterns in different deltas, depending on the local topography, soil, shore structure, and actual water flow. Criminal activity—always more complex than streams of water—is influenced by many factors, including a complex template of attractors as well as socioeconomic

and structural constraints. People, however, move about in a city. Some concentrate around local areas; others move longer distances. They all develop routines, concentrating their activity along paths or routes and spend more time at some locations than others. In the aggregate, there are pushes and pulls in cities that, depending on the urban backcloth or urban landscape, focus agglomerations. These pushes and pulls exist for offenders. Offenders are people who spend most of their time not committing crime and often have their use of an urban area shaped by noncriminal activity.

Exploring crime and place is a major research area that requires an understanding of people, their activities, their networks of friends, and their reasons for being attracted to certain locations or being scared away from others. According to Lynch (1960), we form images of a city and those images persist. Those images help shape our activity and our activity helps shape those images: local activities (such as work, schooling, and entertainment), the character or milieu of locales, their vernacular architecture, residents, shops, parks, and concentrations of people. The term usually used for areas that are well known to a person is his or her “awareness space”; that is, places that are recognized by an individual and where an individual knows how to get to and from. In the aggregate, cities have areas that are part of the awareness space of many individuals. These areas are usually the most active within cities.

All activity is not necessarily positive, nor do all people have the same ability to move and choose their landscape. Neighborhoods have the potential of trapping people. The risk of victimization can be the consequence of a lifestyle, but it can also be drawn from the lifestyle of others in a local area. From a policy perspective, a city helps shape crime patterns and crime patterns help shape a city. It is a challenge to policymakers and researchers to better understand this continuing, dynamic relationship between people and place and how it influences crime.

The complexity of the relationship between crime and the urban environment is very distinct for different types of crimes, different times of the day, different days of the week, and different times in a year. Crime patterns are morphed by a city’s infrastructure, daily rhythm, and socioeconomic mosaic. Some patterns are so strong that they should be evident to most people. Small property crime (shoplifting, theft of personal property, and theft from autos) concentrates in major shopping areas or major transit hubs, while assaults concentrate in and near drinking establishment clusters. Yet, not all shopping areas have major concentrations of crime, nor do all bars. Crime may concentrate in very small areas, such as one apartment building or a single bar, despite lower crime rates in all adjacent properties.

Understanding the dynamics of crime requires careful thought and the ability to move between different scales of resolution. From a research perspective, it is good to start with the most detailed data possible and aggregate based on the policy or research questions. Different results are apparent at different levels of aggregation. From a geographical perspective, when the research question draws one into zooming further into a narrower time and space scale, the research will eventually reach a level where clustering fades and the pattern appears to be more random. When research zooms out to broader scales, clustering will appear. The challenge in research is to find the appropriate scale for the research question but to remain aware of the importance of understanding the finer scales. The appropriate focus keeps moving back to smaller units of aggregation. The study of crime and place focuses on understanding detailed patterns and, using these patterns, understanding what specific patterns help shape more general patterns.

In the symposium of this issue of *Cityscape*, Ronald E. Wilson's introduction sets the stage for a better understanding of what crime and place mean and how the scale of place relates to crime location theories and policy and practice. Wilson's introduction provides the reader guidance on how to navigate through the articles to build a conceptually broader framework for research on place.

In their research on sex offender legislation, Tony Grubestic, Allan Murray, and Elizabeth Mack help the reader understand that laws are different in different states and enforced in different ways. Not only does crime vary from place to place and temporally, but also what constitutes a crime and how offenders are monitored varies. Although the article is about sex offender legislation, the issue is similar for many other types of high-attention public disorder and crime. Law is a major dimension of the analysis of crime patterns.

Complexity requires consideration of additional dimensions, depending on the issue under investigation, and requires thinking at multiple scales of resolution. The article by Philip Harris, Jeremy Mennis, Zoran Obradovic, Alan Izenman, and Heidi Grunwald addresses a different question—one that requires thinking about variation again—as they explore how neighborhoods and individual traits both matter in recidivism. GIS-spatial data mining is linked to better ways of understanding recidivism. It fits naturally within the idea of people acting within a landscape, and considers how places influence people and people influence landscapes, particularly in seeing how different types of recidivistic crimes cluster in different places. Crime patterns become clearer through their analysis.

Advances in this burgeoning area of criminology require new and different ways to analyze problems. As mentioned earlier in this article, innovation is occurring in theory, research, and methodology. Joel Caplan, whose article explores both theory and method, uses risk terrain modeling and criminogenic data layers in a data fusion GIS to show how "...theoretically grounded operationalizations of spatial influence from many risk factors can be used as a control measure of environmental context when evaluating the spatial effect of place-based interventions on future crime events." Caplan asks the theoretician, researcher, and policy or operations expert to look at the landscape and to understand crime as it occurs within its environment. With this approach, it becomes very clear why crime is low in some areas and why it may appear episodically in others but not persist. This work is a major step forward for predictive policing.

Roderick Jones and Derek Paulsen focus on environmental context in their examination of HOPE VI, a national program with the goal of greatly reducing the entrapment of people in highly distressed public housing. The authors report mixed results but note that other levels of information might help explain the variation they observe. It would be valuable to see research such as this repeated.

Space and place matter in all environmental backcloth research. Michael Lens, Ingrid Gould Ellen, and Katherine O'Regan look at the effect of vouchers in enabling low-income people to become more mobile in seeking out housing in safer places. The results are supportive of vouchers but raise some alternative explanations, as good research should. The research addresses the patterns at a census tract level. It will be interesting to see what happens when the level of aggregation moves to block groups or blocks (considering adjacent blocks). It would also be interesting to see whether people with vouchers tend to move to areas close to family and friends, a common intracity migration trend.

Mike O'Leary's article challenges crime researchers to think about criminological and environmental theory but also to think about the mathematics behind some of the algorithms used. The article also reflects usage of larger data sets linking offenders to offenses and indicates some geographic research that will become possible when data sources improve. With each data source improvement, however, comes improved questions. What would have been changed if the analysis had included Baltimore city as well as the county? Would the results have changed in an ecological sense if the base population or housing unit area were different? What about sparser road networks in rural areas? A point-to-point distance could look short but actually be much longer on the road network that must be traveled. The article shows how theory, research, and methods blend when better data are available.

It would be fruitful to return to these topics annually for several years to see how geographic thinking about place, and about place and crime, affect theory, research, and strategic policy development for improving quality of life. This issue of *Cityscape* shows how we as researchers can continue to develop new and better ways to address issues. It would be of value to watch the evolution of these research themes.

## **Author**

Patricia Brantingham is the RCMP Professor of Computational Criminology at Simon Fraser University in British Columbia, Canada, and is director of the Institute for Canadian Urban Research Studies.

## **References**

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