



COMMUNITY CRIMINOLOGY

FUNDAMENTALS OF SPATIAL AND TEMPORAL SCALING,
ECOLOGICAL INDICATORS, AND SELECTIVITY BIAS

RALPH B. TAYLOR

COMMUNITY CRIMINOLOGY

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Ralph B. Taylor

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To Michele, of course

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Behind all seen things lies something more vast.

—Antoine de Saint-Exupéry, *Wind, Sand and Stars*

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Overview

No social fact makes any sense abstracted from its context in social (and often geographic) space and social time. Social facts are located.

—Jim Abbott, 1997

Contextualization and *attention to process* are necessary in the interest of building bridges between the analysis of abstracted variables and their locations in social time and space.

—James S. Short, Jr., 1998

Criminology is a fragmented discipline. . . . A discipline that is fragmented . . . is of little help to politicians, policy makers, and practitioners who want to base their policies and interventions on the best available scientific knowledge about crime causation.

—Per-Olof Wikstrom, Dietrich Oberwittler, Kyle Treiber, and Beth Hardie, 2012

One Criminology or Many?

The Baskets Question

Is there one criminology, or are there many? Suppose we concentrate just on space. Is there one big basket of theories for people, situations, and geographies at spatial scales small (e.g., addresses) and large (e.g., metropolitan areas)? Or are there many different baskets of theories? If there are many, are the theories in different baskets dissimilar in shape and color? Do scholars using theories from one basket talk to those using theories from another basket? Should a theory developed in one basket be transferred to another? Suppose we think about time and thus crime changes. Again, is there one basket of theories regardless of temporal focus? Or are there many baskets? For example, is there one basket for theories ranging from seconds or minutes up to days, weeks, months, years, and decades? Or are there many baskets with different types of theories—of different shape, size, color, texture, and so on—in different baskets? Are the theories in the basket for short-term

changes (e.g., hourly patterns) built in fundamentally different ways from those in the basket for long-term changes (e.g., decade-long crime shifts)? If different criminologists favor different baskets of theories and disparage other criminologists using theories from other baskets, then the field is conceptually Balkanized. Theoretical domains have been divided “into a number of smaller and often mutually hostile units” [535].

For at least two decades, well-known criminologists have worried publicly that theorists have failed to progress toward a criminology integrated across levels of explanation but instead have become progressively isolated [8, 650]. Some of these sentiments are linked to dissatisfactions with variable-centered empirical research [2, 633]. Perhaps the clearest statement came from Jim Short in his 1997 presidential address to the American Society of Criminology (ASC) [676]. He framed the issue as a lack of integration across levels of theorizing [674]. He worried that criminologists were losing sight of the connections between societal factors, which he called “macrosocial” factors, immediate context, which he called “microsocial factors,” and individuals. “Although study of micro-level processes in isolation from macro- and individual-level analysis may yield important knowledge, such knowledge is of greatest value and utility when placed within macro- and individual-level contexts. Situational elements are located in social and cultural contexts, and they are populated by individuals who make decisions” [676: 25]. A focus on “processes in isolation” continues to trouble leading criminologists. Rick Rosenfeld argued in his 2010 presidential address to ASC that macrocriminology—focused on how crime links to broader structural and cultural features of society, or what Short has called macrosocial factors—was being ignored. Rosenfeld decried an “epistemological imbalance” in the field, dominated by microcriminologists focusing on individuals or small groups. Further, he critiqued microcriminologists’ efforts to contextualize theories. “When microresearchers do situate individual criminal behavior in social context, the analysis often extends no further than the local census tract” [622: 2]. One year later, Steve Messner in *his* presidential address to ASC spent considerable time highlighting the same divide and suggesting pathways toward integration [501]. In short, for at least two decades, leading criminological scholars have voiced concerns about the failure of criminological theory to understand how macrosocial, microsocial, and individual factors connect. Of course, there have been attempts to build both contextual and integrated theories which link some of these different arenas [172, 375, 574, 824]. But, in this author’s view, there appears to be both a general tension and a *de facto* separation between macrocriminology, concerned with large-scale historical, social, economic, cultural, and demographic factors,

and microcriminology, concerned with individuals, small groups, and small-scale spaces. The field may be fissioning even further given recent developments in neuroscience [578].

Of course, understanding the processes connecting society, city, neighborhood, household, and individual, and testing relevant dynamics, is analytically and theoretically demanding [632, 633, 649, 820]. It is no surprise, then, that the lack of such links is an area of enduring weakness in criminological theory [813]. The theoretical deficits continue even though such connections are a central concern not only for criminology but also for sociology [512: 5].

Conceptual difficulties aside, disciplinary biases may encourage further theoretical insularity. Scholars enter criminology through many different portals including fields emphasizing the macrosocial, such as sociology or public health, or the microsocal, such as social psychology or social work, or the individual, such as psychology or neuroscience. Disciplinary orientations can strongly shape how scholars frame questions and problems.

The Relevant Philosophy of Social Science Debate

A third set of reasons may contribute to the integration challenge: a broader philosophy of social science debate, pursued at length in sociology, about the micro-level foundations of macro-level outcomes. This debate is complex, wide ranging, and evolving quickly in areas of analytical sociology and computational sociology [170, 336, 337, 377, 392, 543, 568, 583, 651, 763]. The debate, in the simplest terms, hinges on clarifying the causal relevance of micro-level factors, perhaps operating on the individual level, and macro-level factors, perhaps operating at the societal level, to macro-level outcomes. The most relevant points of this debate will be sketched later. One side of this debate favors methodological holism, a set of views that macro-level attributes and processes are the most or the only relevant causal factors and dynamics for understanding macro-level outcomes. Another side favors some version of methodological individualism, a set of views that micro-level attributes and processes, often at the individual level, are the most relevant causal factors and processes, even for macro-level outcomes. Some people in the debate hold positions between these two anchor positions.

Community Criminology and the Debate

This debate has profound implications for constructing and testing criminological theories, especially those in community criminology. Community

criminology theories address crime (defined later) at the community level (defined later) either as a predictor or an outcome, and impacts of community features on crime or a crime-related attribute at the individual, group, or community levels. The profound implications arise because community criminology is concerned exactly with many of the key questions in this social science debate. These questions will be addressed from the vantage of different positions within this debate.

This Book

Why?

This book is needed for three reasons. In general, criminology has failed to construct sound theories that achieve sufficient integration across levels of analysis, although there are some exceptions [824]. This is Short's "level of explanation" project. Second, in community criminology, theorists have not systematically acknowledged the challenges presented by the ongoing philosophy of social science debate about methodological holism versus methodological individualism. This oversight has occurred even though those challenges are directly relevant given core concerns in community criminology. Finally, foundational issues directly relevant to constructing and testing theories in this area have been overlooked. Those concerns are spatial scaling (defined later), temporal scaling (defined later), construct validation of ecological indicators, and selectivity bias, aka selection effects. Each poses both significant theory and measurement challenges. Problems at the intersection of theory and measurement are often overlooked. As Hubert ("Tad") Blalock pointed out some time ago, "I believe that the most serious and important problems that require our immediate and concerted attention are those of conceptualization *and* measurement, which have far too long been neglected" [67: 882, emphasis added].

Goals

This book aims to make progress on Short's "level of explanation" project, responding to the concerns voiced by not only Short but also, among others, Akers, Rosenfeld, Messner, Sampson, and Savelsberg. Systematically addressing the four concerns mentioned earlier helps lay the groundwork for more successfully integrated theories in community criminology. Put even more simply, this volume describes four issues which, because they have been overlooked, have blocked theoretical integration in community

criminology; links these issues to key matters outside of criminology; and provides an integrated framework for considering the four concerns.

Context

Studies of the ecology of crime, the places or conditions under which certain crimes or delinquency are more or less likely, date back to the first half of the 19th century [298, 480]. The most widely cited early American touchstone from the first half of the 20th century remains Clifford Shaw and Henry McKay's widely misinterpreted work on delinquency in Chicago and several other major cities [665, 666]. Work on community connections with crime, victimization, and delinquency continues to be a major area of scholarly interest [125, 132, 632, 638, 788]. Recent reviews or compilations over the past thirty-plus years highlight many features about the patterning and context of community crime or delinquency rates and/or their changes [126, 509, 591, 638, 643, 833].

Scholars looking over the field in the mid-1980s discerned two broad strands of scholarship: sociologically oriented work that was macrosocial in character focusing on "the social context of crime" versus geographically oriented work that was more microsocal "in the area of environmental criminology . . . [devoting] much attention to 'spatial' concerns" [132: vi]. Since the mid-1980s, micro-level empirical work devoted to spatial crime patterning has exploded [439]. There are several reasons. In the late 1980s, ecology of crime researchers discovered hot spots: small-scale locations such as an address or business or intersection experiencing a high volume of criminal activity over an extended period. Lawrence Sherman and colleagues are generally credited with this discovery [669]. They also coined the term "criminology of place." In addition, increasingly sophisticated geographical tools facilitated both the scholarship on and analyses of geographically targeted policing efforts. Further, the latter were generally seen as successful [687]. In Short's terminology, these works were microsocal, examining the immediately surrounding context of a crime event. Of course, the macrosocial work has boomed as well [416, 417, 484, 549, 638, 644]. But despite such increased activity, community criminology remains split between the macrosocial and microsocal streams, with some researchers and theorists following an intermediate mesosocial stream. These differences become evident when contrasting four recent major book-length statements in the field [562, 638, 795, 821].

In this author's view, the different streams can be brought together to develop a fuller picture of crime dynamics linked to community at different

spatial and temporal levels. Broad integration between macrosocial work on “the social context of crime” (investigations focusing on regions, metropolitan areas, counties, cities, municipalities, and even neighborhoods) and microsocial work on the “criminology of place” (focusing on small-scale arenas such as addresses, intersections, and streetblocks where people interact with one another face-to-face) and work on individuals is feasible. Further, work on shorter-term changes can be connected to work on longer-term changes.

Practical as Well as Theoretical Implications

Such theoretical clarification may have important implications for policy and practice. Consider just three current examples. (1) A housing crisis in the United States started in the late 2000s and resulted in rapidly rising foreclosure and unoccupancy rates and falling prices. Connections between these housing-market dynamics and community crime are currently disputed [43, 398, 727]. For example, do crime-prevention impacts provide additional justification for foreclosure intervention programs? (2) Hurricane Katrina displaced much of the population along the Gulf Coast, including ex-prisoners. Ex-prisoners who took up residence in a parish (i.e., county) different from where they resided pre-Katrina were less likely to recidivate, or if they did recidivate, it was later [396, 397]. Again, questions of mechanisms arise. What was it about changing county of residence that decreased ex-prisoners’ criminal involvement? Was this a macrosocial impact, or were important intervening microsocial dynamics involved as well? (3) Crime has dropped in the US and in other places around the world over the past two decades [74]. In some cities, it has dropped drastically. Are small-scale adjustments in policing tactics adopted over the past decade or two, such as hot spots policing, responsible for the large-scale crime drops seen in some big cities such as New York? Or, alternatively, are the large-scale crime drops what sociologists would call emergent properties? Although the causes of New York City’s stunning crime drop are contested and interpreted differently by different scholars, some think these small-scale changes in policing added up to something big [858]. But, again, the question would be, if this interpretation is correct, what were the mechanisms linking together the small-scale and the large-scale changes?

Purpose and Scope of This Volume

The Four Concerns

This volume addresses four core issues. Each requires careful consideration if community criminology is to accomplish a viable theoretical integration. A brief introduction to each follows.

Spatial scaling addresses both what shifts theoretically when examining variables and processes at different geographic scales, and how variables and processes connect across different geographic scales. This topic is relevant in the following three types of situations: (a) a researcher suggests that conceptually similar dynamics apply to spatial units across a wide range of geographic scales; (b) a researcher uses indicators for one or more concepts at a geographic scale markedly different from the scale used in the originating theory; (c) a researcher explains cross-level relationships connecting individuals or smaller geographic scale units to larger geographic scale units, or the reverse. The relevant issues are about more than just aggregating and disaggregating data.

Temporal scaling is about how long it takes for variables to shift significantly or to change other variables significantly. In community criminology, the two issues are the temporal interval required for significant change to accumulate on an ecological predictor or outcome and the period required for a single-level or multilevel ecological process to “cycle”—that is, for the predictor to affect the outcome a significant amount in a significant number of units.

Construct validation is a process concerned with establishing the meaning of a set of indicators. Traditional approaches to construct validation have highlighted the relevance of convergent validation (indicators of the same construct connecting strongly with one another) and discriminant validation (indicators of different constructs connecting much more loosely by comparison). A recent unified view on construct validation highlights the relevance of additional connections. Construct validation has generally been overlooked by ecological community and crime researchers, with two unfortunate consequences. Substantial semantic confusion exists about the appropriate ecological indicators for a number of centrally relevant attributes described by several prominent community and crime theories. Because of indicator-concept confusion, it is challenging to separate the mediating dynamics proposed by different theories from one another. The latter makes it exceedingly difficult to determine the relative advantage of one theory versus another.

Selection effects may occur when people are nonrandomly selected into

places where they live or work or behave, or into social contexts. The perspective adopted here distinguishes three facets of this problem: separating selection effects from contextual impacts of spatial contexts, developing theoretically appropriate selection submodels when the context is primarily social, and estimating how selection effects may contribute to community-level or supra-community-level inequalities.

The Metatheoretical Nature of the Four Concerns

These four general issues matter for almost all theories in community criminology. Each issue addresses *how* these theories are organized. Since the discussion is about “how scientific theories are constructed,” it is about meta-theory. “When we want to explain how scientific theories are constructed, . . . we must speak *about* them; and this requires a suitable terminology. This metatheory, or methodology, is as necessary to science as grammar is to ordinary language” [370: 81]. I elaborate a particular metamodel which organizes these four different metatheoretical issues. A metamodel is “a model which is intended to give an all-inclusive picture of a process, system, etc., esp. by abstracting from more detailed individual models contained within it” [539]. It is a schematic overview of relevant dynamics.

The approach used here is a well-known but variously interpreted sociological metamodel: the Boudon-Coleman framework. It serves four purposes: to integrate the treatment of the four different concerns, to clarify connections between them, to reveal gaps in many theories, and to organize and clarify key points in the relevant philosophy of social science debates.

Other scholars in other social science disciplines concerned with space and behavior are asking similarly searching questions about gaps in *their* ecological theories. For example, *how* community context connects to individual-level outcomes worries thoughtful scholars in demography and public health [223, 626, 627, 628].

Although the issues addressed here are fundamental, the treatment of them is of necessity preliminary. For example, this book will *not* reveal which theory best explains yearlong changes in burglary rates in urban census tracts. But it will point out tough issues that must be tackled cleanly if we want to get to an answer to a question such as this one.

Definitions

Since this volume addresses communities, crime, justice agencies, individuals, and causes, each term merits definition. Related assumptions are highlighted.

Communities

Although some scholars argue and this author accepts that there are important differences between “community” and “neighborhood,” these terms will be used interchangeably in this book [108: 57; 369]. Each of these two concepts has received scholarly attention for a century or more, has waxed and waned in that period as a topic of interest to both scholars and policymakers, and has been defined in numerous ways.

One publication appearing more than five decades ago listed more than ninety definitions of “community,” tapping into sixteen different themes [345]. The concept of the neighborhood is similarly diffuse, precluding scholarly consensus [389].¹ “There are many ways of defining neighborhood,” and “different definitions serve different interests” [108: 17]. At the core, however, all that can be really agreed on *definitionally* is that a neighborhood “is considered a social/spatial unit of social organization, and that it is larger than a household and smaller than a city. The problem with presenting a further list of definitive characteristics is that they often become normative rather than descriptive” [366: 270]. For present purposes, this minimalist but uncontroversial definition from Al Hunter is accepted as a definition of both “community” and “neighborhood.” The term “community” will be the one most often used in this volume.

Despite this definition of “community,” extracommunity dynamics or attributes, for example, at the city or metropolitan or state level, are *still* relevant to community criminology. This has been empirically demonstrated repeatedly. Given the importance of the larger surround, spatial adjacency dynamics deserve theoretical consideration. The metamodel adopted here conceptually distinguishes different *types* of adjacency dynamics.

Some theories distinguish two nested levels of community: neighborhoods, identified in the metamodels here as macro-level; and an in-between or meso-level, such as streetblocks, aka street segments, with the latter spatially nested in the former. In an urban or suburban residential setting, a streetblock is the location that includes the houses on both sides of a street, bounded by the cross streets at both ends. It creates an arena for important, local, face-to-face interactions. It *may* function as a freestanding sociospatial unit or behavior setting of the natural environment [32, 721]. Of course, there are many more levels of community than just these two [365, 711]. Nevertheless, for community criminology, these two levels have proven important.

Hunter’s definition of community sets an upper spatial limit. Communities are smaller than municipalities or civil divisions such as counties, cities, or townships. Of course, spatial patterning of crime exists at higher levels of

spatial aggregation, such as, for example, counties in the United States [29]. Macro-criminology as described by Rosenfeld captures important dynamics occurring at these higher levels of spatial aggregation. Such broader influences of surround on a community and its residents are central to Amos Hawley's description of an ecological perspective (see chapter 6) [327]. Political economy or urban or suburban sociology dynamics follow. All these dynamics are accepted. Since they may reflect processes happening at higher geographic scales than depicted in the metamodels developed here, they merit the term "supra-community" dynamics when invoked.

The imbricated nature of social groups means that different social groups crosscut, or only partially overlap, with spatial units of community [365, 367, 368, 711, 739]. For example, juveniles adjudicated delinquent may participate in groups formed around their home, and these may only partially overlap with groups located at the treatment program assigned [447]. Recently, it has become possible to model these crosscutting influences using multiple membership multiple classification (MMMC) models [110]. But the bulk of community criminology research is more limited, largely focusing on dynamics among a set of nonoverlapping spatial units at a particular level of aggregation, or on contextual impacts.

Crime, Criminality, and Victimization

The term "crime" is used here as shorthand for instances of adult offending behavior, instances of delinquent behavior, and victimization incidents at the hands of offenders or delinquents. Crime may be operationalized as incidence rates and geolocated based on where the event happened. Scholars in this area have been similarly interested in the ecology of criminality: where offenders or delinquents reside.

Ecological disparities in *criminality*, propensities to be involved in adult or juvenile offending behavior, are of interest as well. Ecological researchers usually operationalize these as prevalence rates [28]. Agents of justice, such as police officers, however, do not act similarly in different locations [400]. Therefore, ideally, such rates are based on validated self-report methodologies. These methodologies help remove the disparities in justice agents' actions from ecological variations in prevalence or incidence rates for delinquents and adult offenders. Concerns persist about the scientific qualities of self-reports of juvenile and adult offending. Nonetheless, these methodologies are adequate for a number of purposes [347, 742, 821].

Of course, incidence and prevalence rates are distinct conceptually and geographically. Each type of rate has its own underlying dynamics [28]. At

the same time, those two sets of dynamics may overlap. Crime perpetration and criminogenesis are simultaneously connected and different conceptual issues [115]. Many community criminologists, however, routinely overlook connections or differences between these two types of ecological rates. Sometimes researchers apply models developed for one focus to the other without considering how the outcome question has changed. Further, theorists often overlook how the two sets of dynamics drive one another over time. Both these tendencies limit community criminology theoretically and empirically. *How* these two types of dynamics link over time merits attention in chapter 2. Three crime sequences are introduced: delinquency, adult offending, and victimization. Each crime sequence explores how these different types of rates, and actions of justice agencies, shape one another over time within a community.

No specific a priori lower bound is set on the seriousness of crime—the criminal or delinquent behavior in question. Certainly, US FBI Part I “serious” crimes are of primary interest—homicide, robbery, rape, aggravated assault, burglary, motor vehicle theft, larceny, and arson. But because crime is considered as a potential cause of community change as well as a consequence, a case has been made by several scholars that less serious crimes—for example, drug sales, prostitution, and vandalism—are relevant to community futures [685]. Therefore, the ecological origins and consequences of these less serious crimes, although not of primary interest, are potentially relevant. Less serious crimes should not be confused with instances of physical or social incivility [724].

Community differentials in victimization proneness merit inclusion as well; it is the victimized individuals or households which experience the crime or delinquency incident. Work linking victim prevalence or incidence differentials with ecology has developed rapidly in the past decade or so. Janet Lauritsen and colleagues’ pioneering work with the National Crime Victimization survey has uncovered important locational links with victimization patterns using units of spatial aggregation much larger than communities as defined here [429, 434, 851]. Researchers have examined links between victimization and moving [209, 853]. But it has not been possible, in part because of the infrequency of victimization in many locales, to develop clear connections between victimization proneness and community characteristics at the spatial scales considered here. Nevertheless, despite the scarcity of the empirical work, community differentials in victimization incidence and prevalence rates deserve theoretical attention in community criminology. Thus, one of the crime sequences (chapter 2) addresses victimization dynamics within communities.

Local Justice Agency Actions

This book diverges from some earlier community criminology work and argues that the ecological patterning of local justice agency actions is theoretically central to understanding community-crime links. These actions refer to behaviors of law, considered either as counts or rates within a specified community, affecting residents of that community who are removed, returned, or supervised for a period [63]. These indicators include arrest, incarceration, release, parole, and probation rates. Relevant agencies include the juvenile justice system, police, courts, and probation and parole agencies. Of course, for several decades, researchers have considered the potential ecological deterrent impacts of local arrest rates or incarceration rates, usually at high levels of spatial aggregation such as cities [179, 408, 640]. But more recently, community justice and mass coercion scholars have argued that many communities and crime models are incomplete because such frameworks overlook the *adverse* impacts of these dynamics [158, 160, 458, 617]. But at smaller spatial scales, researchers such as Todd Clear and Natasha Frost have begun more systematically documenting these adverse impacts in census tracts in different cities [255].

Justice agency *local* actions merit attention not only in light of the two theoretical frameworks noted earlier—ecological deterrence and community coercion—but also because, in the US at least, incarceration and supervisory rates are at or near historical highs (chapter 2). These rates are so high that they are shaping not only the course of the entire US economy but also many aspects of local life in many urban neighborhoods [804]. In many of the country's highest (reported) crime communities, dynamics linking communities and crime cannot be fully understood without factoring in the *local* actions of justice agencies, and the consequences of those actions. Such local justice agency actions may be less relevant to communities and crime dynamics in other locations where removal, return, and supervision rates are much lower.

Local Collective Action

Collective, nongovernmental responses to crime and delinquency in the form of hiring private security or mounting collective crime-prevention efforts are not a priori excluded from the conceptual focus but are not highlighted either. It is recognized that security governance is multilayered in complicated ways [841]. Work suggests that collective efforts spearheaded by nongovernmental groups can prove influential on short-term crime changes

[460, 619, 620]. But collaborations involving justice agencies may prove more transformative over the long term [686].

Individuals and Small Groups

Reference will be made to individual-level behaviors, attitudes, sentiments, cognitions, and psychological dynamics. These are properties of individual persons. When several persons are interacting in a face-to-face context, a small group is formed, and small-group or social psychological dynamics take place.

Cause, Causal Claims, Causal Dynamics

Finally, “cause” and “causal process” must both be defined since, as stated earlier, the key research question in this area is to what extent crime “causes” changes in features of community, or vice versa. In the social sciences, “cause” and related terms such as “causal claim” and “causal process” are notoriously slippery and widely disputed [4, 16, 205, 445, 593, 624, 629, 701, 787, 834]. Behind all these conflicting views, terms, and models, however, are a few simple ideas. First, the goal of the social scientist is relatively straightforward. “The social scientist . . . seeks to identify some of the conditions that produced the explanandum [outcome] or that conferred upon it some of its distinctive features. The goal is to discover the conditions existing prior to the event that, given the law-governed regularities among phenomena of this sort, were sufficient to produce this event” [445: 14]. Causal claims can be of three different types, with the first being viewed as “the most fundamental” [445: 14–15]. A “causal mechanism” thesis argues that there is a “law-governed” process, dynamic, or “mechanism” by means of which the cause influences the effect. A causal claim that relies on “inductive regularity” asserts that the cause and the effect regularly occur together and thus inductively infers causation. Statistical associations would support but of course not establish such a claim.

Causal claims imply causal mechanisms [337]. Causal mechanisms or causal chains can be multistep, involving “a series of social events” [445: 16]. Social science explanation differs from natural science explanation, however, in several crucial ways [834]. People do things because of choices, social influences, and constraints. Reasons and influence are relevant. “Social phenomena are constituted by individuals whose behavior is the result of their rational decision-making and non-rational psychological processes that sometimes are at work” [445: 16].

To perhaps oversimplify, establishing causal claims involves isolating potential causes and highlighting the relevant causal processes or dynamics.² Operationally for social scientists, this translates to some widely accepted social scientific practices [174]. Social scientists look for a cause that is an attribute temporally and spatially proximate to the outcome, whose conditions or changes in condition temporally precede changes in the outcome of interest. Causal processes are suggested when the cause and effect indicators are distinct from each other (discriminant validity); there is a statistical association between the two entities; there is some degree of temporal ordering between cause and effect indicators, typically with earlier cause indicators shaping later outcome indicators; alternative plausible, noncausal explanations for the connection between the two entities (i.e., threats to internal validity) can be discounted; and the process identified corresponds with a clear and specified theoretical dynamic.

A Short Introduction to the Boudon-Coleman Metamodel

The Links

This volume uses and elaborates a particular version of the Boudon-Coleman “boat” metamodel [80, 81, 168]. This metamodel embodies a view toward human behavior called “systemism”: that “the constituents [i.e., individuals] interact both among themselves and with their environment” [115: 13]. This metamodel has received considerable theoretical attention of late, bringing to light disagreements about particular features of the metamodel [543, 583, 763]. This chapter outlines the basic structure of this metamodel. In later chapters, this basic formulation of the metamodel will be adapted to organize the four issues addressed in the volume. The metamodel includes four different potential links, as shown later in this section. The boat metamodel depicts two different levels of analysis. “‘Levels of analysis’ in scientific explanation typically refer to sets of causal processes, each representing different degrees of organizational complexity” [377: 60].³ Here, and typically, individuals are separate from a macro-level. That macro-level can refer to any range of social structures: nations, societies, organizations, regions, interest groups, and so on. Basically, any of the *societal* units of interest to criminologists, sociologists, or political scientists could constitute the macro-level.

The vertical dimension of the boat metamodel, and thus the distinction between “macro” and “micro,” will be defined differently than has been done previously. Raymond Boudon and James Coleman both used the vertical dimension to contrast macro-level attributes, broadly, with individual-level

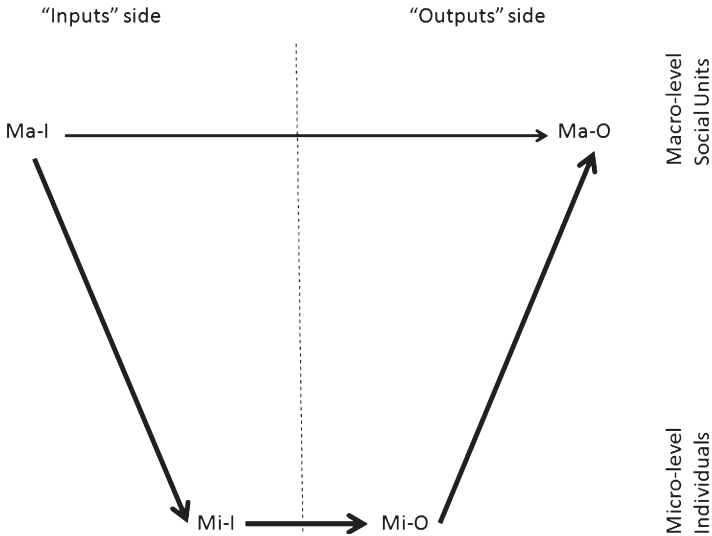


Figure 1.1. Boudon-Coleman metamodel.

factors. The example Coleman used, and others have similarly, is the effect of Protestantism on capitalism [444, 543]. Here, however, the dimension is altered in two ways: (a) it is tied explicitly to geographic scale, and for the most part, (b) it is limited to a particular range of geographic scales, sub-city regions down to geolocated individuals. Consequently, even though the vertical dimension as used here still reflects some of the macro versus micro differentiation suggested by Coleman and Boudon, it does not capture the full flavor of all the societal versus individual contrasts implied by their and other sociologists' usage.⁴ Nevertheless, making this dimension explicitly spatial provides a clear framework for approaching the four foundational issues of concern. "Micro," as in previous treatments of the metamodel, means individuals, except that in community criminology those individuals are geolocated.

The standard boat metamodel contains the following links. The links represent an "analytical approach to social mechanisms" [337: 57]. "All relationships between the variables are empirical and causal. This is symbolized by the arrows" [543: 211].

*Link 1: Ma-I → Mi-I.*⁵ Macro-level inputs, through one or more situational or contextual processes, create psychological inputs; that is, they affect individuals' sentiments, cognitions, and intentions. These links are called bridge assumptions [543]. The macro-to-micro connection depicted here is of long-standing interest to social science theorists [444].

Link 2: Mi-I → Mi-O. Micro-level inputs set in motion one or more psychological processes which lead to a micro-level outcome. This link represents “assumptions about regularities of individual behavior or a theory of individual behavior” [583: 3].

The individual-level sentiments, and/or cognitions and/or intentions referenced earlier, the micro-level inputs, contribute to a later individual-level outcome, that is, a micro-level output. The latter usually references behaviors but could capture attitudes, sentiments, cognitions, or behavioral intentions. Some versions of this model reference *only* actions or purposive actions as the micro-level outputs [168: 19].

Link 3: Mi-O → Ma-O. Micro-level outputs, across many individuals, lead to macro-level outputs. The process reflected here could reflect “transformation rules” or “aggregation rules” [543: 211]. The latter, which is clearly relevant if the micro-macro dimension is explicitly spatial, refers to statistical aggregation if individual-level or smaller spatial scale properties are aggregated by geographic proximity. The resulting property of the macro-level unit is an aggregate property [437, 444]. Individual delinquency involvement can be statistically aggregated to create a community-level aggregate property: a delinquency prevalence or incidence rate. But three points merit mention. First, the macro-level outcome is conceptually different from the micro-level outcome, even though it has a micro-level analog.⁶ Second, if this link involves something more than statistical aggregation by geographic proximity, then it may describe an emergent property of the macro-level units; that is, it could reflect transformation rules. If one focuses on purposive actions (Mi-O), uses the micro-macro dimension in a nonspatial fashion, and assumes interdependence between the actions of different people, then there are “various ways in which actions [Mi-O] combine to produce macro-level outcomes” [168: 20]. The formation of norms is just one case in point [168: 265–299]. For example, a face-to-face group of teens heavily involved in delinquent activities may develop a hardened delinquent subculture; those norms may be operative at certain places at certain times. Transformation rules also might apply in some spatial contexts. Third, even if the link describes only statistical aggregation by geographic proximity, linking micro-level outputs to macro-level outputs through aggregation rules, the macro-level outputs specified could be *accompanied* by other macro-level outputs even though the latter are not explicitly referenced as macro-level outputs.

Link 4: Ma-I → Ma-O. Macro-level inputs, via macro-level mechanisms, lead to macro-level outcomes.⁷ The causal dynamics in question are taking place at the level of the complex entity itself: a society, an organization, an institution, or a community, for example. The dynamics occurring involve

social structure.⁸ Depending on what that concept of social structure is, the dynamic suggested in this link may represent a point of view called sociological holism; that is, “Social structure operates mechanically and naturalistically *over the heads of individual actors*” [568: 198, emphasis added]. A scholar embracing sociological holism will grant this link a causal status. In the context of this metamodel, that means that even after controlling for the preceding three links, this link captures an independent sociological dynamic. If the micro-macro dimension is made explicitly spatial, this is the same as saying that there are independent ecological dynamics at work “above” the level of individuals. This is the view embraced by some scholars of human ecology [327].

Different Interpretations and Controversy

Considerable controversy surrounds the boat metamodel. To oversimplify, scholars differ about the following.

1. Is link 4 *needed* as a causal mechanism in a theory? Coleman did not always include it when discussing the metamodel [377]. Scholars embracing some of the many varieties of methodological individualism would question the causal status of link 4 relations [391, 543, 763].

From the point of view of a mechanism-based explanation, the basic entities are human agents and their relations. . . . A basic point of the mechanism perspective is that explanations that simply relate macro properties to each other (arrow 4) are unsatisfactory. These explanations do not specify the causal mechanisms by which macro properties are related to each other. Deeper explanatory understanding requires opening up the black box and finding the causal mechanisms that have generated the macro-level observation. [337: 59]

2. Is link 4 the *only* needed causal mechanism [391]? If the model includes *only* link 4, then the causal theory embodies methodological holism; “theories at the level of the whole can be confirmed and can explain at that level, without a full accounting of underlying details” [392: 142].

3. Is the chain composed of links $1 \rightarrow 2 \rightarrow 3$ *needed* as a causal mechanism in a theory? [377]. Understanding these macro-micro-macro connections has been an area of longstanding interest in sociology [444]. Understanding link 1 has been of longstanding interest in social psychology [705]. A focus on this chain ($1 \rightarrow 2 \rightarrow 3$) *solely* assumes that individuals form the bedrock—the “logical atom”—in any sociological analysis [80: 36]. Such a perspective

embracing methodological individualism is usually associated with a Weberian point of view, focusing on individuals doing things for reasons. A Durkheimian view, in which people do things because of their roles in society, is often associated with methodological holism [81: 30–32].⁹

Some varieties of methodological individualism also can be linked to a philosophy of social science idea that individuals do things because they have reasons, rationales, and intentions [763, 834]. The “principles of methodological individualism . . . recommend . . . that we should seek what the subjects’ actions mean to them in their own particular situation or, in other words, the adaptive value of such actions” [81: 53].

4. Can collective outcomes be explained *solely* via the macro-to-micro-to-micro-to-macro dynamics (links $1 \rightarrow 2 \rightarrow 3$)? Are these dynamics necessary *and sufficient*, rendering link 4 causally superfluous? If the causal model includes *only* chain $1 \rightarrow 2 \rightarrow 3$, methodological holism is denied and some version of methodological individualism is maintained [391, 543, 763].

These controversies are longstanding. “The individualism-holism debate has endured for centuries” [392: 143]. Informed social scientists and philosophers of social science take different views [337]. Perhaps these disputes are also fundamentally irresolvable in the abstract.

A Resolution of the Debate?

But maybe not. Nicos Mouzelis, a European-based social theorist, has offered a synthesis of modern and postmodern sociological thinking that explains how the methodological holism / methodological individualism debate might be surmounted [523]. Unfortunately, his analysis has not factored into the most recent statements, reviewed earlier, on the holism versus individualism debate. His language is technical and closely cross-references numerous grand sociological theorists. As I am guessing that the details of his analysis may not be of interest to most community criminologists, these details are relegated to online appendix A, which can be found at <http://nyupress.org/Taylor/AppendixA.pdf>. The main points of his argument can be stated as follows. Theorists have misinterpreted several crucial terms in this discussion, confusing action for agency and incorrectly equating some actions with micro-level processes and others with macro-level processes. Both actors and institutional structures have causal powers, but they are *different* types of causal powers. Once these points are clarified, actors with agentic powers can reflect and plan (Mouzelis calls this “intra-action”) and then interact, those interactions being shaped and constrained by structurally influenced features of the external environment. His model explains how micro and macro pro-

cesses jointly shape a broader process of social causation [523: 232–234]. In other words, all four links in the Boudon-Coleman metamodel can be operating simultaneously in an integrated fashion. “Structural causality” is linked to “actors’ causality,” and both can be simultaneously operative [523: 275].

The Stance Taken Here

Mouzeli’s analysis in several important respects “solves” the holism/individualism debate. Consequently, throughout the volume, depicted metamodels will include all four links; metamodels with additional levels may include even more. All these links are assumed to be potentially causative and potentially operating simultaneously. That said, Mouzeli’s analysis may not garner flocks of followers. The individualism versus holism debate is likely to remain alive and well in criminology. Consequently, the four foundational issues explored here will, where appropriate, be considered both from the perspective of methodological holism and from the perspective of some variety of methodological individualism. Some issues will be considered from an intermediate perspective, such as meso-level holism. It will be shown how each issue can be aligned with a particular metamodel, depending on which of these broad perspectives is adopted.

Community criminology addresses causes and impacts, at different scales, of community crime rates and, more broadly, of various elements in the community crime sequences (chapter 2). Sometimes outcomes at the individual or household/address level are the focus. Consequently, in some cases the metamodel under investigation addresses just a portion of a boat metamodel, for example, links 1 → 2. In such a truncated version, methodological individualism is often appropriate.

In addition to being sensitive to both anchor points in the individualism versus holism debate, this book also embraces Short’s encouragement to try and contextualize the outcomes under investigation, to connect the macro-social to the microsocial to the individual. This suggests carefully attending to link 1 bridging assumptions and sometimes expanding the link to include intermediate scales.

Implications

For Theory

The seemingly basic points addressed here, which are as much about theory as they are about methods and analyses, lead to sobering implications about

the current state of community criminology. Whether one accepts some of these implications depends in part on the position one takes on the sociological holism versus methodological individualism debate.

- Perhaps we understand little about what is behind ecological correlations because the field has failed to connect ecological properties or dynamics with either small-group or individual-level psychological and behavioral dynamics.
- The new criminology of place, although tremendously helpful for the purposes of tertiary crime control, is doomed to fall short of its promise of a *simple* approach to *understanding* crime.
- “Hot spots” of crime, although good for numerous practical purposes, prove theoretically problematic.
- The most important structural community crime correlates such as socioeconomic status have been documented since in the 1920s. Serious questions can be raised about how much this field has advanced, at least in some domains, in the past eight decades. Such a lack of progress is due in part to putting attention on the wrong things [821]. But, perhaps more importantly, theoretical progress also has been impeded because scholars have not taken seriously the four fundamental matters highlighted here.
- If the field takes to heart lessons about change emerging from the ecological orientation of Amos Hawley and Robert Bursik, scholars will give up cross-sectional ecological research. All cross-sectional data sets are inherently confounded: ongoing ecological continuity cannot be separated from recent ecological changes.

For Policy and Practice

If one accepts that there are significant limitations of research on communities and crime to date, important practical implications follow. Imagine a policymaker concerned with mounting a community-based, collective crime-prevention program [619, 620]. She asks, of the various conceptual frameworks available, which one works best? Being a well-read policymaker, she knows, putting aside the importance of context for a moment, that the best supported conceptual framework will, all else equal, provide the best starting point for framing the logic of such a prevention program.

Regrettably, this hypothetical policymaker will be confronted by three difficulties. First, many studies seek only to test the adequacy of a single theoretical model preferred by the researcher, rather than comparing the adequacy of several different models. These studies are not structured to provide

strong inference [566]. No corpus of empirical work focusing on either a range of community-level outcomes or a single community-level outcome (e.g., community-reported robbery rates) tests the relative predictive power of a *range* of adequately operationalized conceptual models using comparable spatial and temporal units of aggregation. The same tests using a *range* of spatial and temporal units also have not been undertaken. Second, if the policymaker seeks to compare how different models fare in different studies, there are additional challenges. Different studies may use the same conceptual label but operationalize particular ideas in markedly different and sometimes inappropriate ways [729].

Finally, the policymaker may find comparisons of effect sizes for different community-crime-rate covariates, but (a) the comparisons usually focus on demographic-setting conditions rather than theoretically central processes and (b) there are few if any studies comparing relative fit of several different theoretical models and in which key constructs from all those different theories are adequately and distinctively operationalized. In short, community criminology research to date is of limited practical value. Addressing the concerns outlined in this book may increase the utility of that work.

The Chapters Ahead

Chapter 2 examines the production of macro-level rates of crime and criminality, for adults and juveniles, and victimization. Understanding the causes and consequences of community-level crime and criminality is at the heart of community criminology. Considerable previous work has simply accepted these rates or counts as “givens.” Such strict operationism creates perils. In an effort to avoid these hazards and reinvigorate conceptual thinking around the relevant macro-level dynamics, three distinct but related core community-crime sequences are proposed and outlined: delinquency, adult offending, and victimization. Of interest is how these sequences are ecologically produced and maintained, how the ecological sequences may be related to individual-level dynamics, how they address the question of ecological continuity, and how the sequences illuminate both adjacency effects and prevalence/incidence slippages. Each sequence sees the *local* actions of criminal justice agencies as central in numerous ways. Reader beware: this chapter becomes lengthy because considerable previous research is marshaled to support the sequences described and to specify outstanding questions.

Chapter 3 starts the treatment of spatial scaling. Three different ecological examples illustrate how spatial scaling is relevant and underscore its conceptual importance. More specifically, potential conceptual missteps when we

think across levels, aggregation bias and the *limited* conditions under which it is theoretically disturbing, and the significant implications for both measurement *and* theory of aggregating by geographical proximity all merit attention.

Chapter 4 introduces the spatial version of the Boudon-Coleman meta-model. It is used in this volume as a vehicle for metatheorizing about community criminology. Advantages of this orientation are highlighted. The approach also helps to organize thinking about spatial adjacency effects and points in a different theoretical direction than do many current treatments of this matter.

Chapter 5 takes up the challenge to spatial scaling concerns presented by place criminology and the use of associated concepts such as hot spots. The view here is that place criminology is useful for tertiary prevention and crime control but has limited promise as a framework for understanding the dynamics behind crime patterns, levels, and changes in communities. Further, it will be suggested that hot spots, albeit practically useful for many purposes, are philosophically and empirically problematic as a foundational unit in a criminology of place. Whether other geographic units can serve as foundational units in a place-based criminology is considered.

In some respects, the challenges presented by temporal scaling parallel those presented by spatial scaling. Chapter 6 addresses temporal scaling in community criminology. There are two broad issues: the time it takes for a theoretically described process to *cycle*, that is, for a cause to shape an outcome; and the time it takes for a significant change to appear in either community crime or another community attribute. Too often social scientists in different disciplines neglect these crucial time matters. In community criminology, these oversights have contributed to theoretical confusion. Temporal scaling concerns, when linked to Hawley's and Bursik's view on ecological change and continuity, suggest that all cross-sectional, macro-level communities and crime analyses have extremely limited theoretical and practical value. They also imply that significant insights into ecological crime dynamics over time will not be gained unless and until (a) the extant temporal ambiguities in theories and data are resolved and (b) researchers separate ongoing ecological continuities from ecological discontinuities, that is, unexpected ecological changes.

Chapter 7 continues the treatment of temporal scaling and aligns these concerns with a temporally dynamic metamodel. For followers of methodological individualism, this will be an elaborated boat metamodel. Specific temporal ambiguities are highlighted. A hypothetical example, building in part on one of the three illustrative studies introduced, shows how a dynamic boat metamodel might work. Finally, different analytic approaches

to longitudinal dynamics, corresponding to different perspectives—methodological holism, meso-level holism, and methodological individualism—are noted. Each analytic approach frames ideas of ecological continuity versus unexpected change in different ways, which are sketched.

Chapter 8 suggests that concerns about ecological construct validation seriously challenge community criminology. Unless and until these semantic ambiguities can be resolved, researchers will be unable to compare the relative strengths of different theories. Such comparisons are needed if the field is to advance conceptually and/or to provide sound community crime-prevention advice. A path toward resolving these concerns is sketched.

Chapter 9 considers the thorniest problem of all: selection effects. On the “input” side of the boat metamodel, these pose a formidable alternate explanation of neighborhood effects. More recently this problem has drawn attention as it shapes the “output” side of the boat model. This chapter contributes the following four ideas to the neighborhood effects versus selection effects debate. (a) It admits that this problem is not solvable at a metatheoretical level. (b) But it can be organized at a metatheoretical level. The dynamic boat metamodel reveals three distinct aspects of selectivity bias for community criminology. These three separate but related aspects of the selection problem are predestination nonrandom selection dynamics, documenting postarrival processes underlying neighborhood effects, and taking into account ecological impacts of selective in- and out-migration patterns for intercommunity spatial, economic, cultural, and political inequalities. (c) Three separate aspects of the problem create three distinct but related sets of issues. Each facet of the problem deserves its own approach. Focusing on one aspect of selection dynamics does not solve the questions associated with the other two. (d) Selection problems, although not solvable at a metatheoretical level, can be solved within the frameworks of specific theories. Making progress within these frameworks requires that proponents of each individual theory craft a theoretically congruent selection submodel and test each theory’s submodel as they test each theory.

Chapter 10 summarizes some of the main arguments suggested in the volume, returns to a discussion of the levels-of-integration challenge, and considers how interested researchers might go about addressing the metatheoretical concerns raised in this volume.

Intended Audience

This volume should prove of interest to both community criminologists and those interested in multilevel/mixed-effects models where crime is an

ecological attribute or individual criminal behavior in a community context is an outcome. Such scholars find homes in the disciplines of criminology, criminal justice, sociology, political science, public health, epidemiology, anthropology, urban studies, social work, economics, and psychology. In addition to current scholars, graduate students in these fields with these interests should find the volume useful.

Because the volume is intended to be at least somewhat accessible to graduate students, discussion of highly technical issues requiring extremely advanced analytic or mathematical capabilities is avoided. The underpinning math and technical models can be found in the cited references. In short, although there may be a few equations here and there, there will be no extensive mathematical or statistical derivations. I apologize in advance to capable readers annoyed by this volume's shying away from formal proofs. Nevertheless, regardless of your current academic (or nonacademic) position, if you have survived an eighth-grade algebra course, an introductory graduate-level statistics course covering multiple regression, an introductory graduate-level research methods course, and an introductory graduate-level theory course in your discipline, you should be fine. The volume may prove suitable as a text in graduate courses on community criminology, human ecology, crime and society, health and place, advanced theory, or advanced methods.

Closing Comment

This book addresses four foundational matters: spatial scaling, temporal scaling, ecological construct validation, and selection. Each concern lies at the *intersection* of conceptualization, measurement, and theory testing. The focus is on how these matters apply to community criminology. In one sense, the volume is an effort to advance Short's levels-of-integration project, albeit with an outcome focus that is sometimes different.

This chapter opened posing an unanswerable question: is there one criminology, or are there many? Given the recent and not-so-recent comments of leading criminologists—Messner, Rosenfeld, Sampson, Savelsberg, Short, Wikstrom, and others—its seems that criminological theory has at the least been fragmented, with different models scattered across different temporal and spatial levels of analysis. This author worries that, at least in the corner of the discipline of criminology concerned with communities, progress on theoretical integration is blocked by the four fundamental issues raised here. This volume is a response to those worries. It specifies what these issues are, why they are conceptually crucial, and how we can respond to them in our theorizing and theory-testing efforts.

Three Core Community Crime Sequences

Operationism has occasionally hypertrophied into a radically anti-theoretical attitude.

—Herbert Feigl (1945)

Are hypothetical operations which are physically impossible with present available techniques, of scientific use? Is the other side of the moon what you would see if you went there?

—Herbert Langfeld (1945)

All research methods require philosophical justification at some level.

—Christopher D. Green (1992)

Criminological theories are not always clear about what they aim to explain.

—Per-Olof Wikstrom, Dietrich Oberwittler, Kyle Treiber, Beth Hardie (2012)

Current Views about Community Crime Indicators, and the Operationism Debate

The Concern

This chapter conceptually defines a key outcome or a key predictor in all community crime models: community crime rates. As used here, these rates refer to attributes and dynamics at any stage in any of three core community crime sequences involving delinquents and delinquency, offenders and offending, or victims and victimization. Although there are exceptions, many researchers interested in crime either as an ecological predictor or outcome have taken crime for granted.¹ In-depth reflection on the ecological processes creating the scores proves rare. Instead, especially if researchers use crime or delinquency data from official sources, they typically announce the crime type of interest and the data source, report the geocoding hit rate or geolocation process if relevant, and move on to describing remaining

variables.² Moving away from indicators of crime per se, community criminologists using indicators as calls for service, police incident reports, arrests, self-reported delinquency, self-reported offending, or self-reported victimization will often provide additional *technical* information as appropriate, covering things such as agency-based data processes or self-report procedures. Researchers focusing on large numbers of small-scale geographical units such as neighborhoods or streetblocks and restricted to archival sources necessarily, given crime's rarity, often use alternate indicators such as call for service in specific categories [735]. Barbara Warner and others have considered the theoretical implications of how these available community-level crime and proxy crime indicators intertwine [781].

But the crucial question of how different crime and proxy crime indicators are generated over time at the community level is rarely tackled. What is going on that creates these different counts or rates? Further, *over time*, and *within communities*, what dynamics link different indicators? Finally, how does scholarship on key issues in the geography of crime, environmental criminology, and other fields aid our understanding of indicator generation processes, including those processes linking different indicators? This chapter pursues these three issues.

Some community criminologists seem to have unwittingly adopted an antitheoretical attitude about community-level crime indicators: they might implicitly or explicitly recognize methodological, analytical, and sociological limitations of macro-level crime indicators while simultaneously bypassing the dynamics generating these indicators. Overlooked dynamics include, among others, the causes and implications of intracommunity longitudinal endogeneity, that is, crime outcomes or dynamics in the community that contribute to later crime outcomes or dynamics; connections across core community crime sequences; prevalence/incidence slippage; and the multiple and sizable influences of criminal justice agency (CJA) actions at various points in each core crime sequence. Such dynamics and connections are sketched here.

Stated differently, this chapter seeks to enrich the discussion of community crime rates in their many different forms and to gain some clarity about the different stages involved in generating community rates of crime, delinquency, or victimization. The hope is that "a deeper interpretation of the facts" around community-level crime indicators might emerge [234: 288]. The aim is to stimulate thinking about the constructs and dynamics behind the sometimes too readily accepted community-level indicators of crime, delinquency, and victimization. Absent such a "deeper interpretation," community criminology runs two risks. The first risk is equating key concepts

with observed scores on variables. This is the problem of strict operationism (see later in this chapter). The second is losing sight of concepts that scholars cannot immediately envision how to assess empirically, the “other side of the moon” in a pre-lunar-mission era. These risks are not unique to community-level criminology. Individual-level criminological theory broadly has struggled with just this issue [281].

Broader Philosophical Underpinnings and Implications

As in the preceding chapter, pulling the lens back further reveals that what is at issue, for both individual- and community-level theories, is a philosophy of science debate. The debate here is about the meaning and implications of operationism. Operationism says that what something is, is what is empirically captured, no more, no less. “In the words of [P. W.] Bridgman, ‘we mean by any concept nothing more than a set of operations; *the concept is synonymous with the corresponding set of operations*’ [105: 5]” [288: 294]. Operationism, widely promoted in physics in the 1920s, later proved widely influential in psychology from the 1930s onward. It continues to shape scholarship despite extensive critiques from philosophers of science and rejection of the idea itself by some original contributors including Bridgman [288]. Social scientists’ views on operationism varied widely in the 1940s [422]. That diversity of opinion persists today [700]. The zombie-like tenacity of *strict* operationism perhaps has been fueled substantially by the emphasis on operationalizing concepts in research methods texts [288].

In contrast, the view suggested here on operationism follows Herbert Feigl’s [233, 234, 235, 288]. Most importantly for community criminology, Feigl’s view means that theorizing about concepts not yet captured with current indicators represents a crucial and guiding activity [233: 253].

A reader progressing through the following descriptions of core community crime sequences may react with “How am I going to measure that?” He or she would do well to recall two points. A key theory enterprise is forging ahead to pose “‘why questions’ by establishing unobserved yet credible causal mechanisms” [425: 240; 814]. In criminology as in other scientific disciplines, the tug of war between data and theory has been vigorous since its inception. A report by Jerome Michael and Mortimer Adler castigated the field in the early 1930s as unscientific because it relied largely on raw facts and lacked interpretive and general theories [269, 508]. Scholarship “must distinguish between logical, . . . empirical, . . . and practical possibilit[ies].” Such distinctions lead to this tug of war [233: 253]. In addition, community criminology to date has not yet fully considered the conceptual implications

of different types of community crime indicators: how they are generated, what is “behind” them, how different sequences connect, and the roles of criminal justice agencies at multiple points in each of these crime sequences. We need to.

Chapter Structure

The three core community crime sequences center on delinquency, crime, and victimization. Each sequence examines community-level prevalence, incidence, and repeat features. The *community* rather than the variable or indicator is the lens. More specifically, the focus is on the within-community, macro-level dynamics connecting different features of each core sequence; the roles of criminal justice agencies at various points in each sequence; the connections between the different core sequences; and the implications of these sequences for operationalizing indicators.

Research grounds the assumptions behind the stages and links in each core sequence. More specifically, behavioral geographic and ecological crime research examining where offenders live, where offenses happen, and what is known about the journey to or from crime provides the conceptual foundation, as does recent research about the locale-altering intrusiveness of CJA actions in many urban communities.

What the Core Crime Sequences Accept as Givens, and Implications

Each of the three core community crime sequences builds on several points amply demonstrated by earlier research not only in community criminology but also in the behavioral geography of crime, the sociology of law, and environmental criminology. These fundamental points are outlined in the following sections, and metatheoretical implications for thinking about macro-level community crime dynamics are noted.

Adult Incidence Rates, Delinquency Prevalence Rates, and Adult Prevalence Rates Are Ecologically Distinct

Criminological theorizing at the individual level routinely separates criminogenic tendencies from engaging in specific criminal acts [281, 814, 818, 821, 823]. Although the terms used may vary, the key idea is that the developmental sequences and personal factors leading a person to be more or less inclined to criminal or deviant acts are conceptually distinct from actually

engaging in a criminal or deviant act or desisting from these acts. How criminogenic tendencies are measured separately from involvement in criminal acts, the adequacies of those indicators, and the sources and nature of the tendency/act discrepancies represent important areas of scholarship [224, 331, 353, 473, 513, 514, 749, 750, 823].

The parallel ecological distinction was first systematically investigated in the 1970s in the first Sheffield (UK) study [28]. British researchers John Baldwin and Sir Anthony Bottoms gathered data in the 1960s and 1970s about the town of Sheffield. Historically, like Pittsburgh, Sheffield had hosted substantial steel production. Gathering information on where adult offenders lived, where juvenile delinquents lived, and where crimes happened, Baldwin and Bottoms constructed rates for these three at the enumeration district (ED) level. These areas are somewhat smaller than census tracts, areal units used by the US Bureau of the Census. The researchers' most important finding was that adult offender rates, juvenile delinquent rates, and adult offense rates all had spatially distinct distributions [28: 58, 75, 76]. "The offence and offender areas of the city are by no means the same" [28: 76]. Prevalence and incidence rates emerged as ecologically distinct, and the spatial distribution of the former varied depending on whether juveniles or adults were considered. Further, land uses shaped the ecological distributions of offender rates. Two were singled out: proximity to "main areas of heavy industry" and problematic public housing communities ("difficult housing estates") [28: 191].

Baldwin and Bottoms's ecological separation of offender and offense areas startled other scholars at the time. It ran counter to some earlier suggestions that the ecological distributions of prevalence and incidence rates were spatially congruent [28: 97; 759]. This earlier widely accepted spatial congruence between incidence and prevalence rates perhaps arose from an empirically supported view of many US researchers: broad differentiations in city structure, and associated broad-gauged processes of economic and ethnic differentiation, powerfully determined a range of social ills including both poverty and crime [723]. These ideas date back at least to the mid-1800s in the US [518]. Early 20th century studies routinely observed lower rates of many social problems, such as mental illness as well as delinquency, in the outer as compared to the inner zones of large cities [227, 666, 678]. Relying on concentric models of city growth, researchers organized data into concentric rings with the central business district (CBD) at the core [117, 357]. These patterns had been empirically observed in much rougher form in the mid-19th century as well [27, 480]. What was new in the early 20th century was the regularity of the patterning across different cities and the persistence of the patterning across decades in one city.

So, in the early 20th century, US researchers generally applied the same broad logic to offender and offense rates. For example, a study by R. Clyde White of felons and felonies using data from the late 1920s in Indianapolis found that rates of both of these decreased linearly with the log of the distance from the city center when the data were organized into these zonal concentric rings [807]. Such early studies also sometimes found localized factors altering these broad patterns. White noticed that certain land use factors, such as locations near railway lines, linked to elevated felon or felony rates. In the 1930s, many indigent persons “rode the rails,” hitching rides from town to town on slow-moving freight trains. White also noted ecological discrepancies for white-collar offenses. But these were seen as minor departures from broader regularities. Thus, one of the general points absorbed by many researchers on the ecology of crime from the first half of the 20th century up until the 1970s was the relative *ecological* interchangeability of prevalence and incidence rates. Certainly, given urban spatial structures, their origins, and the fact that the distances between home and offense locations were often relatively short (see later discussion), this ecological substitutability made sense up to a point. Given the behavioral geography of crime, it especially made sense when researchers used large areal units such as census tracts or even larger spatial units such as Chicago’s natural areas. That interchangeability perhaps encouraged another substitution: applying ecological models built on delinquent prevalence rates to adult offender prevalence rates or to adult or juvenile incidence rates. In short, researchers’ reliance on large areal units, ready application of the same models to different crime or delinquency outcomes, and observed overlapping empirical patterns meant few questions were raised about the implied conceptual equivalencies between delinquency or crime location-based incidence rates and prevalence rates. This was community criminology’s understanding prior to Baldwin and Bottoms’s first Sheffield study.

That study, instead, suggested the following. (1) It would be wise to think in conceptually distinct ways about juvenile prevalence rates, adult incidence rates, and adult prevalence rates. The distinct spatial patterning suggested somewhat distinct causal *ecological* dynamics.³ (2) At the same time, the different patterns related to one another. Comparing rankings of areas on adult prevalence versus incidence rates suggested both conceptual connections and distinctiveness. (3) Land use or opportunity structures prove important. Some areas were more “crime attracting” than others [28: 97]. (4) Social class was crucial, but its relative importance was conditioned by the extensiveness of public housing (council estates in the UK).

METATHEORY IMPLICATIONS

Several metatheoretical implications for ecological crime patterning arise from the ecological distinction between offending and offense rates. (a) It suggests conceptualizing and modeling the ecological dynamics behind each rate as independent but also related. The first stage of each of the three core sequences, presented later in this chapter, directly addresses this view. (b) Work on areal offense rates underscores the relevance of areal distributions of crime-specific opportunity structures such as different land uses [28, 807]. Taking these into account may radically alter our understanding of the broader urban patterning of offense rates [75].

This volume generally aligns with Hawley's and Bursik's human ecological perspective. They both emphasized understanding community differentials by focusing on the functional niches that communities occupy relative to one another (see chapters 5–7). Combining this view with Baldwin and Bottoms's insight suggests additional broad implications. (c) Crime-specific niches might deserve examination. (d) Finally, how offenders get from where they reside or work or socialize to where the crimes take place deserves consideration. Environmental criminologists and behavioral geographers have spent decades studying this. One of the most well-researched features of that individual-level work has been the distance-related features of these dynamics. These are described next; then implications are examined.

Distance-Dependent Spatial Behavior

Extensive individual-level work in behavioral geography and environmental criminology has modeled features of the journey to crime and offender residence–offense location–victim residence mobility triangles [301, 747]. The journey *from* crime also has begun to attract researchers' attention for motor vehicle theft and illegal drug purchase in open-air markets [452, 463, 464]. Several distance-related features of journeys to crime, journeys from crime, or crime mobility triangles are notable.

a. The distributions of individual journeys generally follow distance decay functions.⁴ The standard spatial-interaction model acknowledges the friction of distance. This is pivotal to understanding crime patterning [828]. Generally, it costs more, and takes more time, to move *physical* things greater distances, including oneself. Not surprisingly, then, the friction of distance and thus distance decay functions shape the dynamics for journeys to and from crime and for mobility triangles [55, 301, 598, 600]. The distribution of trip distances for delinquent as well as adult offenses turns out to generally follow

an expected distance decay function [758]. Stated more formally, the probability of the offense happening a certain distance away from the point of origin of the journey to crime or a delinquent act is in part—there are other factors, of course—a “power function of distance with a negative exponent” [758: 21].⁵ Often researchers do not have the origin point for the trip to crime and so substitute residence of the offender or delinquent.

The distance decay effect is not just about space; it is about the interaction of space and time, temporal as well as spatial constraints [581]. Individuals spend considerable time around nodes such as home, work, school, or frequently used nonresidential venues. Further, they often are under time constraints when traveling between nodes. Thus, they have more time to explore potential targets and engage in actual offending in locations *near* to one of these nodes.

b. Journeys to crime are relatively short. White’s Indianapolis study, noted earlier, plotted Manhattan distances between the centroids of the tracts where felons lived and the centroids of the tracts where their felonies happened [807]. White found (his table VI) an average distance of 0.84 miles to personal crimes and an average distance of 1.72 miles to property crimes.⁶ The first Sheffield study of distances to crime sites had roughly comparable findings [28: 81–98]. Current work finds comparable distances from offender residence to offense location [694].

c. As White found over eighty years ago and other researchers have since, journeys to crime are shorter for personal crimes than they are for property crimes. White proposed that the short distances suggest that personal crimes are

crimes against neighbors; they suggest irritation from close and frequent contacts. On the other hand, crimes against property occur at greater distances from the residence of the offender and, presumably, against persons or corporations more or less unfamiliar to the offender. Crimes against property involving violence, that is, robbery and automobile banditry, are committed at relatively great distances from the residence of the offender. . . . It may be that robbers and bandits go farther from their residences, because the danger of being arrested for such offenses is greater than for the commission of certain other crimes against property. [807: 507]

White’s use of terms such as “irritation” versus “unfamiliar” targets suggests *different* causal dynamics for the two different crime types. Perhaps personal crimes are not planned but rather happen more spontaneously when “irritation” erupts into violence [91]. Eruptions are more likely in places where a

person spends more time, just due to temporal exposure. By contrast, property crimes may involve more planning, although some researchers suggest otherwise [185, 600].

Given the journey patterns, and the personal- versus property-crime distance differences generally, it is not surprising that personal-crime victims live close to where they are victimized and that personal-crime perpetrators operate close to where they live. A Washington, DC, study of murder mobility triangles confirmed the “spatial coincidence of offenders’ homes, victims’ homes, and the location of the incident” [301: 221]. About half of the murder victims “died in the same neighborhood cluster in which they lived,” and “victims and offenders lived in the same neighborhood” about a third of the time [301: 222].

d. There may be a “hole in the doughnut” whose size varies as a function of the offense in question.⁷ Very few offenses may be committed quite close to home because the offender or delinquent seeks to avoid easy identification by known others [91]. In the case of vehicle or bicycle theft, the offender or delinquent would be wise to steal the item outside the radius within which he or she intends to use it in order to avoid identification [758]. For delinquents, if accomplices are involved, the hole in the doughnut may be even larger [758].⁸

METATHEORY IMPLICATIONS

Several ecological, metatheoretical implications follow from the distance-related dynamics revealed by the individual-level research. (a) Although ecological incidence and prevalence rates are conceptually distinct, the strength of the empirical connection between the two will depend on at least two factors. The larger the size of the community defined, the stronger the empirical connection between the two, given the typical distances seen in research. The connection seems likely to be weaker for property as opposed to personal crimes since the median distance for the former is generally greater. Further, within personal or property crimes, the strength of the distance decay function may be crime specific. (b) Even though the victimization core sequence is conceptually distinct from offender and offense sequences, connections are likely between the three, and, again, the strength of the connections may vary depending on spatial scale. The mobility triangle work suggests stronger links between victimization rates and offender rates for larger-size community units and for personal as compared to property victimization. (c) Adjacency dynamics merit attention in models developed for macro-level crime rates. Impacts of offender, offense, and victimization rates in nearby, adjacent communities seem likely. Further, adjacency impacts may be stronger

the smaller the community unit investigated and when personal crimes or offenders, as compared to property crimes or offenders, are under consideration. Therefore, researchers should anticipate an interaction between impacts of spatially lagged predictors and spatial scale, with the lags proving more powerful at smaller spatial scales. Adjacency dynamics will receive attention when spatial scaling is discussed (chapters 3–5).

Dramatic Increases in Criminal Justice Agency Intrusiveness, and Stratified Consequences

Figure 2.1 shows the US combined rate of federal and state year-end incarcerated prisoners, per 100,000 residents, for 1925–2008. This rate had remained relatively stable from about 1930 to about 1970, leading some scholars to suggest a stability of punishment thesis [73]. Since 1970, however, the rate has increased about five times. From 1925 to 2008, the total number of federal and state prisoners has increased 16.6 times (from 92,000 to 1.52 million), while the total population in the country has increased only 2.6 times (from 116 million to 304 million). During the past thirty years, there have been equally dramatic increases in supervision rates outside of state and federal prisons. Since 1980, probation, parole, and jail populations have each tripled.⁹ The examination of the reasons behind these exploding numbers, and the economic, cultural, political, and criminal justice implications of these shifts, has generated several streams of sophisticated scholarship [264, 472, 745, 803, 804, 805].

Of interest here are the implications, for urban communities, of the localized impacts of increasing CJA-managed offender-removal, offender-return, and offender-supervision rates. Increases in those rates are clearly implied by the long-range temporal trends. Relevant localized impacts include the following four points.

a. Most incarcerated offenders “come home” again [757]. Although the figure varies from year to year, in the past couple of decades, about 0.6 million previously incarcerated offenders have been released annually [770]. This is roughly equivalent to the residential population of the District of Columbia or Baltimore. Extensive scholarship around what is called the reentry process, and what makes it successful, has emerged in the past twenty years [561]. Successful reentry is challenging in part because of prisonization effects and postrelease practices disenfranchising ex-felons [472, 806]. Clearly, the relative volume of monitored or unmonitored ex-felons has implications for overall community social problem indicators such as unemployment and poverty rates [564].

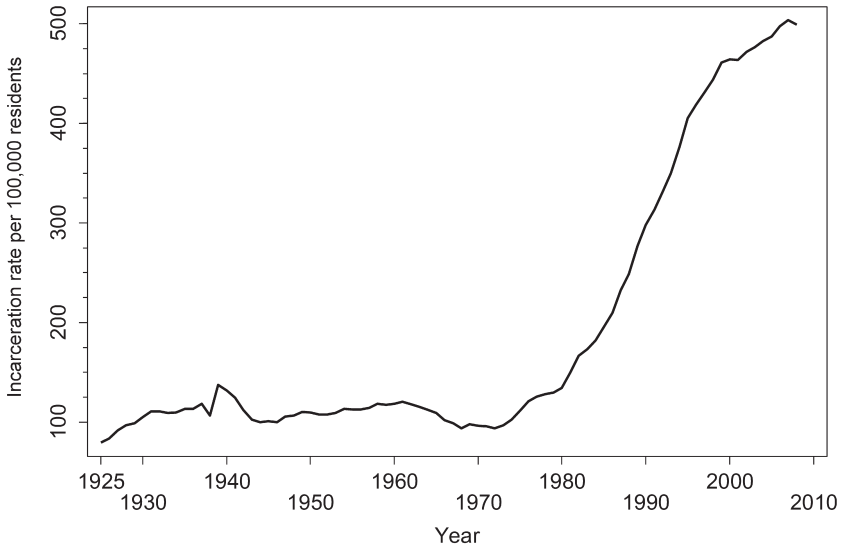


Figure 2.1. United States incarceration rate, 1925–2008. The prisoner counts for 1925–1986 come from Langan et al. [421]. Prisoner counts for the years 1987, 1988, 1999, and 2007–2008 are from the Bureau of Justice Statistics table “Key Facts at a Glance: Correctional Populations” (online: <http://bjs.ojp.usdoj.gov/content/glance/tables/corr2tab.cfm>; accessed 6/16/2010). Other prisoner counts are from table 6.13.2007 from the Sourcebook of Criminal Justice Statistics Online (online: <http://www.albany.edu/sourcebook/wk1/t6132007.wk1>; accessed 6/16/2010). Population figures come from the US Census table “No. HS-1. Population: 1900 to 2002” (online: <http://www.census.gov/statab/hist/HS-01.pdf>; accessed 6/16/2010). Population figures for 2002–2008 come from the US Census table “Resident Population by Sex and Age: 1980 to 2008” (online: <http://www.census.gov/compendia/statab/2010/tables/10s0007.pdf>; accessed 6/16/2010).

Researchers may gain a better understanding of the ways returned and returning ex-felons in communities shape community life and community crime over time by separating stocks and flows. In prison population studies, the estimated number of people incapacitated for an entire year, the stock, is distinguished from the number admitted or released in a year, the flow [456]. The community-level impacts of stocks and flows of released offenders may depend in part on the interaction of the two levels. For example, in communities with large numbers of returned ex-offenders and high offender prevalence rates, the marginal impacts on community functioning of an additional returned ex-offender may be negligible; the in-flow is only a small fraction of the stock. Alternatively, in communities with extremely low numbers of already-returned ex-offenders and low offender prevalence rates, even small

in-flows of ex-offenders returning to the community may more noticeably affect community offending rates.

b. Because incarceration rates demonstrate marked racial and socioeconomic inequalities, so too do ex-offender return rates [751]. Small numbers of urban communities, often those with residents who are lower socioeconomic status or populations of color, are asked to “take in” extremely large numbers of releasees.

c. Removal rates are spatially inequitable at the subcommunity level as well as the community level. Eric Cadora has developed maps for state agencies showing, on a census-block-by-census-block basis, how much is spent per annum to house new prisoners [276]. He has found, in parts of Brooklyn (NY) and elsewhere, “million-dollar blocks.” These are census blocks where \$1 million or more is committed each year to house new prisoners.¹⁰ If the removal rates are inequitable at the subcommunity level, it seems likely that ex-offender return rates and supervision rates are as well.

d. Although the percentages vary from year to year and may be trending downward, in the 1990s about four out of five released prisoners were still under some form of supervision [756]. Whether the continued supervision is beneficial for the releasee or the community is a complex question. But the relevant point here is simply that some neighborhoods, because they have extremely large numbers of released prisoners relative to other communities, are going to host a lot more CJA monitoring activity as a consequence.

METATHEORY IMPLICATIONS

Several broader theoretical points are implied by the foregoing discussion. Most broadly, CJA actions which play out differentially across communities in a locale will differentially disadvantage those communities. The ways these disadvantages operate has been of interest to scholars working within community-justice and mass-incarceration frameworks [158, 159, 160, 458, 617]. These scholars have argued that excessively high removal rates reduce rather than improve community safety because important members of pro-social local networks are removed. Important questions remain about the community-justice framework and the supporting evidentiary base [458, 736]. Nevertheless, the important point is that CJAs are much more active in some communities than others. Whether that activity is in the form of higher removal rates, higher supervision rates, or the way the police treat citizenry, in some locales actions of CJAs are dominant features of local life and generate consequences that skew fundamental demographic features of community life, such as gender ratios and unemployment [472, 507, 631]. Recent urban ethnographies provide ample examples [82, 680]. Therefore,

when crime-producing dynamics in a community context are considered, CJA actions are crucial components. In the core sequences described later in this chapter, those actions will be part of each sequence.

In addition, beyond just differential levels of CJA involvement in different communities, CJAs operate in different ways, and/or are perceived to operate in different ways, in different places [400, 737]. For example, unbounding rates—the rates at which police determine that reported crimes have *not* happened—link to community socioeconomic status [712]. And, of course, substantial work links individuals' race with their views of police, although questions persist about the impacts of neighborhood racial composition on citizens' views of police [590, 639].

Finally, the ecological differentials in offender removal, return, and post-release supervision rates engender accompanying spatial variation in deep-seated cynicism about and distrust of CJAs in some communities [111, 112, 139, 140, 703]. These attitudinal variations have behavioral consequences. Consequences include altering individuals' willingness to report crimes seen or experienced and their willingness to participate as witnesses or plaintiffs in legal proceedings. "An increasing array of conceptual and empirical work has linked a perceived lack of responsiveness on the part of legal actors to both more and less reporting of crime" [87: 7]. These areal variations will shape how the different elements in a core community crime sequence connect and how those connections may differ by community.

Introducing the Core Crime Sequences

The preceding section has sketched some findings with broad metatheoretical implications for community crime patterns. Given that background, three core sequences describing community-level dynamics are introduced in this section. The three sequences address delinquents and delinquency, adult offenders and offending, and victims and victimization. At various points, each sequence draws in CJA responses or assumes previous CJA actions. The sequences are macro-level in the sense that they represent accumulations of conditions and actions over a community-sized area over a period of time.

Elements in each sequence can be positioned in the boat metamodel introduced in chapter 1 in two possible ways. They could function as macro-level inputs (Ma-I) positioned at the top left of the metamodel, reflecting the idea that these attributes will cause later changes. Alternatively, they can be placed at the top right of the metamodel, as macro-level outputs (Ma-O), becoming community-wide outcomes. It also is possible to have different elements from the same sequence, or from different sequences, in both positions in

a metamodel. For example, one could examine impacts of adult arrest rates (Ma-I) on later first-time delinquent prevalence rates (Ma-O) [736].

If a researcher is treating elements of one of these sequences as a macro-level output (Ma-O), a question arises. What is the *theoretical* relevance of individual-level dynamics? This issue connects to debates about sociological holism versus methodological individualism (chapter 1). How does one view the theoretical relevance of the individual-level elements of these community-level core sequences? Are they merely descriptive of the micro-foundations of the macro-level outcome, or are they theoretically relevant causal dynamics?

The view taken here is as follows. Each stage of each community crime sequence has its origin, *in part*, in individual-level, unaggregated actions. Those origins or micro-foundations do not preclude the relevance of macro-level causal dynamics. Conversely, the causal relevance of macro-level dynamics does not necessarily preclude the causal relevance of individual-level processes. The relevance of each may depend on the specific theory being investigated, the spatial scale of the community in question, the time frame spanned by the output, and perhaps the specific crime in question.

Delinquent/Delinquency Core Community Sequence

Figure 2.2 depicts the core community-level delinquent/delinquency sequence. The solid line around the sequence itself reflects the geographical distinction between inside the community versus outside. Arrows crossing the community boundary reflect influences or movements involving the community and the surround. The sequence starts with self-reported delinquent acts, within a specified period and within a specified community, by juveniles who have not previously committed delinquent acts. If the researcher is focusing on juveniles aged, say, ten to seventeen, and a period of a year, at the end of that year, x many delinquent acts will have been committed within the community by juveniles reporting that they had not committed any delinquent acts prior to that period. These reports generate a first-time delinquency incidence rate. It may be preferable to construct gender-specific rates; for example, x many acts per thousand boys aged ten to seventeen. Upward- or downward-pointing, light arrows containing u represent suspected sets of unknown influences. Light upward-pointing arrows not containing a u indicate clusters of influential factors that are generally known. If a light, upward-pointing arrow crosses the community boundary, ecological patterning of that influence seems likely.

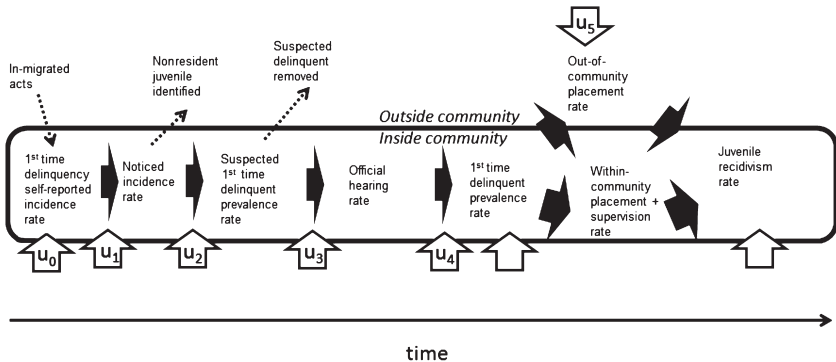


Figure 2.2. Core community crime sequence for delinquency.

This sequence, like the others, starts with self-report indicators. Considerable scientific research has examined how self-report-based indicators score on scientific benchmarks of reliability and validity, and the impacts of different types of administration such as randomized response techniques or audio computer-assisted self-interviews (ACASI) [347, 742]. This literature is complicated, and some important questions have not yet been fully resolved. Some scholars suggest that the data may prove satisfactory for some purposes. “The self-report method for measuring crime and delinquency . . . seems to be successful and capable of producing valid and reliable data” [742: 71]. On the other hand, “the reliability and validity” of juvenile and adult self-reports on offending “continues to be a major concern,” and “criminologists continue to ask whether there is systematic bias in the reporting of criminal behavior and arrests” [407: 523]. Underreporting and overreporting continue to be a problem and may “behave” differently [407]. Finally, and perhaps most importantly here, the reliability and validity of self-reports of delinquent acts or adult offenses *at the community level*, and how these benchmarks of scientific quality might shift depending on community factors, has received scant attention. Consequently, even though all three of these sequences begin with self-report indicators, the uncertainties and limitations associated with those indicators, especially as community-level indicators, must be borne in mind.

Some of these first-time delinquency acts are committed by juveniles residing within a specified community of interest. Others are committed by juveniles residing outside the focal community. The latter group of acts is “in-migrated” to the community in question. This is shown by the left-most downward-slanting dashed arrow in figure 2.2.

Of course, there are questions about how such an indicator could be gathered. What type of self-reporting protocol would be used by the researcher? How does the researcher ensure that juveniles are reporting the location of the incidents in question accurately? How does the researcher avoid backward or forward telescoping of the reported timing of the acts using an unbounded survey methodology? Is the researcher interested in the full range of delinquent acts or just acts above a specified seriousness threshold? In short, there are many important operationalization issues involved in getting to these incidence rates.

Given all these challenges, given that delinquency self-report methodologies are only about five decades old, and given continuing concerns about the reliability and validity of delinquent act self-reports, it is no surprise that the bulk of ecological delinquency research has focused on delinquency prevalence rates using official records to locate delinquents' residence [407, 677]. Observation or official records have shown at least since the mid-1800s that delinquents are more likely to be found in some urban communities than others, and that is still true [480, 665, 666, 786, 838]. The ecological patterning exhibits both stability and change [119, 120, 121, 122, 123, 124, 125, 126, 665, 666, 736]. It is suggested here, however, that delinquent acts be the focus. Such a focus aligns with situational action theory's (SAT) focus on specific crime acts [817, 821]. This first community rate suggested here is the first-time delinquent self-reported incidence rate. In the figure, an arrow crossing the neighborhood boundary labeled "u₀" suggests that the over- and under-reporting of delinquent acts may be ecologically patterned.¹¹ If the degree to which delinquent acts are heralded or shamed varies across communities, such ecological influences seem plausible, even when adolescents are providing confidential reports. The same ecological patterning may apply for self-reported adult offenses.

Within a spatially delimited community, within a set period, a certain number of delinquent acts occur, committed by juveniles who reside either within or outside that community and each of whom had not previously committed such acts. Recent research reveals that locations of delinquent acts are ecologically patterned and heavily influenced by land use features such as public transport routes, locations of specific types of land uses, and surrounding levels of community surveillance [819]. That work is limited, however, because it has not yet distinguished between first-time and repeat delinquent acts. That distinction is important because criminal justice agency actions can have an ecological patterning that is driven by more than the issue itself [655]. A focus on first-time acts should reduce potential influences of prior CJA actions on what juveniles do where and when.¹²

Acts committed in the community by first-time delinquents, living either within or outside the target community, may be detected by civilians. If detected, they may or may not be reported to authorities. Delinquent acts also can be directly observed by officials such as teachers or CJA personnel. Thus, a certain fraction of the delinquent acts taking place will create a noticed incidence rate, shown as the next stage in the sequence. "Noticed" stands in for the sum of (a) acts officially observed and (b) those detected-and-reported by civilians.

How sizable will the gap be between the self-reported act rate and the noticed act rate? It seems likely that a range of factors, some of which may be ecologically patterned, will shape this gap. On the civilian side, many of the same complexities that shape reporting victimization may be relevant here. At the least, it seems that connections between the potential noticer and the juvenile in question, as well as views about the police, would be relevant [386, 854]. So too would community structural factors, such as socioeconomic status, racial composition, and inequality. These can shape views about reporting to the police generally, reporting victimizations to the police, and perceptions of police effort around community issues such as troublemaking juveniles [41, 140, 265, 703, 737, 852]. But the research has yet to specify the relevance of each of these factors. Verifying the applicability of each is important given the complex literature on adult crime reporting and the importance of event seriousness [424, 684]. In short, a host of unknown factors, labeled " u_1 " in the figure, shape the process of self-reported delinquent acts becoming noticed delinquent acts. The arrow is shown crossing the community boundary because the unknowns are likely ecologically patterned, perhaps at different levels of geography.

The next process in the sequence translates the noticed incidence rate into a suspected first-time delinquent prevalence rate. Again, the translation of the noticed rate into the suspected rate probably depends on different, as yet unspecified factors, some of which are ecologically patterned (in the figure, upward arrow u_2).

Some ways these factors (u_2) could shape the translation include the following. Not all delinquent acts have identifiable actors. The juvenile may not be seen or, if seen, may not be identified. In some communities with strong local social ties and high levels of homogeneity, residents may know exactly which children were responsible for which delinquent acts and may freely share this information [459]. This is a core idea in the popular and often distorted social disorganization theory [122]. So in some communities, most juveniles residing in the community who were responsible for the acts may soon be identified. In other communities, the identification rates may be

much lower [459]. Further, if a juvenile is identified, he or she may not be found by CJA personnel. If found, variations in how different CJAs are organized and how different CJA personnel act become relevant. Ecological variation at the state, jurisdiction, and community levels seems likely. Every state in the US has its own juvenile justice system [394]. At the jurisdiction level, different police departments may have different traditions. In Philadelphia, for example, the juvenile “catch and release” (before hearing) rate for police officers, traditionally, was relatively low [516, 517]. Police in different departments have different styles, and which style is adopted seems likely to shape the “catch and release” decision [829]. Further, within a department, there can be important differences at the community level. Community characteristics shape localized policing norms at, for example, the district or precinct levels [400, 712]. Finally, the “catch and release” decision may depend on the race of the juvenile. African American youth strongly perceive that they are treated differently by local police [111, 112, 265, 703, 801].

Some of the juveniles linked to delinquent acts in a community may reside outside it. This is shown in the figure with the upward dashed arrow labeled “nonresident juvenile identified.” These juveniles contribute to the next stage in the sequence, a suspected prevalence rate, but for their community of origin, not the community where the delinquent act took place.

At this stage in the sequence, juvenile justice system actions become increasingly relevant. Given the perspective here, and bearing in mind that each state in the US has its own juvenile justice system and that some options such as intensive-supervision juvenile probation may only be available on a county-by-county basis, there are at least four important ways that juvenile justice system actions may intersect with community.

First, following a preliminary hearing, is the rate at which first-time suspected delinquents are dropped out of the system ecologically patterned across communities? This dropping out is shown with the upward dashed arrow “suspected delinquents removed” in the figure. Theoretically, given Eric Schneider’s historical perspective on the class-linked goals of the juvenile justice system, an ecological patterning of early dismissal rates seems likely [655]. Empirically, there is some supporting, albeit indirect, evidence. Nancy Rodriguez’s study of juveniles processed in Arizona looked at placement into diversion programs as one outcome of interest [607: 403, table 2, model 1]. Some fraction of those who were diverted would not proceed further in the juvenile justice system. Her results observed ecological patterning of this outcome before controlling for compositional effects.¹³

The potential influence of these unknown factors shaping the connection between the suspected juvenile rate and the official hearing rate, arising

substantially from delinquent-geography-linked variations in juvenile justice system operations, is represented in the figure with the upward arrow labeled “u₃.” Again, the arrow crosses the community boundary to capture the idea of potential ecological patterning of influences. After removing cases dismissed at preliminary hearings and diversions which may result in later dismissal for many juveniles, each community then has an official hearing rate for suspected first-time delinquents.

In addition to dismissals before official hearings, from the community justice perspective, a second set of placement actions are of interest. Prior to suspected juveniles’ official hearings, are they placed in custody in secure institutions? If so, are they placed outside their home communities? Such placements, of course, can happen for many reasons including, among others, deteriorated home conditions, a violent incident, or substance-abuse needs [226]. Rodriguez’s intriguing work suggests that the removal of suspected juveniles from their communities through decisions such as pretrial detention depends on a complex interaction of juvenile ethnicity, such as being Latino in the US Southwest, and community structural factors, such as disadvantage [606]. This potential detention differential across communities for suspected first-time juveniles prior to their official hearings is *not* specifically referenced in the figure.

A third set of community-justice-relevant agency actions are dismissal rates at official hearings. Some first-time juveniles will be judicially dismissed. Are dismissal rates ecologically patterned? Rodriguez’s work suggests they might be [607].¹⁴ But more evidence is needed. To capture the idea of potential ecological patterning of the dismissal rate at the official hearing stage, another set of unknown influences is shown in the figure, the upward arrow labeled “u₄.”

At this juncture, official delinquency prevalence rates, albeit only for first-time delinquents, first appear in the sequence. We know from close to a century of research that the combined prevalence rate for first-time and repeat male juveniles is ecologically patterned [659, 663, 665]. Recent work shows that this is also true when only first-time male delinquents are considered [736]. This author is not aware of work on the ecological patterning of the prevalence rate for first-time female delinquents. Ecological influences on official prevalence rates are represented in the figure with an upward *unlabeled* arrow crossing the community boundary. It is unlabeled because these influences are largely known.

Justice agency actions prove relevant in a fourth way by shaping the outcome of the finding of delinquency for an adolescent. Broadly speaking, three options are possible, although specific options vary by locale. Juveniles

may receive straight probation. Or they could be mandated to attend a program but allowed to remain domiciled at home, in their own community. Or, third, they could be placed in a secure program or institution outside their home community. From a community justice perspective, the latter, an out-of-community placement rate, amounts to a type of removal rate.

Is there an ecological patterning to the out-of-community delinquent placement rate? Stated differently, controlling for juvenile and incident characteristics, do the odds of first-time delinquents being placed out of community versus within community vary by community? Some recent work suggests so. Rodriguez's work with her statewide Arizona sample of first-time and repeat delinquents found significant random variation across zip codes in the odds of correctional placement, and significant impacts of a zip-code-level concentrated disadvantage factor [608].¹⁵ Jamie Fader and colleagues did focus specifically on first-time delinquents' out-of-community placement with a Philadelphia sample of juveniles. Unfortunately, they did not address the question of ecological patterning [226]. Zachary Hamilton and colleagues, working with a sample of first-time and repeat juveniles with mental-health or drug-abuse needs, examined out-of-community placement for a small number of programs, each program located within a different county [311]. Their results (p. 152) seem to suggest that out-of-community placement rates still varied by county, even after controlling for juvenile and program characteristics. Thus, the possibility of ecological patterning in the out-of-community versus within-community placement rates for first-time juveniles seems supported but not unequivocally. Consequently, the figure includes another unknown arrow, "u₅," suggesting that as-yet-unidentified factors can influence this ecological patterning.

Whether delinquents are placed on straight probation, complete a program while remaining at home, or are placed in a program or secure facility outside of their home community, they may commit additional delinquent acts. Since the focus at this point in the core sequence has shifted to juvenile prevalence rates, the location of these additional delinquent acts, whether inside or outside the community, is not emphasized. (Of course, that pattern is important practically and theoretically.) These repeat delinquent acts, working through the same stages already identified for first-time delinquent acts but not shown specifically in the figure, may result in a second official finding of delinquency, that is, official recidivism. Repeated recidivism by a juvenile leads to him or her being labeled a chronic delinquent [838].

There is, however, one important way in which repeat official findings of delinquency are different from initial findings. Two recent urban ethnographies, both completed in Philadelphia, pay attention to African American

delinquents and their encounters with and attempts to avoid criminal justice agents such as police. Alice Goffman describes both juveniles and adults [270]. Jamie Fader describes a group of delinquents back in the community after an out-of-community placement [225]. Although there are crucial differences theoretically and empirically between these two works, both agree on the heightened presence of police in the lives of poor African American male adolescents with a record.

With official recidivism, the now-familiar question of ecological patterning resurfaces. Even though recidivism may be more likely for those delinquents previously placed in out-of-community secure institutions since their risk levels were higher, this question can focus on ecological patterning of official recidivism for all first-time delinquents, regardless of their previous placement [383].

Recent quantitative work, including several studies in Philadelphia, albeit not focused on official recidivism of first-time delinquents, does support the idea of ecological patterning of first-time delinquents' recidivism. The work suggests, however, that the ecological influences may be selective. More specifically, ecological influences on juvenile recidivism may depend on either the type of juvenile or the type of recidivism. One study using zip codes suggested that "for high-risk juveniles . . . considerable evidence supports the hypothesis that location ameliorates or intensifies the existing risk factors for chronic offenders" [383: 501]. Qualitative follow-up work suggested that the lack of "community-based, grass-roots organizations with which the juvenile can be placed" in some zip codes was responsible for increasing the risk of chronic juvenile offending [383: 501]. Other juvenile characteristics may be relevant as well [534].

Alternately, the ecological patterning may be relevant only for some types of recidivism. Work in Philadelphia, using small community units, census block groups, confirmed an ecological patterning to recidivism, but only for some types of juvenile offenses such as drug crimes [305, 499]. In that work, community features such as SES and social capital, as well as conditions in nearby communities, proved influential [498]. Whether ecologically differentiated responses by justice agencies mediate the relevance of community features remains unknown. Goffman's and Fader's works both suggest police-district-linked differences in how juveniles in different communities are policed.

In short, albeit selective in ways not yet fully understood, empirical work clearly demonstrates that official juvenile recidivism is ecologically patterned at the community level. This impact of ecological predictors on this outcome is shown in the figure with the last upward-pointing arrow crossing the

community boundary. It is not labeled as unknown, however, since research has begun to specify the relevant community characteristics.

SUMMARY

Delinquency rates may be of interest in community criminology either as macro-level inputs or macro-level outputs. This section, starting with self-reported first-time delinquent acts, has sketched the subsequent rates which are generated; described the connections between different rates at different points in the sequence; outlined different ways both the various rates and the transitions from one rate to the next might be ecologically patterned or have been shown by previous research to be ecologically patterned; and highlighted different ways justice agency actions, sometimes ecologically patterned, have shaped or could shape either rates or transitions between rates.

The foregoing discussion can be placed in a broader socioecological framework. Although not all the rates described here have been examined for ecological patterning, several have. That work, starting with Shaw and McKay and continuing with Bursik, Solomon Kobrin, Lyle Shannon, and others, has demonstrated both stability and change across periods such as a decade or several decades [126, 659, 663, 665, 666]. The relevant community structural attributes shaping the ecological patterns are better known for some rates than others. For some transitions between sequential rates, prior research, as noted earlier, has either hinted at or documented ecological patterning across communities. The ecological patterning of those transitions also may exhibit both stability and change over a period of several years. Further, since juvenile justice systems vary by state, and juvenile justice processing patterns are likely to vary by jurisdiction, the sequences shown here are implicitly nested within such broader differences. In short, it is important to bear in mind that the sequence shown here is embedded in a much broader spatiotemporal context.

The foregoing discussion of necessity has simplified both delinquency and juvenile justice processing, given its focus on community-level crime patterns. Nevertheless, the following points should be clear. Unless a community criminologist interested in delinquency as a macro-level input or output focuses on incidence rates of self-reported, first-time delinquent acts, the delinquency indicators he or she uses arise from a complex blend of influences. Further, some of the most important factors creating this blend are justice agency influences on rates and transitions between rates. Some of these shaping influences already have been identified in earlier research; others have not. Moreover, these shaping actions operate differentially across communities. Consequently, given these influences of justice agency actions

and variations in them across communities, it would be inadvisable to interpret any delinquency rate other than a first-time, self-reported incidence rate as reflecting only or largely community attributes. Yet most research does just that.

Adult Offender/Offense Core Community Sequence

Despite the broad similarity to the juvenile delinquent/delinquency sequence, the adult sequence is modeled separately for a number of reasons. First, the relationship between within-community prevalence rates and within-community incidence rates is likely to be different given that juveniles appear to be more affected by community surroundings and have more restricted behavior patterns [812]. Second, justice agency actions, barring juvenile cases transferred to adult court, are more serious; this has implications for connections between the offender/offending sequence and the victim/victimization sequence and for the community justice perspective. Finally, the periods within which different segments of the sequence take place are different for offenders versus delinquents. Pretrial and removal (if convicted) periods for adults may be much longer.

Figure 2.3 displays the macro-level core offender/offense community-level crime sequence. It is conceptually and empirically related to the preceding delinquency core community sequence for several reasons. These different connections are bundled together in the first point in the sequence and labeled “delinquency dynamics” for the year previous. This feature includes the community-level—not case-level—delinquent elements applicable to seventeen year olds residing in the community the year prior to the first adult offender year investigated. Upward- or downward-pointing light arrows containing a “u” represent suspected sets of unknown influences. Light upward- or downward-pointing arrows not containing a “u” indicate generally understood influences at different points in the sequence. A light, upward-pointing arrow crossing the community boundary suggests ecological patterning of that influence.

Of course, some of the transitions in this sequence involving criminal justice agencies have been described by researchers at national levels, and there are different ways to decompose different transitions shown [231, 247]. But work to date has not yet described these transitions for small-scale units such as communities.¹⁶ Further, previous work has not sought to connect up these sequences with self-report-based information about offenses. A final gap in previous research on community-level offending, removal, and return rates is its failure to systematically separate first-time offenders from repeat

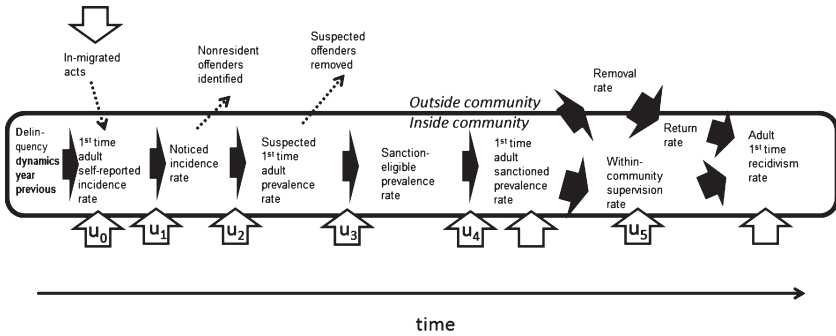


Figure 2.3. Core community crime sequence for adult offending.

offenders. Not only are these two groups conceptually distinct; they are likely to behave differently. One group's actions are shaped in part by previous treatment received from CJAs. The core sequence described here builds on the previous work but also seeks to identify gaps in the community-level sequence while simultaneously describing how they could be filled.

SEQUENCE INITIATION

The sequence initiates by recognizing two target community delinquency dynamics from the year previous that contribute, a year later, to adult offending. Seventeen-year-old juveniles residing in the target community who committed first-time juvenile acts, regardless of what consequences ensued, may be more likely to offend as adults than other eighteen-year-olds also residing in the community. This assumes that the former juveniles are still in the community a year later. This point extrapolates from work showing that young-adult offending probabilities link to having a juvenile record.¹⁷ A second dynamic applies to juveniles previously adjudicated delinquent and placed out of the community. They may return to the target community as adults aged eighteen or older during the target year of interest for the adult sequence. These delinquents probably were placed outside the community in light of acknowledged programming needs, the seriousness of the juvenile offense, or a repeat delinquency pattern [226, 383]. Now that these delinquents are back within the target community as adults, it seems they would be more likely than others to offend as adults.¹⁸

After recognizing potential delinquency-based community influences, the adult portion of the sequence begins with an adult incidence rate based on self-reported offending for first-time adult offenders only. Starting with self-reporting clearly presents challenges, especially when targeted within

small geographic areas. The concerns mentioned previously about juvenile self-reporting probably apply here as well and are shown in the figure with “ u_0 .” In the initial stages, the offender/offending core community sequence is conceptually close to the delinquent/delinquency sequence. The focus is on offenses committed within the community by first-time adult offenders residing there. Resident adults who did not commit previous offenses *as adults* may become first-time adult offenders. If a first-time adult offender who is not a resident in the community commits the crime act, then the act has been in-migrated to the community. An example of an in-migrated act would be adult drug sellers traveling to a lucrative drug market located outside their home community [704]. The volume of in-migrated crime acts committed by first-time adult offenders depends on a range of factors whose influences are somewhat known; this influence is shown with a downward-pointing unlabeled arrow at the upper left of the figure. The permeability of community boundaries, shaping how quickly potential offenders move into and through a community, the sharpness of edges between communities, and the presence of potential targets for personal or property crimes in the target community all seem relevant to the volume of in-migrated crime acts [99, 142, 704, 733].

Self-reported crime acts within the community are then either noticed or not at the time they took place. As with the delinquency sequence, “noticed” means that acts are officially observed and recorded by justice officials or detected and reported by civilians. Further, as with the delinquency sequence, the transition from occurring to noticed is affected by a range of factors whose exact influences are not yet known (u_1) but whose influence is likely to be ecologically patterned. Several threads of work including differential willingness to contact police in different types of neighborhoods, differential responsiveness of police across districts or precincts, and impacts of victim-offender racial combinations all suggest such patterning [111, 400, 712, 852]. Fuller specification is needed about the geographical patterning and dynamics behind these influences.

Parallel to the transition in the delinquency sequence, noticed, nonresident, first-time adult offenders are removed, leaving the noticed first-time adult incidence rate. This translates into a suspected first-time adult prevalence rate. Of course, this translation is not one-to-one because some acts lack identifiable actors. The loss rate due to nonidentified actors may prove geographically patterned at broad spatial scales. For example, it may be lower in rural as compared to large urban jurisdictions. The upward-pointing arrow “ u_2 ” captures the possibility of ecological variation at the community level in this loss rate due to unknown factors. The latter may link in many

urban core communities to residents' reluctance to "snitch," that is, to identify potential suspects to the police [139]. Hesitancy to snitch may be especially strong in urban communities composed primarily of lower-income populations of color. From here forward, actions taken by CJAs, including the courts and probation and parole agencies, largely shape the sequence. There are several transition points, and the broad outline of these transitions is generally well understood at the national level [231]. But specific processing steps and transitions between them vary from jurisdiction to jurisdiction and of course from country to country.

Some suspected first-time adult offenders residing in the target community may be dropped from additional processing. This loss is shown in the figure with the upward-slanting dashed arrow "suspected offenders removed." This can happen through a variety of different justice system mechanisms. Other suspected offenders continue their steps in the judicial process [166]. Eventually, a fraction of these suspected first-time offenders proceed to the point where they are eligible for some type of sanction.¹⁹ In this transition from the suspected prevalence rate to the sanction-eligible prevalence rate, it again seems plausible that ecologically patterned influences could prove relevant. At present, however, the specifics of these influences *at the community level* are unknown (u_3). Empirical work on the broader demographic and crime context and residence-linked offender attributes such as race and class shows that these shape justice system processing. Further, the aforementioned sentencing review links context and sentencing outcomes. Finally, the broader theoretical assumptions of the sociolegal framework are potentially relevant as well. All these considerations strengthen the chances that community-level influences shape this transition point in the sequence [63, 176, 232, 306, 307, 572, 702, 764].

Justice processing then creates a prevalence rate of sanctioned first-time adult offenders. All types of sanctions are of interest, ranging from community service and probation before judgment to prison time and capital punishment. Putting aside complexities around the type of sanction and its severity, the two key questions for the adult offending sequence are (a) do community-level—not case-level—factors affect the process of translating the prevalence rate of those first-time suspected offenders eligible for sanctioning into the rate of those actually sanctioned? and (b) if such community-level factors can be identified, does their influence persist after controlling for compositional differences in offenders and offenses? Crime patterns differ across communities, as do demographic structures, so these probably contribute to community differentials in the transition rate for the first-time

offenders [27, 79, 573]. Views held by actors in CJAs about different communities may prove relevant as well [181]. But it is not clear exactly what *specific* community factors, net of specific, case-level factors, prove relevant or how they apply just to first-time offending. These various potential influences on the translation process are labeled “u₄” in the figure.

Of course, scores of studies going back to the 1930s have examined community-level correlates of offender prevalence rates [807]. But few of these works have concentrated on just the prevalence rates of first-time sanctioned adult offenders. It seems plausible—but not certain—that many of the factors shaping the geographic patterning of the broader prevalence rates might contribute similarly to the first-time rates. But at this point no one knows for certain.

Once an offender is sanctioned, there are three key outcomes from the community perspective. Most obvious are the removal and supervision rates themselves. (Most of those first-time offenders under supervision in the community are likely to be on probation, but other arrangements such as supervision under a drug court also are possible.) Community justice / mass incarceration theorists have examined the causes and consequences of both removal and supervision rates [158, 159, 160, 617, 618, 804]. The “collateral consequences of mass imprisonment” are substantial, including family disruption, economic adversity, and adverse effects on child development and maternal mental health [825: 218]. Researchers have begun documenting these impacts at the community scale [158, 255]. But in addition to the rates themselves, the ratio of the two outcomes—the odds of removal versus in-community supervision for first-time offenders—also is critical. The possibility that ecological factors could affect the odds of removal versus within-community supervision, due to influences as yet unknown, after controlling for the influence of incident characteristics themselves such as seriousness, is captured in the figure with the arrow labeled “u₅.”

A distinction between stocks and flows for describing correctional populations was noted earlier [456, 457]. Similarly, when we think about potentially positive and negative consequences for the community of sanctioned adult first-time offenders being removed from or being supervised in the community, the stocks and flows distinction also may be important. It may prove helpful to separate impacts of residents being removed within a year versus those already removed at the start of the year and for its entirety. The same distinction may be important for supervision: separating those residents entering supervised status during a year versus those already under supervision at the beginning of the year and for its entirety.

Of course, most adult offenders removed are away for only a period and eventually “return home” [757]. Of relevance here is the number of first-time adult offenders who have been removed from the community for some length of time, whether via jail or prison, coming back to live in the community during a given year. This is indicated in the figure by the return rate. Extensive research on reentry provides a wide range of alternative perspectives on the processes of reentry, the impacts on communities, and questions about the determinants of successful reentry [561, 756, 771]. Those who are under supervision, combined with those returned from a prison or jail stay outside the community, can then either recidivate or not [466]. This gets us to the last stage in the adult sequence: the rate at which first-time adult offenders recidivate.

Numerous methods and theories have been applied to understanding determinants of adult recidivism [195]. Recent works have begun to highlight the relevance of neighborhood context for recidivism [349, 363, 409, 497, 545, 589, 745, 780, 788]. On the assumption that most of those same factors shape first-time adult recidivists, an unlabeled upward-pointing arrow is included in the figure at the far right to reflect those researched factors. Nevertheless, questions abound. Which features of neighborhood structural demographic or land use context are most relevant to recidivism? How do social services and local social support affect reentry/recidivism dynamics? Metatheoretically, are the neighborhood context features broadly applicable, or are complex interactions between offender features and neighborhood features most relevant?

Given the range of different theoretical perspectives for understanding recidivism, it is likely that a range of theoretical perspectives will develop for framing the impacts of neighborhood context on recidivism and the determinants of neighborhood recidivism rates. Work to date, however, has not sought to separate recidivism for first-time adult offenders from the recidivism of adults who previously recidivated. The recidivism of the latter group, in general, seems more likely to be influenced by earlier CJA actions and less likely to be influenced by ecological context.

Many recidivism studies rely either on rearrests or reconvicitions. Ideally, since this sequence originated using self-reports, self-reports would be used for gauging recidivism. Some reentry projects already have adopted self-report methodologies for gauging recidivism [423].

Once a former offender has reoffended, a modified adult offender sequence begins. Here, additional adult offenses are the focus. The main changes in the sequence (not shown) would be at the initial stages and would include two community-level features from the previous year: “criminal

justice dynamics in previous year” and “adult first-time offender dynamics in previous year.”

Is it possible that within a specified period such as a year, within a community, a person can commit both initial and repeat offenses? Yes. Thus, across an entire community within a year, some number of individuals may be contributing to both first-time-based and repeat-based community adult offender sequences.

SUMMARY

The core sequence for adult first-time offending and offenders presumes an initial influence of delinquency dynamics within the community from the year previous as the community’s seventeen-year-olds turn eighteen a year later. During the year examined, adults eighteen and older can offend for the first time or not, as captured with self-report. Through a multilink process, first-time offending rates become first-time suspected offender rates. Criminal justice processing proves increasingly important for later stages in the sequence and for transitions between stages. Sanctioned first-time adult offenders may then either recidivate or not. It is important to separate out first-time offenders in the community sequence for the same reason this was done with the delinquency sequence: to isolate as much as possible influences of CJA actions in the community prior to the year examined.

This sequence could and should start with self-reports of offending. If each period, such as a year, is treated separately, a stocks and flows design for estimating removal, supervision, and return rates can be adopted. For theoretical as well as practical purposes, the separation of flows from stocks seems important. Indicators from any point in the depicted sequence can be used as macro-level inputs or outputs in communities and crime research. Given the sequence depicted here, however, the caution shared with delinquency researchers applies similarly to those researching adult offending at the community level. Unless the indicator used is based on first-time adult offender self-reports, the community crime indicator reflects far more than community attributes.

Victim/Victimization Core Sequence

RATIONALE

Including victims and victimization as a core community-level predictor or outcome sequence in community criminology may strike some readers as odd. It is included for several reasons. Most importantly, the extent and intensity of residents’ crime victimization in a community is as much a core

element of that community's fabric as its crime rate. Whether interest centers on the crime victims living in the neighborhood (victim prevalence rate), the frequency of victimization incidents happening in the community to residents or others (location-based victimization incidence rate), the extent to which residents know about victimization incidents happening to other neighbors (indirect location-based prevalence or incidence victimization rates), or elements of different revictimization rates, each of these features shapes numerous behavioral, emotional, and attitudinal aspects of community life. The latter includes residents' plans to move or stay, their views about the world, their views about and involvement in homegrown collective crime-prevention efforts, and, perhaps most importantly, their views toward and willingness to cooperate with CJAs such as police and courts. To state this last idea as a second rationale, victimization rates shape how citizens perceive and interact with CJAs, and perhaps other public institutions as well [658]. How often one or one's neighbors have been victimized and how justice agencies have responded shape community-level differences in perceptions of institutional legitimacy and willingness to obey laws [140, 413, 760]. So there are important practical implications as well. Third, crime has many costs to society, but arguably among the most important costs of crime are victim impacts [343]. Since these costs differ across space, victims are a key part of understanding the ecology of crime and its impacts.

Finally, the victimization sequence intertwines with the delinquency and offender sequences in multiple and important ways. Ecological aftereffects of delinquent or criminal acts depend in part on whether victims report crime and whether victims are retaliated against if they do report crime or even talk to justice personnel. If victims do not report, fewer crimes are detected, and arrests are less likely. If victims are unwilling to testify, convictions probably prove more difficult. If conviction rates are lower, removal rates will be lower. Reoffending rates may be higher as well if offenders are not arrested, convicted, and incapacitated. If offenders have more time available in the community subsequent to committing an offense, some may commit more offenses sooner either in that community or in another one. Further, as is well known from scholarship, those same individuals who are victims one day may be offenders the next [433]. This overlap between victim and offender status appears to be context dependent and stronger in more disadvantaged neighborhoods [48, 49].

Turning the broader issue on its head, why should community victimization dynamics *not* be included as a core, community-level crime sequence? Perhaps the most important objection arises from the difficulty in operationalizing these rates. This is addressed in a later section.

SEQUENCE

The macro-level sequence for victims and victimization is shown in figure 2.4. Although it is assumed that the sequence generating community-level victimization attributes is similar across different crime types, specific transitions in the sequence may be affected by different factors including crime type. To take an obvious contrast, the factors influencing reporting or not reporting motor vehicle theft are different from those shaping a decision to report domestic assault. The community-level consequences of victimization reporting also vary by crime type. To keep this sequence parallel with the two preceding ones, and for conceptual clarity, it is presumed that victimization information is obtained initially from self-report sources, as exemplified in victimization surveys. The upward-pointing light arrow containing “ u_0 ” represents suspected sets of unknown influences. As in the preceding two sequences, light upward- or downward-pointing arrows not containing a “ u ” indicate clusters of influential factors that are generally known. If a light arrow crosses the community boundary, ecological patterning of that influence seems likely or already has been established.

INITIAL SELF-REPORTED RATE

The sequence initializes with victimization incidence rates, as self-reported by residents living within the target community, for a period specified by the researcher. Issues of spatial scaling, temporal scaling, crime levels, and crime type are each critical in determining whether the researcher will see ecological variation in neighborhood victimization rates. There are two opposing dynamics. On the one hand, Part I victimization rates are relatively rare in

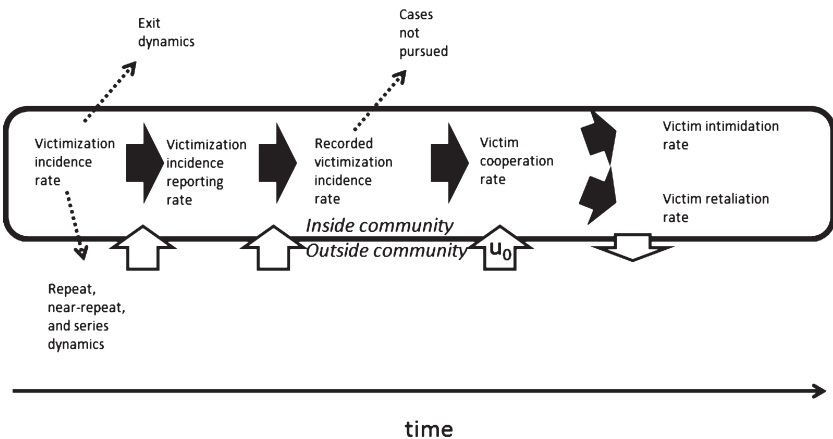


Figure 2.4. Victim/victimization core macro-level community crime sequence.

many locations and for many people. This means that if the researcher is (a) investigating a Part I crime that is infrequent relative to other Part I crimes, using (b) relatively small-scale community units which are (c) located in a relatively low-crime region and (d) using a recall period that is relatively short, it will be difficult to document significant ecological differentiation. This is because many places will have very low rates with very wide confidence intervals [683]. On the other hand, if spatial and temporal units become too large, then important ecological and temporal rate differences become blurred. An additional challenge is that the best reports of recent victimization experiences, which minimize respondents' tendencies to telescope recalled events forward or backward in time, require bounded interview techniques and thus panel survey designs [719: 257].

Beyond these challenges, the researcher also faces another key decision. There are three classes of incidents a researcher could use to operationalize a community-level victimization incidence rate:

1. Victimization incident takes place within the specified community and involves a resident victim
2. Victimization incident takes place within the specified community but involves a nonresident victim
3. Victimization incident takes place outside the specified community, but the victim is a resident of the specified community

Each of these alternative operationalizations is defensible. Here, in order to maintain a close parallel between this community sequence and the preceding two, the initializing victimization incidence rate focuses on target community residents victimized within the target community (operationalization number 1).

REPEAT, SERIES, AND NEAR-REPEAT DYNAMICS

The self-reported victimization incidents of residents within their community could link to earlier or later incidents through three possible dynamics which have been documented in research: repeat, near repeat, and series victimization. For ease of presentation, figure 2.4 shows the initial incidents linked to just later incidents via such dynamics. Those later incidents could take place within or outside the target community.

Repeat victimization, or revictimization, occurs when crime victims experience additional victimization incidents [220, 228, 229, 230]. Work on burglary, for example, has suggested that households are at increased risk for repeat burglary in the period right after the initial event [558, 753].

Revictimization probabilities depend on a range of factors, including the type of initiating crime [228]. Intervals between victimization events vary, again, depending on a range of factors, sometimes making it difficult to separate revictimization from series victimization [346]. It is not known if revictimization rates vary ecologically [228]. Revictimizations constitute a substantial portion of victim incidents [228]. The very latest work suggests that the frequency distribution of victimization in a population is a complex mix of the revictimized, the once victimized, and the not victimized, constituting, in effect, latent classes [358]. Whether such classes can be estimated at the community level is not known.

Within revictimization incidents, nonseries are separated from series victimizations [697]. The latter are also called high-frequency repeat victimizations [432]. When victims “are unable to furnish details of each incident separately” for “similar incidents” while answering a victimization survey, a victimization series has taken place [202]. For analysts of the US National Crime Victimization Survey (NCVS), the series “victimization counting rule”—what is the minimum number of incidents constituting *one* series?—shifted from “three or more crimes similar in nature” in the 1970s to six or more in the 1980s to a current maximum of ten [432: 1]. When a series has been identified, NCVS respondents are asked details just about the most recent one in the series. How series are defined does alter some characteristics of victimization [432]. Series revictimization appears to be most likely for the victimization types of “domestic violence, school violence, and workplace violence” [432: 6]. Within a series, given such victimization types, it is no surprise that repeat incidents are most likely to have occurred “in the same place” [432: 6]. The larger-scale ecological implications of this place dependence of repeat incidents are not understood at this time.

Within a victimization series, the incidents are “similar” as noted earlier. The idea of near-repeat victimization alters the series victimization idea in three ways. It tightens the similarity criterion of series victimization: initial and repeated crimes are of the same type. Further, it shifts the victim focus from the same victim to the same area. Rather than it being the same individual or household affected, it can be a nearby household or address. So it is the immediate *area* that is revictimized by the same type of crime. “Area” is typically defined at a small spatial scale, such as the length of an urban streetblock in an older, large US city—a radius of about four hundred feet in many places. Finally, for a place, the revictimization interval is confined to a narrower time frame, on the order of a just a few days or a couple of weeks. The spatial and temporal parameters are variable and ideally should match what is known about the operation of offenders in those contexts.

After someone has been victimized in a locale, the odds are higher, for some time immediately after, that someone else will be *similarly* victimized in a *nearby* location. Near-repeat patterns have been documented for both burglaries and shootings [582, 754]. Near-repeat patterns are more spatially and temporally restricted than hot spot patterns. The temporal and spatial bounds of near-repeat phenomena continue to be investigated.

The repeat/series/near-repeat victimization research offers for communities two implications and a corollary. The near-repeat idea anticipates short-term and micro-scale spatiotemporal variation in victimization propensities. Within a community composed of several streets, within a year, there may be some periods lasting from a few days to a couple of weeks when residents in one subsection of the community—along one streetblock or near one house—are at increased risk of being victimized. The series idea suggests victimization-risk heterogeneity that is spatially dependent but less temporally variable. In line with hot spot ideas, there are some addresses where, month after month, neighbors call police to handle violent or potentially violent domestic issues. The corollary is that the relationship between these two dynamics—series victimization versus near-repeat victimization—will shape how much the meso- to micro-scale spatial crime differences based on victimization shift over time in a community. If series victimization is more frequent relative to near-repeat victimization, the spatial patterning will be more stable over an extended time at very small spatial scales.

EXIT DYNAMICS

Victimization can alter a victim's relationship with his or her community. These alterations are captured in the figure with the upward-slanting arrow labeled "exit dynamics." Victims may depart. Those community residents previously victimized may move out of the community due to the associated stress and trauma [776, 853]. Not only may victims leave, but indirect victims also may do so. In communities with higher victim prevalence rates, residents just hearing about the experiences of local victims may be more likely to exit the community [853].

REPORTING

The first horizontal arrow in the figure represents dynamics linking self-reported victimization incidence rates with victimization reporting rates. The traditional scholarship on this relationship emphasized the importance of event seriousness rather than attitudes toward the police as the most determinative factor [682, 684]. More recent scholarship, however, suggests that the relationship is conditioned by how the police have reacted to

previous victimization reports, community characteristics including local collective efficacy, and local attitudes about police fairness and effectiveness [193, 282, 854]. Localized views about “snitching” or “grassing” prove relevant as well [140, 196, 260]. These additional conditioning factors are suggested in the figure by the first upward-pointing, solid, unlabeled arrow on the left. Again, since the arrow crosses the community boundary, ecological patterning is suggested.

Although prior CJA actions in a community and interactions with its residents shape reporting, once incidents are reported, CJAs become increasingly relevant in several ways. There is slippage between the victimization incidence rate reported and the recorded victimization incidence rate. The slippage arises for several reasons. Police may or may not unfound the victimization reported, and these tendencies vary ecologically [712]. A reported victimization is classified as unfounded if follow-up work by police lead them to conclude that the initial report was “false or baseless,” the terms used by the FBI in its Return A form for police departments submitting data for Uniform Crime Reports. When asked by citizens to take a report, police may or may not comply, and compliance patterns vary ecologically [690]. Theories for both the ecology of policing and the behavior of law suggest varying degrees of agency responsiveness depending on, respectively, the locale and the victim-perpetrator relationship [63, 400]. Community racial and socioeconomic-status composition may shape police responsiveness [690]. These ecologically patterned influences are shown in the figure by the second unlabeled upward-pointing arrow. These dynamics are somewhat understood, so influences are treated as largely known.

CASES DROPPED

Once a victimization incident has been recorded, numerous factors beyond the victim’s and the justice system’s control may result in a case not being pursued. The suspected offender may not be identified or, if identified, may not be located and apprehended. If apprehended, the case may not be pursued because CJA agents offer to drop prosecution of this incident in return for cooperation on another case or for pleading guilty to a different, more serious incident. For innumerable reasons, the case might not go forward. This possibility is indicated in the figure with the second upward-slanting dashed arrow labeled “cases not pursued.” This arrow references relevant *nonvictim* factors. The next horizontal arrow reflects the transition to active case processing of the incident. If the case moves forward, for victims in the community, the next important matter is the rate at which they cooperate with police and court personnel.

VICTIM COOPERATIVENESS AND VULNERABILITIES

Victim cooperativeness affects case processing. From empirical work—at least in domestic violence cases—it appears that victim actions and court actions mutually influence each other. Deciding whether to prosecute a case depends in part on a victim's cooperativeness [194]. At the same time, a victim's cooperativeness depends in part on how the case is moving forward; for example, in domestic violence cases, victims appear to be less supportive if felony rather than misdemeanor prosecution is pursued [395].

Communities are organized structurally in part along racial lines. Victim race links to cooperativeness with CJAs [395]. So too do views about the justice system [802]. It seems plausible to infer that victims from some communities are more likely to cooperate than victims from other communities. Given how cooperativeness links bidirectionally with court processing, such variation, should it exist, might be a contributing factor to documented community-level differences in legal cynicism [638, 639]. A second, more general line of thought also underscores this expectation. High violence levels in an urban community can be interpreted as part of a larger pattern of community vulnerabilities to a broad range of health and social problems. These vulnerabilities, which are ecologically patterned, also seem likely to lessen victim cooperation [244, 402]. Such suggestions are mere hunches at this juncture given how little research appears available on ecological variation in victim cooperativeness across a wide range of crimes. The work so far seems to have concentrated mostly on domestic violence victims, witnesses in organized crime cases, and victims or witnesses with special needs [260, 261, 312, 784]. Given the limited work on ecological patterning, the possibility of such community variation in victim cooperativeness is labeled as an unknown (u_0) factor in the figure.

VICTIM INTIMIDATION AND RETALIATION

Victim cooperation opens the possibility of victim intimidation and retaliation. Although treated here as two separate issues, these represent a subset of revictimization experiences. Showing rates of victim intimidation and retaliation as “next” stages in a neat temporal sequence oversimplifies a much more tangled web [260]. Victims may feel and actually be intimidated before they cooperate, and retaliation may be intimidated after they cooperate. The revictimization and retaliation, if it does occur, can take place inside or outside the victim's resident community. The downward-pointing solid arrow on the right in the figure indicates retaliation against residents taking place outside the focal community. Qualitative work with testifying witnesses suggests that this does happen [784]. Although victim and witness protection

programs at the local level concentrate on protecting vulnerable parties before and during criminal proceedings, witnesses' and victims' concerns about potential retaliation and their vulnerability extend far beyond that spatially and temporally [258, 274]. They are worried about being vulnerable in their homes and their neighborhoods for unspecified future periods [258, 259, 260]. These worries persist despite relocation [784].

Such fears have grounds. To provide just two dramatic examples, in Baltimore City in 2002, the Dawson family was murdered in their home by fire-bombing drug dealers. (This incident is depicted in fictionalized form in season 4 of *The Wire*.) The dealers were angered by complaints to police about their activities. In 2005, also in Baltimore, drug dealers launched six Molotov cocktails against the home of Harwood community leader Edna McAbier. She survived the attack, and the career drug dealer and firebomber got an eighty-four-year sentence [22].

“STOP SNITCHING”

The issue of intimidation and retaliation brings us to the “stop snitching” movement in low-income urban communities of color. Complicated questions arise about how to interpret this movement [139, 196]. Police always have relied on confidential informants or snitches to advance cases, and such informants, if adults, are generally aware of the risks they face [198, 623].

“Stop Snitchin” once meant refusing to implicate one’s confederates if one were caught committing a crime. It also referred to individuals who became government informants, trading immunity from prosecution in return for turning in family, friends, and rivals. . . . Today, however, the message is much broader, encompassing all forms of cooperation with the police, including that of witnesses and family members. Appearing on T-shirts, street murals, and album covers by major recording companies, the message receives reinforcement from well-known rappers and is rapidly becoming a social norm. [196: 1205]

The movement can be seen as part of criminals’ intimidation of neighborhood residents. But an alternative, more structural argument also has been forwarded. The movement may be part of a broader normative shift in urban communities of color as their residents attempt to craft homegrown community justice in settings where police are viewed as ineffective at best and corrupt and abusive at worst [140, 196, 761]. This normative shift often leads to community leaders working directly with local criminals to negotiate agreements, including protocols about when and when not to involve police [140;

555; 556; 724: 286–288; 768; 769]. Debate about the causes, consequences, and interpretation of the “stop snitching” movement are likely to continue.

But from a victim and community perspective, these important questions notwithstanding, the question again is whether there is ecological patterning. David Kennedy has suggested that community variation in homicide clearance rates is evidence of just such geographic variation in intimidation [657]. If there is such ecological patterning net of compositional differences in homicides across locales, then two points are of interest. In the case of intimidation, there are psychological, social, and family consequences that play out geographically as a result of victim noncooperation. Those harms may be important not only for the individuals involved but also for understanding and mitigating broader geographies of vulnerability [244, 402]. In the case of retaliation, there are serious consequences for the revictimized victims, those around them, and the local criminal justice system. These too are probably geographically patterned. Criminal justice officials interpret near-repeat shooting patterns as reflective of just such retaliatory activities [582].

But despite the near-repeat shooting evidence, and despite the geographical patterning of both views about the police and homicide clearance rates, questions remain. Are the *rates* at which potential witnesses are intimidated, and at which cooperating witnesses are retaliated against, ecologically patterned at the community level? At this juncture, we just do not know whether this is so and, if it is, what the determinants are.

SUMMARY

Current period dynamics start with self-reported victimization experiences of residents within the community. Incidents are reported or not, and reported incidents are recorded or not, each transition depending in part on community-level factors. How pursued cases are processed and their outcomes both intertwine in complex ways with victim cooperativeness. Such cooperativeness seems likely to be ecologically patterned, but specific ecological factors have not yet been identified. The two most important consequences for the residents in the community, and for the amount of justice delivered in the community, are victim intimidation and retaliation rates.

General Sequence Features

Now that each sequence has been introduced, some general points about the sequences merit attention. (a) To some extent, each of these three core sequences depends on the specific crime type. The distance work on personal versus property differentials, to take just one example, suggests that

the strength of the adult offending prevalence/incidence ecological connection may vary by crime type or even specific crime. It is probably weakest, for example, for arson and motor vehicle theft because these require such specific target and offender characteristics. It is likely higher for the delinquency sequence generally because delinquents travel shorter distances than do adult offenders. Perhaps the victim/victimization sequence is the most ecologically differentiated by specific crime type because different victimization experiences are so qualitatively different. Although a victim of motor vehicle theft, a victim of domestic violence, and a victim of household burglary have much in common experientially and in terms of how they interact with CJAs, there are also tremendous differences.

b. Although each sequence is presented in a linear fashion over time, in any large urban community for any defined period, all dynamics of each sequence are simultaneously operative. Therefore, the depicted starting points for each sequence are arbitrary.

c. Along a related line, although each of these three sequences is presented as recursive over time, there are places where there is feedback over time to different points in the sequence. This feedback quality is perhaps more obvious in the victim/victimization sequence. Individual-level work documenting how earlier police responsiveness shapes willingness to report later victimization supports this idea, as do areal-level differences in perceived police responsiveness and studies of police-community programming [688, 737, 854]. Other obvious feedback dynamics include the effect of higher community-level removal rates for adults or secure out-of-community placements for delinquents on later adult offending incidence or delinquent incidence rates in the community in question or in nearby communities. The shape of this relationship has been contested. Community justice theorists have argued that past a certain point, the safety-producing community impacts of adult removals turn into safety reductions for the community [158, 617]. A clear picture has not yet emerged regarding the claims of this argument, although there have been some extremely encouraging results recently [255, 736].

d. For each sequence, actions of CJAs are crucial components. In some ways, this is so obvious as to be trivial. When police go on strike, there is no reported crime, for example. But in other ways, the contributions of CJAs are more subtle and perhaps more difficult to pin down. Work on racialized perceptions of policing, procedural justice, community policing, and impacts of police contact all speak to these contributions [241, 359, 362, 594, 762, 800, 854].

e. Work on ecologically stratified responsiveness of CJAs leads to the expectation that CJAs contribute in different ways in different communities

to the sequences shown [400, 712, 737]. Rodriguez's example of juvenile pretrial detention decisions that depend on both delinquent ethnicity and community demographic composition is a good case in point [606]. Such stratified responsiveness or engagement "makes sense" given broader models of political economy. Different communities have different histories, occupy different ecological niches, and are differentially valued by outside political and economic interests [450, 515].

f. These sequences can be used to illuminate the "how" behind two often-observed features of ecological crime or delinquency parameters: continuity over time of prevalence and incidence rates, and slippage between prevalence and incidence rates. Clearly, numerous important extracommunity factors—historical, socioeconomic, land use related, racial or ethnic, or political—contribute to a community's relative position in a jurisdiction on delinquency, adult offending, and victimization parameters. This is a key axiom in the human ecological approach developed by Hawley, Bursik, and others. All of these factors contribute to stability of ecological position. But these three sequences, and the connections between them (see the following section), illustrate the endogenous, *within*-community dynamics which also promote ecological continuity. For example, earlier criminal activities in a community which did not result in arrests, or resulted in arrests but not convictions, increase the likelihood of future criminal acts, given an ecological deterrence perspective, and may reduce future reporting of crime incidents [179]. Generally, previous delinquents are more likely to be future delinquents, previous adult offenders are more likely to be future offenders, and CJAs are likely to act in the future toward people in a community in ways that are similar to how they have acted previously. Such temporal continuities have complex determinants at many different levels, which go beyond the scope of this book. Nevertheless, the key point is simply that in many ways things will stay the same in terms of cross-community, ecological orderings not only because of dynamics beyond the community but also because of the dynamics illustrated in these sequences taking place within communities. There is an endogeneity to these processes. Outcomes later become predictors.

g. The slippage between ecological prevalence and incidence rates arises for a host of reasons, some of which are illustrated with these three sequences. The sequences here have shown some obvious points contributing to the slippage: delinquents or offenders or victims commit delinquent or criminal acts or get victimized outside their community of residence. Depending on whether the prevalence or incidence rate is of interest, this means incidents are being exported outside the community of residence or being imported

because the delinquent/offender/victim resides in another community. For a given community, for a given sequence, for a given crime type, interesting questions surface around how much exporting versus importing is going on. Ecological work on “crime spillover” at the municipality level has given these issues some consideration [113, 199, 309]. Comparable work at the sub-municipality level, however, is much rarer [596].

h. Finally, and most importantly, each of these sequences contextualizes some of the most popular community crime indicators examined by researchers. Simply put, a community-level reported Part I crime rate, calls-for-service rate, or official delinquency prevalence rate occurs as a product of a complex sequence of preceding events. Each is a variable that is highly conditioned, and CJAs play numerous key roles in that conditioning. Researchers are advised to acknowledge such dependencies when interpreting these community rates theoretically.

Links between Core Sequences

For simplicity of exposition, these three core macro-level, community-level crime sequences have been presented independently. There are, however, numerous important connections across the three sequences. Most broadly, each dynamic conditions the other two.

Some of these connections are relatively obvious, especially if one imagines considering the different sequences at different points in time. A community with a high male delinquency prevalence rate in one five-year period may have a high male adult offending prevalence rate a decade later. A high incidence rate of delinquent drug selling may link bidirectionally at the same point in time to a high incidence rate for adult drug selling given the scale of drug-market activities in a locale.

Less obvious connections also seem plausible. Higher local rates of victim intimidation or actual retaliation may dampen victims’ later willingness to report adult or delinquent offenses, thus affecting, respectively, clearance or hearing rates. Communities with higher ex-felon return rates also may experience higher future victim intimidation or retaliation rates.

Measurement Matters

These three ecological crime sequences have been presented in the hopes of countering a strict operationism which has pervaded much community criminology. Toward that end, each of the three series presented embeds widely used indicators in broader conceptual dynamics.

Four Concerns

Each series, however, presents serious challenges to operationalization. Deriving acceptable indicators is especially problematic when (a) incidence rates rather than prevalence rates are considered, (b) criminal justice agencies become part of the dynamic, (c) smaller-sized communities or time slices are considered, or (d) the focus is on victimization.

a. Best bets for capturing macro-level incidence rates would rely on self-reporting. This can be done [821], but it requires tremendous resources, especially if the community scale is defined relatively modestly, on the order in the UK of output areas or in the US of census block groups. This is simply because incident rates are low for serious incidents. Further, although self-reports can be pretty good for some purposes, they are far from perfect [407]. Further, how self-report biases link simultaneously to delinquent/offender/victim characteristics *and* community features is not yet known.

b. The reporting of crimes, delinquent acts, or victimization incidents to CJAs is far from universal and depends on incident, personal, and community factors. Thus, justice agencies become part of the described dynamics only some of the time. This worsens the problems associated with low base rates.

c. Temporal scaling is a crucial metatheoretical matter (see chapters 6 and 7). The shorter the period used for gauging community-level rates or changes, the worse the low base rate problem.

d. Victimization surveys such as the British Crime Survey or the National Crime Victimization Survey are specifically designed to minimize a range of technical difficulties associated with this type of self-report. These require special samples and procedures [719: 252–257]. The resulting information can describe societal-level shifts over significant periods [338, 430, 431]. For the NCVS, Janet Lauritsen was the first to attach attributes of large-scale areas to the surveys, permitting insight into variations in victimization patterns in different types of communities [42, 429, 434]. But the technical requirements of such surveys, combined with the rarity of victimization, means that city-level, let alone community-level, estimates with reasonable standard errors, for either prevalence or incidence rates, are just not feasible.

Potential Responses

In light of such concerns, there are two potential types of responses. One is to resignedly accept strict operationism when we think about community crime indicators and to just make do. This means a continuing confusion

about the meaning of ecological crime indicators. The preferred alternative, however, is to embrace alternative methodologies to start filling in some of the dynamics in some of the sequences depicted. Geolocated, agent-based simulation models, space-time case-control studies, time-space budgets, and the coding of open-ended responses to standardized scenarios around sensitive topics, followed by geocoding, are just some of the possibilities.

Geolocated, agent-based simulation models may prove particularly helpful. These have been used for modeling crime geographies [294, 295, 462]. These are described more fully in chapter 7. Such simulations could prove useful for developing a fuller understanding of the depicted community-level sequences. Prior research can be used to suggest appropriate starting parameters for some dynamics. For example, findings from earlier work on prior police responsiveness and later victimization reporting would be relevant to some of the steps in the victim/victimization sequence [854].

Space-time case-control studies and time-space budgets are two different ways of getting important information about travel of potential victims or potential offenders in time and space [811, 819]. Patterns suggested by such studies can be ecologically aggregated to help model prevalence-incidence links shown in the three sequences and to help unpack the import/export questions noted earlier. Results from such studies can be used on a stand-alone basis or treated as parameter inputs for geolocated, agent-based simulations.

Structured scenarios on sensitive topics can be embedded in qualitative interviews in different neighborhoods to gain some insight into ecological variation. Patrick Carr, for example, has folded open-ended questions about structured “stop snitching” scenarios into interviews to gain a sense of the range of conditions under which “snitching” might be permissible [138]. Ecological aggregation of content-coded responses could provide insight into the degree of ecological patterning and how that patterning links with other ecological features. Such information could help illuminate some of the links in the sequences that involve CJAs.

Understanding the crime dynamics depicted in these three sequences is especially crucial if crime is the ecological outcome of interest. Various methodologies can help grow our understanding of these dynamics, and their use is recommended. Despite the challenges, their employment is preferable to hypertrophying into a “radically anti-theoretical attitude” about these matters.

Closing Comment

As one valued colleague constantly reminds me, it is one thing to say what my outcome variable is and quite another thing to say what it is that I am interested in explaining. Too often researchers interested in the community causes or consequences of crime have addressed only the first matter and relied on a strict operationism to avoid considering the second matter. This chapter has sought to address the second concern. It has done so by describing three core ecological crime sequences. These sequences accept as givens several points made in earlier research: the importance of distinguishing ecological prevalence and incidence rates, the power of distance and the predominance of proximity for much crime-related activity, and the sizable and ecologically differentiated impacts of local CJA actions. The sequences help address the prevalence/incidence distinct-but-related issue, provide a different perspective on ecological stability over time for various prevalence and incidence rates, and suggest different pathways involved in adjacency effects. It is readily admitted that ecological estimation of all the stages in each of the three sequences, let alone of the connections between the sequences, is extraordinarily challenging given a focus on small-scale areas and what we know about limitations of offender/delinquent self-report and victim survey methodologies. Ways of combining some innovative tools currently employed by computational criminologists or others may prove helpful. Such approaches may permit advancing to more precise descriptions of the three sequences, their ecological variation, and their connections.

Spatial Scaling I

Relevance and Conceptual Importance

In a sense, aggregation by spatial units is understood in that the criteria for aggregation are clearly operationalized. But what we generally lack is a theoretical model connecting spatial location with the other variables in the system. Thus we achieve operational simplicity at the expense of theoretical clarity. The result is that we are unable to link our macrolevel aggregated data with the microlevel causal processes that may have produced these data.

—Hubert M. Blalock, Jr. (1979)

Many of us have a “newness fetish,” which is driven by a belief that criminology has generated bodies of theory and research of steadily increasing quality and creativity over time. . . . Nothing could be further from the truth.

—Robert J. Bursik, Jr. (2009)

Over the twentieth century we have been repeatedly confronted with structural correlates . . . associated with crime rate variation.

—Robert J. Sampson (2000)

Overview

This chapter is the first of three examining spatial scaling and its metatheoretical implications. Spatial scaling, generally, considers how thinking about relevant theoretical processes depends—or does not—on the geographic extent of the units being investigated. It refers to a range of potential concerns which are simultaneously theoretical and methodological. These concerns are typically relevant when

- a researcher examines how indicators of two different concepts connect, and interprets those observed connections, while considering results from a range of research units of varying geographic scale;

- a researcher applies a theoretical model, wholly or in part, to geographic units markedly different from the geographic scale of the units for which the model was originally developed;
- a researcher explains the dynamics by which concepts create influence *across* either different (a) levels of analysis or (b) levels of geographic aggregation.

Examples will follow later in the chapter. The next section introduces three examples of community criminology. Two date from almost a century ago, and the third represents a vigorous stream of current research. The three studies provide contrasting examples of the conceptual challenges involved in making theoretical sense of observed ecological relationships. The two historical examples illustrate Bursik's quotation in the chapter epigraph, implicitly questioning how much has been added to our understanding of community-crime links in the past century. More importantly, all three examples highlight the metatheoretical importance of spatial scaling.

To put the last point more prescriptively, community criminologists have two choices, depending on how they address the question of methodological individualism (chapter 1). If they opt for sociological holism, they want to specify the relevant level of spatial and structural aggregation and to explain how the dynamics operate at that level. If they opt for methodological individualism, they want to specify the relevant spatial and structural levels of context and to explain how those contexts affect individuals and how individuals in turn affect those contexts.

The following section highlights three related theoretical concerns involving spatial scaling. The first is about assuming homology versus discontinuity across spatial scales, and the connections between these assumptions and what are generally referred to as aggregation versus disaggregation issues. These analytic matters have substantial, often overlooked conceptual ramifications. The second concern involves potential conceptual missteps related to spatial scaling. Measurement and analytic issues are backgrounded. The third matter involves the potential which aggregation by geographic proximity has for creating conceptual confusion or potentially misleading results. Here, conceptualization and measurement are emphasized equally, and the links between the two are foregrounded. The closing section summarizes the main arguments of the chapter.

Three Examples

Two historical ecological research examples examining delinquency and one current research stream investigating community correlates of homicide pro-

vide three illustrative examples of spatial scaling concerns. The two historical studies, both from the late 1910s / early 1920s, were located in two very different cities: metropolitan London, with a population of about 7.3 million in 1921, and Columbus, Ohio, with a population of about 237,000 in 1920. Across the two cities, the community scale difference was more than an order of magnitude. At that time, the average Greater London borough population was around 252,000, and the average Columbus election-ward population was around 15,000. The third research example considers a more recent research stream on homicide at different levels of geographic aggregation.

Why these examples? Both historical examples demonstrate considerable theoretical sophistication, including attention to spatial scaling concerns. Further, all three examples link community crime with the same feature of community demographic structure: poverty, or a closely related idea of resource deprivation—and several different ways to interpret such a link. Further, the three examples as a group illustrate different approaches to the philosophical debate between methodological holism and methodological individualism (chapter 1).

Metropolitan London (UK), Post-World War I

BURT AND THE BURT CONTROVERSY

Sir Cyril Burt (1883–1971) was arguably the most influential British psychologist of the first half of the 20th century. He was best known for his work on educational testing and the heritability of intelligence. After he died, controversy arose about possible fabrication of some of his later data [204]. Although he may have been guilty of publishing with a fictitious coauthor, recent scholarship suggests that his later work was probably not fraudulent [287].

THE YOUNG DELINQUENT

In 1925, Burt was a professor of education at the University of London and serving as a psychologist to the London County Council [201]. That year, he published a six-hundred-plus-page volume, *The Young Delinquent*,¹ which represented several years of research into causes of delinquency [129]. He gathered from case files the addresses of around two hundred boys and around seventy girls in London who had been adjudicated delinquent, and he learned the case histories of each. Homes were visited, and reports were gathered from parents and teachers. He also gathered information on “control” cases, juveniles who had not been adjudicated delinquent. He sought to craft a definitive statement about the relative contribution of intrapersonal, interpersonal, household, and community factors to individual delinquency.

Of course, delinquency meant something different at the time of his study than it does now [655]. Delinquent behaviors of that time, compared to those of today, might seem far more innocent and less serious. Given Burt's period, it is understandable that he said, "delinquency I regard as nothing but an outstanding sample—dangerous perhaps and extreme, but none the less typical—of common childish naughtiness" [129: vii].

METHOD

Separate from the delinquent and control cases just described, Burt examined delinquency in Greater London ecologically. He created delinquency rates based on "industrial school cases."² Burt mapped these industrial school cases to obtain borough-level delinquency rates.³ He described the ecological variation in these rates—the percentage of children who were delinquent, males and females combined—across the twenty-nine boroughs of greater London.⁴ For poverty, Burt used data originally compiled by Charles Booth in the late 1880s.

OBSERVED PATTERNS

When Burt looked at his map, he noted, "the broad association between crime in the young and poverty in the home and its surroundings, is at once impressed upon the eye, if a chart be made of the distribution of juvenile delinquency in the different parts of London" [129: 70]. Comments such as this led other researchers to accuse him of committing what was later called the ecological fallacy (see chapter 4) [743].

Burt focused on poverty at the community level, given its importance in the individual cases examined. Poverty was much more common in the households of delinquents compared to control households of nondelinquents. "*Over one-half of the total amount of juvenile delinquency is found in homes that are poor or very poor*" [129: 69, emphasis in original]. Burt's impression that "over a large extent of [Greater] London, then, the poorer districts seem the more criminal" was confirmed in the correlation between delinquency and poverty of .67 at the borough level [129: 75, 78].

Burt observed other features in his data that became well known as a result of subsequent US ecological delinquency research later in the century [665, 666]. In addition to the community poverty ↔ delinquency link, routinely seen and variously interpreted by delinquency researchers since, Burt also noted "high rates right outside the city centre," slightly lower rates further out, and the lowest rates in the "city centre" and in the outermost areas "on the margin" [129: 71, 72, 75].

But Burt also saw some things that later ecological delinquency research-

ers often overlooked [77, 148, 419]. These included the influence of land use on delinquency, and delinquency variation at the streetblock level. The latter was especially notable in some outer parts of London where delinquency rates were generally lower. “In the outlying districts in the north . . . there are small and isolated patches of crime. In neighborhoods such as these the lawless population is often limited to a few narrow and notorious side-streets” [129: 74–75]. It turned out that some of this “lawless” population in these outer city locales had been relocated there by earlier renovation and rehousing programs. Government housing and rehousing policies in the UK have long been linked to community crime rates [79]. In short, there were some higher-delinquency streetblocks, with accompanying reputations, in generally better-off boroughs. Meso-level dynamics were relevant and linked to broader policies operating at the time.

Turning back to the former overlooked feature of Burt’s work, the land use–delinquency connection, Burt noted that in the outer portions of Greater London, a “few groups seem to have sprung up near the big suburban places of amusement, Earl’s Court, the White City, and the Crystal Palace, at the time when these exhibitions were first opened or built” [129: 75]. Later research in environmental criminology developed the term “crime generators” for such land uses [96].

Burt’s data also included indicators for household instability (rate of illegitimate births) and poor relief. These two connections with delinquency are not pursued further here, but analyses (results not shown) of Burt’s borough-level data show that the connection between poverty and delinquency persists even after taking these additional factors into account.

BURT’S THINKING ABOUT POVERTY AND DELINQUENCY

Immediately after introducing the ecological relationship between delinquency prevalence and poverty, Burt alerted the reader to problems of agency and cause.

But throughout I must insist that, however extensive and however exact, a mere comparison of tabulated figures must never take the place of concrete studies, or of an intensive first-hand scrutiny of the concrete chain of causation, as it operates in particular cases. Here as elsewhere, in gauging the effect of any natural agency, we can put little faith in arm-chair deductions: we must watch that agency at work. [129: 78]

He then introduced his next “illustrative” case study, Tommy B., with the voice-over, “When poverty is present, how does it exert its influence? Of the

various ways in which economic hardship may promote or encourage crime the most immediate is through semi-starvation. Hunger is the stimulus; and the ensuing crime is theft—the pilfering of food itself, or of money to buy food, or articles to be sold or pawned for such money” [129: 78–79]. To recap the chain of thought: Burt started with an overrepresentation of poor households in the delinquent as compared to nondelinquent cases he was intensively studying. He then confirmed that delinquency prevalence rates were higher in more impoverished boroughs by looking at the prevalence rates of industrial school cases. He then thought that individual cases such as that of Tommy B., who lived in an impoverished household, would illustrate the dynamics set in motion by household poverty, reverting here to a psychological framework, thinking about poverty as a “stimulus” within the household and stealing as the “response” by the delinquent.

In short, Burt appeared to be addressing the issues of context and engaging in multilevel thinking as he did so. His thinking embodies methodological individualism (link 1 → link 2). Borough-level poverty (a macro-level input, Ma-I) made it more likely that youth residing in households there would experience hunger (a micro-level input, Mi-I), and this would set in motion individual-level dynamics resulting in delinquent behavior (micro-level outputs, Mi-O). Burt was aware of the need to think about how individual-level dynamics might be involved in these ecological relationships.

Burt’s broader conceptual framework is described later, but the key points so far are that when his text and analysis are considered together and when we think just about the *ecology* of delinquency, the example demonstrates (a) an awareness of cross-level dynamics, with the neighborhood shaping household dynamics and individual needs; (b) significant variation in delinquency prevalence rates at multiple levels of ecology, the borough and sub-borough (i.e., streetblock) levels; (c) a concentric gradient to the delinquency patterning across broader metropolitan London, with higher rates in more central boroughs and lower rates in outer boroughs; and (d) the influences of particular types of nonresidential land uses on delinquency prevalence rates.

Columbus (OH), Post–World War I

MCKENZIE

Roderick Duncan McKenzie (1885–1940) was born in Manitoba, Canada, and went to the University of Chicago in 1913 to pursue graduate work in sociology. W. I. Thomas and later Robert E. L. Park, both prominent scholars in the Chicago School of human ecology, were significant faculty influences. In 1915, McKenzie began a full-time instructorship in sociology at

Ohio State University in Columbus (OH), where Ernest W. Burgess, another member of the Chicago School, was a faculty member. Following World War I service, McKenzie completed his dissertation and held positions at West Virginia University, the University of Michigan, and the University of Washington. In his last decade of life, he headed up the Sociology Department at the University of Wisconsin. He is considered a key figure in the emergence of the Chicago School in the first half of the 20th century and was one of the first scholars of human ecology to closely consider ecological dynamics at the metropolitan level [328]. Hawley's 1950 volume *Human Ecology* originated with a book project of McKenzie's left unfinished at the time of the latter's death.⁵

CONTEXT AND INDICATORS

Columbus circa World War I

At Ohio State University, McKenzie made extensive studies of community social organization in Columbus as part of his dissertation research, applying emerging human ecological ideas to community life and urban organization more broadly [492]. He aggregated demographic indicators to the election-ward ($n = 16$) level. Columbus's downtown at the time centered on the state capitol, east of the Scioto River, near the intersections of Broad Street, running east-west, and High Street, running north-south. The extension of electric streetcar lines along Broad and High Streets was opening up middle-class neighborhoods in the (respectively) eastern and northern sections of the city in the first two decades of the 20th century. Sinclair Lewis's *Babbitt* touches briefly on the economic implications of streetcar service being extended.

Columbus also had the typical "transition zone," located just outside the central business district. "Surrounding the main business section on all sides for a distance from one to a dozen blocks there is a black and grimy area unfit for human habitation. . . . This region is very largely given over to colored people and poor whites" [487: 150]. The locale had been previously zoned for vice, a not-unusual urban practice in the late 1800s and early 1900s [420]. This may have contributed to this zone's "migratory class of people" and its status as a "rendezvous of the vicious and criminal classes" [490: 149].

Columbus was surprisingly ethnically and racially diverse at the time, with substantial black and immigrant populations clustered close to the three industrial areas and a stable, longstanding German community. Many European ethnicities were represented, including Romanians and Hungarians [490: map I].

Broadly, industrial land use patterns drove economic and ethnic features of settlement patterns. But there also was segregation at lower ecological levels. “Each of these industrial areas has a more or less distinctive life of its own,” and within these, there was a “distinct tendency . . . for the different racial and linguistic groups to form little colonies within these industrial communities, . . . [and in one community] every street represents a different racial or national aggregation” [490: 152].

Delinquency

McKenzie mapped Columbus boys who were adjudicated delinquent by Franklin County Juvenile Court and under the “official supervision” of the court for a one-year period stretching from mid-1918 to mid-1919 [490: maps IV, V]. Delinquency rates were somewhat clustered at the ward level (Global Moran’s $I = .15$; $p < .15$) but were less clustered than socioeconomic status (see the “Socioeconomic Status” subsection). McKenzie commented on this lack of clustering of delinquency.

Population

Since the city’s sixteen ward boundaries had been redrawn following the 1910 census, McKenzie used the number of registered, all male electors in 1918, per ward, as his population indicator. This allowed him to create a male delinquency rate per one hundred male electors and a dependency rate (see the following subsection) per one hundred male electors.

Socioeconomic Status

To capture socioeconomic status (SES), McKenzie used two indicators: charity relief, which reflected extreme disadvantage, and property taxes paid.⁶ McKenzie tracked official dependency cases, probably using data from the ACC General Registration Bureau [116: 123].⁷ These households were extremely poor and consistently so from year to year. We would expect extreme poverty to be associated with higher delinquency rates. Mapping the relief rate by wards showed that the wards with the highest relief rates were all located in and close to the downtown area. Further, these dependency rates were strongly spatially autocorrelated (Global Moran’s $I = .33$; $p < .01$).

A more general SES indicator came from tax records: local property taxes paid on household furniture per registered elector for 1918. As of 1916, Columbus collected both a real estate property tax and a general property tax and employed assessors to estimate relevant property values [116: 243]. Not surprisingly, the wards with the lowest SES were clustered around the downtown, and the two wards with the highest SES included the new middle-class

communities recently developed toward the northern end of the High Street streetcar line and the eastern end of the Broad Street streetcar line. The election wards had spatially clustered scores on this SES indicator (Global Moran's $I = .30$ ($p < .05$).

Stability

To capture stability, McKenzie calculated the percentage of electors registered in 1918 who also voted in 1919 in the same precinct. (Precincts were subdivisions within electoral wards.) The far northern and western wards and three wards in the eastern section of the city below Broad Street were the most stable; least stable were three wards which included the downtown and just north and west of it. Stability was only loosely spatially clustered (Global Moran's $I = .14$; $p < .15$).

FINDINGS: DELINQUENCY PATTERNING

The wards in the top quartile on delinquency prevalence rates included two located just northwest of the center of the downtown and a third ward somewhat further north of the downtown. Within each of the first two were sizable industrial areas and African American settlements. The third included an industrial area and Italian and African American settlements. The last ward in the highest prevalence quartile was the southernmost one in the city and abutted an industrial area just outside the city limits. This ward had extensive African American and Hungarian settlements.

The delinquency pin map appears in figure 3.1. McKenzie, whose ecological orientation emphasized stability as well as SES, was interested in the global patterning of stability relative to both delinquency and poor relief. After comparing the delinquency pin map with a dependency pin map (not shown), he noted that "the relation between mobility and dependency is much more conspicuous than the relation between mobility and delinquency" [490: 166]. This would seem to raise questions about whether stability, thought to underpin local supervisory control of juveniles, directly influences delinquency [126]. Instead of questioning the relevance of stability to delinquency prevalence, however, McKenzie questioned his stability indicator. He noted that it may not have captured short-distance, within-neighborhood moves. Given his familiarity with these locales and other data he collected at the time, he knew that these within-neighborhood moves were substantial.

But of most interest here given the focus on spatial scaling were two additional observations by McKenzie. First, he noted that delinquency cases exhibited a "rather even dispersion of cases throughout the entire city" [490:

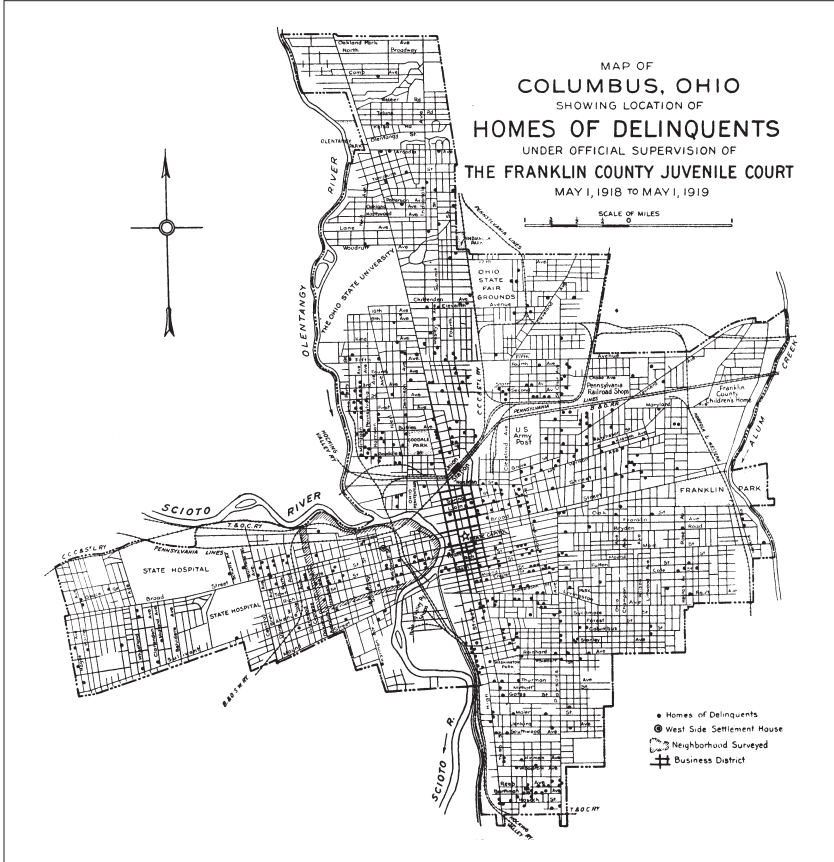


Figure 3.1. McKenzie's Columbus (OH) delinquency pin map [490: map V].

165]. Second, he noted that locations of delinquent households clustered significantly *within* wards. He suggested, “*single streets or individual family groups rather than neighborhoods seem to form the nuclei for wayward children*” [490: 165, emphasis added]. Close examination of his pin map shows many streets where delinquent addresses appear concentrated along a small number of streetblocks. This is especially apparent in wards just east of the Olentangy River to the northwest and south of downtown.

My interpretation is that McKenzie was suggesting that delinquency dynamics were operating at a lower level of analysis than dependency dynamics and that dependency dynamics linked more strongly at the community level to low status and consequent instability. Although he did point out that the highest mobility wards had the highest dependency and delinquency

rates, he seemed to be proposing that delinquency prevalence, in comparison to dependency, was based on more localized, face-to-face dynamics [490: 166]. Delinquency was less structurally driven than was extreme poverty. Given later work on the role of groups in committing crimes, on street corner groupings and delinquency, and on the important influence of short distances on friendship formation, McKenzie's insight based on the spatial patterning of households with delinquents seems on target [240, 710, 783]. It also aligns with his comments elsewhere on stability-linked attachment differences between different streetblocks in the same neighborhood [492: 609–610].

MCKENZIE'S INTERPRETATION

McKenzie's primary interest was in community dynamics. Consequently, his causal focus, given nascent Chicago School ideas, was on the adverse effects of instability, created by current labor market conditions, on community processes.

Where the population is continually shifting there is little opportunity for the development of neighborhood sentiment, and as a result, local concerns are usually left to take care of themselves. It is hard to develop interest in neighborhood affairs among families who are the while conscious of the temporary nature of their domicile within the ward. The problems which the mobility of population presents to political reformers are likewise common to social workers in other fields. Organizations dealing with delinquency and dependency are hampered in their efforts by the frequent movements of their "cases." [490: 159]

Putting the case more directly, McKenzie stated, "Rapid community turnover also plays havoc with local standards and neighborhood mores. It is impossible to have an efficient local opinion in a neighborhood where people are in constant move" [490: 158]. And it was this line of reasoning that guided McKenzie in his interpretation of the influence of industrial land uses. As described earlier, the four wards with the highest delinquency rates included or abutted significant industrial land uses. He indicted the "modern factory system," which was in his mind "the chief cause of the present migratory tendencies of the wage-earning class" [492: 161]. "The middle class tradesman and many of the professional groups" by contrast "are more or less tied to definite localities by the nature of their work" [492: 161].

To recap, McKenzie's observations on delinquency and its causes were as follows. He recognized the primary importance of economic stratification

by job availability and job type as a determinant of community quality of life, as well as the roles that geography, technology, land use, and history played in shaping stratification. For example, as streetcar lines emerged and then extended, these developments permitted higher-income households to live farther away from the city center. He anticipated that stratification created instability as people working in manufacturing jobs or blue-collar jobs related to railroads moved often in response to job availability and price shifts and that these together loosened neighborhood mores and made it difficult for local institutions to mobilize households for community betterment. Weaker locale mores and local institutions facilitated the emergence of delinquency. He suggested that delinquency spatial clustering may have been more significant at the streetblock (or even family cluster within streetblock) level than at the ward level. McKenzie's approach appears to embody some version of methodological individualism, reflecting concern with unpacking the mechanisms associated with different levels of social and spatial structure. In essence, he was expanding link 1 in the boat metamodel.

Three of McKenzie's observations paralleled Burt's: (a) SES drove delinquency. The two researchers disagreed on the dynamics, however, with Burt seeing household hunger as the issue and McKenzie seeing migratory labor for industrial and blue-collar work, and resulting weaknesses in neighborhood informal controls and neighborhood institutions, as the issue. (b) Delinquency prevalence clustered at subcommunity locations. Both mentioned clustering by streetblocks, and McKenzie also pointed out clustering by families. (c) Both recognized that land use patterns contributed to the patterning of delinquency prevalence rates, and both described specific delinquency-relevant mechanisms arising from those land use patterns.

Homicide and Demographic Covariates: A Current Research Stream

The third example addresses homicide rather than delinquency. Ken Land and colleagues examined the structural, demographic correlates of homicide rates at the city, metropolitan, and state levels using data from four periods: 1950, 1960, 1970, and 1980.⁸ Even though the data analyzed were aggregated above the community level as defined here (i.e., sub-city-level units), their work is relevant to community criminology: they clearly state that they are addressing "community, metropolitan, or ecological structural effects on homicide" [416: 924, emphasis added]. Their work, and other work in a similar vein, is important because it captures a particular stance on spatial scaling, the *homology position*. This view, as explained in the following sub-

sections, expects that both the strength of and dynamics driving a particular ecological relationship remain unchanged across a range of different-sized geographic units.

RESOLVING INCONSISTENCIES AND THE CLAIM

Land and colleagues' starting point was the inconsistent pattern of findings in earlier ecological studies linking homicide and demographic structure [416]. They concluded that the inconsistency arose in part from multicollinearity problems with structural covariates, leading researchers to commit the partialling fallacy [278].⁹ Land and colleagues simplified the covariate space with principal components analysis. That analysis yielded a size/density component and a resource deprivation/affluence component.¹⁰ Additional variables (e.g., percentage of divorced males, a southern location indicator) also were retained as individual predictors.

Land and colleagues made two claims to generality: spatial and temporal. Discussing states, metropolitan statistical areas (MSAs), and cities, the researchers stated, "a general theory of structural covariates of homicide should be capable of accommodating *all* these levels of analysis" [416: 933, emphasis in original]. They also noted some works at lower levels of aggregation, such as census tracts, using violence rather than homicide rates and commented, "a general theory of how structural covariates affect homicide rates also should be applicable at these levels, but attention to this is beyond the scope of the present paper" [416: 933]. Regarding time, they stated, "theoretically invariant relationships should hold across time, and the greater the number of time periods in which this is found to be the case, the more confidence one has in conclusions regarding invariance" [416: 933].

INITIAL AND SUBSEQUENT FINDINGS

The researchers found, for 1960, 1970, and 1980, that size/density, resource deprivation/affluence, and the percentage of the male population that was divorced "now exhibit statistically significant relationships to the homicide rate in the theoretically expected positive direction across all time periods and levels of analysis" [416: 947]. Their conclusion was that "the theoretical presumption of relatively invariant relationships across time periods and social space" was supported [416: 951].¹¹

Land and colleagues' work has been widely cited and has spawned numerous similar analyses in both US and non-US contexts, especially at the city level [482, 483, 484]. For example, in a recent city-level analysis looking at data from some later decades, researchers argued, "we find support for the claims of invariance established in Land et al." [483: 219].

WHY THE CONCLUSION DESERVES CONSIDERATION

This conclusion of invariance deserves close examination for two reasons. First, if the conclusion is correct, ecological researchers interested in homicide, and perhaps in other crimes as well, are justified in being *theoretically* indifferent to spatial scaling concerns.¹² The geographic scale just would not matter. Second, if this conclusion is correct, it is acceptable for researchers to work with data sets containing units of markedly different sizes. No ill consequences would necessarily follow. Steve Messner, Eric Baumer and Rick Rosenfeld's analysis of the forty "geographical areas" in the Social Capital Benchmark Survey provides a case in point: "Most of the units are cities, counties, or county-clusters, but the sample also includes three states (Indiana, New Hampshire, and Montana) and one subarea within a central city (North Minneapolis)" [504: 886]. The researchers recognize the novelty of this combination and seek to increase confidence by replicating demographic links to homicide comparable to those found by Land, McCall, and colleagues. Nevertheless, for purposes here, the key point is that analyzing such a congeries is permissible only if the homology assumption is correct.

CONSIDERING THE INVARIANCE CLAIM MORE CLOSELY

Let us investigate the invariance thesis more closely, first considering the term itself and then thinking about three different themes contained within the broader thesis.

Investigating "Invariant"

What do these researchers mean when they say that the relationship is "invariant" or "relatively invariant"? The *Oxford English Dictionary* (OED) defines "invariant" as "unvarying, invariable" [538]. It defines "invariable" as "not subject to variation or alteration; unchangeable, unalterable; *remaining ever the same*, unchanging, constant; *occurring alike in every case*, unvarying" [537; emphasis added]. So if a structural covariate of homicide has an invariant impact across units of different geographic scale, its coefficient would be "alike" or "the same" across analyses.

Land and colleagues, however, seem to use "invariant" in another, less restrictive sense, referring specifically to "effects that are statistically significant and of invariant algebraic sign" [416: 931]. This second use of "invariant" would seem closer to the term "consistent," whose two most common definitions, again according to the OED, are "agreeing or according in substance or form; congruous, compatible" and "having its parts or elements in agreement" [536]. "Consistent" clearly references less similarity than "invariant."¹³

Themes within the Thesis

The invariance thesis itself, thus, for any *one* covariate, has various forms, ranging from strong to weak. In the strongest form, a structural covariate would demonstrate links to the crime in question, homicide in the LMC research, that are statistically similar in strength across the instances being compared, and each instance of the link would achieve statistical significance in the theoretically expected direction.¹⁴ In its weakest form, the different instances of the link merely would have the same algebraic sign across the instances being compared and would be generally statistically significant across the different instances. In this form, “invariant” has been translated into roughly “consistent.”

But beyond the varying strengths of the argument for any one covariate, three distinct corollaries follow. Each focuses on a different way the thesis makes the case for generality: structural range, geographic range, and temporal range.

Structural range refers to the number of distinct covariates demonstrating comparable links with homicide. That number varies across studies. In Land et al.’s original work, three were identified: size/density or population structure, resource deprivation/affluence, and percentage of males who were divorced. Later work at the city level for later decades found comparable links for these three covariates [483]. But the range appears smaller when countries are compared, with only one covariate, resource deprivation, linking comparably across a number of studies [576]. Work in Chicago, at the community level, suggests concentrated disadvantage, which is somewhat comparable to resource deprivation, links to homicide [521].¹⁵ In short, there can be differences in the range of structural attributes demonstrating roughly comparable links to the crime in question.

Geographic range refers to the range of geographic-sized units examined. It has varied across studies. Land et al.’s original work considered cities, metropolitan areas, and states. Later homicide work has considered larger-scale units such as countries and smaller ones such as communities [521, 576]. The bulk of the homicide work in this vein, however, has examined cities or MSAs.

Temporal range refers to the number of periods across which the comparable links are observed. “Theoretically invariant relationships should hold across time” [416: 933]. The initial work in this vein considered 1960, 1970, and 1980. Later work has extended the city-level work to 1990 and 2000 [483].

Evaluating Versions and Themes of the Invariance Thesis

Starting with different versions of the overall invariance thesis, which version seems supported by work to date? Across markedly varying spatial scales

from communities to nations, a moderate form of the thesis gains support. One structural attribute composed primarily of low-SES variables but also including elements of family structure and racial composition—the resource deprivation / affluence (similar to concentrated disadvantage) feature—has linked significantly and in the same direction to homicide in studies examining communities, cities, MSAs, states, and nations.

But a stronger version of the broad thesis has not been directly tested. No works have yet verified that this link between resource deprivation / affluence and homicide is of *comparable* strength across these different spatial scales. Further, for other fundamental dimensions of demographic structure, no works have yet observed significant links with homicide in the same direction, across a full range of spatial scales ranging from communities to nations.

How about generality across period? Although works to date by Land, McCall, and others have observed similar patterns across different periods for the three main attributes examined at the city level, their results do not settle the question. This is because these researchers failed to establish stationarity of the demographic covariate structure across the different periods.

Establishing stationarity is relevant to establishing construct validity, clarifying the underlying meaning of the indicator. “Stationarity cannot be guaranteed by using the same operationalization at both points in time. It may well be that the same . . . [indicator] measures different constructs at different times” [390: 239]. Establishing stationarity means establishing similar structures at different periods. If stationarity cannot be established, then it is not clear that the same predictor-outcome links across different periods *mean* the same thing. Verifying the stability of the entire demographic covariate space is a key precondition to establishing comparable causal impacts across different periods. Work to date of Land and colleagues does not provide evidence on this point.¹⁶ Further, work by other scholars at the community (intracity) level suggests that stationarity may be unlikely, at least at this level.¹⁷ In short, the work of Land, McCall, and colleagues in this vein has not established stationarity of demographic structure across periods for geographic units at the city level or higher. Thus, the construct validity of the demographic covariates used has not yet been established. Some work using subcity, community units in one specific city suggests that stationarity may not exist at this level. Of course, societies and communities change, thus causing such shifts over time in how different demographic variables correlate at the community level or higher. McCall and colleagues have commented on some of these city-level shifts [483: 234]. But they have not directly addressed the implications of these shifts for the stationarity question.

Related to the question of construct validity is the semantic ambiguity that surrounds the component that Land and colleagues' labeled "resource deprivation/affluence" and the closely comparable component at the community level used by Robert Sampson and colleagues, "concentrated disadvantage." Resource deprivation / affluence does not correspond with earlier replicated components of demographic structure established at the neighborhood, city, or MSA levels [56: 16; 275: 138–140; 587]. The size/density component *does* align with this earlier work.

Earlier ecological work has repeatedly established *separate* dimensions for socioeconomic status, family stage/stability, and racial composition. Land, McCall, and colleagues' deprivation/affluence component, however, seems to conflate elements of these three. The variables in this *one* component seem to refer to *several* different identified urban dimensions. The connection of one observed indicator with several underlying established constructs creates semantic ambiguity [4: 69].¹⁸ The construct captured by the indicator is not clearly identified. Regrettably, this ambiguous index is widely used [482, 483, 484]. It is also unfortunate that the counterpart to resource deprivation / affluence at the community level, concentrated disadvantage, also widely used, similarly confounds SES, household structure, and racial composition [521, 638, 645]. Other researchers have recommended, for policy and theoretical purposes, moving away from these confusing composites [475, 689]. Community criminologists have not yet heeded that recommendation.

In sum, for one community feature, the invariance thesis receives substantial empirical support if "invariant" is interpreted as "consistent." One index of demographic community structure, resource deprivation / affluence links cross-sectionally in a consistent but not identical way to homicide rates at the city, MSA, state, and nation levels. Concentrated disadvantage links to homicide rates consistently at the community level. That said, the interpretation of this *consistent* relative deprivation / affluence / concentrated disadvantage link to homicide is not clear-cut given concerns about semantic ambiguity. This index does not correspond with widely recognized demographic dimensions of community structure. Further, moving beyond this one structural feature, the "consistent" version of the argument is not supported for a broader structural range of structural attributes. Turning to time, claims of invariance or even consistency in the link between resource deprivation / affluence and homicide over time should be viewed cautiously. Until stationarity over time of demographic structure has been established at any one of these geographic scales, the interpretation of this link over time remains an open question.

Given these points, the assumption of homology for the homicide-community structure link across different geographic-sized units or across different periods for any one geographic scale may not be appropriate. Therefore, spatial scaling concerns deserve attention from community criminologists interested in homicide. We know even less about the crime-community structure link across spatial scales for other serious crimes beyond homicide. Consequently, researchers interested in other crimes should not assume homology either.

The Three Examples, Spatial Scaling, and Theoretical Dynamics

The highlights of the two early studies and the one current research stream in community criminology have been introduced. How did their views on spatial scaling contrast?

BURT

In the US, educational psychologist E. L. Thorndike accused Burt of assuming that spatial scale did not matter and of thinking that ecological relationships were identical to individual-level relationships [743]. But a close reading of Burt's summative section on causes of delinquency at the end of his volume suggests otherwise. Instead, it appears that Burt arrived at a multiple-cause model, not unlike some current "risk and protective factors" theorizing, with an emphasis on the former [326, 856]. "When we glance back through page after page, and turn in succession to table after table, one striking fact leaps out in bold relief—the fact of multiple determination, . . . a multiplicity, of alternative and converging influences" [129: 599].

Burt introduced an idea similar in some ways to the concept of turning points, which is currently important in life-course criminology theories [426]. Burt labeled these turning points "some unfortunate event" [129: 601]. Then, in a summary table, he listed contributing causes to varying percentages of cases [129: 603]. In the category "environmental conditions," he included one cause "outside the home" which was a minor factor for about fifty boys and girls each and a major factor for only a handful of each. The bulk of his causal interest was in individual hereditary and psychological and physical conditions. When he listed causes in descending order of importance, "influences operating outside the home—as bad street companions, and lack or excess of facilities for amusement"—came in at eleventh place out of fifteen [129: 606–607]. Family, household, and innate features proved more important.

Burt's model taken as a whole seems to be a multilevel one, with differential emphases across levels. Individual factors are highly important, but household factors including "unfortunate events" and to a lesser extent community factors proved causative as well. He clearly leaned toward methodological individualism in his theorizing.

MCKENZIE

McKenzie's overall theoretical orientation is clearly ecological and sociological. The bulk of his theoretical attention centered on community-level dynamics linked to status and stability, dynamics that became key mechanisms in what has come to be called the social disorganization model and its updates including the basic systemic model of crime and the collective efficacy model [122, 126, 634, 638, 641, 645, 666].

McKenzie's discussion and analysis of delinquency was extremely limited, as this outcome was not his main focus [490: 165–167]. This makes it tricky to infer what his delinquency theory was and how it related to spatial scale. The following interpretation, therefore, should be treated as highly speculative.

Like Burt, McKenzie highlighted causal factors at a range of levels. He recognized streetblock-level dynamics. "Single streets or individual family groups . . . seem to form the nuclei" of delinquent groups [492: 165]. Streetblocks proved important elsewhere in his Columbus study, where he talked more extensively about local neighborhood-improvement groups. Such groups covered single streetblocks, or strings of streetblocks along an arterial, up to an areal cluster of blocks [491]. He also recognized more aggregate community land use, class, and race/ethnicity dynamics. He noted that two wards with high delinquency "happen to include industrial areas and have comparatively large colored and immigrant populations" [492: 166]. Lower-SES, working-class households often located near these industrial land uses, presumably for convenience of getting to work and cheap housing.

McKenzie decided that one's conceptual focus for community could be either a larger (neighborhood) or smaller (streetblock or immediate surround) spatial unit depending on one's purpose. Reflecting on the circumscribed definitions of neighborhood offered by his students at Ohio State University and how that contrasted with the broader community areas commonly referred to by other city residents, he concluded, "For certain administrative purposes it is important to consider these larger geographical expressions as units of neighborhood interest, while for other purposes, where intensity of social opinion counts, the smaller nuclei of common life may prove more effective units" [491: 351–352]. Later sociologists have

concurrent in the assessment that neighborhood or community exists at multiple nested layers and that these different layers are sometimes overlapping or imbricated [365, 711].

In sum, McKenzie, like Burt, also seemed open to causal models that included factors from different spatial scales, arguing that the scale considered depended on the phenomenon of interest and research purposes. But whereas Burt concentrated on household and individual dynamics, McKenzie seemed to concentrate on small groups, sometimes at the streetblock level, and on ecological, ward-level dynamics driven by the relative ecological niches held by those wards in the overall city mosaic. Position in the city shaped racial and ethnic composition, land use, transportation networks, the types of jobs available, the quality of the housing, and the stability of the residents. All of these shaped community and streetblock characteristics, which in turn shaped delinquency outcomes.¹⁹ This *might* be the causative delinquency model that McKenzie would have stated had he devoted more time to this outcome. McKenzie's thinking appears to have leaned toward a version of methodological holism that recognizes contextual impacts (link 1 in the boat metamodel) but views the small group as well as the individual as appropriate units of analysis.

LAND AND COLLEAGUES

Finally, Land, McCall, and colleagues, as described earlier, have argued for the theoretical irrelevance of spatial scaling generally with their invariance thesis. Their perspective clearly aligns with methodological holism and suggests that holism can operate comparably at different levels of spatial scale. The strong position they take is that specific factors are influencing homicide in comparable ways across multiple spatial scales and periods. As described earlier, the data do support a moderate version of the invariance thesis, for one aspect of community demographic structure, if "invariant" is treated as a synonym for "consistent." But, also as described earlier, several questions about the work arise. These suggest that several aspects of their invariance thesis are not yet settled. How methodological holism plays out may well depend on spatial scale.

Of course, the lure of the strong form of the invariance thesis is understandable. "A generalizable theory to explain community, metropolitan, or ecological structural effects on homicide, or, more generally, any other type of crime rate" is certainly a worthwhile goal. Land and colleagues worried that if they could not do this, then "theoretical efforts to explain crime could become entangled in a potentially unending specification of context-specific

relationships. Sociologists and criminologists might then be well advised to pursue the development of general explanations of crime-rate variation at the level of individual differences in criminality” [416: 924]. In short, they worried that if macro-level generalities could not be recovered, the only viable research alternative would be at the individual level. Such worries strengthen the appeal of the invariance thesis.

FINAL COMMENT

Researchers whose work was undertaken almost a century ago observed a strong, ecological connection between socioeconomic status, or poverty, and delinquency, at the scales of small (Columbus election wards) and large (London boroughs) communities. Not surprisingly, some eighty years after the publications of these works, in the communities and crime field as a whole, this continues to be the sturdiest link between demographic community fabric and community crime rates [573].

Both these now-deceased researchers embraced some form of methodological individualism, seeking explanatory mechanisms at lower levels of analysis: in Burt’s case, at the level of households and individuals and, in McKenzie’s case, at the small local group levels of streetblocks and extended families. At the same time, both recognized the relevance of supracommunity dynamics, each incorporating in different ways the contributions of land use and city sector.

The work of Land, McCall, and colleagues, by contrast, leans strongly toward methodological holism, suggesting that resource deprivation / affluence, or a closely comparable index of concentrated disadvantage, connects with homicide rates in geographic units ranging from communities to nations. Their work provides support for a weak version of the invariance thesis, where “invariant” means “consistent.” As importantly, significant questions persist about the thesis. Given the version of the invariance thesis supported, and remaining questions, it seems premature to conclude on the basis of their work to date that spatial scale is *theoretically* irrelevant when examining links between communities and crime. This naturally leads to the next question: in what ways *is* spatial scale conceptually important?

Spatial Scaling and Theoretical Concerns

This section introduces three types of theoretical concerns related to spatial scaling: potential conceptual missteps, aggregation issues, and the analytic implications of aggregating by geographic proximity. Each is taken up in turn.

Potential Conceptual Missteps Related to Spatial Scaling

When thinking across different spatial scales about causes, causal processes, or even just observed relationships, researchers try to be alert to potential missteps in their theorizing. These missteps are introduced briefly here. Although graduate students in some disciplines are routinely indoctrinated against some of these, the entire set deserves attention.

FALLACY OF THE WRONG LEVEL

In recent years, this idea has been associated with Johan Galtung. This fallacy is committed if one inappropriately generalizes one's theorizing about concepts or dynamics across levels of analysis. The specific fallacies discussed later, except for the contextual fallacy, represent specific varieties of the fallacy of the wrong level. "In general the fallacy of the wrong level consists not in making inferences from one level of analysis to another, but in making direct translation of properties or relations from one level to another, i.e., making too simple inferences. The fallacy can be committed working downwards, by projecting from groups or categories to individuals, or upwards, to higher units" [262: 45]. Galtung saw two aspects of this problem. "One is related to a simplistic way of thinking about social phenomena, namely the idea that they somehow repeat themselves at different levels of organization" [262: 46]. The second problematic feature was

the use of the lower level in proposing causal theories. To explain a correlation between collectivities, one may advance the hypothesis that the same relation holds for the individuals that are members of the collectivity. . . . There are actually two problems here: first of all, the causal explanation using lower levels may be *completely* wrong, . . . and then it may be *partly* wrong, in which case interesting additional explanations may be lost. [262: 46]

To put this concern in the context of the two historical delinquency examples described earlier: if one thinks that the delinquency prevalence rate at the city level has the same properties or meaning as the delinquency prevalence rate at the streetblock level, one is committing this fallacy; if one thinks similarly about the poverty rate at the city versus streetblock level, one is making the same mistake; if one thinks that the causal dynamics connecting poverty and delinquency at the streetblock level are the same as, that is, homologous with, the dynamics taking place at the city level, one is committing this fallacy.

GROUP FALLACY (FLOYD ALLPORT)

Although the term “group fallacy” has been used in different places to mean different things, for social psychologist Floyd Allport, it meant losing sight of the roles of individuals in shaping group behavior and sentiment. He was responding to analyses of collective behavior and psychiatric writings, appearing in the first quarter of the 20th century, linking macro- and individual-level psychological properties. He complained that “the convenient and picturesque manner of speaking in terms of groups as wholes has infiltrated much of our social thinking” [15: 688]. Such a practice was acceptable for descriptive purposes but not for explanatory purposes.

The views which we have thus far examined are examples of what I have chosen to call the “group fallacy.” This fallacy may be defined as the error of substituting the group as a whole as a principle of explanation in place of the individuals in the group. The word “group” is here used in the widest sense. Two forms of the fallacy may be distinguished. The first attempts its explanation in terms of psychology, assuming that it is possible to have a “group psychology” as distinct from the psychology of individuals. The second renounces psychology and relies upon some other form of group process for treatment of cause and effect. Both forms abolish the individual; and, it may be added, both therefore abolish the services of psychology as a possible helpmate of sociology. [15: 691]

The first form of the fallacy allows groups to do things that individuals do, such as have a thought or a feeling or behave. The second form of the fallacy argues that explanation only need refer to group-level processes and characteristics and that these are separate from *and unrelated to* individual-level processes and characteristics. This is comparable to a meso-level version of methodological holism. Take, for example, an analysis of group involvement in crime [783]. If a theory were to argue that it was the properties of the groups, separate from the properties of the individuals, that “caused” individual delinquent acts, then the group fallacy would be committed.

ECOLOGICAL FALLACY

The ecological fallacy, also sometimes called the aggregative fallacy, is another type of “fallacy of the wrong level.” The label used here is usually associated with William Robinson, although he referred only to the “ecological correlation problem” and did not use the term “ecological fallacy” [605].

Robinson, using individual-level, US state-level, and US Census regional-level data from the 1930 US Census, linked racial composition and reading

illiteracy and showed, as E. L. Thorndike had demonstrated with hypothetical data more than a decade earlier, “there need be no correspondence between the individual correlation and the ecological correlation” [743: 354]. Inferring that there is a correspondence is to commit the ecological fallacy.²⁰

In a recent reanalysis of Robinson’s data, S. V. Subramanian and colleagues accused Robinson of committing the atomistic fallacy (see the following subsection) [707]. They showed that illiteracy was a complex function of individual race as well as state characteristics and that context moderated impacts of individual factors. More appropriate, they suggested, was a multi-level perspective.

INDIVIDUAL/INDIVIDUALISTIC/ATOMISTIC FALLACY

In this type of fallacy of the wrong level, one mistakenly makes conceptual assumptions in an upward rather than downward direction. One thinks relationships seen for individuals or smaller spatial units hold similarly for groups or larger areas.

Different scholars have proposed slightly different terms for this fallacy and have focused on somewhat different facets [14, 653, 654, 708]. Hayward Alker and Mervyn Susser focused just on inappropriate generalizing about relationships with their terms, respectively, “individual” and “atomistic.” Susser suggested that one commits this fallacy “where inferences about ecological relationships are made from associations observed at the individual level” [708: 60]. The terms “psychological” or “psychologicistic fallacy” are also sometimes used rather than “individual fallacy.”

Erwin Scheuch’s idea of the individualistic fallacy refers to properties rather than processes [654: 19]. For a political scientist concerned with nations as the unit of analysis, key properties of those units might *not* be derivable from information about individuals living in those countries. Scheuch emphasized that when the collectivities in question are quite large, such as nation-states, a focus solely on aggregate properties to the exclusion of structural or emergent properties will result in an incomplete picture of those entities.²¹

CONTEXTUAL FALLACY

Robert Hauser described the contextual fallacy as

a not very distant cousin of the aggregative or ecological fallacy . . . , since both involve misinterpretation of the between-group or ecological correlation. . . . The contextual fallacy occurs when residual differences

among a set of social groups, which remain after the effects of one or more individual attributes have been partialled out, are interpreted in terms of social or psychological mechanisms correlated with group levels of one of the individual attributes. [324: 659]

Advantages, disadvantages, and relevance of contextual effects continue to be hotly debated, even subsequent to the arrival of multilevel models [64, 444, 533]. The contextual fallacy *might* be committed in situations in which all of the following occur: the researcher has individual outcome data across a range of contexts, has individual-level predictors, aggregates some of those individual-level predictors, and finds impacts of one or more aggregated individual-level predictors on the outcome.

Two of the five problems Hauser lists concern us here [325: 366]. The significance of the contextual variable might arise from the researcher's *incomplete* model at the individual level, which omits one or more theoretically relevant individual-level predictors. Given the example-based discussion earlier in the chapter of spatial scale, one could argue similarly that the fallacy is committed if theoretical features at a lower level of spatial aggregation (e.g., streetblocks) are left out and predictors at a higher level of spatial aggregation (e.g., census tracts) are included. Imagine a delinquency prevalence rate model that used both individual race and racial composition of the community and found a significant effect for both. Hauser's worry is that the significance of community racial composition might arise in part from omitted individual-level variables.

Second, Hauser worried about unclear dynamics. The processes whereby context affects individual attitudes, sentiments, or behaviors, link 1 in the metamodel, are often unspecified. How is one to know which of several plausible dynamics might be "carrying" the contextual impact? Is it possible for a community-level condition to directly shape individual behavior? Must not there be a pathway involving perceptions, cognitions, or sentiments through which the outside context "enters" the individual and sets individual-level dynamics in motion?²²

Determining whether a researcher has committed the contextual fallacy requires examining several features of the research study and of the researcher's interpretations of results. A researcher finding and interpreting a contextual impact may not have committed the contextual fallacy if the researcher can address Hauser's methodological and analytic concerns, has a fully specified theoretical model at the individual level, and has a relatively clear idea of the dynamics driving the contextual impact.

IMPLICATIONS

Two general implications emerge from this conceptual review of different potential missteps in theorizing and researching at or across different spatial scales. Most importantly, these concerns urge an abundance of caution before one concludes that relationships between variables, and the properties or meanings of the variables themselves, are similar across different spatial scales. Further, these concerns argue for devoting analytic and conceptual care to relationships and variables at both individual and aggregated levels and, as importantly, to the links across levels. Criminological theorizing at the ecological level has not been sufficiently integrated with criminological theorizing at the individual level [813, 815, 816]. Achieving such integration without committing these missteps presents a challenge.

Aggregation Bias under the Homology Assumption

This section highlights just a couple of the most relevant points from an extensive literature, mostly in sociology, around aggregation and disaggregation issues.²³ Whereas the preceding issues addressed the logic of conceptual thinking, these points address modeling matters under specific conditions [316, 317].

Figure 3.2 proposes a model whereby higher socioeconomic status leads to decreased tolerance of deviance, and both of these lead to a decreased probability of delinquency. Tolerance of deviance refers to weakened concern about minor illegal actions [639]. The model is shown at three levels: individual, streetblock, and community. The outcome is individual-level delinquency prevalence rates. The exact same variables are used at each spatial scale. The dashed vertical lines represent aggregative relationships: the same variable is just aggregated or disaggregated. The data are presumed to be cross-sectional; this makes the aggregative relationships noncausal.

What will a researcher expect with regard to how the model behaves at different levels of analysis? That will depend on how he or she feels about a fundamental question. Does the researcher assume homologous relationships across different spatial scales? Or does he or she assume discontinuity?

Assume for the moment that the researcher expects homology between each corresponding micro-, meso-, and macro-proposition. A meta-theoretical stance such as general systems theory might lead one in such a direction [57].

Under the homology assumption, the same relationship (e.g., the impact of tolerance of deviance on delinquency after controlling for SES) has a

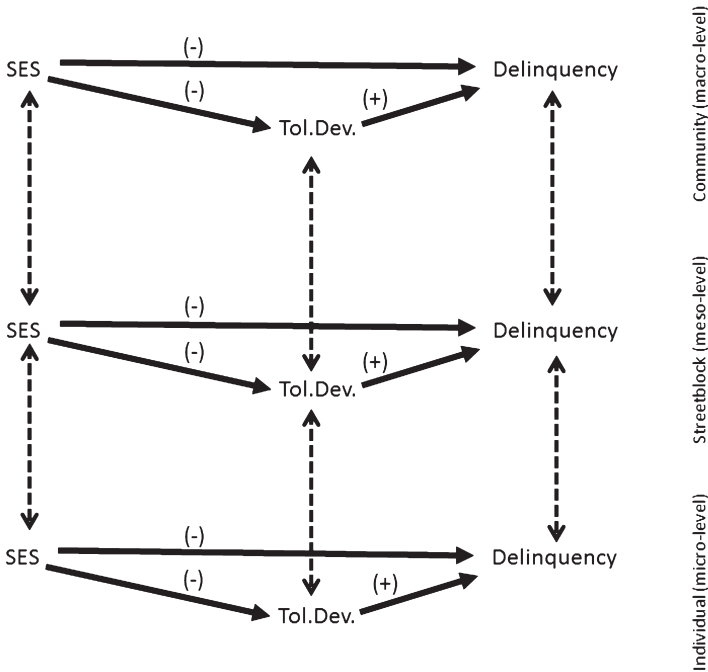


Figure 3.2. Causal and aggregative relationships in simplified causal model at three levels of aggregation: individual (micro-level), streetblock (meso-level), and community (macro-level). Adapted from Hannan [316: 19, figure 2-1]. Causal relationships are solid; dashed arrows represent aggregative relationships. Data are presumed cross-sectional.

homologous relationship across levels because the “laws” or processes connecting the cause and outcome are “formally identical” [662: 40]. If we “either implicitly or explicitly posit a basic consistency across levels of analysis,” we are committing ourselves to the “homology thesis,” or homology assumption [316: 2].

In this context, “consistency” has a specific meaning and is a technical term [316: 21]. In the example, consistency means that micro-level impacts of tolerance of deviance on delinquency, after controlling for SES, would, when appropriately averaged, match the predictions from the macro-level equation.

Deviations from consistency indicate aggregation or disaggregation bias under the homology assumption. Under this assumption, such deviations occur, and the macro-level relationship contains aggregation bias, when non-corresponding parameters in the model covary with one another [316: 79]. A

theory assuming homology can be modified to incorporate the parameters creating aggregation bias. Thus, the biasing parameters can be separated from the parameters that are more theoretically central.

But notice that the assumption of homology is key. *If and only if* one expects homologous relationships across levels of aggregation need one be concerned about bias related to aggregation and disaggregation [316: 23]. Suppose instead that the discontinuity assumption is held. Then differences in patterns of impact across levels of aggregation are *anticipated*. Assuming discontinuity means you would “*expect* to find large and important differences in analogous models estimated at different levels of aggregation,” differences that to those who assume homology would be “quite disturbing” [316: 3]. If the researcher assumes discontinuity and finds that a portion of the model—for example, impacts of tolerance of deviance on delinquency after controlling for SES—works differently at different spatial scales, the researcher cannot just wave his or her hands and say it was due to aggregation bias. Rather, *if discontinuity is assumed, understanding the different relationships across aggregative levels is a key part of theory development*.

In short, if one assumes discontinuity and finds discrepant relationships in one or more parts of the model at different spatial scales, the variation could be occurring for theoretical, metatheoretical, or analytic reasons. It is incumbent on the researcher to learn about the causes of the discrepancies seen in relationships at different spatial scales. A simplicity-seeking researcher might try to make this problem manageable by asking, which level of spatial scaling is the *correct* one? This may *not* be the most helpful approach, however, because the relationships at each level could be correct, just correct in different ways. To ask *which one is correct?* misses more fundamental questions. Those more fundamental theoretical questions are as follows.

1. What do we expect of this relationship at different units of analysis? As John Hipp put it, the researcher wants to “carefully consider the causal mechanisms for these structural properties” at that particular level of spatial scale [348: 674]. And, most crucially, one needs to make a decision about assuming homology versus discontinuity.
2. Given that expectation, how do we think relationships will differ at different units of analysis?
3. And relatedly, how if at all do the relationships at different units of analysis connect?
4. Finally, and perhaps most difficult of all, what is the origin of a relationship at a certain level?

*Spatial Scaling and Thinking outside the Model:
Unmeasured Variables*

This section outlines ideas relevant to question 2 from the preceding section. These are issues that go *beyond* the variables in one's theory. These are separate from the issue of potential flaws in one's specific model as one considers different spatial scales, and separate from observing and reacting to different links between variables in one's model at different spatial scales. The matters discussed here have been previously addressed, especially in the work of Hubert Blalock [65, 67, 69]. The goal here is to describe the matters which are most central to community criminology.

The discussion starts with one idea: if there are variables that are relevant to an outcome, but (a) those variables are *not included* in the current model of the outcome *and* (b) how those variables behave is influenced by geographic proximity, then spatial scale will alter key relationships between variables *included* in the current model. This is a different point than the ones asserted in the preceding section. Here the question is, are there generally predictable shifts linked to what is happening *outside* the model as one aggregates or disaggregates geographically? The answer is there probably are. But the specifics depend on how the aggregating variable links to predictors and outcomes [65: 101]. The broader processes at work when shifting spatial scales for the units of analysis were summarized by Blalock as follows:

In shifting from one unit of analysis to another we are very likely to affect the manner in which outside and possible disturbing influences are operating on the dependent and independent variables under consideration. . . . The key to the problem may come with the realization that in shifting units [by shifting spatial scale] we may be affecting the degree to which *other* unknown or unmeasured variables are influencing the picture. [65: 98–99]

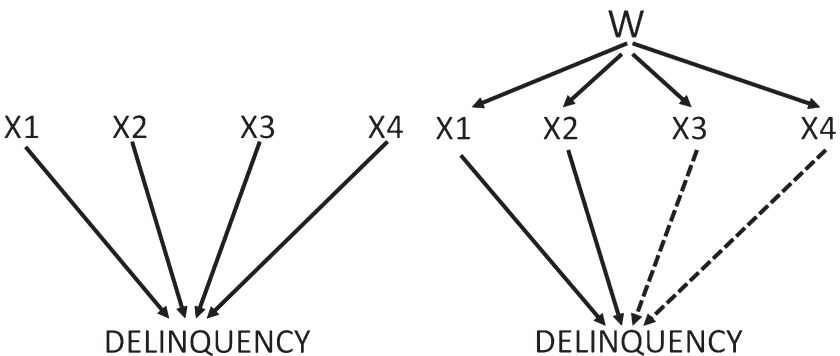
The theoretical implication is that one needs to have a (meta)theory about how the criterion for aggregation (here, proximity) fits into this theory. Without such a theory, one will have no way of deciding whether the micro-theory is better specified than the macro-[theory], or vice versa, or whether [the mean of] X belongs in the correctly specified micro-equation for Y. [69: 258]

This is not just a matter of methodology or measurement, even though discussions about disturbances and aggregations may sound like something

best left to analysts. As with the partialling fallacy (see earlier in this chapter), these matters concern the *interface* of theory and measurement and the potentially “productive interplay between theory and research” [67: 881]. Stated simply, it is a matter of *theoretical completeness*. One’s theory contains gaps unless it includes a relatively complete understanding of the connections between spatial proximity at multiple levels, predictors, outcomes, and disturbances.

Many geographically savvy community criminologists already consider these matters to some extent. Examining global and local patterns of spatial autocorrelation and the associated investigations—considering impacts of spatially lagged outcomes; controlling for spatially correlated error terms; examining, as theoretically appropriate, the impacts of spatially lagged predictors—are important steps toward greater theoretical completeness. But more is required. Blalock is urging investigators to develop, at multiple geographic levels, a detailed *descriptive awareness of* and *theoretical insight into* how predictors, outcomes, and disturbances behave at different spatial scales. This is a set of activities for the theorist and the empirical researcher to address collaboratively.

Let us return to McKenzie’s data on delinquency at the ward level in Columbus. His data included two relevant predictor variables: socioeconomic status (X1: SES) and stability (X2: STABILITY). Imagine a slightly different theoretical model, one that also sought to include two additional variables: racial composition as captured in percentage African American (X3: AFRAM) and percentage foreign born (X4: FORBORN). Such a four-factor model is shown in figure 3.3.



Figures 3.3 and 3.4. Figure 3.3 (left): Four-factor ecological delinquency model. X1 = SES; X2 = stability; X3 = percentage African American; X4 = percentage foreign born. Figure 3.4 (right): Influence of location (W) on delinquency predictors. Two predictors (X3, X4) are unmeasured. Adapted from Blalock [67: 889, figure 1].

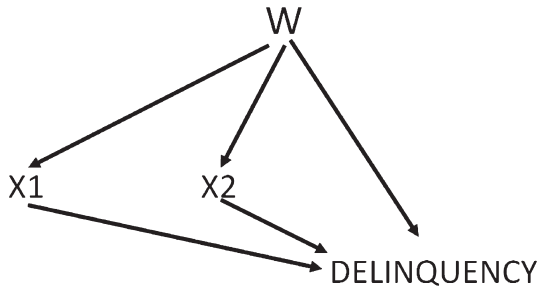


Figure 3.5. Impacts of aggregation by geographical proximity with misspecified model. Adapted from Blalock [67: 891, figure 2]. Relationships between predictors and outcome are now partly spurious, due to the joint impact of aggregation by geographic proximity on both predictors and the outcome in the context of a misspecified model.

Now imagine three additional points. (1) Location can be captured by a variable labeled W .²⁴ (2) Location influences scores on all four of the predictor variables in one's theoretical model. This is because urban (and suburban and rural) communities are organized ecologically, at multiple levels [327]. This is shown in figure 3.4 with W linking to all four predictor variables. (3) And, as in McKenzie's data set, indicators are missing for the racial composition (X_3) and percentage foreign born (X_4) variables. Thus, the impacts of these two variables on the outcome are shown using dashed lines. Technically, this model is now incomplete, or misspecified. Indicators for key variables are missing.

Such specification error shifts the relationship between location (W) and the rest of the model. Now, because some predictors were omitted whose scores depend in part on location, W correlates both with the predictors in the model *and the outcome*. "If we aggregate by [W] we are grouping by a cause of Y , and . . . this produces a systematic bias" in estimated impacts on delinquency [67: 891; see also 65]. The aggregation is creating "partly spurious relationship[s]," as shown in figure 3.5 [67: 891].

Generally, specification error is always a more serious problem when examining macro-level relationships. This means the researcher is often using data after they are aggregated by geographic proximity [67; 69: 257]. "If we group individuals by proximity W , we do the very *opposite* of controlling for W ; we further confound it with X . One way of seeing this is to consider that we have grouped by a cause of a dependent variable, thus confounding X with other causes of Y " [69: 255].

If we have grouped by proximity, we increase the correlation of the [unmeasured variables] U_i (and therefore e) with X , thereby confounding with X a whole host of effects of other variables. The more causes of Y that are causally connected to the proximity variable W , and the larger the size of the groupings, the more serious this effect will be. Therefore, we are likely to attribute to X the effects of numerous variables also associated with the grouping criterion. [69: 256]

In the example here, for the SES variable at a lower level of aggregation, there may be no direct connection between SES and delinquency. But, through the influence of these unmeasured variables linked to the process of aggregating by geographic proximity, linked in turn to SES, one could appear. Along these lines, Michael Hindelang and colleagues in a major self- and official-report delinquency study found a very slight negative relationship between SES and official delinquency at the tract level and no SES relationship at the individual level. They concluded that this link “appears not to be associated with individual characteristics but appears, at least with respect to class, to be associated with areas in which lower-class adolescents are more likely to reside” [347: 197]. Those factors “associated with areas” could be exactly the unmeasured variables like those under discussion here.

Thus, we arrive at the previously noted need for (a) an aggregation theory *linked to aggregation by proximity* and (b) corresponding “micro-level formulations as underpinnings” [69: 258]. The next chapter begins our consideration of how to organize those “underpinnings.”

Thinking more broadly, some final implications follow. First, cross-level theories are needed to help model these matters. Otherwise, we face “an overwhelming range of choices of causal specifications” [316: 49]. The researcher needs to carefully consider the links between his or her key theoretical indicators and potentially relevant but unmeasured attributes also shaped by geographic proximity. Careful theoretical-empirical, speculation-assessment cycles with a focus on model errors and their geographic structure can be fruitful. The point being suggested here *is not a statistical one*. Instead, it is about engaging in empirically informed, multiple-level *theoretical investigations* which are linked to multiple levels of measurement.

Second, community criminology needs to move beyond simple ideas about how variations in spatial scale shape the theoretical models in question. It is no longer sufficient to merely acknowledge that the level of aggregation or the level of clustering matters and will change relationships. It is more complicated than that. “The simple notion of a clustering effect is

shown by a causal analysis to be too undifferentiated to be of much help in resolving the problems” [316: 49].

Regrettably, most recent work still seems to be focusing on broad clustering or scaling effects. Recent work in delinquency, for example, has highlighted the effects of clustering but does not provide a clear theory about aggregation and disaggregation [547]. Recent observations that certain crimes might spread spatially in what appears to be a fractal process are probably correct [238: 113]. Such observations, however, do not move us toward a deeper understanding of the location-linked and therefore scale-linked dynamics specific to the predictors and outcomes in question. More is required [348]. Stronger theoretical integration between communities and crime work and research on the geography of crime, urban sociology, and urban and suburban political economy will help with this deepening effort [439, 579, 581, 671, 672, 673]. What community crime researchers generally lack is a theoretical model connecting spatial location with the other variables in the system. Thus, current researchers often achieve operational simplicity at the expense of theoretical clarity.

Summary and Implications about What Is Needed

Researchers have known about community-level links between socioeconomic status and crime—which includes delinquency in this volume—for close to a century. The two early examples considered, when considered through the lenses of spatial scaling and methodological holism versus methodological individualism, proved theoretically sophisticated. Researchers recognized the relevance of dynamics and factors—causal processes and causes—operating at different levels. Further, on careful inspection, these early researchers did not inappropriately assume homology across spatial scales. Current researchers who do make such an assumption, if they also espouse the invariance thesis in its strong form, are overstating their case. Despite recent work providing support for some versions of the invariance thesis as it applies to homicide, a general case can be made that spatial scaling is an important issue deserving further conceptual as well as methodological attention from community criminologists. Getting clear on that issue, however, involves a range of conceptual challenges. Broadly, the questions about assuming homology versus discontinuity and different forms of the fallacy of the wrong level are most relevant. Another set of conceptual challenges surface when the interface between measurement, geographic proximity, and theory is considered.

Spatial Scaling II

Metatheorizing about Community-Crime Linkages

The literature on aggregation and disaggregation is both technical and discouraging in its implications, if one takes seriously the goal of integrating microlevel analyses, based on the individual as unit of analysis, with macrolevel studies where groups are the focus of concern.

—Hubert M. Blalock, Jr., 1979

An adequate holistic framework should provide conceptual tools for overcoming the compartmentalization that prevails today between micro- and macro-sociologies.

—Nicos Mouzelis, 2008

Overview

This chapter and the next five each dives into specific conceptual problems afflicting community criminology. The preceding chapters have provided an orienting toolkit. Chapter 1 outlined two ways of thinking about community-crime connections: methodological holism and methodological individualism. Chapter 2 placed three classes of crime and crime-related indicators into broader, ongoing, community-level sequences. Chapter 3 confirmed that aggregating or disaggregating by geographic proximity *necessarily* introduces *both* conceptual and analytic shifts. Two examples in that chapter, almost a century old, supported links between community crime patterns and Short's macrosocial and microsocial factors and underscored the broad importance of spatial adjacency effects.

To make progress on Short's levels of explanation project or, more generally, to move community criminology toward a more integrated approach, researchers need a way to think about, organize, and contrast community crime theories and to unpack what the theories are saying about process. Toward that end, this chapter returns to the Boudon-Coleman boat metamodel. That metamodel receives three modifications: spatial scale is

aligned with the macro-micro dimension, adjacency or extracommunity dynamics are added, and an intervening subcommunity level is included.

The elaborated boat metamodel will be used to conceptually review how research in the criminology of place and hot spots more generally thinks about community criminology (chapter 5). Important issues related to the passage of time have been largely overlooked in community criminology (chapter 6). The elaborated metamodel can be further developed into a dynamic version so that important conceptual distinctions between ongoing ecological continuity and ecological discontinuity can be captured (chapter 7). (Ecological discontinuity is not to be confused with the discontinuity assumption in aggregation.) The dynamic metamodel illustrates ways researchers can address two other largely neglected issues in community criminology: ecological construct validation and the related lack of studies providing strong inference (chapter 8). A problem that has been increasingly noticed in community criminology, selection effects or selectivity bias, is revealed by the dynamic boat metamodel to be three distinctly different albeit related concerns (chapter 9).

Why the Boat Metamodel?

Why choose the boat metamodel? There are several reasons. It already has proven its applicability to criminological interests and is widely respected as a sound and straightforward template for organizing how we think about these theories [477, 638, 821]. In addition, once modified, it provides a framework incorporating additional spatial concerns such as diffusion and extralocal effects. Further, the framework can be adapted to accommodate temporal and spatiotemporal dynamics. Moreover, it provides an organizing frame for two critical features of community crime dynamics: contextual effects and agency. Finally, and perhaps most importantly, this version of the boat metamodel presents significant challenges for community criminology in its current form. It poses hard questions about the ways community fabric, individuals, face-to-face groups, CJA local actions, and crime all tie together. The framework helps specify and organize the important conceptual challenges that lie ahead for community criminology.

Are there alternatives? Yes. For example, one might take the “exchange relation” rather than the individual as the “fundamental building block” [173: 32]. Alternatively, one might use micro-level transactions [171]. But given the topic of interest here, the boat metamodel maintains congruence not only with decades of criminological theorizing but also with current criminological models in which individuals are the theoretical focus [178, 281, 814].

Further, if a researcher favors some variety of methodological individualism, individuals must be specifically included in the models and metamodel used. This approach satisfies that requirement. To be clear, macrocriminologists adopting methodological holism or meso-level criminologists adopting a criminology of place will not need a metamodel structured as a boat metamodel. But community criminologists with other views will need this.

What Is Ahead

The boat metamodel is elaborated by aligning its macro \leftrightarrow micro dimension with geographic scale. A specific meso-level, the streetblock, is introduced to capture Short's microsocial, small-group dynamics, at least in a residential context. The idea of adjacency effects is introduced. Modifications to the boat metamodel demonstrate how these can be incorporated and the questions they raise. As needed, consideration is given to both methodological holism and methodological individualism.

Metamodel Elaborations

Aligning Geographic Scale with the Micro-Macro Dimension

Figure 4.1 shows a boat metamodel in which the geographic scale of the geolocated social unit has been aligned with the macro-micro dimension. Starting from an individual resident or individual household, the geographic scale can extend from extremely small spatial units such as individual addresses, street corners, hot spots, or streetblocks up to nations or regions of the world. As units increase in spatial scale, so too do organizational, institutional, social, cultural, and organizational complexities. A city will have more organizations and cultural norms than, say, a neighborhood, but the latter nevertheless has norms and organizations too. So even though a community in a city is not as "macro" as a city, it nevertheless has macro-level properties.¹ Spatial scale is congruent with, albeit distinct from, the broader micro \leftrightarrow macro dimension as used by Coleman and other sociological theorists [523]. It also aligns with the use of this dimension in the theories of Sampson, Wikstrom, and others [638, 818, 824]. The horizontal dimension here is explicitly labeled. It takes time for processes to work, whether those processes are macro, micro, or bridging. In chapters 6 and 7, the temporal dimension will be further elaborated. The units of the temporal scale will depend on the specific theory and indicators.

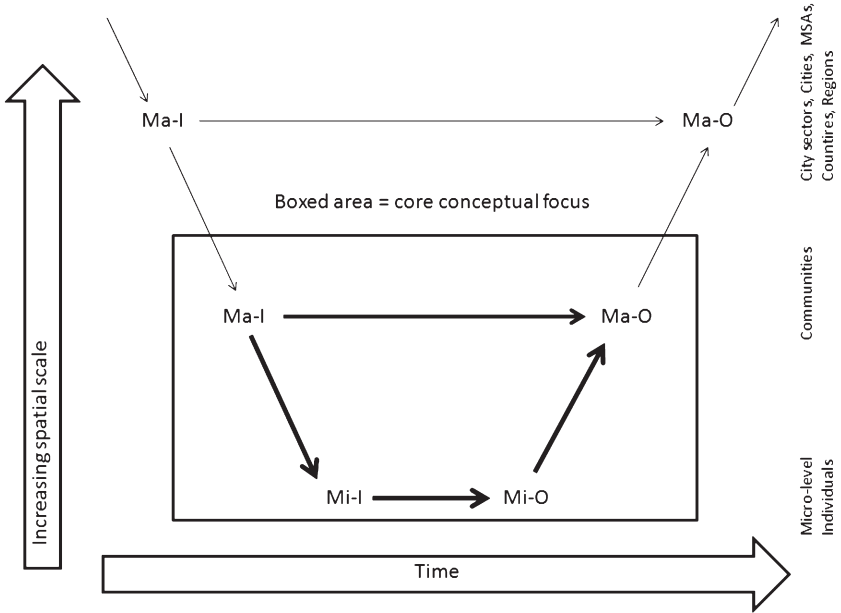


Figure 4.1. Range of spatial scale of key interest. Ma = macro; Mi = micro; I = input; O = output.

Limiting Focus to a Specific Range of Geographic Scales

The boxed-in portion of the metamodel describes the current focus: from the individual up to the level of the community or locality, and slightly beyond, to extralocal dynamics. The latter are subcity dynamics taking place at a scale somewhat above the community: “extralocal layers.”² These “capture the interdependence of social processes through spatial networks, and thereby mechanisms such as diffusion and exposure,” reflecting “extralocal layers” of “macrolevel influences” [638: 61]. For example, a community-level negative association between changes in language diversity and changes in homicide might be stronger in some regions of a city than others [285]. That is why the top portion of the box extends somewhat higher than communities on the spatial scale.

Of course, at higher spatial scales, extending beyond the conceptual focus of this book, important crime dynamics take place. Research on urban, suburban, and rural differences; regional differences related to violence; county-level or city-level crime correlates or dynamics; and international crime differences underscores the importance of these variations [12, 29, 163, 487, 506,

531, 532]. These extra-extralocal variations provide the broader setting conditions within which the dynamics of interest are considered.

Finally, although the “floor” of the metamodel shown is the individual resident, it is recognized that biological and neurological factors are involved in crime dynamics [577; 578; 675: 169]. Biological/neurological factors are not explicitly incorporated, but it is recognized that these substrates shape some Mi-I → Mi-O connections.

The metamodel as outlined works for models in which crime or CJA actions play different “roles.” Core concerns of this book are crime as a cause of community features, crime as a consequence of community features, and community crime shaped by as well as producing local actions of CJAs in a community. Therefore, crime or justice actions could be placed in a metamodel three different ways. Crime or justice actions may function as cause, playing substantial roles in producing contextual effects (Ma-I → Mi-I). Alternatively, crime or justice actions may function as macro-level outcomes (Ma-O). Finally, if the models are longitudinal, crime or justice actions could be *both* at the stern of the boat on the left (Ma-I) *and* at the bow of the boat (Ma-O) on the right. For example, impacts of high removal rates (Ma-I) in a locale on later local delinquency prevalence (Ma-O), via the effects on individuals (Ma-I → Mi-I → Mi-O), might be of interest for a community justice theorist [158].

Introducing a Meso-Level

Recall, from chapter 1, Short’s suggestion to develop models that permit integrating the individual, the microsocal, and the macrosocial. “Any theoretical package that purports to account for violent crime must include fundamental biological conditions and processes, learning mechanisms, and macro-level (environmental) conditions. . . . The package ought, also, to include micro-level [as distinct from individual] processes” [675: 169]. The boat model is inherently multilevel, capturing the interplay between individuals and some broader social unit. But social units at multiple levels, that is, multilevel systems, also can be accommodated. Both Burt’s and McKenzie’s work from almost a century ago suggest consideration of an intervening, meso-level spatial unit.³

Because the micro-macro dimension has been aligned with spatial scale, the intervening unit to capture Short’s microsocal processes also should be geographic. The unit also should be appropriate both for a community focus and small-group dynamics. A further elaboration of the boat metamodel appears in figure 4.2. In this elaboration, the streetblock—its properties and

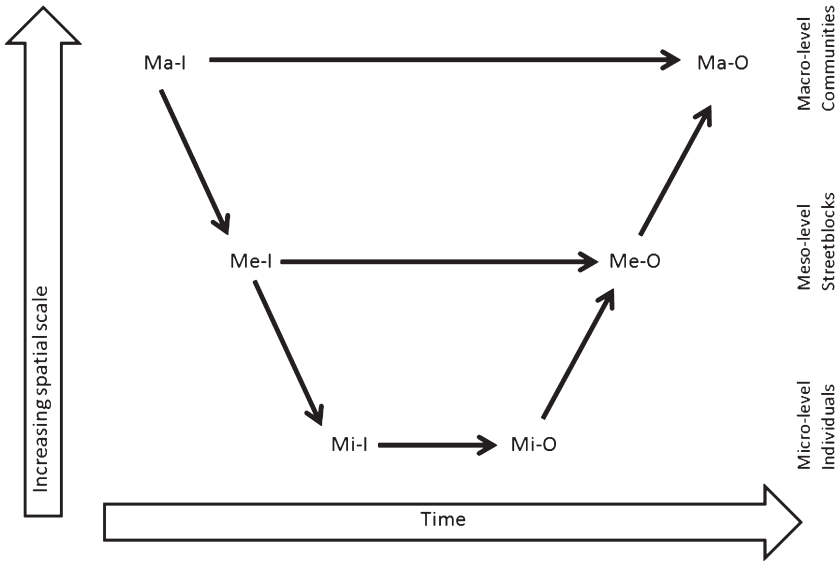


Figure 4.2. Streetblocks as a meso-level connecting communities and individuals. Ma = macro; Mi = micro; Me = meso; I = input; O = output.

dynamics—is interposed as a meso-level (Me) of analysis. Of course, other in-between levels, rather than streetblocks, also are possible.⁴

Streetblocks are used here as an in-between or meso-level for several reasons. They have been implicated as important, organizing containers in urban delinquency work going back almost a century, as seen with the work of both Burt and McKenzie. Current work associates streetblocks with crime differences and varying offender dynamics [411, 692, 704, 735, 794, 795]. Additionally, streetblocks are clear-cut spatial units, and they predominate in the types of urban and suburban communities often investigated by community crime researchers [21, 46]. Often, you can literally see where they begin and end. Further, expanding on their social significance, they create a well-observed, well-documented, functioning social as well as spatial unit in urban and suburban locales [249; 250; 263; 492; 351]. Streetblocks represent an important layer of community [711]. Under *some* circumstances, they may create free-standing sociospatial units called behavior settings [721]. Moreover, because streetblocks host or create face-to-face groups, they generate norms [240, 721]. The presence of norms means that choosing streetblocks as face-to-face scale sociospatial units permits, following Short's suggestion, incorporating microsocial processes into the metamodel. Also supporting this selection is available knowledge about the microecological dynamics

related to crime and disorder in these locations [249, 250, 411, 721, 795]. Finally, streetblocks are subunits geographically nested completely within the higher level of aggregation, the community. Such a spatial arrangement aligns readily with the interpretation of the macro-micro dimension applied here.

The inclusion of streetblocks enriches the formulation of crime-related dynamics in multiple ways. It separates the Ma-I \rightarrow Mi-I link into two different links. Community influences are first felt at the streetblock level: Ma-I \rightarrow Me-I. Community features or changes shape streetblock attributes or cause streetblock changes. Streetblock conditions or changes in turn affect household- or individual-level changes or attributes: Me-I \rightarrow Mi-I. Similar distinctions occur on the output side. The outcome arising from individual-level dynamics shapes streetblock conditions: Mi-O \rightarrow Me-O. These streetblock attributes in turn shape community outcomes: Me-O \rightarrow Ma-O. Further, the model permits streetblocks to have their own, meso-level dynamics: Me-I \rightarrow Me-O [721, 795]. For example, the presence of certain types of non-residential land uses on a streetblock, or traffic levels, can alter streetblock dynamics among residents [21, 38, 411]. Finally, including this meso-level similarly enriches prevention possibilities. Prevention programs, depending on the circumstances, might be successfully targeted at individual streetblocks, rather than seeking to affect entire neighborhoods [559, 777, 778]. This permits a “small wins” approach [789].

Of course, this mediating level of sociospatial dynamics may be more or less relevant depending on the particular crime outcomes or predictors. For example, youth without access to cars have more restricted activity fields than do adults, so streetblocks might be more relevant for adolescent than adult crime inputs and outputs [812: 134]. There might be situations, for example, teens involved in motor vehicle theft and joyriding, in which alternative mediating structures would be more appropriate.

Implications for Understanding Adjacency

This section describes how the elaborated boat metamodel approaches spatial adjacency. Adjacency effects appear because communities are embedded rather than isolated sociospatial units. The embeddedness creates complexities: “the inherent spatial organization and spatial structure of phenomena will tend to generate complex patterns of interaction and dependencies which are of interest in and of themselves” [18: 8]. For example, a macro-level outcome of interest to a community criminologist may exhibit a spatially nonrandom pattern even after model predictors have been included. How do

we think about this embeddedness? How are such dynamics factored into a modified boat metamodel?

Tobler's first law of geography, originally introduced as a heuristic shortcut and not as a law, is that near things in geospace are more related to one another than things farther away. This leads to an expectation of spatial nonrandomness at multiple geographic levels—more specifically, to an expectation of spatial dependence [511]. “Spatial dependency is the extent to which the value of an attribute in one location depends on the values of the attribute in nearby locations” [248: 14]. Spatial dependency between geographic units on an attribute is captured with global or local measures of spatial autocorrelation [19, 161]. Those correlations could be positive or negative. In addition, geographic units could be related because of a broader supracommunity or extralocal spatial heterogeneity in which “different causal processes are thought to operate in subregions of the geography” [503: 447]. For example, work by Corina Graif and Robert Sampson showed different neighborhood-level links between changes in language diversity and changes in homicide in different sections of Chicago [285]. It can be challenging to separate spatial dependence from spatial heterogeneity because they “can be observationally equivalent and detection of one must be tested while the other is controlled for” [503: 447]. Techniques such as geographically weighted regression focus specifically on this challenge [248]. From a broad theoretical vantage, both spatial autocorrelation and spatial heterogeneity are “information bearing,” the former “since it reveals the spatial association” and the latter “since it reveals both the intensity and pattern of spatial associations” [511: 284].

Of course, numerous researchers over many decades have demonstrated that crime patterns cluster spatially at many different levels: parts of the country, counties in a metropolitan area, or communities in a city [29, 503, 736]. Both delinquency examples introduced in the preceding chapter observed such supracommunity clustering. Burt commented on the extremely high rate of industrial school cases in several boroughs just north of central London. Figure 4.3 shows an extract from that map. Shoreditch, Finsbury, Holborn, and Southeast St. Pancras all had prevalence rates at or above 0.25 percent—2.5 delinquents per thousand and higher. Burt remarked that what these boroughs shared was that “after the City itself, [these] are the oldest regions of London” [129: 71]. Further, at the time of his writing, it was a region of London where a hardened criminal subculture had existed at least since the times of *Oliver Twist* and “on first impression” is “still very much the same” [129: 72]. Third, it was ethnically mixed: “Irish, Jews, and Italians mingle with the lowest type of English loafer” [129:



Figure 4.3. High-delinquency cluster of Greater London boroughs circa 1922. Adapted from Burt [129: 73]. Boroughs shown had the highest delinquency prevalence rates and were shaded black in Burt's original figure.

72]. Finally, excellent target density for robberies and burglaries existed close by; these locations were “on the edge of the richer haunts of business, pleasure, or residential comfort” [129: 72]. In short, history, proximity to high target density for some crimes, and the historically durable, hardened criminal subculture in that part of Greater London all contributed to these *adjoining* boroughs being the only ones in the group with the highest delinquency rate.

In the Columbus data of McKenzie, three wards with high delinquency rates that were just west, north, and south of the downtown business district, the latter centered at Fourth and Broad, created a significant ($p < .05$ by Global Moran's I) local cluster of high-delinquency communities surrounded by other high-delinquency communities. That cluster is shown in figure 4.4. The high-high-delinquency cluster revealed in McKenzie's data was near to or included industrial areas, the riverfront, and the downtown central business district.⁵

Supracommunity geographic dynamics, or what Sampson calls “extra-local dynamics,” can be modeled in three different ways: spatial disturbances, spatial effects, or spatial heterogeneity. The following section describes how the boat metamodel incorporates such modeling. How that incorporation works specifically will depend on whether the researcher favors methodological holism or methodological individualism or something in between.

Spatial Disturbance / Spatial Error Models

Imagine that a researcher working with cross-sectional data and predicting some type of community crime rate with community-level variables finds model residuals from more proximate units correlating more strongly with one another [18: 37]. This is a *spatial disturbance / spatial error* model, seen in figure 4.5 [29]. Model errors of spatially adjoining geographic units (j and k) are correlated ($e_j \leftrightarrow e_k$). “A spatial error model gives the analyst an indication that [spatial clustering of residuals] reflects the influence of unmeasured variables” [143: 136; 502]. The size and/or direction of the residual “is due to spatially autocorrelated missing variables,” assuming it is not due to measurement error or some type of modifiable area unit problem [143: 136–137; 540].

These spatially autocorrelated error terms create analytic difficulties for the researcher. The challenges can be handled in a number of ways [18: 100–116]. In a typical cross-sectional spatial analysis, a researcher using an appropriate package can direct it to allow errors to covary in a pattern following a spatial weight matrix.⁶ Although most typically *spatial* proximity is addressed with a spatial weight matrix based on some type of contiguity/adjacency rule or distance metric, proximity also can mean a type of “general” non-Euclidean space which might be social or cultural [18: 8].

But there are interpretive difficulties as well. What do these correlated errors mean theoretically? “Intuitively, the spatial weight matrix is taken to

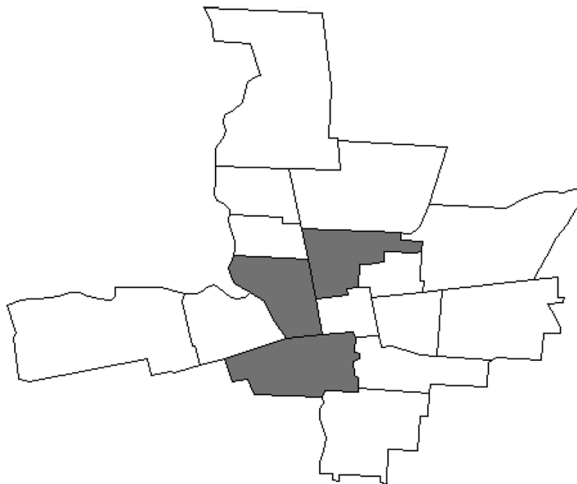
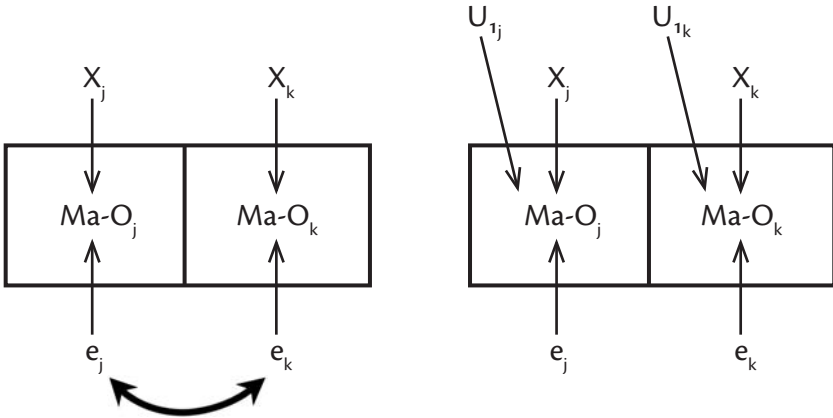


Figure 4.4. McKenzie’s delinquency-rate data at the ward level, Columbus (OH). Significant high-high-delinquency local cluster is shown in darker color. Analysis by the author.



Figures 4.5 and 4.6. Figure 4.5 (left): Graphical depiction of spatial disturbance / spatial error. Communities j and k adjoin geographically. X = community-level predictor; Y = community-level outcome; e = error. Figure 4.6 (right): Spatially adjoining errors (e) no longer spatially correlated after entering appropriate predictor (U_1 , previously unmeasured variable). Communities j and k spatially adjoin.

represent the pattern of potential spatial interaction that causes dependence, *but the nature of the underlying stochastic process is not specified*" [18: 102, emphasis added]. Some distance-dependent processes are at work, but it is not clear what these are. In some situations, the researcher may be able to identify an additional *theoretically relevant* predictor that somehow captures this underlying process causing spatial dependence. If the additional community-level predictor (U_1) captures some of that underlying process, then models with the additional predictor might no longer have errors that are significantly spatially autocorrelated. This is shown in figure 4.6.

What is happening here metatheoretically? It depends on what happens after this operation and on the researcher's worldview. Does the additional variable (U_1) make the correlation between the residual spatial disturbances nonsignificant? Or not? And does the researcher's broader theory align with some variety of methodological holism or methodological individualism?

Holism, residuals nonsignificant. Let us start with scenarios in which the added variable results in residuals no longer significantly spatially autocorrelated. If a researcher favors methodological holism and adds a community variable, the conclusion about mechanisms is something like the following. Portions of the scores on the now-included community-level feature, portions not overlapping with other model predictors, were spatially patterned at the supracommunity level, for example, by region within a city (interpretation A). The researcher can verify this directly. That additional link 4 (Ma-

$I(U_1) \rightarrow \text{Ma-O}$) in the model rendered the residual outcome variation spatially random.

Individualism, residuals nonsignificant. A researcher leaning toward some variety of methodological individualism, who adds a macro- or micro-level variable that reduces the spatial correlation among residuals to nonsignificance, has different interpretive possibilities. Those possibilities depend on whether the added predictor is individual-level or macro-level.

If the added predictor is individual-level, then the interpretation would involve either link 3 in a boat metamodel ($\text{Mi-O} \rightarrow \text{Ma-O}$) (interpretation B) or a link 2–link 3 combination ($\text{Mi-I} \rightarrow \text{Mi-O} \rightarrow \text{Ma-O}$) (interpretation C). Regardless of which portions of the boat metamodel are involved in interpreting the altered residual correlations, the inference is as follows. The portion of the newly added individual-level predictor, which is independent of predictors already in the model, was ecologically patterned at the supra-community level. This raises the possibility of some spatially based selection dynamics operating at the supracommunity level. (Chapter 9 covers selection dynamics.)

If the added predictor is macro-level, a researcher favoring methodological individualism might opt for a slightly different interpretation. The portion of the added macro-level predictor, which was independent of other predictors already in the model and was ecologically patterned at the supra-community level, instigated some variety of individual-level processing ($\text{Ma-I} \rightarrow \text{Mi-I}$). The latter led to an individual-level outcome ($\text{Mi-I} \rightarrow \text{Mi-O}$), which, when, aggregated, altered the community-level spatial patterning of residuals ($\text{Mi-O} \rightarrow \text{Ma-O}$) (interpretation D).

The important point here is that if an additional predictor makes the spatial autocorrelation of the outcome residuals nonsignificant, and these residuals were significantly correlated before, from a metamodel perspective, the researcher is not sure what is happening. One of several metamodel pathways or sets of pathways could be involved, depending in part on the researcher's stance on methodological holism versus individualism (interpretations A–D). Only one of these interpretations (A) can be empirically verified. Whether the added predictor is macro- or micro-level does not necessarily narrow down the mechanisms that might be responsible for the shift in spatial patterning of model residuals.

Residuals remain significantly spatially correlated. If a researcher adds a predictor and the residuals remain spatially autocorrelated, or even if he decides not to add an additional predictor and to live with the spatially correlated disturbances (e.g., modeling the latter with a lambda coefficient in spatial error regression), the researcher has little idea what that spatial

pattern means. The coefficient capturing those spatially autocorrelated errors could be reflecting not-yet-modeled, and therefore unmeasured, metamodel dynamics. Those dynamics might align with any of the foregoing interpretations (A–D) or any combination of those interpretations. In short, in spatial terms, the specific theoretical model being tested is incomplete.

Spatial Diffusion / Spatial Lag Models

A different set of dynamics may create spatial patterning of an outcome: diffusion processes. “Geographers have traditionally recognized two basic forms of spatial diffusion processes: contagious diffusion, characterized by the spread of an innovation in short steps, often between adjacent units of roughly equal importance; and hierarchical diffusion, distinguished by relatively long steps from large to smaller units” [361: 333]. Which type of diffusion is more relevant may depend not only on the topic under consideration but also the geographic scale. For example, George Rengert investigated illegal-drug-selling practices at the intercity level and found that they diffused hierarchically from larger to smaller markets in Pennsylvania [597]. By contrast, Colin Loftin proposed that assaultive violence at the community level spreads through contagious diffusion [448]. Within a metropolitan area, homicides may diffuse through contagion-like processes as well [503]. Epidemic theories in effect assume spatially dependent, contagious diffusion processes; these may apply to many aspects of community well-being [183, 519]. Models to capture contagious diffusion are called “spatial diffusion” or “spatial lag” models. People, events, information, or agency responses are somehow spatially spreading from nearby locales into a target locale.

A researcher using spatial diffusion or spatial lag models confronts the same predicament as the researcher adopting a spatial error model: outcome residuals are spatially correlated. But the response is different because different *conceptual dynamics* are suspected. Diffusion processes related to variables already in the model on either the predictor or outcome side are held responsible. This is different from adding new predictors to capture previously unmeasured attributes linked to spatial error. How the researcher models diffusion depends in part on what dynamics are suspected. Options include adding a spatially lagged predictor, a spatially lagged outcome, or both [219].

MODELING DIFFUSION BY ADDING A SPATIALLY LAGGED OUTCOME

If a researcher thinks spatially constrained contagious diffusion processes are at work and finds spatially autocorrelated error terms at either the global level (using Global Moran’s I) or local level (using LISA statistics), one option

is to introduce a spatially lagged outcome. This is accomplished by adding “the weighted mean of the local values of y [the outcome] in neighbouring areas” as a predictor [143: 136]. The researcher hopes that after introducing the spatially lagged outcome as a predictor, residuals from the model no longer demonstrate significant spatial autocorrelation. If this happens, the researcher is assured that the impacts of the other nonlagged predictors are capturing only *within*-community dynamics.

What is happening here conceptually? Say a community crime rate is the outcome for a researcher. “The spatial lag model implies that any geographic clustering of a measure of crime is due to the influence of crime in one area on that crime in another” [143: 136]. This has implications for the metamodel. Say a researcher introduces a spatially lagged crime outcome variable, and this reduces residual spatial autocorrelation to nonsignificance, both globally and locally. How she interprets that metatheoretically depends on the researcher’s broader orientation. A researcher leaning toward methodological holism is likely to conclude something roughly like this: there is some extralocal feature or set of extralocal features, operating at the supra-community level, that create somewhat common crime levels across spatial clusters of communities. These clusters arise from spatial contagion diffusion processes, even after controlling for other features in the specific model. So SuMa-I \rightarrow SuMa-O (interpretation E). Because the spatially lagged outcome is based on an average of surrounding communities, it is by definition an extralocal or supra-macro-level attribute. The specific features responsible for this supracommunity clustering of scores are simply not known. The researcher is assured, however, that the coefficients for the other predictors in the model depict impacts relevant only to community-level outcome variation *independent* of the surrounding, supracommunity spatial patterning of that outcome.

Suppose a researcher finds that a spatially lagged outcome resolves the correlated residuals problem, as described earlier, but leans toward methodological individualism. What metatheoretical interpretation follows? The researcher will assume that extralocal, spatially contagious diffusion processes are affecting community conditions (SuMa-I \rightarrow Ma-I). These conditions are not captured with other macro-level predictors already in the model. These community features set in motion some type of individual-level processing (Ma-I \rightarrow Mi-I), leading to an individual-level outcome which is then aggregated to a macro-level outcome (Mi-I \rightarrow Mi-O \rightarrow Ma-O) (interpretation F). Although spatially lagged outcome models are often used when macro-level crime is the specific outcome of interest, these diffusion dynamics can apply to other types of noncrime, community outcomes as well [519].

The important point with the spatially lagged outcome models, as with

the spatial error models, is that confusion persists at the level of metatheory. If the spatial autocorrelation of residuals is rendered nonsignificant, the researcher is not sure which interpretation (E or F) to apply.

SPATIAL DIFFUSION WITH MODELED PREDICTORS:
SPATIALLY LAGGED PREDICTORS

A third type of spatial adjacency dynamic considers spatial diffusion but on the predictor side. As with the spatially lagged outcome models, spatially lagged predictor models also have proven important in communities and crime research [496; 562: 96–105]. This model shares similarities with the spatially lagged outcome model described earlier. They both address “horizontal effects” because they are about places being affected by other nearby places, presumably through some type of contagious diffusion.

Nevertheless, there are important analytic differences between the two types of spatial lag models [308: 313–314; 441]. The spatially lagged outcome model adds that lagged variable in response to an overall pattern of spatially autocorrelated residuals. Further, the model expects that including the lagged outcome will render the remaining spatial autocorrelation among residuals nonsignificant. By contrast, with the spatially lagged predictor model, no initial pattern of spatially autocorrelated residuals is required before including that lagged predictor. Nor is it necessary that the inclusion of that spatially lagged predictor render the residual spatial autocorrelation nonsignificant. Another key conceptual difference is that for the spatially lagged predictor model, the adjacency influences are contained within or suggested by the theoretical model itself. Rather than postulating *un*measured supracommunity similarities linked to proximity in geographical or social space, the researcher’s existing theoretical rationale, embedded in a spatial or sociospatial context, justifies the lagged predictor’s inclusion [496]. With the spatially lagged predictor models, predictor scores on, for example, predictor X_1 in adjacent communities ($k, l, m \dots$) affect outcome scores in a focal community (j) even after controlling for X_1 in the target community itself. Consider as a hypothetical predictor the volume of illegal-drug buyers at outdoor drug markets in a focal community (j) and in adjoining communities ($k, l, \text{ and } m$). The outcome is violent street crime. Drug-market activity in community j will affect violence in that same community. Drug buyers in the community rob others to get funds for drugs and are sometimes robbed of their drugs. But if drug buyers leaving drug markets located outside the focal community travel into the focal community (j) while being followed by potential offenders looking to rob them, then average drug-market activity in communities $k, l, \text{ and } m$ around community j will affect violence in community j .⁷

What is happening metatheoretically? Using the preceding example, say a researcher favors methodological holism. The model of community-level drug-market activity already includes indicators for the focal community (MA-I_j). The researcher is *spatially* expanding the model. But the expansion is not conceptual. In some locations, due to nearby rather than focal drug-market activity (SuMa-I_{k, l, m}), focal-community street violence is higher. The extralocal attribute, nearby drug-market activity, is not adding any new macro-level processes. It is simply saying that the *same* processes, already included in the conceptual frame, operate in a wider geographic range than anticipated (interpretation G). A researcher favoring methodological individualism rather than methodological holism can make the same addition on the input side of the metamodel but just connects inputs to outputs with a different series of links (interpretation H).

Of course, conceptual as well as geographic expansion *can* occur with the addition of a spatially lagged predictor. This seems to be the case with models examining violent-crime impacts of racial concentration effects. Ruth Peterson and Lauren Krivo have discussed how the addition of surrounding racial composition eliminated violence differentials between predominantly white and predominantly African American census tracts in multiple cities. A proximity dynamic was involved. “Clearly, proximity to the structural privileges associated with whites is critical for gaining access to . . . resources” [562: 100].

Spatial Heterogeneity

“The term spatial heterogeneity refers to variation in relationships over space” [440: 7]. The link between a predictor and an outcome is nonstationary; that is, it depends on location. The implication, as noted earlier, is that different causal dynamics are at work in different parts of a region. The example mentioned earlier was the finding of Graif and Sampson in Chicago that a tract-level negative relationship linking increasing language diversity with later decreasing homicide varied by region within the city. “Spatial location conditions the overall relationship between immigration and homicide” in Chicago [638: 256; see also 285]. Other crime researchers working with much larger spatial units such as counties have similarly observed such conditioning effects [29].

To organize these dynamics within the elaborated boat metamodel means first recognizing that there is a location-based, extralocal factor or set of factors at work, operating above the community level. Graif and Sampson’s link between language diversity and homicide proved strongest in the

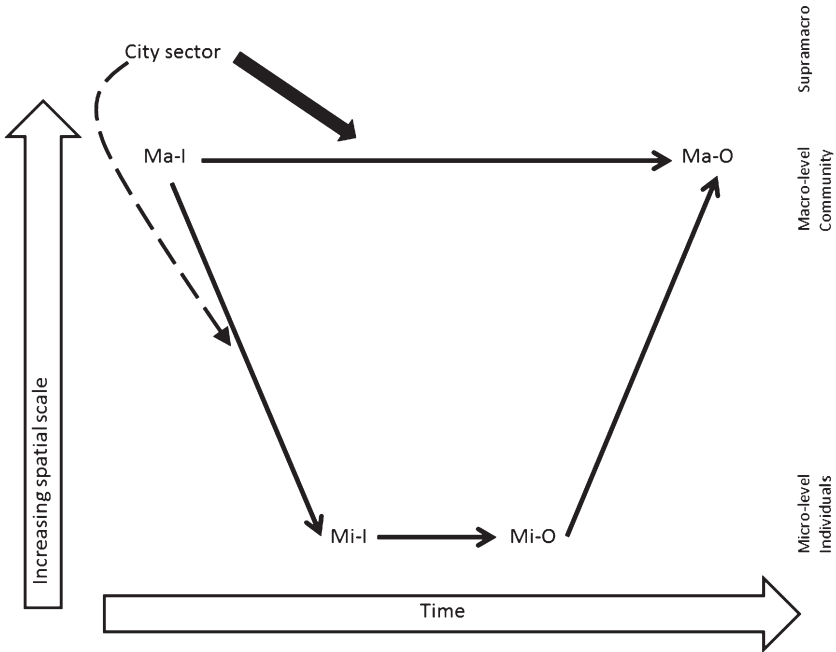


Figure 4.7 Impacts of spatial heterogeneity in the elaborated boat metamodel. Solid arrow shows city-sector impact following a methodological holism perspective. Dashed arrow shows impact following a methodological individualism perspective.

northwestern section of the city and in the middle and near southern sections of the city. Something—we do not know what—about the features of these regions of the city made the connection more robust there [638: 256]. *How* that connection works depends—again—on whether the researcher is leaning toward methodological holism or methodological individualism. These two possibilities are shown in figure 4.7. In the figure, “city sector” is included just as an example of a type of extralocal level since this was used in Graif and Sampson. From a holism perspective, some unknown, location-linked, supramacro factor (SuMa- I_u), associated with city sector, is conditioning or moderating the macro-level relationship (Ma-I \rightarrow Ma-O; link 4) [36]. This is shown in the figure by the solid arrow affecting link 4 (interpretation I). From an individualism perspective, supramacro, locational differences condition the impact of community on individuals (Ma-I \rightarrow Mi-I; link 1). This is shown in the figure by the dashed arrow. City sector affects link 1 (interpretation J). This is a different type of moderating relationship. Therefore, with such extralocal dynamics, there are two issues to be addressed. One is theoretical:

given the theorized dynamics, what specific extralocal attributes are creating the spatial heterogeneity and why? The second is metatheoretical: what links in the metamodel are altered by these extracommunity attributes?

Closing Comment

Before leaving the consideration of spatial adjacency impacts from a metamodel vantage, four general matters deserve consideration. First, are these complications needed? Do adjacency effects need to be incorporated as part of community and crime metamodels? Empirical work to date strongly suggests they do. In community models with delinquency or crime outcomes, research documents numerous adjacency effects [20]. These might reflect influences of adjoining (spatially lagged) crime rates or, for example, spatially lagged predictors such as nearby alcohol-outlet density, nearby percentage white, nearby racial change, or nearby resource deprivation with socially contingent effects [29, 340, 496, 521, 562, 857]. The processes whereby adjoining locales influence one another over time are important and taken up when spatiotemporal concerns are addressed [164, 503].

Second, if we wish to incorporate these spatial adjacency effects, is the boat metamodel “needed”? Yes, if the researcher favors some version of methodological individualism. In this case, the boat metamodel sharpens thinking about how extracommunity dynamics link to local, specific individual features. Too often substantive discussions of spatial adjacency impacts for social problem or violence outcomes refer vaguely to diffusion or contagion processes rather than specifying particular structural, cultural, or social dynamics which might drive these diffusion processes [183, 448, 746, 773, 774]. The metamodel used here encourages researchers to frame more carefully the channels by which these adjacency impacts occur and to move beyond relatively imprecise terms such as “diffusion” and “contagion.”

Third, turning to the disciplinary-specific interests, the foregoing discussion has centered on models in which crime or delinquency have been the outcome of interest. Generally, the same concerns raised here apply when crime or delinquency or justice agency rates are used as key ecological predictors.

Finally, the spatial contextualizing described here is justified not only because it aligns theoretically with relevant empirical research, current orientations in community criminology factoring in extralocal dynamics, and the human ecological paradigm [285, 327, 638]. More importantly, it is *required* by the nature of social geography generally and, in particular, by how the geographies of crime and justice are spatially patterned and spatially linked to one another, at multiple spatial levels [92, 319].

Spatial Scaling III

Understanding Place Criminology and Hot Spots

Seek simplicity and distrust it.

—attributed to British philosopher and mathematician

Alfred North Whitehead

Overview

The preceding chapter explained how the boat metamodel organized theoretical dynamics along a macro-to-micro dimension.¹ That dimension was modified to correspond to the geographic scale of the units analyzed. Dynamics at and across different geographic scales were considered, as were adjacency effects. This chapter uses the modified boat metamodel as a lens for examining the assumptions behind the “criminology of place” [669]. The latter reflects “a new concern with micro units of place such as addresses or street segments [streetblocks] or clusters of these micro units of geography. . . . [This work] has generated not only scholarly interest in crime at place but also strong policy and practitioner interest in what has been termed ‘hot spots of crime’” [793: 4]. Current police microtargeting and predictive strategies built on hot spot ideas also are part of the current criminology of place.

Predictive policing is one example of such strategies. “Predictive policing is the application of analytical techniques—particularly quantitative techniques—to identify likely targets for police intervention and prevent crime or solve past crimes by making statistical predictions” [560: xiii]. A broader definition is that predictive policing involves “taking data from disparate sources, analyzing them, and then using the results to anticipate, prevent and respond more effectively to future crime” [557]. From one perspective, predictive policing is simply a high-tech add-on to what police have already been doing. “In many ways, predictive approaches seek to use technological evolutions to enhance longer-standing police practices, such as a focus on hot spots, data and spatial analysis, problem-oriented approaches to policing, and the accountability engendered through Compstat” [652: 229].

The first national discussion on predictive policing was held in November 2009 [766].

The concern with hot spots emerged as part of a broader shift in “crime prevention research and policy,” which was “traditionally . . . concerned with offenders or potential offenders,” to a new and “very different approach that seeks to shift the focus of crime prevention efforts” [790: 1]. Researchers suggesting this reorientation argued for a shift in the unit of analysis used for crime prevention. This new effort focused not on people committing crime but on the places where crime occurs. A criminology of place “demands a shift in the approach to crime prevention, from one that is concerned primarily with why people commit crime to one that looks primarily at why crime occurs in specific settings. It moves the context of crime into central focus and places the traditional focus of crime—the offender—as one of a number of factors that affect it” [790: 2]. This shift to “the context of crime” or “why crime occurs in specific settings” turns attention to spatial units. The geographic scale of units used in much of this work corresponds roughly to the meso-level introduced in the elaborated metamodel in the preceding chapter. The associated sociospatial processes correspond to what Short has called the microsocial level involving face-to-face and small-group dynamics [676]. It appears to this author, however, that in the past fifteen-plus years, the underlying metatheoretical orientation of a good number of place criminologists has subtly but profoundly shifted. The “context of crime,” its “specific settings,” has indeed become the focus for place criminologists. But the offender-in-setting has become lost. Whether this was due to the lack of individual-in-setting data or to place criminologists seeking to draw brighter lines between themselves and individuocentric criminologists, or both, the metamodel implicitly assumed by many of these researchers is clearly meso-level methodological holism: place-level factors affect place-level crime outcomes.

For short-term crime control, an exceedingly important goal for practitioners and policymakers alike, such an orientation is completely acceptable. The goal is to stop lots of crime from happening in the future in the places where it already is happening, without adverse consequences for crime in other places. From a community crime-prevention or policing vantage, such goals and the accompanying strategies amount to tertiary prevention.²

But suppose that practitioners’ or policymakers’ goals extend further, either to secondary prevention, “treating” places at risk of becoming high crime, or to primary prevention, generally lowering crime levels in places regardless of their risk of becoming high-crime places? In these cases, the meso-level methodological holism implicitly endorsed by many criminology

of place researchers is too limited. Secondary or primary crime-prevention goals would seem to require a stance of methodological individualism, that is, the type of integrated criminology sought by Short, Wikstrom, and others.

The criminology of place stance also might mislead. Places do not behave. To theorize in ways suggesting that they do is to commit a place-based version of Floyd Allport's group fallacy [15]. Micro-level places may be affected by crime or justice agency dynamics or may facilitate or impede dynamics that might lead to crime acts. But the etiology of crime acts is about *individuals*, perhaps in small groups, behaving in certain ways in certain places [821]. This is also true when we consider the ecological consequences of localized justice agency impacts such as removal, return, and supervision rates. In the end, both persons and environment must be considered. Further, to believe that some of the units proposed for a criminology of place, such as hot spots, actually exist, is to commit another fallacy, that of reification. Finally, to focus on the "heat" of hot spots may mean that one is committing yet another fallacy, that of misplaced concreteness. These three conceptual concerns, which represent ways criminologists or policymakers or practitioners could *potentially* be misled, are amplified later in the chapter. The foregoing concerns lead to two questions: for a criminology of place, are some units of analysis recommended as foundational units for investigating "settings for crime"? Further, how do researchers, policymakers, and practitioners concerned with secondary or primary prevention bring the individual back into a criminology of place? One recent example that does this is noted.

If you are a researcher, policymaker, or practitioner concerned solely or largely with short-term crime control in specific high-crime places, skip this chapter. The current criminology of place and its underlying approach is completely adequate.

The Reemergence of the Criminology of Place on a Smaller Scale

Researchers working in areas variously called environmental criminology, spatial criminology, geographic criminology, or criminology of place have argued over the past twenty-five years that those who are concerned with predicting crime have been going about it the wrong way [667, 669, 790]. These scholars have argued that researchers and policymakers should concentrate on the places where crime happens and seek to understand crime's spatial patterning rather than trying to predict individual-level offending. The basic idea is tantalizing and compelling in its simplicity.

These arguments were founded in part on earlier ecological work at higher levels of aggregation dating back to the mid-1800s and in part on works in

the behavioral geography of crime and environmental criminology dating back to the 1970s [88, 319, 321, 793]. Work in environmental criminology on high-crime-intensity places, crime patterns, and the cone of resolution laid the groundwork for criminology of place ideas, including the hot spot idea [91, 93]. (In fact, a case can be made that hot spots were “discovered” in the mid-1970s by Doug Frisbie and other crime-prevention researchers at the Minnesota Crime Prevention Center but were not labeled as such [254]. Just ask any long-term Minneapolitan about Moby Dick’s Bar—where you could get “a whale of a drink.”) Although the crime of place research tradition is longstanding, what has changed in the past twenty-five years is the focus by many researchers on crime happening in very small-scale places, the rise in popularity of the concept of hot spots, especially among practitioners, and the emphasis on how this approach is markedly different from traditional criminology.

The hot spots approach, one example of the criminology of place, would appear to be on firm conceptual foundations. It relies on frameworks such as situational crime prevention and routine activity theory [153, 154, 156, 177, 178, 236, 237, 238]. Further, substantial empirical support has emerged [722]. Policy support has followed as the approach has proven successful in policing efforts targeted at any number of crime problems such as drug markets or repeat burglaries [85, 481, 558, 567, 798]. The approach has been further boosted by findings that the number of crimes displaced as a result of micro-targeted enforcement efforts was often far less than the number of crimes prevented. Spatial displacement, and other types of displacement, appeared not to be as big a problem as first feared [344]. In fact, sometimes the opposite could happen; microtargeted enforcement efforts could improve safety or reduce disorder in areas just beyond the targeted locale, creating a diffusion of benefits [157]. A complex and controversial but, many scholars argue, effective set of police analysis, review, and targeting procedures called COMPSTAT, made possible by the rise of GIS in crime analysis in the 1990s, provided the tools needed to implement the approach in police departments [401, 679, 797]. Some of the GIS programs used permit autoidentification of hot spots or high-crime clusters [323]. Not surprisingly, the approach became enormously popular among police leaders themselves [103]. Given the apparently secure theoretical foundation, positive empirical results, supportive technologies, and organizational review procedures, it was not surprising, then, that geographical targeting for police-based crime-prevention efforts received strong support from prevention overviews and from a highly regarded 2004 National Academy of Sciences report [668, 687]. Since then, the next iteration, called predictive policing, has married COMPSTAT-type

approaches with computational criminology to provide sophisticated, small-scale, look-ahead predictions about places at risk of serious crime.

Potential Concerns

This section outlines conceptual and empirical concerns with a criminology of place focusing on relatively small spatial units ranging in size from a streetblock or more down to an address or parcel or facility. Many of the examples here will refer to hot spots because this is one of the most widely popularized spatial units and one of the units operationalized at an early stage by accompanying software such as Crimestat. That said, it is important to recognize that the criminology of place has a broader focus that extends to a range of units of analysis, and theoretical frames beyond those used to support hot spots analyses. The concerns voiced here about hot spots may apply to some degree to other units of analysis used by place criminology researchers, depending on the unit used and the theoretical frame.

A Limiting Metamodel

Despite initial hopes that criminology of place researchers could learn about crime actions of individuals in settings, over the past two decades, many hot spots researchers focusing largely on short-term crime control have narrowed their theoretical view to exclude both the individual and the larger context. Whether this reflects conceptual drift in response to data gaps, efforts to intentionally differentiate “wheredunit” criminologists from “whodunit” criminologists, the short-term crime-control focus, or something else is not known. Consequently, the metamodel they usually adopt to analyze hot spots or comparably sized units assumes methodological holism at the level of hot spots (see figure 5.1), that is, meso-level holism. In this model, meso-level inputs—where meso-level can correspond to hot spots or comparably sized units such as streetblocks, addresses, address clusters, particular land uses, or intersections—create meso-level crime or disorder outputs (Me-I → Me-O). Certain things happen *at the hot spot* or comparably sized unit to make crime at the hot spot go up or down. Policy or practice-relevant meso-level inputs of interest often include policing or community resources deployed to the spatial unit to reduce crime. Sometimes researchers will consider impacts on meso-level outputs of surrounding contextual factors at slightly larger spatial scales or will remark on heterogeneity of the Me-I → Me-O link across places. But their focus, as framed by the modified boat metamodel, leaves out context effects (Ma-I → Me-I; Me-I → Mi-I)

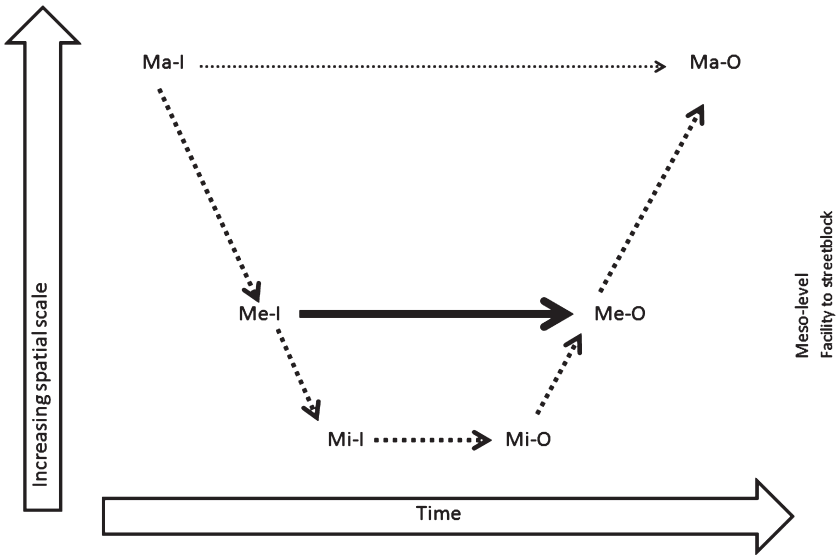


Figure 5.1. Metamodel implied by a hot spots or comparable approach. Hot spots approach focuses on solid arrow; dashed arrows are not of immediate interest.

and agency effects ($Mi-O \rightarrow Me-O$; $Me-O \rightarrow Ma-O$). The hot spots approach, and similar approaches at this scale, achieve their advertised simplicity of approach by assuming that everything *else* is *not* of immediate interest. The dynamics not of interest are shown in the figure with the dashed connections. Again, this is a meso-level version of methodological holism.

But if one has concerns extending beyond short-term crime control, one needs a different metamodel. The researcher needs a frame which addresses how hot spot attributes and processes connect both to the broader community setting and to individual-level dynamics and attributes. Looking up the spatial scale, key features of the broader community could facilitate the emergence of a hot spot such as a street corner or streetblock ($Ma-I \rightarrow Me-I \rightarrow Me-O$). For example, street corners located closer to a major commuting arterial or expressway on/off ramp may have higher volumes of out-of-neighborhood vehicle traffic, making such corners more attractive to volume drug dealers and thus a place with a higher volume of drug sales [599]. With regard specifically to streetblocks, earlier work confirms that broader neighborhood context influences crime-relevant, resident-based attitudes at the streetblock level [721, 734]. For streetblocks, this idea has been formulated as a microecological principle that “block life is conditioned by features of adjoining blocks.” This idea is an analog to the ecological principle that

“different groups are mutually interdependent” [721: 134]. Looking down the spatial scale, influences on micro-level dynamics might be important. For example, because of higher vehicle volume on a streetblock, a local gang leader living nearby might decide to expand operations to that streetblock and instruct his members accordingly (Me-I → Mi-I → Mi-O). This leads to expanded numbers of armed young men from that gang on the corner (Mi-O → Me-O). That presence may lead to other corner-level outcomes (Me-O) such as shootings, which may vary in intensity depending on a range of gang-, enforcement-, and market-related dynamics.

Concerns with Hot Spots

Conceptual and operational concerns about hot spots start with how they have been defined. Scholars previously have raised some of these concerns [70, 114, 323, 621, 722]. The points made here acknowledge those earlier discussions but also seek to clarify more fundamental concerns. In light of these more fundamental concerns, the concept of hot spots does not answer theorists’ quest for a foundational, small-scale, place-based unit of analysis.

Hot spots are defined as places where the density of crime occurrences, relative to the surround, is higher, “small places in which the occurrence of crime is so frequent that it is highly predictable, at least over a 1-year period” [667: 36]. Environmental criminologists have suggested that hot spots arise due to a confluence of transportation patterns, land use patterns, and notoriety of places among offenders [97].

Two logical confusions cause problems for the hot spots concept [726]. Each relates to a fundamental logical fallacy. First—from an assumed stance of hypothetical realism—hot spots exist in the data world but not the real world, unless you are a geologist [104, 134, 722]. There are types of places which exist in both social scientists’ data world and the real world: places such as land use parcels, facilities, houses at specific addresses, behavior settings, and streetblocks are some examples [351, 718, 809]. They can be pointed to, and we can agree when we see them—a bar, a vacant house, an empty lot, an individual house or business. But we do not see hot spots in the real world. To conclude that hot spots are free-standing entities existing in the real world is to commit the logical fallacy of reification [284]. Rather, and as has been widely recognized, hot spots are complex mixes of different types of places and spaces [722]. There is no coherent unity *intrinsic* to each hot spot itself. Its definition is fundamentally relativistic: the location identified is associated with higher crime counts than surrounding locations.

Since hot spots do not exist in the real world in the same way that a house, lot, or nonresidential land use does, questions arise about their boundaries. Consequently, empirical studies examining the effectiveness of police practices have run into problems operationalizing this construct [114]. When researchers and police personnel move from the maps to the streets, adjustments to hot spots' boundaries are often necessary [84].

Causes of confusion about how to operationalize specific hot spots go beyond this one logical fallacy. They also include the following: hot spots often mix points and areas (places and spaces); operational definitions are often jurisdiction specific; inconsistent criteria over time within jurisdictions are used to define or bound; and land use patterns are not always taken into account [323]. To clarify this last point, "A hot spot is a condition indicating some form of [crime] clustering in a spatial distribution. *However, not all clusters are hot spots* because the environments that help generate crime—the places where people are—also tend to be clusters. So any definition of hot spots has to be qualified" [323: 112, emphasis added].

Operational difficulties deepen even further because hot spots can be defined for a wide range of spatial scales. "One can find hot spots of any size—from hot spot places to hot regions" [217: 2]. Of course, if large-scale hot spots are of interest, then such hot spots do not serve the needs of criminologists looking for a fundamental, small-scale, place-based unit.

The existence of hot spots at various spatial scales deepens not only operational challenges but also conceptual complexities. John Eck has recognized that the homology assumption across geographic scales does not hold, and therefore causal dynamics will be different at different scales. "The factors that give rise to hot spot places are different from the factors that give rise to hot spot streets, hot spot neighborhoods, or hot spot cities" [217: 2].³

In sum, several challenges make it hard to operationalize hot spots. The problems go beyond the fallacy of reification. These difficulties might be lessened if researchers and practitioners used micro-level spatial units that exist in the real world as well as in the data-based crime-map world instead of hot spots.

Consequently, since hot spot *operational* definitions vary across studies, or vary within a jurisdiction over time, questions arise about the evidence indicating that hot spots policing strategies are effective.

Whereas the fallacy of reification makes mistakes going from the abstract to the concrete, a related fallacy involves focusing selectively on concrete qualities as one abstracts. The abstraction may overlook other potentially important qualities. This is the fallacy of misplaced concreteness: "the

accidental error of mistaking the abstract for the concrete” [808: 50–51; see also 137]. “Where does the misplacement come in?” Prima facie it seems as though at best there is the suppression of important detail in the definition; at worst the crux of the matter has been ignored” [435: 240].

This error can create misdirection because it draws our attention away from other potentially critical features of these locations. By labeling locations hot spots and concentrating our attention largely on the dominant characteristic they share—more frequent or more intense or higher-rate crime occurrences in the hot spots than the surrounds—other important *organizing* features of crime patterns may be missed. Those could be features of the environmental backcloth including land use or temporal patterning or other important types of heterogeneities.

A hypothetical example may illustrate the problem of misplaced concreteness. Imagine that crime analysts in a city are investigating temporal shooting patterns. After reviewing their data, they have decided that six-hour blocks starting at nine p.m. on Friday, Saturday, and Sunday were “hot times” for shooting incidents. The Sunday p.m. hot times all came on three-day weekends. Would it be more appropriate to call this group of high-frequency shooting times “hot times”? Or would the label “weekends” with some “three-day weekends” be better? Most of us probably would agree that the weekend labels are more appropriate and shed more light on routine activity patterns contributing to higher shooting rates during these times. Further, the “hot times” label would be missing important heterogeneity within this group of times: the differences between weekend and three-day-weekend shooting patterns in the example here. In short, by concentrating on this one common feature (hot times), rather than the other important feature these times share in common (weekends) and important differences between the two groups of times (two- versus three-day weekends), analysts could miss crucial features contributing to crime patterns. The same dangers arise when applying the “hot spots” label. Rather than just labeling areas as hot spots and moving on to the intervention efforts, it may be important to look more closely at the crime patterns and their relationships with a variety of features, starting with individual land uses and addresses and moving up from there.

Previous work has highlighted important differences within hot spots. Temporal and spatial patterning can be markedly different across hot spots, and implications for crime control follow [580]. Hot spots may be more or less spatially stable over time at the address or streetblock level, depending on the crime in question [722]. Domestic violence would seem to be the most stable at the address level; police get called repeatedly to the same household. Burglary seems likely to be stable at the streetblock level because

burglars will often work their way down a street. Near-repeat research has established that following an initial burglary, later burglaries nearby were more likely [753, 754].

Alternative Micro-Level Place Units?

In sum, hot spot *analysis* represents a tremendously important and useful tool for prevention and law enforcement purposes [217]. It permits identification of high-crime locations and high-crime times [580]. That information can be used to structure prevention programs, police interventions, or patrolling allocations. But the hot spot *concept* is not useful, for all the reasons described in the preceding section, if we intend it to be *the* foundational meso-level unit for developing theoretical models of crime dynamics at small spatial scales. Nor is it useful if the purposes are primary or secondary crime-prevention rather than tertiary prevention or short-term crime control.

If researchers reject hot spots for the reasons described here, where does that leave them? Are there other basic place-based units which might serve as the foundation for a criminology of place focused on “wheredunit” rather than “whodunit”? The answer is, yes and no. Yes, there are some place units which might serve as fundamental units in such a criminology. But no, choosing any of these units will not create the simplified, one-level criminology of place sought by leading place criminologists. None of the current choices permit such straightforward modeling. The reasons why are somewhat specific to the unit in question and are clarified in the following subsections.

Units that might serve as fundamental building blocks in a small-scale criminology of place are grouped into two categories: those that probably would not work and those that might work. For the first group, current and past uses or definitions of the terms have created significant semantic ambiguity and thus operationalization challenges. These challenges are so significant that such units defy consistent operationalization within or across research studies. For the second group, each candidate is useful in a meso-level criminology of place. But each unit also creates its own complexities. Those complexities require adopting some version of methodological individualism and considering dynamics at multiple levels and/or across levels.

Micro-Level Places That Probably Would Not Work

To resolve the confusion about this group of small-scale, place-based units of analysis, two questions must be answered. (1) What is the fundamental unit

of analysis? Terms such as “place,” “opportunities,” “contexts,” and “situations” are sometimes used interchangeably [790]. How interchangeable are they? (2) Different spatial units of what range are acceptable as “places” or small-scale units of analysis? Should all units be of roughly comparable area? Or are variations acceptable, and if so, what range in the spatial scale of a selected foundational unit is acceptable? This variation exists: look at descriptions of place-based units of analysis in theories supporting this approach.

OPPORTUNITY STRUCTURE

Situational crime prevention (SCP) theory focuses on reducing the opportunity structure for crime. But these opportunities are not just places.

The opportunity structure is not simply a physical entity, defined at any one point in time by the nature of the physical environment and the routine activities of the population. Rather, a complex interplay between potential offenders and the supply of victims, targets, and facilitators determines the scale and nature of opportunities for crime. Potential offenders learn about criminal opportunities from their peers, the media, and their own observation, but they are differentially sensitized to this information as well as being differentially motivated to seek out and create opportunities. Thus, offenders’ perceptions and judgments about risks, effort, and rewards play an important part in defining the opportunity structure. [155: 14]

Apparently opportunities have both observable, “out there” components and subjective components. Further, they change quickly; those shifts depend on many factors. Opportunities emerge from a “complex interplay” involving offenders, other people, and place qualities. With the consideration of “offenders’ perceptions and judgments,” there is an inherent subjectivity to the concept of opportunity structures.

The question of scale remains open. The concept itself provides little specific guidance on spatial scale. Opportunities perceived by offenders have ranged from townships and communities to specific features such as the front doorway of a house [47, 141, 142, 600].

If SCP proponents accept that their model only hopes to guide tertiary prevention activities and evaluations, then the opportunity structure concept is completely adequate. Analysis of an existing crime problem targeted by an intervention reveals the relevant opportunity structure. The latter suggests potential intervention points for prevention programs. This approach is well suited to important short-term crime-control objectives.

The opportunity structure concept, however, is far less adequate if the goal is different: primary or secondary crime prevention or understanding the ecological crime pattern targeted. The concept is so diffuse and so spatially flexible that researchers cannot create clear definitions and clear operationalization guidelines across different crimes or different crime contexts. The situational specificity of SCP, one of its crucial practical strengths, simultaneously creates conceptual challenges.

The preceding comments do not detract from the enormous practical, policy, and prevention contributions made by SCP. The approach helps classify problematic places [156]. It also provides an analytic approach clarifying the dynamics contributing to specific crimes in specific contexts [177]. The benefits of this approach over the past three decades are substantial and incontrovertible.

SETTINGS WITHIN ROUTINE ACTIVITY THEORY

Routine activity theory (RAT) argues for understanding crime as a complex function of the confluence of several factors: available and valued targets, motivated offenders, a lack of guardians, a lack of place managers, and a lack of intimate handlers of the offenders [236, 237]. These criminal events happen “within a setting, that is, a particular slice of time and space” [236: 64]. In RAT, settings are sometimes equated with behavior settings: “setting is just a short way of saying behavior setting” [238: 102]. This equivalence, however, is not helpful and is potentially erroneous. Although all behavior settings have a physical setting, not all settings qualify as behavior settings or even as sub-units (synomorphs) of behavior settings.

More recently, additional place terms have been added to this theory. These include specific crime habitats and crime niches. A habitat “invites [a] particular type of crime over a certain area” [238: 113]. “A crime niche consists of all aspects of a crime’s existence that enable it to survive and grow. Thus a niche goes beyond particular places or territories” [238: 125]. Marcus Felson has introduced the “niche” term in some of his most recent writings, with the laudable goal of clarifying important parallels between ecological processes relevant to nonhuman species and to ecologies of crime.

The use of the terms “settings,” “habitats,” and “niches” as constructs defining the fundamental units of spatial analysis in RAT provides conceptual richness. It is not clear, however, if the writings developing or using these terms provide definitions that are clear enough to guide operationalization.

These different terms contribute to semantic ambiguity in RAT [4: 68–69]. As a result, researchers apply RAT to a vast range of spatial scales. Some researchers have analyzed multiyear changes in national crime rates using

RAT, while others have argued that the theory is about smaller-scale dynamics, dynamics that are matters of feet and seconds [165, 216]. Given the discussion in chapter 3, and the rejection of the homology assumption, it seems extremely unlikely that the exact same concepts and dynamics are involved at such widely different spatial scales. Or, at the least, this point that has not yet been established. So the question seems open: what are the relevant processes and units at different spatial scales?

These comments on RAT are not meant to serve as a thoughtful, comprehensive review of the many advantages of this theoretical approach or of its theoretical shortcomings or of the strengths, weaknesses, or incompleteness of its evidentiary base. It is a useful theory and generates many insights. The only point being made here is that the conceptual writings of RAT do not provide a clear-cut candidate for the fundamental unit of analysis in a micro-level criminology of place.

SETTINGS IN SITUATIONAL ACTION THEORY

As a final example, *situational action theory* (SAT), whose outcome of interest is individual acts of crime or delinquency, uses the term “setting,” which “may be defined as the social and physical environment . . . that the individual, at a particular moment in time, can access with his senses” [814: 86–87]. Settings occur within an individual’s activity field, which “may be defined as the configuration of the settings in which the individual takes part during a particular period of time” [814: 86]. In essence, as a person moves through time and space, moving through his or her activity field, he or she is surrounded by an accompanying setting that rolls along with him or her at the center.

On the positive side, with SAT, at least the upper limit of a person’s setting seems relatively clear since it is limited by sensory perception—at least as long as we ignore hearing or viewing via electronic communication. Leaving out travel by airplanes, helicopters, or the space shuttle, one cannot see an entire community or township at once. In a typical day, my settings are bounded by the curve of the street, the length of the hallway in a building, or the size of a room.

Nevertheless, settings cannot serve as the fundamental unit in a small-scale criminology of place. They are not free-standing spatial units in the external environment. They are defined not by a location but rather by the perceiver’s location.

Further, settings depend on perception. A setting can overlap between different people. Much about a location might be commonly perceived or intersubjective. There can be considerable agreement. But there can be

considerable disagreement too. Two people moving through the same setting might disagree about major features of the setting, such as whether it includes a clown on a unicycle [371].

Again, as with RAT, the purpose here is not to comprehensively review SAT, which has proven powerfully predictive of juvenile crime acts [818]. The only point pursued here is whether the settings of SAT could serve as a fundamental unit in a micro-level criminology of place. They do not appear to fit the bill.

In sum, for the reasons noted, the situations of SCP, the settings/niches/habitats of RAT, and the settings of SAT do not appear conceptually appropriate or sufficiently detailed to serve as a fundamental, readily operationalized place unit in a micro-level criminology of place.

Micro-Level Place Units That Might Work

Some units, however, might work as the fundamental unit in a small-scale criminology of place. Some come from outside of criminology. This section reviews the advantages and disadvantages of each as a potential foundational unit in a small-scale criminology of place. It will be seen that although there are some points which recommend some candidates, none of these units permits building a small-scale place model as simple as sought by prominent criminologists of place (see figure 5.1). Each potential fundamental unit implies issues of context and agency, albeit in different ways. The candidates are reviewed in the following subsections. The strengths and weaknesses of each are examined. Following the review, the next section considers the broad prospects for a small-scale “wheredunit” criminology that is substantially simpler than already-existing criminologies of place. It also asks, what should the status of places be in a causal model of crime acts?

FEATURES OF ENVIRONMENTAL BACKCLOTH: CRIME PATTERN THEORY

Patricia and Paul Brantingham’s crime pattern theory approach to environmental criminology relies heavily on the idea of a multilayered environmental backcloth [89, 91, 95, 96, 98]. The features of the environmental backcloth help us understand where and when crimes occur.

The backcloth layers include structural and activity features. Relevant structural layers include particular types of facilities that may be crime generators or crime attractors and the sociological background, such as relative SES of the locale [96, 97]. Activity patterns create pathways with varying levels of traffic and nodal activity areas [45, 95]. Structural and activity layers

can intersect in interesting ways, for example, altering the clarity of between-community edges [99].

From an environmental criminological, pattern theory approach, then, hot spots are not foundational units of analysis but rather are byproducts of intersecting dynamics involving the demographic characteristics of the surrounding population, travel patterns, and particular land uses or combinations thereof. Although the environmental backcloth provides an *analysis* of why hot spots appear, it does not offer a clear *simple* alternative unit [97].

In sum, crime pattern theory is fundamentally interested in the multi-level dynamics captured in the boat metamodel. Relevant contextual effects include nodes, edges, and paths, whose qualities are shaped by broader areal demographic and land use factors (Ma-I). Any of these might intersect with specific land uses, shaping the crime-facilitating potentials (Me-I) of the latter. Those potentials reflect the likelihoods that nearby offenders and victims also might be located near or brought into those land uses or facilities. This approach is extremely helpful for any number of conceptual and practical purposes. But it is not the simplified approach sought by the current crop of place criminologists assuming meso-level holism.

STREETBLOCKS

Streetblocks are the two sides of a block face between two cross streets. Are they possible candidates for a simple criminology of place?⁴ There is much to recommend streetblocks as fundamental units in a criminology of space. They are important conceptual and operational units in planning and useful organizing and prevention units in community psychology [21, 182, 559, 575, 778]. In addition, recent theoretical and empirical works provide insight into the internal structure of streetblocks, processes taking place on streetblocks, and how streetblocks link to the broader context. Microecological principles for streetblock dynamics have been proposed [721]. Longitudinal work has shown how crime patterns vary over time across streetblocks and how streetblocks connect to their surrounds [303, 794]. These later works extend earlier cross-sectional work with streetblocks on crime and reactions to crime [735].

Despite these advantages, streetblocks cannot serve as a fundamental unit for the criminologists of place assuming meso-level holism. This is because streetblocks can demonstrate significant *internal* differentiation in their crime patterning and in residents' or streetblock users' views about safe or unsafe streetblock portions [604, 717, 730]. It seems more accurate to consider them key intervening *meso*-level units, as was done in chapter 4, if one assumes methodological individualism.

Another complication is that streetblocks are not free-standing units as

envisioned by a simple criminology of place. Rather, streetblock crime and reaction-to-crime patterns are both strongly shaped by surrounding context [303: 81–82; 734]. Streetblocks are probably best thought of as meso-level units, connected to both micro-level, individual-level dynamics and to broader macro-level contexts.

SPECIFIC FACILITIES / INDIVIDUAL LAND USE PARCELS

The next candidate as the fundamental unit in a micro-level criminology of place would be specific facilities, located on individual land use parcels.

The resulting crime locales often take the form of facilities—places that people frequent for a specific purpose—that are attractive to offenders or conducive to offending. Facilities might provide an abundance of criminal opportunities (e.g., either a target-rich environment for thefts or abandoned or otherwise unguarded properties that could be used for illicit activities like drug dealing). Or they might be the sites of licit behaviors that are associated with increased risk of crime (e.g., heavy alcohol consumption in crowds) [20: 216].

On what types of facilities should researchers focus? Environmental criminology suggests that crime generators and crime attractors are of most interest. Nodes are locations in an urban, rural, or suburban space with commercial or institutional or public properties functioning as use generators, drawing pedestrian or vehicular traffic [95, 292]. Pathways leading to nodes may facilitate high volumes of pedestrian or vehicular traffic. The node might contain land uses—for example, high schools, bus stops, subway stops—which draw in a mix of users that includes some potential offenders, along with a high volume of others who might be potential victims. Such land uses are likely to generate crime and would be called *crime generators* [95]. Crime generators in short are “businesses, institutions, and facilities that bring large numbers of different kinds of people into a locale” [485: 299].

By contrast, *crime attractors* are facilities drawing in potential offenders because the locations themselves are an attractive target for the offense planned or because those locations are known to generate potential targets [95: 17]. For example, potential street robbers in extremely low-income locales are drawn to streetblocks with check-cashing outlets [704].

Crime Occurs around as Well as in the Facility

A focus on facilities, however, or on particular problematic land uses (e.g., one specific house used as a crack house) will require abandoning the

simplified metamodel sought by some criminologists of place. This is because facilities generate activity in spatially surrounding buffers. Consequently, a facility-level or address-level focus as the unit of analysis will in many cases require spatial expansion.

Facilities or individual land uses such as a drug house can set in motion dynamics that result in crime. But in many cases, those results might be spatially displaced from the facility or specific land use where the dynamics originated [468: 42]. Closing-time fights in a parking lot down the street from a bar are a classic case in point. The fights and the incident reports center on a parking lot. But the interactions which led to the fight may have started in a bar nearby [171]. A place-based focus just on the parking lot will “miss” the facility where the incidents originated. A buffer with the bar at the centroid, with the size and shape of the buffer based on what is known theoretically or empirically about patrons’ spatial behavior on exiting, will capture both the incidents and how the location of the facility contributes to them.

In other words, if the facility itself is seen as a micro-level unit, crime activity in the surrounding buffer, at the meso-level, also is affected. In the boat model framework, $Mi-O \rightarrow Me-O$ links are created. Thus, it will be necessary to “buffer out” from the place itself, creating a surrounding, bounded area, counting crimes or incidents within such zones centered on the facility or address of key interest. The researcher also may need to construct an appropriate denominator to derive a crime intensity or density rate or a crime index. The theoretical metamodel links created are highlighted with the solid arrows shown in figure 5.2.

Dynamics take place within the facility ($Mi-I \rightarrow Mi-O$). For example, alcohol consumption and large numbers of diverse patrons ($Mi-I$) in a bar lead to escalating interpersonal tensions, verbal exchanges, and maybe some pushing and shoving ($Mi-O$) [171]. Some of these frictions undoubtedly lead to fights and assaults within the bar, and police are probably called to that address many times. But it also is probably true that many times events within the facility do not result in fights, assaults, or the police being called until after the parties have left the facility.

In other words, in addition to fights in the bar, the dynamics within the facility may facilitate serious, extensive interpersonal aggression in the vicinity *adjoining* the facility ($Mi-O \rightarrow Me-O$) *depending on the conditions surrounding the facility*. Nearby fights and assaults might be especially likely immediately following closing time, when many patrons exit the facility at roughly the same time. Thus, fights, aggravated assaults, or shootings are likely to happen at higher rates in the nodal areas or buffers immediately

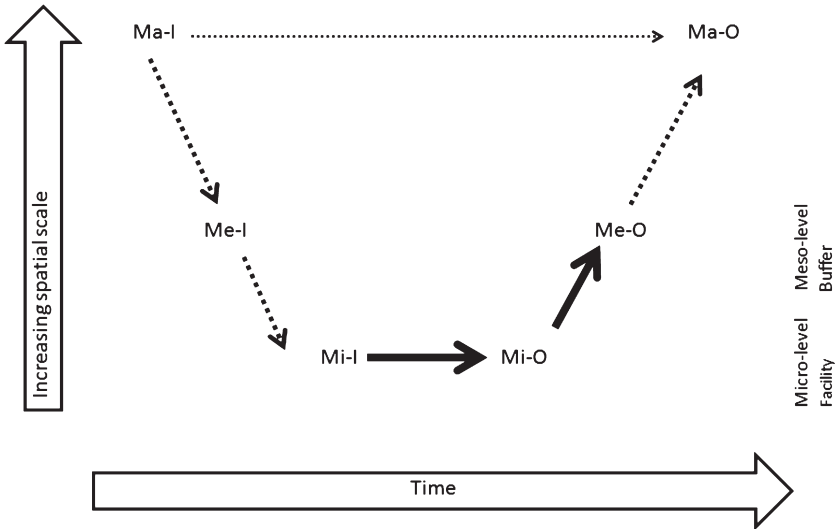


Figure 5.2. Metamodel with facilities as foundational, micro-level unit. In addition to the facility-level dynamics ($Mi-I \rightarrow Mi-O$), cross-level dynamics between facility and surrounding buffer merit attention ($Mi-O \rightarrow Me-O$).

around a facility such as a bar, relative to the rate in the surrounding community. The rate may be high relative to the locations around the buffer especially at certain times, such as after closing time on weekend nights.

Some criminologists might argue that the link proposed here— $Mi-O \rightarrow Me-O$ —is unnecessary and might suggest that it would be easier just to analyze the crime rates in the nodal area or buffer. Operationally, that might be simpler. But if the *causal* connection between prealtercation dynamics at the facility and later violence outside in the surrounding buffer is missed, specific intervention strategies might be misplaced. More broadly, the dynamics discussed here in the context of a bar and later outside fights or violence may apply more generally to facilities that are crime generators or crime attractors [95]. There are likely to be dynamics linking features of the facility itself, including crime and related dynamics, with crime occurrences in the surrounding area.

Of course, numerous questions arise about the buffers around a crime-generating or crime-attracting land use, including whether to shape buffers to agree with the local geography, their appropriate size, how to handle overlapping buffers, and so on. These all can be addressed with theory or by crafting local adaptation rules. Work in environmental criminology also may prove helpful here in applying theory to the construction of these

meso-level buffer areas around facilities. For example, rather than taking an entire area around a facility, one could take pathways into account as people approach or exit a facility, and define a nodal area topologically rather than with a simple areal buffer. Assuming that people are arriving and departing on foot, one type of buffer construction might rely on the topological idea of nodes and turning points. For example, in one study, “the nodal areas around each high activity establishment were defined as those blocks within two turnings of the nodal point: that is, either two blocks linearly along the street on either side of the nodal point; or the block containing the nodal point together with one block in either direction at the next intersections” [95: 16–17].

Thinking about the Facility-Buffer Dynamics

Coleman has discussed the social dependencies that shape $Mi-O \rightarrow Ma-O$ processes and mentions five different types of social psychological dynamics [168: 248]. Here, when we start with a facility and work our way up to a buffer or nodal area ($Mi-O \rightarrow Me-O$), the dynamics may be similarly multithreaded.

In addition to relevant social psychological dynamics, there are people-place dynamics as well. Given the complexities of crime, the latter dynamics may be specific to certain crime types and/or facility types. Relevant social and physical features will be those likely to increase or decrease the chances of interactions leading to violence [171]. Here are just a few examples of social or social-physical interdependencies potentially relevant to $Mi-O \rightarrow Me-O$ transitions. These focus on facilities such as bars and outcomes such as assaults or shootings and assuming that the interacting parties had previously been in the facility itself.

- a. The likelihood of assaults or shootings in the nodal area or buffer depends on both the time it takes and the distance to be traversed in order for patrons to leave the surrounding zone. Structures permitting quicker exit decrease the probabilities of chance patron encounters outside.
- b. The likelihood of assaults or shootings in the nodal area or buffer depends on the temporal and spatial clustering of exiting patrons. If all are leaving at the same time and entering the buffer at one point, violence seems more likely. If patrons leave at different times through numerous readily available exits, violence seems less likely. If there is one major parking lot with only one exit creating a jam, or a bus stop or subway stop where many departing patrons congregate, violence seems more likely.
- c. The likelihood of assaults or shootings in the buffer will be lower if there is a higher density of place managers and if they are perceived as effective

(e.g., real police versus private security). If district police dispatch several cars to the buffer around closing time, that may decrease the chances violence will take place.

- d. The likelihood of assaults or shootings will be lower if the exit routes out of the buffer used by patrons contain fewer places of refuge or concealment for potential assaulters [530].

If the focus is on predatory street robbers lying in wait for exiting patrons, the dynamics will be different: a, c, and d may still apply, but b may work in the opposite direction. Exit patterns that clump patrons together may reduce chances for street robbers. So the dynamics need to be specified as they might apply to specific crimes.

To sum up, then, on facilities as candidates for the fundamental units in a micro-level criminology of place, depending on the specific crime type, spatial buffers and/or nodal areas and the dynamics linking facilities to such areas will still need consideration. In short, micro-to-meso-level dynamics still deserve attention. This is not the simplified criminology of place sought by many researchers.

CANDIDATES FROM BEHAVIORAL GEOGRAPHY

Behavioral geography provides the next-to-last set of candidates for fundamental units in a micro-level criminology of place. This field provides an array of person-level, space-based or time-and-space-based constructs for organizing offender and victim movements. The array includes projects, paths, trajectories, stations, path space-time bundles, action spaces, activity spaces, activity systems, potential path space, potential path areas, and trips [275: 267–291]. Some of these concepts have proven useful for understanding patterns of different crimes such as burglary [581, 600].

For researchers seeking simplified, one-level, crime-in-place modeling, however, two difficulties emerge. Each of these constructs centers on the individual, the very unit that the new criminologists of place hoped to escape. Indicators based on these concepts provide tools for analyzing individual behavior, not crime-in-places or crime-related outcomes-in-places. Of course, the constructs can be aggregated to places. But then we are back to individuals behaving within locations.

Further, these conceptual tools embed complex interplays between the individual potential offender or victim and features of the local environment. They are about individuals as they behave in specific locations or regions and respond to the features of that locale. Environmental criminology terms these “templates,” which include the features about a place extracted by an

offender [91]. As with SAT's settings, there can be shared features of templates, but significant individual differences are likely as well.

So again, there is nesting. The same type of person with the same type of purpose—a potential robber looking for a target, a potential victim trying to find a safe walking route home—is going to behave in different ways depending on both temporal and spatial factors. Analytically, each individual is “placed” in specific times and specific places, leading to a multilevel metamodel. Therefore, although indicators based on trips or activity spaces or other behavioral geography concepts can be aggregated by places to create location-specific inputs or outputs in a communities and crime model, individuals, not places, are the more fundamental substrate. One ends up with individuals at the micro-level and places at the meso-level. And this is before temporal variation is even considered. So, again, the vision of the simplified criminology of place is not fulfilled.

BEHAVIOR SETTINGS

The final candidate for the foundational small-scale place is the behavior setting. Although the behavior setting concept has been referenced by some recent place-sensitive crime theorists [238, 822], these units appear to be misunderstood by some, both in terms of what they are and how their existence is established.

Behavior settings were discovered by researchers, led by Roger Barker, at the Midwest Psychological Research Station in Kansas. They began researching a small town in the 1940s, and over the ensuing four decades, Roger Barker, Louise Barker, Paul Gump, Phil Schoggen, Alan Wicker, Herb Wright, and others detailed the structure of public and institutional life in the town and replicated their findings in a small English town [33]. They discovered that behavior settings were free-standing ecobehavioral units in the community and that the behavior patterns in these settings pressured people to do setting-relevant things while they were there.

Behavior settings are foundational micro-level place units because they are the natural units of the public or institutional environment [31, 32, 656]. They have recurring patterns of behavior, called “standing patterns of behavior,” and are surrounded and enclosed by a physical milieu. The standing pattern of behavior “is a discrete behavior entity with specific temporal-spatial coordinates, . . . a precise and delimited position (location) in time and space” [656: 31]. The standing pattern of behavior results from a variety of ecobehavioral circuits operating within the behavior setting. There are four types of circuits: goal oriented, program, deviation countering, and vetoing

[32: 167–181]. These circuits help maintain the behavior setting and respond to changes in the composition and activities of those who are present.

To qualify as a behavior setting, the time-space entity must pass both a structural test and a dynamic test [656: 54–71]. Many “geographic areas” of communities might be “excluded as behavior settings. . . . Only parts of the community or institution that display certain properties, particularly synomorphic relations with standing patterns of behavior, meet this test” [656: 38].⁵ A particular setting might host several different types of behavior settings over time (e.g., a high school gym). The gym itself does not qualify as a behavior setting, but the gym does support a diverse set of behavior settings (sports contests, community musical productions, and so on). Lists of behavior settings and information about when they are operating and what happens there answer the question: what is the texture of the public, social environment? [32: 154].

There is much to recommend considering behavior settings as foundational units in place-based crime theorizing. Solid conceptual and empirical work points to these as fundamental ecobehavioral units [32, 656, 809]. The concept already has found broad application to a range of organizational and educational problems including dropping out [34, 810, 826]. The concept is applicable to an extent to urban streetblocks and their disorder problems [721]. Further, and importantly, research procedures ensure that identified behavior settings have a specified level of independence from other behavior settings. Behavior settings exist in the real world as well as the data world and can be reliably identified and assessed. On a recent evening walk to a corner store a few blocks away, I passed several active behavior settings including a gas station, a pizza shop, a yoga studio, a karate studio, a Thai restaurant, a local meditation center, and two local pubs. Inactive settings included a pharmacy, a tailor shop, a breakfast shop, a sewing center, a jeweler, and a hair salon.

Nevertheless, despite all the points in favor of making behavior settings foundational units in place-based criminological theorizing, *as a practical matter*, the behavior setting should *not* be considered. Here is why.

1. At this juncture, no one has any idea how much crime, of different types, takes place *inside* a behavior setting, or as a result of immediately preceding events in a behavior setting, as compared to *outside* behavior settings. So there is no point choosing behavior settings as the place- and time-based unit if crime is the outcome of interest, and we are not sure how much of the outcome takes place within the time and space framework of behavior settings versus outside them. Further, it may be the case that the answer to the

question of how much crime happens inside versus outside behavior settings depends on the particular crime type or subtype. Consider the following:

- Assaults in a nightclub are part of a behavior setting, and features of the behavior setting facilitating such outcomes could be examined. Assaults on the streets outside a bar immediately after closing time probably are linked to events taking place within the behavior setting, but the *actions* take place outside the behavior setting.
- Corporate criminality carried out in organizations during business hours or fraudulent business practices perpetrated by employees during business hours are part of behavior settings. But how much of these activities take place outside behavior settings?
- Residential burglaries of detached houses would seem to take place outside behavior settings.
- Motor vehicle thefts and carjackings may take place outside behavior settings. Although local traffic ways are behavior settings and prescribe driving and parking behavior, it is not clear that criminal events taking place near trafficways should count as happening in behavior settings. If someone is held up on a sidewalk on a downtown street in the early morning hours, did that happen in a behavior setting or not?
- A local park with groundskeepers and facility managers is a behavior setting when it is open but not when it is closed. How much crime happens within versus outside the park behavior setting?

In short, it seems likely that, for some crimes anyway, a case can be made that much crime happens *outside* behavior settings because it is *those* times and places which are less regulated, less supervised, and less likely to be hosting place managers. Consequently, it does not seem sensible to propose behavior settings as foundational place units for understanding crime as an outcome in communities when initially we have no idea how much crime, by various crime types, is taking place within behavior settings.

2. Documenting behavior settings is extremely labor intensive [656: 48–73]. Although the process can start simply enough—one can “walk the streets and halls of the community or institution and observe and record”—the challenge arises in determining which parts of a behavior setting, which synomorphs, are independent of one another and qualify as separate behavior settings and which are interrelated parts of a broader behavior setting [656: 49]. The standing pattern of behavior in each behavior setting is required to have a defined level of independence from the standing patterns of behavior in other behavior settings. Determining whether that criterion is met

requires having information from a range of synomorphs and making calculations about overlap versus independence. This is a lot of work.

Conceivably, in an urban or suburban locale, a small research team could carry out such a project for one or two small communities, and a lot could be learned [725]. But the task seems overwhelming, in terms of both staff resources and required research budgets, when one thinks about a region of a city or an entire suburban township. Further, the justification seems uncertain if researchers cannot even stipulate at the front end what percentage of crimes of type X take place within rather than outside behavior settings.

*Summary Thoughts on Fundamental Micro-Level
Criminology of Place Units*

The micro-level criminologist of place who seeks a basic place-based spatial unit which will be useful for *both* controlling and understanding crime, and an accompanying metamodel considering *only* dynamics at that spatial scale, is unlikely to reach a happy outcome. The dynamics either at higher spatial scales involving buffers or at lower spatial scales involving individuals or at both higher and lower spatial scales probably deserve inclusion in the model.

Do Places Commit Crimes?

Although places may host crimes, they do not cause crime. Places do not behave; people do, individually and in groups. As mentioned earlier, thinking otherwise risks running a place-based version of Floyd Allport's group fallacy. Recent scholars have asked, how can "our understanding of crime at place be advanced most significantly"? [793: 5]. Understanding implies learning why crime acts occur. For methodological individualists, understanding why crime acts occur requires learning, as it would for any other behavior, what is the meaning and intent of crime acts [834]. The micro-level criminology of place cannot answer such questions. Individuals-in-context need to be brought back into the picture.

Of course, as already underscored, place criminology can help with crime control, that is, tertiary crime prevention. It also can document the impacts of justice agency actions, not only those of law enforcement but also those of supervising and monitoring agencies such as parole and probation. The significant practical value associated with describing and actuarially predicting these connections should not be underestimated. For these purposes, the metamodel of meso-level holism, implicit in place criminology, proves sufficient.

If the purposes of the researcher or policy analyst go beyond such description and control, however, the new criminology of place may *not* be the most applicable orientation. If the goals include understanding, or primary or secondary prevention, and methodological individualism is assumed, the “wheredunit” cannot replace the “whodunit” approach. If we are to understand the small-scale, place-based outcomes (Me-O) that through a range of processes lead to community crime patterns (Ma-O) or how community crime patterns (Ma-I) affect small-scale places (Me-I) and in turn individuals (Mi-I), it is not just about “whodunit,” but rather it is about “whodunit” where, and when, and why. If we want to learn about the causes of crimes in communities, we need to know which individuals are committing which crime acts in what places, at what times, and why.

Closing Comment

This chapter has considered the emergence over the past twenty-plus years of a criminology of place focusing on patterning of crime across small-scale places as an alternative to either individual-centered criminology or more geographically global ecological criminology. But perhaps individuals versus places as the microfocus instead should be seen as complementary perspectives. Michael Maltz has suggested that this issue is analogous to thinking about light as particles versus waves [467]. When the focus is on individuals, the particle perspective dominates. When the focus is on crime in places, the wave perspective dominates.

Some place criminologists have implicitly adopted a metamodel of meso-level holism: Me-I \rightarrow Me-O. These researchers focus almost exclusively on features of hot spots associated with crime. Although such a meta-approach is adequate for short-term crime control, for other prevention purposes focused at a small spatial scale, connections at and across multiple spatial scales require theoretical attention. This required broadening for those who are interested in long-term crime control raises questions about the conceptual robustness of a straightforward, uncomplicated criminology of place. Further, hot spots specifically, when considered as one example of a spatial unit for the criminology of place, pose sizable conceptual and operational challenges. Such difficulties mean that this unit should not be adopted as a foundational, small-scale place unit in a criminology of place. Alternative candidates for the foundational unit are problematic in different ways. Of the various potential candidates, facilities seem to be the most promising. Facilities correspond to individual addresses, land uses, parcels, buildings. Crime researchers interested in micro-level dynamics have recently recognized that

the problem of the unit of analysis in place criminology is a serious one [793]. That is a positive development. But they do not know yet how to solve it.

If researchers are willing to investigate carefully properties of facilities associated with crime events, the relationships between facilities and immediately surrounding spatial buffers facilitating or impeding the emergence of crimes near facilities, and to construct those buffers using key ideas from environmental criminology in crime-specific ways, this approach could prove extremely helpful for the criminology of place. In short, the simplest metamodels we can hope for with a micro-level criminology of place involve parcels or facilities nested within nodal areas or buffers. The metamodels then set the stage for serious work within specific theories examining the connections between parcels or facilities and surrounding dynamics. Such cross-level transitions mean thinking about how individuals behave. Thus, at least for those who lean toward methodological individualism, and perhaps for others as well, it is necessary to bring the individual back into the conceptual frame. “Whodunit” needs to be placed within “wheredunit” rather than dropped altogether.

Temporal Scaling I

Cycles and Changes

In my beginning is my end. In succession
Houses rise and fall, crumble, are extended,
Are removed, destroyed, restored, or in their place
Is an open field, or a factory, or a by-pass.
—T. S. Eliot, “East Coker”

Overview

This chapter is the first of two considering how time operates in community criminology. Relevant temporal scaling issues include the following: (a) How much time must elapse for scores on an ecological, community-level variable to shift significantly for a significant number of units? This is a question about time horizons. (b) If one changing variable is an input and another changing variable is an output, are they both *capable* of changing at comparable rates in the period investigated given the natures of each attribute? Is it possible for the input and output changes to be in phase? This is a question about the unity of the time horizon of different variables. (c) Given the broader theoretical frame within which these two variables are situated, what is the period within which the theorized ecological process involving the two variables will cycle? How long does it take the theorized ecological process to cycle? This question is about the broader theoretical framework, not the specific variables themselves. (d) Finally, there is the question of “durational ambiguity.” This applies if the period for which a unit of analysis has had a particular score on a variable is important but unknown.

Community criminologists have overlooked these issues. Although there are important exceptions, how time works in several specific theories has been overlooked or handled in confusing ways. Some of the most popular community criminology theories woefully underspecify time matters. To advance the discussion, this chapter builds on three core ideas about either time or ecology: ecological redefinition and ecological discontinuity as reflected in the works of Hawley and Bursik; two different aspects of temporal confusion highlighted by Andrew Abbott; and the implications of Stanley

Lieberson's ideas about causal asymmetry. This chapter explains how these temporal scaling ideas connect to one another and explores their implications for community criminology.

As in previous chapters, whether one favors methodological holism or methodological individualism shapes how one frames the concerns. This chapter, given its reliance on Hawley's and Bursik's ecological ideas, adopts methodological holism. The next chapter develops these same ideas using a version of methodological individualism captured in a temporally elaborated version of the boat metamodel.

The following section describes the Hawley/Bursik approach to understanding ecological change. Abbott's ideas about different varieties of temporal confusion appear next, followed by Lieberson's ideas about causal asymmetry. These ideas generate implications for three different types of connections between predictors and outcomes—cross-sectional, covarying changes, and lagged changes. Finally, how major ecological community-level crime theories address temporal scaling is reviewed.

Temporally Confused in Myth, Fiction, and Theory

Temporal confusion is perhaps most easily introduced with a simple idea. In the real world, we generally know how long certain activities take: cutting the grass, walking to the corner store, or taking a nap. In fiction and myth, however, naps sometimes get temporally distorted, disorienting the nappers. Epimenides fell asleep for fifty-seven years in Zeus's cave on Crete. He awoke with the gift of prophecy in 6th century ancient Greece. Washington Irving's Rip van Winkle took an elixir-assisted afternoon nap that stretched into a two-decade siesta. He missed the American Revolution. In everyday living, we know how long it takes for a nap or a night's sleep to occur; we know what the cycle is. When such a cycle is distorted, regardless of the mechanism, and we miss time, disorientation and confusion abound. Elapsed time does not match up to our expectations.

Unfortunately, many theories about communities and crime fail to clearly specify how time affects communities. The significance of time *ecologically* is important, even for those who favor methodological holism. Understanding this significance requires some human ecology ideas.

Hawley, Bursik, and Key Ecological Ideas

Amos Hawley was a sociology graduate student in 1940 when his mentor, dissertation committee chair, and department chair, Rod McKenzie, passed

away. McKenzie had been ill for a couple of years, and Hawley had been teaching McKenzie's courses. Hawley was asked by McKenzie's widow to complete work on the book her husband had been contracted to write [330]. Although Hawley did not start from scratch, all he had were McKenzie's scattered notes and written excerpts from other works. The result, ten years later, was *Human Ecology: A Theory of Community Structure*. The work has been cited over seventeen thousand times since its publication, and the frequency with which it has been cited *per year* averaged about sixteen hundred at the beginning of this decade.¹ The work defies easy summation but has found service in a range of disciplines ranging from community health to organizational sociology and has been critiqued on a number of grounds [13, 242, 266, 381, 382, 827].

Of course, there are other approaches one could take to understanding the urban or metropolitan ecosystem. The "new urban ecology" and the "new urban geography" represent alternative views about the operation of ecosystems, the dynamics of interdependence, and the relative importance and functions of material versus cultural dimensions [169, 438]. Nevertheless, alternatives and controversies aside, the human ecological framework and several of Hawley's ideas are used here not as a theory to be tested but rather as a general guiding framework for conceptualizing and operationalizing change in community criminology. The broad perspective is helpful toward this end in specific ways. It directs attention to the system of communities in a jurisdiction such as a city or a township or a broader region such as a metropolitan area. It encourages conceptualizing these communities and the functions they serve relative to one another. At heart, it is focused on change. It recognizes that between-community interdependence arises from local history and conditions. Finally, and most importantly, it simultaneously recognizes ecological stability and ecological change.

Before diving into specific points, two issues deserve mention. Hawley strongly embraced methodological holism. "Adaptation to environment is a collective phenomenon. It is accomplished, that is, only through organization" [330: 3]. Consequently, for him, the key question was how these collectives connect to the surround. "Human ecology . . . fastens its attention upon the human interdependences that develop in the action and reaction of a population to its habitat. . . . Human ecology makes a detailed analysis of the process and organization of relations involved in adjustment to environment" [327: 72]. Here, Hawley's ideas, and their application by Bursik, are developed from the perspective of methodological holism. In the next chapter, they are reframed—multileveled, if you will—using methodological individualism. Harvey Molotch has shown that there is no inherent incompatibility between

methodological individualism and ecology [515]. Nicos Mouzelis's synthesis of holism and individualism suggests a similar conclusion [523].

Where Human Ecology Directs Attention

From the ecological vantage, the framework for capturing and interpreting change is the broader spatial system within which communities are embedded [329: 46]. The broader ecosystem is a "unitary phenomenon." This might be a core city, a metropolitan area, a set of adjoining rural jurisdictions, or something different. In most US cities at the heart of major metropolitan regions, these ecosystems extend well beyond the core urban municipality to the broader metropolitan area [121]. The central notion is that the broader ecosystem which surrounds the communities has an overarching, defensible ecological integrity.

Although this broader ecosystem is unitary in a spatial sense, it has within it numerous linked ecologies [5: 247]. There are economic, political, cultural, governmental, and historical dynamics operating within the ecosystem and influencing one another [515]. In the language of political economy, stratification along economic, racial, ethnic, and cultural lines creates differentials in power, financial return, and viability of future investments; these, in turn, lead to some communities garnering more resources than others and shape the outcome of competition between communities [184, 310, 341, 449, 450].

For current communities in largely developed sections of largely developed counties, the broader ecosystem already has created differentiation in residential and nonresidential land uses. Historically, locations and patterns of nonresidential land uses, combined with transportation patterns, have shaped residential textures in cities [327: 264–288]. McKenzie's discussion of Columbus (chapter 3) provided some examples. He also explained how the emergence of the metropolitan area as a new form of human settlement in the first quarter of the 20th century in the United States created land use and population patterning at a broader sociospatial scale as well [494].

In the same way that different types of nonresidential land uses or clusters of businesses or facilities serve different types of functions for the larger ecosystem, so too do different residential locations. "Familial units are distributed with reference to land values, locations of other types of units, and the time and cost of transportation to centers of activity" [327: 280]. These factors, along with others, translate into how much it costs to rent or buy housing in a locale. In addition to spatial stratification by SES, spatial residential segregation takes place along ethnic, immigration status, and racial lines as well [147; 327: 275]. Differentiation of residential locations along SES,

race and ethnicity, and age of housing is the spatial and residential counterpart to broader differentiations in community social life [327: 182–192]. Communities in different segments of a jurisdiction serve different functions by providing places to live for different groups. Current community differences arose from past and current power dynamics and competition at different levels [327: 202; 449]. Recall from the Columbus World War I example how cheap worker housing was located close to major manufacturing activities. Competition in the specific local context creates differentiation across communities.

Differences across residential communities in occupations and occupational status, the latter a key element of broader socioeconomic stratification, provide insight into the nature of the differentiation. But Hawley warned “that the occupation concept is often construed too narrowly. The usual census tabulation of occupations includes only the ‘respectable’ activities, *even though illicit or criminal occupations may constitute permanent and integral functions in the community*” [327: 217, emphasis added]. Hawley’s remark directs our attention to specific crime rates such as adult offender or juvenile delinquent prevalence rates, construing those as part of a broader ecosystem’s occupational structures. Perhaps return rates of released offenders may be part of these broader patterns as well. Further, the same point might be made about opportunities for different types of offending (e.g., motor vehicle theft, purchases of illegal drugs).

The key point is that within a jurisdiction, which might be part of a larger ecosystem defined at the metropolitan or regional level, communities, *relative to one another*, serve different functions for their residents. “Ecological organization pertains to the total fabric of dependences that exist within a population” [327: 179].² “Illicit or criminal occupations,” and perhaps the patterns of their targets, may be part of those differentiated functions.³

Niches, Niche Redefinition, Operationalization, and Bursik

Within a system such as the communities in a city in a metropolitan region, change reflects how a unit within the broader ecosystem gets or becomes functionally redefined, often in response to “changes in external conditions” [327: 180]. “Change occurs as a shift in the number and kinds of functions or as a rearrangement of functions in different communities” [329: 46]. Change reflects communities being *rearranged* relative to one another on key community dimensions including aspects of demographic structure and crime.

Of course, much has been written about city growth as the key engine driving community shifts and “rearrangements of functions” [357]. But even

absent general city growth, a range of political, racial, cultural, and economic factors, often intertwining in complicated ways, still shape neighborhood changes [119, 120, 121, 123, 341, 342, 449, 450]. “Occurrences such as the obsolescence and physical deterioration of property, shifts in the forms and routes of transportation, the introduction of new types of industry into or the elimination of established industry from the local economy, or the erection of buildings having either attractive or repellent effects may singly or in combination bring about a change of occupants” [327: 400].

Consider the rate of adult males arrested for drug sales and distribution in a hypothetical community, per one thousand adult males in the community. We can ask whether the rate was higher in the past three years ($t-2 - t-0$) than it was in the three years prior to that ($t-5 - t-3$). Of course, for practical, policy, and prevention purposes, such rate increases or decreases are important on their own. Nevertheless, from Hawley’s perspective, even more crucial is whether the different rates during the two periods place that hypothetical community in different positions *relative* to other communities in the broader ecosystem. Did the community’s standing on that variable, relative to the other communities in the ecosystem, *shift* between the period ($t-5 - t-3$) and ($t-2 - t-0$)? Relative standing can be explicitly referenced using indicators such as population-weighted percentiles. Population-weighted percentiles are just like percentiles except that they take into account the size of the community in question and the total fraction of the ecosystem’s population scoring at or below that level [149, 180, 731]. If a community occupied the ninety-fifth percentile on the male adult drug-dealing arrest rate, it would mean that that community’s rate was higher than or equal to the arrest rate experienced by 95 percent of the population in the communities of the broader ecosystem. Relative position is crucial because it reflects the ecological niche occupied by that community on that parameter in the broader ecosystem [121: 42–43; 149]. Hawley equated a “niche” with a “functional role” [327: 44]. So that ecological niche captures the roles or functions that community is serving in the broader ecosystem.⁴ A sizable shift in a community’s niche over time means time has changed that community’s role in the broader ecosystem on the attribute in question.

At one point in time, a community’s specific score for a relative niche contains, as Bursik pointed out and Hawley implied, two ingredients [121]. First, it reflects ongoing ecological continuity associated with the community’s position in the broader ecosystem. Such continuity reflects in part the community’s more distant past, what Molotch has called its “structuration” [515: 793]. Second, it reflects ecological discontinuities, recent and unexpected shifts in the community’s niche in the broader ecosystem. Therefore, if a

variable reflects a community's niche on some attribute, its current score on that variable is a complex blend of ecological continuity and discontinuity.

Take the case of community-level average owner-occupied house values in a large metropolitan statistical area composed of urban and suburban communities.⁵ Different communities were built at different points in time, and some at the time of construction were intended to serve a particular clientele. Some may have been designed for wealthy, upscale clients, others for working-class households, and still others for newly formed families. Of course, as soon as houses were built, their relative housing quality started to change over time. Houses filtered down to lower-income households faster in some areas than others, got converted from owner-occupied to multifamily structures faster in some places than others, or became trendy and upscale faster in some areas than others [246]. All these shifts affected the functions served by particular communities for their residents. A relative niche on house value also can shift as significant volumes of new housing stock are added to the metropolitan area, older housing stock is removed, transportation or economic shifts occur, or targeted policies are developed [450].

So in each community for each variable of interest—for example, relative owner-occupied house value, relative offender prevalence rate, relative removal rate, relative percentage African American, relative percentage foreign born—current relative scores reflect both recent ecological discontinuities and longer-term ecological continuities in the niches occupied by the community. Continuities reflect not only history but also political, cultural, and economic traditions and practices continuing to unspool over time. Some decisions made in the distant past, such as zoning an area for vice, segregating by race, or emphasizing one type of industry, became part of some communities' ongoing legacies at future points in time [208, 212, 420, 515].

Not everything that is part of either a community's ecological continuity or recent ecological discontinuity necessarily results from benign or "naturally occurring" processes. Political and economic decisions, such as where to place public housing communities or where to fund gentrification and reinvestment, reflect economic interests and political struggles [123, 449, 450]. Many of these decisions are race linked [556]. History does repeat itself, but the change process is not simple. Rather, it involves a complex mix of small-scale and larger-scale interactions and networks as envisioned by theories of structuration [515].

To view the matter more broadly, at any point in time, any community's relative score on an attribute of interest captures, in addition to ecological continuity reflecting past influences, *recent unexpected change or ecological*

discontinuity. If the latter are sizable, they suggest that a redefinition of that community's ecological function or niche in the broader ecosystem has recently occurred on that attribute [120, 128]. Unexpected change relative to other communities occurs when there has been a “shift in the number and kinds of functions or as a [result of] rearrangement of functions in different combinations” [329: 46]. A community which, within a broader ecosystem such as a metropolitan area, was at the ninety-fifth percentile on drug sales and distribution arrests per one thousand resident adult males ten years ago may be at the thirtieth percentile today. The function that community played in the broader ecosystem, in terms of adult males involved on a per capita basis in drug distribution and sales, has shifted. The community's ecological niche on that feature has been redefined.

Operationally, following Bursik and George Bohrnstedt, ecological continuity and discontinuity can be captured in a lagged regression framework, regressing later (t-0) scores on earlier (t-10) scores of an attribute, where t reflects years, for example [121, 76].⁶ Say the variable of interest is normally distributed community robbery rates (ROBB) and the time interval is a decade (t-10 to t-0). Predicted scores (a+bX) reflect ecological continuity over time. Residuals (e) reflect ecological discontinuities surfacing during the decade.

$$\text{ROBB}_{t-0} = a + b(\text{ROBB}_{t-10}) + e$$

The residual (e) captures the portion of the current (t-0) robbery rates predictable *neither* from beginning-of-the-decade robbery rates *nor* from overall changes affecting robbery rates in the entire ecosystem between the two points in time t-10 and t-0. The ecological discontinuities are unexpected in this sense.⁷ If a particular community's recent ecological discontinuity on an attribute, its residual (e), proves sizable, that community's function or niche in the broader ecosystem has shifted over the change period. Something has happened in that community, or near to it, or something has *not* happened to it that has happened to many other communities, resulting in a realignment of that community's “standing” relative to other communities in the ecosystem on robbery rates. Sizable ecological discontinuity suggests niche redefinition.

A substantial methodological implication emerges. Cross-sectional ecological analyses, for example, of crime rate outcomes, cannot separate ecological continuity from recent ecological discontinuity. This means *any* cross-sectional ecological analysis generates scant theoretical insight. Consequently, community criminologists seeking to make conceptual headway on the causes and consequences of community crime rates should abandon

all cross-sectional analyses. This implication echoes Sampson's call for dynamic rather than static models but provides a different, ecologically focused rationale [635].

Thinking about Time in Theories

Hawley and Bursik's approach to ecological change provides a context within which specific temporal concerns can be examined. These concerns prove metatheoretical because they apply broadly to a range of theories and their assumptions. Three ideas from Abbott are explained: time horizon, unity of time horizon, and durational ambiguity. Two additional methodological critiques merit discussion as they apply to time, communities, and crime: Lieberman's causal asymmetry and David Kenny's discussion of stationarity.

Durational Ambiguity

Abbott's notion of "durational ambiguity" applies when "the duration over which a given indicator has characterized a unit of analysis is unknown but consequential" [4: 72]. If a community's score on an attribute is retrieved, the question is, for how long has that score characterized that community? One implication of the Hawley/Bursik view of ecological change is that community-level crime rates in a cross-sectional model inherently contain durational ambiguity. Ongoing ecological continuity cannot be separated from recent ecological discontinuity. Only longitudinal data can resolve durational ambiguity.⁸

Time Horizon and Unity of Time Horizon

A different type of concern arises when a researcher explicitly investigates changes on an outcome. When a theorist, policymaker, or program evaluator asks, "How long?" he or she wants to know how long it will take for a change in a theoretically relevant predictor, policy, or intervention to have a demonstrable impact on a specified outcome. Underlying any answer provided are some temporal assumptions.

TIME HORIZON

When a researcher picks a specific period during which she expects significant change to be evident on a variable, she is making an assumption about the time horizon of that variable. "The time horizon of a variable or phenomenon is that period which must elapse before we can measure a meaningful

change in it (a change distinguishable from noise). . . . Time horizons of aggregates are usually longer than those of their micro constituents” [4: 286]. Stated differently, “time horizon is the waiting time until a result [change] exceeding a certain limit is passed” [4: 174]. A researcher using the Hawley/Bursik ecological approach to conceptualize change can operationalize meaningful ecological discontinuity as sizable outcome residuals. If a significant number of communities experience significant ecological discontinuity on a variable between two points in time, then the time horizon for that variable is equal to or smaller than the interval between these two points for these communities in that context.

Abbott, as noted in the first quote in the preceding paragraph, also has linked temporal and spatial scaling. In general, one would expect that the requisite time horizon would be longer for units of analysis which are more macro in character. As used in this volume, this means units at larger geographical scales.

UNITY OF TIME HORIZON

With changes in two variables, one a cause and one an effect, questions arise about a related conceptual issue, the “unity of time horizon.” Many approaches to theorizing about change make an underlying assumption of the unity of time horizon: “that causes and effects have meaningful fluctuation *over the same period*” [1: 173]. For example, a model examining impacts of community crime rates on community house prices might assume that crime changes in the past year (the interval t_0-t_1) affect in house price changes in the same interval. Again, a researcher using a Hawley/Bursik frame would be assuming that significant ecological niche redefinition could accrue for *both* variables within the same year for a significant fraction of communities. This represents a particular type of assumption about temporal scaling. The key metatheoretical question is, on what basis is such an assumption supported?

Of course, assumptions about unity of time horizons between pairs of variables multiply as causal frameworks become more sophisticated. Take for example the coercive framework developed by Dina Rose and Todd Clear. It describes how a complex set of community dynamics are adversely affected when community removal rates through imprisonment become excessively high [158: 70–91]. The dynamics suggested by Rose and Clear’s model are outlined in figure 6.1.

Studies of adverse effects of removal rates on communities have linked one-year community changes with one-year changes in removal rates [160, 595]. The embedded “unity of time horizon” assumption is that for each

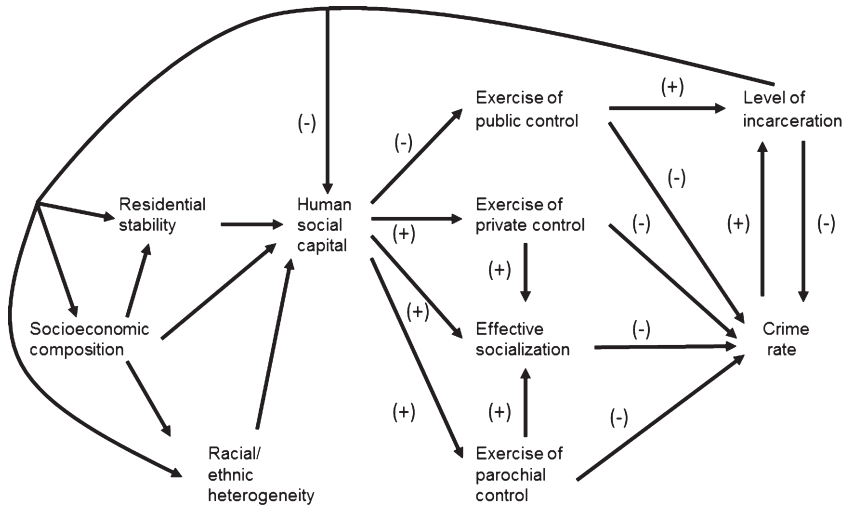


Figure 6.1. “A nonrecursive model of crime control, social disorder, and crime” [158: 86, figure 4.1].

connected *pair* of variables involved in the process, the dynamics envisioned will “cycle through” within a one-year period, thus allowing one to see linkages between changing removal (incarceration) rates and changing crime rates. The full Rose/Clear framework contains many pairs of variables, each pair carrying similarly embedded unity of time horizon assumptions [350, 458, 736]. How long does it take for various links in the model to cycle? Are all links on the same cycling period? Or does it take longer for some nonrecursive effects to be felt at the community level than other ones? Whatever is temporally assumed about these different pairs of variables in the framework has implications for how a researcher would test such a model.

The coercive mobility framework provides much-needed insight into, and inspires needed thinking about, the adverse community-level consequences of high removal rates. It is a valuable and important theory. It is not singled out here because its treatment of the time horizon or unity of time horizon questions is any more deficient than the treatment found in any number of other community and crime theories. Many, if not all, other theories in community criminology are comparably underspecified. The important point is that time horizons need to be specifically assessed and unity of time horizon assumptions carefully tested. The results of these tests create crucial scope conditions for any crime theory examining ecological change [772]. In complex models with nonrecursivity (feedback loops), time and timing

questions get even more complex. Further, answers may depend on both the geographic size of the unit, as Abbott has suggested, and crime type [136].

Researchers with access to time-stamped, geocoded point data for crime can answer at least some of these time questions. They can specify ecological crime discontinuities as residuals (e) using different periods. Variances of the residuals and the number of sizable residuals provide clues about time horizons.

Time and Asymmetric Causation

Communities have histories which become incorporated into ecological continuities [515]. Consequently, even though certain events may be “intrinsically reversible,” linked causal processes may not be [443: 66]. Abbott calls these “sequence effects.” “The whole idea of narrative history is that the order of things matters” [4: 51].

Consider the following example. A community experiences declining house values and a subsequent increasing vacant housing rate. Later, robbery and drug-arrest rates increase as outdoor drug-market dynamics and associated violence intensify [597]. Suppose that after all this the community begins to experience gentrification. This does *not* mean that drug activities and robberies drop to their initial rates [443: 79–83]. This is because the high drug and violence rates *themselves* altered conditions in and around the community. For example, changed criminal activity patterns might have increased residents’ reluctance to become involved in local improvement efforts or decreased police responsiveness to citizen calls or altered how outsiders and potential in-migrating households viewed the community. The genie cannot be put back in the bottle because events have changed the underlying and perhaps spatially adjoining causal dynamics. So even if what was once a key cause is reversed, the *process* is not reversible. This is Lieberman’s idea of causal asymmetry. Local history has happened and cannot be undone. Causal dynamics may have shifted because of that local history.

Shifting Causal Structures over Time and Causal Impacts

In addition to shifting causal dynamics, questions surface about shifting causal structures. Causal impacts over time can be estimated only if the causal structure in question exhibits stationarity, already described in chapter 3. To refresh, “stationarity refers to an unchanging causal structure” and is different from stability [390: 232]. Imagine a researcher analyzing community-level crime rates and community-level social capital at two points

in time, separated by several years, in one city. Identifying the impacts of earlier social capital levels on later crime shifts depends on the structure of social capital—the relationships among its different components—remaining roughly the same at the two times. Shifts in the structure of social capital would cloud causal interpretations. Establishing stationarity becomes more critical when impacts are temporally lagged. Bursik's long-term-change work on delinquency and community structure suggests nonstationarity in community structure [119].

Temporal Scaling Concerns for Different Data Structures

Temporal scaling concerns apply to three different types of data structures: cross-sectional, covarying changes, and lagged changes. Each data structure presents temporal confusions and potential solutions. The discussion assumes a Hawley/Bursik ecological perspective grounded in methodological holism and thus an interest in separating ongoing ecological continuity from ecological discontinuity, that is, niche redefinition.

Cross-Sectional Data Structures

Generally, cross-sectional analyses tell us little about cause [443: 180–181]. A further problem, given the Hawley/Bursik perspective, is that they provide no information about ecological redefinition. Nevertheless, many communities and crime researchers have and likely will continue to engage in cross-sectional, ecological work for any number of reasons. This section details the most relevant temporal scaling concerns and considers whether an instrumental variables approach can clarify causal dynamics for these data structures.

Any cross-sectional community-level ecological analysis implying causality makes assumptions about time. Consider, for example, a community-level tolerance-of-deviance model (figure 6.2) [639]. This presents one theoretical



Figure 6.2. Cross-sectional, community-level delinquency model. All variables are macro-level.

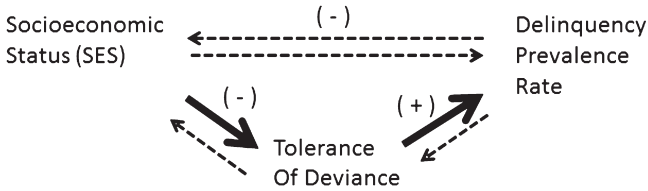


Figure 6.3. Cross-sectional, community-level delinquency model. Dashed arrows indicate excluded pathways because initial model estimated is a recursive model and no direct impacts of SES on the outcome are anticipated.

perspective for clarifying the negative relationship seen between community SES and delinquency in both the Burt and McKenzie examples (chapter 3). This model suggests that in higher SES communities, there is *less* tolerance of deviant behaviors such as young teens drinking, smoking, or fighting or people generally breaking the law. Such views do vary ecologically [639]. The idea is closely allied with notions of moral/legal cynicism, for example, believing that “laws were made to be broken” [638: 225]. The model rules out a direct effect of SES on delinquency. Rather, it anticipates that tolerance of deviance mediates *all* SES impacts on delinquency. The classical social disorganization theoretical frame supports such a view [404: 85]. A feature of community structure sets in motion community cultural processes, leading in turn to a delinquency outcome. All the dynamics shown are presumed community level; that is, the model assumes methodological holism.

If all the data were from the same calendar year, what is such a cross-sectional model assuming about the *timing* of causal dynamics? First, and as shown in figure 6.3, such a model allows no feedback; that is, nonrecursive effects are excluded. Variables appearing later in the model, further to the right, do not influence variables earlier in the model, further to the left. These excluded effects are shown with the dashed arrows. For SES and delinquency, the model excludes direct effects in *both* directions.

A researcher might have specific reasons for why each feedback effect should be set to zero. Perhaps the researcher argues that within a year, it is unlikely that *that* year’s delinquency rate would influence the variables reflecting community SES (e.g., median house value, percentage employed, median occupational prestige, median education level of adults in the community). The researcher also does not expect the delinquency prevalence rate to affect typical community views about deviance because typical (median) community views shift slowly over time, barring special circumstances.

CROSS-SECTIONAL ANALYSIS CONSIDERED ECOLOGICALLY

Adopting a Hawley/Bursik perspective raises questions, however, about the researcher's reasoning. That perspective interprets *each* cross-sectional ecological indicator as reflective of *both* ecological continuity *and* recent ecological discontinuity, *even though the data-collection period was limited to just one calendar year*. The continuity and discontinuity components of each variable prove inseparable in such a cross-sectional analysis. Consequently, *no* feedback effects, from an endogenous variable placed further to the right in the model to a variable, exogenous or mediating, placed further to the left, can be ruled out theoretically. Indeed, theoretically, *each* potential feedback effect *should be ruled in*. So following this view, all the dashed lines in figure 6.3 should be solid lines. For example, it could be that the portion of the outcome variable reflecting ecological continuity is affecting the recent ecological discontinuity portion of the tolerance-of-deviance variable.

In short, with cross-sectional ecological data, even though the window of data collection may be short, *a portion of the scores on each indicator reflects a period that is greater than the data-collection period*. Further, the relative contributions of those discontinuity and continuity components to assessed scores on a variable probably differ across communities. Therefore, the appropriate assumption is that all potential causal pathways, regardless of directionality, are theoretically defensible and *potentially* relevant. Therefore, the researcher needs to test a fully nonrecursive model with all potential pathways examined (e.g., figure 6.3 with all solid and dashed lines included).

DO INSTRUMENTAL VARIABLES PROVIDE A SOLUTION?

Such concerns may not stress a sophisticated researcher skilled in techniques such as two-stage least squares (2SLS) and instrumental variables (IV) who thinks such problems quite solvable [293]. With an instrumental variables approach, the researcher finds instruments which stand in or serve as proxies for their respective indicators. In the model shown in figure 6.3, the Hawley/Bursik approach mandates that the researcher find an "instrument" for each variable in the model because all direct effects and all feedback effects are anticipated theoretically.

Key properties of variables used as instruments are high correlations with the variable they replace and much lower correlations with other variables in the theoretical model. Practically and conceptually speaking, however, the IV approach may be less than optimal.⁹ There are four analytic issues. Since these are somewhat technical, they appear in appendix B (online at <http://nyupress.org/Taylor/AppendixB.pdf>). Readers willing to accept a priori that instrumental variables are inherently problematic can skip it.

TEMPORAL AGGREGATION IN CROSS-SECTIONAL ECOLOGICAL MODELS

As mentioned earlier, temporal scaling issues of aggregation in some ways parallel spatial scaling concerns. Cross-sectional researchers considering aggregation over different periods have to address the same questions as those considering aggregation over different spaces.

Among those questions, most important is, does the researcher expect the same relationships between variables in his or her model regardless of the period reflected in the variables? Are relationships in which each indicator is based on a year of data expected to be the same as those based on a decade of data? This is the familiar homology assumption but applied to time rather than space. If the researcher assumes homology, then the goal is to isolate the factors causing aggregation bias, that is, covariation between noncorresponding parameters at different levels of temporal aggregation. Temporal spuriousness can cause such noncorrespondence [316: 86]. By contrast, if the researcher assumes temporal discontinuity—links may vary depending on the period of temporal aggregation—aggregation bias and noncorrespondence is not problematic per se; it is just part of how things work differently at different temporal levels of aggregation.

It seems wisest at this juncture to assume temporal discontinuity in community criminology, for several reasons. Little is known about time horizons and unity of time horizons in various models. Questions of durational ambiguity also seem significant but have received scant attention. Aggregating by temporal proximity has the potential to introduce the same spuriousness and unmeasured-variables concerns that Blalock voiced about aggregating by geographic proximity.

THE BOTTOM LINE: CROSS-SECTIONAL DATA

The foregoing discussion about time raises several serious challenges for ecological cross-sectional analyses. These are theoretical, not methodological, barriers. (a) Because each cross-sectional ecological indicator inevitably confounds recent ecological repositioning within the broader ecosystem with ongoing ecological continuity in the community's relative position, all theories should be tested with fully nonrecursive models. An ecological-continuity component of an outcome, for example, may affect the recent-discontinuity component of a predictor or mediating variable. Cross-sectional data cannot separate, for each community, the portion of each variable reflecting ecological continuity from the portion reflecting recent ecological discontinuity. In Abbott's terms, this is a durational ambiguity problem that is unsolvable with these data. Further, (b) The most common way of analytically approaching

this challenge, modeling with instrumental variables, has important limitations. These limitations are likely to be especially significant for ecological models. (c) Temporal aggregation is similar in fundamental ways to spatial aggregation. Given concerns about time horizons and durational ambiguity, coupled with little systematic research on just these matters, it seems wisest for researchers to assume discontinuity across different levels of temporal aggregation. (d) Up until now, researchers have chosen the size of the period used for cross-sectional indicators on the basis solely of data availability. Instead, these choices should emerge from an understanding of the theoretically expected relationship between the size of the time window and the rate at which local conditions are changing on the attributes of theoretical interest for the ecological units of interest. This is a time horizon issue.

The broader implication of the foregoing is that the Hawley/Bursik perspective on continuity and change creates an unsolvable durational ambiguity problem for ecological cross-sectional analyses. As a result, researchers cannot learn what is happening *causally* in communities and crime ecological models on the basis of cross-sectional data if they are examining a system of communities that is *not* in “ecological equilibrium” [121: 59].

Almost three decades ago, Bursik, commenting on a cross-sectional model showing impacts of race on delinquency, made this same point more succinctly. “It is impossible to determine the extent to which this pattern is ongoing or a temporary reflection of a changing urban structure” [121: 58]. *Consequently, community criminologists favoring methodological holism are strongly encouraged to stop conducting all macro-level cross-sectional analyses.* From a theoretical vantage, such analyses are minimally informative.

Covarying Changes

Covarying changes arise from a panel data design in which predictors and outcomes are both assessed at the same two (or more) points in time. Statistical treatment of such data can become quite sophisticated. The modern econometric approach treats potential confounds as variables [844: 247–250]. Metatheoretical implications of differing-sized time windows in such an analytic design are considered here.

Although analyses based on covarying changes cannot be causally definitive, they are theoretically useful. For example, an ecological researcher may be interested in the degree to which multiyear changes in delinquency covary with multiyear changes in tolerance of deviance over the same period. Such an analysis could be focusing attention on simultaneously occurring,

potentially bidirectional processes of ecological redefinition. Perhaps a community becomes repositioned in several ecological niches simultaneously.

AN EXAMPLE: DELINQUENCY CHANGES AND COMMUNITY STRUCTURE CHANGES

In a series of articles and book chapters in the 1980s, Bursik examined connections between changing delinquency rates and changing community structures in Chicago. Decades were the change periods. Data extended from 1940 to 1970. That work demonstrated that relative delinquency rates shifted as communities were repositioned relative to one another [121, 128]. The connection varied in understandable ways depending on the decade in question, thus proving that it was historically contingent to a degree [119]. Racial changes in adjoining areas linked to delinquency changes in focal communities [340]. Decisions about locations of public housing communities elevated instability and delinquency [123]. Earlier delinquency could spur later ecological demographic changes [120].

Of specific interest here, Bursik's work considering covarying unexpected changes in community structure and delinquency referral rates used regression residuals, as described earlier, to capture recent ecological discontinuity. Given data limitations, the change periods were decades, and the spatial units were Chicago's sizable natural areas [128]. Given that he was working with archived data going back to 1940, he had no choice about temporal or spatial unit selection. Further, given that Chicago's natural areas are quite sizable, with populations of roughly sixty thousand around 1960, and that the change period of ten years was sizable as well, the time horizon for change was sufficient for significant shifts at the community level on both delinquency and community structure.

IT IS ABOUT TIME: WHAT THE RESEARCHER MUST DECIDE

Ecological theorists examining covarying changes should think about temporal scaling regardless of corresponding data availability. Foremost is Abbott's time horizon question. Over what period are significant shifts expected for *both* central predictors and outcomes? Periods in question may range from a day, used in some ecological deterrence work, to a decade, used by Bursik [191]. If the indicator change period is extremely short, the principal concern is thinking about instantaneous covariation. Does this make sense theoretically? Does a change in a predictor (Δ_1 , "delta 1") lead instantaneously to a change on an outcome (Δ_2 , "delta 2")? Or is something else happening? Instantaneous causality would mean that the second change in

the community is a reaction to the first change “without any measurable time delay” [286: 205].

Two alternative explanations arise for why two changes can covary closely even if the change period is short, such as a day: spuriousness and extremely short time horizons for the processes in question [286]. Spuriousness recasts the two changes as reflections of a third underlying shift. That third underlying and presumably unmeasured shift could have occurred in the interval preceding the change period. The second possible explanation suggests that after some delay, the predictor change, Δ_1 , does affect the outcome change, Δ_2 , but that delay is briefer in duration than the change window used for data collection. Processes connecting Δ_1 and Δ_2 “cycle” in a time interval shorter than the data interval for assessing the changes.

If the researcher rules out spuriousness, the next key question is whether the short-term community-level changes for both variables (Δ_1 and Δ_2) represent significant ecological discontinuity and redefinition or mere noise in the indicators. This is Abbott’s time horizon question again. Deciding how much time is sufficient for significant changes to accrue depends on the specific theoretical context, the specific ecosystem and period in which the communities are situated, the indicators chosen, and the geographic size of the units of analysis. Larger-size units may take longer to manifest significant change [4]. So spatial and temporal scaling issues intersect. If the researcher is satisfied that sufficient time has elapsed for significant change to emerge—the assumption about time horizon for both predictors and outcomes appears correct—then a further question arises. Is the change period long enough for the theoretically described processes to “cycle,” that is, for the first change (Δ_1) to *affect* the second change (Δ_2), or vice versa, and thus demonstrate covariation between Δ_1 and Δ_2 ?

TEMPORAL SCALING, COVARYING CHANGES, AND THEORY:

EXAMPLE AND IMPLICATIONS

Recent work by John Hipp and Daniel Yates examined impacts of neighborhood parolee return rates on neighborhood crime rates in Sacramento (CA). Community was operationalized at the census-tract level. Their work illustrates how these assumptions prove relevant [350]. They examined co-occurring monthly changes. During months when neighborhoods experienced increases in the number of returning parolees, aggravated assaults, burglaries, and robberies increased as well. Various moderating effects pointed out how parolee return volume intersected with community structure and organizational climate. The main effects in combination with these and other moderating effects left the door open for several time-dependent

processes underlying the various returnee volume–crime relationships. Three classes of relevant processes were suggested for the connections: (a) direct involvement of the parolees in local criminal activity; (b) indirect involvement through interaction with and stimulation of local criminal contacts; and (c) alterations in household structure [350: 644].

Given the size of the areal units used in Hipp and Yates's study, it seems plausible that the time horizons for (a) or (b) easily could be less than a month.¹⁰ These two—(a) and/or (b)—could be underlying the connection between Δ_1 (parolee release change as an example of change in the predictor) and Δ_2 (crime change as an example of change in the outcome). The time horizon for processes linked to (c) seems likely to be significantly longer than a month. These processes engender substantial *community-level* demographic change. Ultimately, of course, which processes drive the covariation is an empirical question.

In studies such as Hipp and Yates's, deliberate manipulation of the time scale might help reduce the plausible range of theoretically relevant processes. Suppose, for example, that the change period was narrowed from a month to a week, and the positive returning-parolee change–crime change relationship persisted in robust form. Such a finding could argue against the two indirect processes (b and c) and in favor of the direct-involvement process (a). For (b), one could argue that it takes time for various networks to reactivate subsequent to a parolee's return, and it would be unlikely that such networks would be reactivated *and* that criminal actions would take place within a week. For (c), one could argue similarly that the processes affecting household structures *broadly* at the neighborhood level and leading to criminal actions could not cycle in less than a week, barring truly catastrophic events. Of course, using shorter intervals to capture changes reduces the volume of such changes as well, a feature arguing against using shorter periods.

Nevertheless, systematic attention to temporal scaling in many situations may help reduce the range of plausible underlying conceptual processes linking two covarying changes. This requires that the researcher specify the time horizon for each plausible processual dynamic. Once specified, data and analyses can be structured to systematically exclude particular processes. Again the process-timing connection would depend on the geographical size of the units studied. Theoretical clarity may result.

SPURIOUSNESS

Finally, a question relevant no matter what the time scale used, short or long, is temporal spuriousness, a concern specifically cited by Michael Hannan and extrapolated from Blalock's discussion as well. Is there a third unmeasured

change, taking place during or before the data-collection period capturing change, that could *plausibly* explain the connection between Δ_1 and Δ_2 ? Spuriousness is an especially serious concern, no matter the size of the change period, because communities are the focus. These units of analysis are embedded in the larger collective life of their city, suburb, or municipality.

THE BOTTOM LINE: COVARYING CHANGES

The choices that researchers make about temporal scaling when studying linked ecological changes have numerous implications. At the obvious end, there needs to be sufficient time within the period studied for significant community-level changes to accumulate, in enough communities, on both predictor and outcome indicators of interest. Too narrow a time horizon does not allow sufficient time for changes to surface, thereby constraining the covariation between the two changes of interest. “Too narrow” depends on theory, the size of the spatial units in question, and the background rates at which communities’ ecological niches on variables 1 and 2 are changing.

Further, if a very narrow time horizon is accepted, clarity is needed on what is happening in the short period that ties Δ_1 and Δ_2 together. Assuming flexible data structures, choice of the appropriate temporal period *depends more than anything else on the relevant conceptual framework*. What are the theoretically plausible time frames within which Δ_1 could affect Δ_2 , or vice versa? Data structures and change rates permitting, the researcher can systematically vary temporal scale to investigate the processual dynamics responsible for the covariation. If only one process is relevant, the investigation may shed light on its cycling period by varying temporal scale. If multiple processes are potentially plausible, systematic temporal scaling may help narrow the conceptual field. The temporal scaling issues also can be addressed through simulations (see chapter 7).

Finally, regardless of the size of the period for accumulating change in a model, worries about spuriousness never disappear. The z variable causing both Δ_1 and Δ_2 may be changes arising in the period examined or changes or static conditions appearing in a previous time frame but setting in motion dynamics which continue to operate over time. With covarying changes, of course, the biggest challenge is that the researcher cannot learn which change is cause and which is effect. For that, a stronger design is needed.

Lagged Changes

Suppose an ecological researcher collects data at three or more time points, and the data structure allows the researcher to examine the effects of earlier

ecological changes in a predictor on later ecological changes in an outcome or mediating indicator. Such analytic models have the potential to provide stronger causal inference than models examining covarying changes. Generally, when later changes link to earlier changes, temporal spuriousness seems less plausible as a threat to internal validity, compared to the covarying changes data structure just discussed. From a policy perspective, linking an earlier change to a later change is the most useful type of study design. Some policy analysts might argue that it is the *only* useful type of empirical evidence. Policies are about changing things—adding something or taking something away.

MOST SIGNIFICANT METATHEORETICAL QUESTIONS

If earlier community-level changes can affect later community-level changes, what metatheoretical questions about time surface? Most of the questions reviewed in the context of two covarying changes still pertain. In Abbott's parlance, time horizons need to be estimated theoretically. But there is a crucial additional consideration: what is the appropriate period within which to expect that a predictor change assessed over a specific period shapes an outcome change assessed over a later specific period [318]? Not only must the temporal window(s) for accumulating Δ_1 (for changes in predictors or mediators) and Δ_2 (for changes in an outcome or a mediator) be decided. The researcher also needs to decide, what time lag between the predictor change and outcome change should be anticipated theoretically? What is the *theoretically* expected minimal duration (Δ_3) before an input change can shape an output change at the community level? This is in effect a question about the connection between two time horizons, a particular type of durational ambiguity [4: 70]. Theory describes the processes linking the two types of changes. Spatial scale of the community units is relevant as well since larger units generally will take longer to demonstrate significant change [4: 174].

Figure 6.4 suggests two different hypothetical temporal arrangements for Δ_3 . In the upper scenario, changes on the outcome begin immediately after a change in a predictor has registered. There is no lag ($\Delta_3 = 0$ temporal units). In the lower scenario, changes on an outcome begin six temporal units after a change in a predictor has registered. There is a temporal lag ($\Delta_3 = 6$ temporal units) delaying the impacts of the first change on the second change.

In short, theoretical ambiguity about the appropriate length of the lag between predictor changes and outcome changes creates challenges for theories seeking to tie the two changes together. A researcher can meet this challenge by assuming some form of methodological individualism and

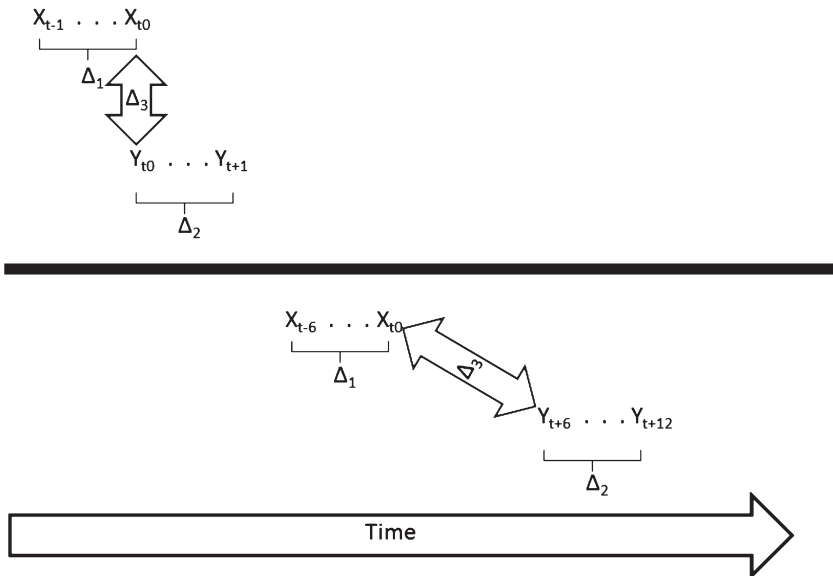


Figure 6.4. Two hypothetical temporal arrangements between changes in predictor (Δ_1) and outcome (Δ_2). Δ_3 = time between two lagged changes. Upper portion: $\Delta_3 = 0$ temporal units; bottom portion: $\Delta_3 = 6$ temporal units.

further specifying macro-to-micro-to-micro-to-macro links in the relevant theory and corresponding metamodel [81: 101–102]. Details follow in the next chapter.

AWARENESS OF TEMPORAL CONFUSION ABOUT Δ_3

Have community criminologists recognized the importance of specifying the temporal lag between predictor changes and outcome changes? In one theoretical arena, ecological deterrence, they have. Consequently, researchers have tested different-sized lags. In another theoretical arena, routine activities, one scholar has bounded the time scale for centrally relevant dynamics. Relevant work is briefly summarized in the following subsections.

Ecological Deterrence

Ecological deterrence theory posits area-wide impacts of criminal justice actions such as increasing arrest or clearance rates on later declining crime rates. At least scholars here have lamented the lack of theoretical guidance about the appropriate lag. Almost forty years ago, Douglas Cousineau commented in his review of deterrence, “most researchers using the ecological approach have failed to allow for an appropriate time lag between sanction

and effect” [179: 153]. Greenberg and colleagues have similarly noted the lack of theoretical specification [291].

Researchers typically will respond to the lack of clarity about what the “appropriate” lag should be by testing for deterrence effects using a number of different lags. Yearly, quarterly, monthly, and even daily lagged effects of arrests on later crime have been examined, mostly at the city level, although there have been studies at neighborhood and county levels [127, 144, 145, 191, 290, 291]. These works defy easy summation aside from concluding that the impact in a study often does appear to depend on the length of the lag. Works investigating multiple lag structures find that the size of the delay can determine whether an impact appears. A second conclusion which may be warranted, but is currently based only on one study, is that the presence of a lagged deterrent impact may be modified by significant local history, such as race riots [146].

Routine Activity Theory

Routine activity theory in its most basic form argues that crimes occur when a motivated offender and a suitable target are close together in space and time while a capable guardian is absent. The theory has been tested as an explanatory framework for large-scale crime shifts [165]. Later versions have added place managers and handlers of potential offenders [236, 237].

Questions about temporal scaling in routine activities theory have been widely overlooked save for Eck’s theoretical critique [216]. In this rarely cited work, Eck argued in favor of investigating short periods and short time lags.¹¹ “Criminologists interested in examining crime events should know enough to avoid . . . using data aggregated to long periods such as weeks, months, years, or decades” [216: 794]. Eck argued that in the case of routine activity theory, since the theory requires the close confluence of several different factors and since it focuses on explaining crime events, it *only* can be tested at “locations no larger than addresses and street corners” using very small time windows [216: 792]. “The time intervals . . . must be no longer than the time required to commit a crime. . . . If the time interval is too long, each interval is likely to contain both crime and non-crime periods” [216: 793]. Routine activity theory, therefore, according to Eck, cannot be tested with aggregate (community-level) data because it is about whether a crime event occurs in a small time-space window because of a confluence of particular attributes of that time-space window. “No aggregate data, of any type, can test routine activity theory. Aggregate data are simply irrelevant” [216: 792]. In short, Eck has argued that because the time lag between predictors and the criminal event taking place in the period or not must be so narrow and

because the stipulated proximity among predictor components requires such a short distance, routine activity theory cannot be examined using a time scale larger than minutes and a spatial scale larger than individual addresses or street corners.

In short, one of the most popular theories for understanding community-crime connections would appear, at least according to Eck, to require extremely short time lags between the confluence of predictors and the outcome. The confluence described by routine activity theory can be described as a set of related changes taking place in a narrow time window (Δ_1) which almost instantaneously (Δ_3) change that time-place from one where no crime act is occurring to one where a crime act is occurring (Δ_2). Researchers seem to have overlooked Eck's prescription.

COMMUNITY JUSTICE / COERCIVE MOBILITY

In the case of the community justice / coercive mobility model, some theorists have recognized that they do not have the data they need.¹² When data permit examining a range of lags (Δ_3), connections suggested by the model appear to be contingent on the size of the lag [736].

COLLECTIVE EFFICACY

The ecological collective efficacy model about crime changes has not yet advanced to the point of examining impacts or determinants of *changes* in collective efficacy. But neighborhood-level collective efficacy has been linked to subsequent, multiyear changes in neighborhood homicide rates [521].

Collective efficacy is thought to mediate the relationship between structural factors such as disadvantage (status + race) and stability, and outcomes such as violence. "This pathway is presumed to operate over time, wherein collective efficacy is undermined by the concentration of disadvantage, racial segregation, family disruption and residential instability, which, in turn, fosters more crime" [636: 154]. Collective efficacy is also thought to act as an exogenous cause of subsequent structural changes, such as changes in poverty [636: 159]. Given these links, one might expect sizable changes in collective efficacy in a short time frame.

Yet, in some later work, Sampson seems to be arguing that collective efficacy, at the natural-area level at least, is stable over a multiyear period, such as 1995–2002 [638: 170]. "Collective efficacy . . . is surprisingly durable. . . . The evidence points to social reproduction amid a period of overall change" [638: 168]. So for this theory, several important questions remain. How stable are ecological niches on collective efficacy over what period for what size

ecological units? If significant ecological discontinuities suggesting niche redefinition surface for collective efficacy over a multiyear period, how do those connect to antecedent or following changes in the types of crime indicators discussed in this volume?

GST

Another relevant communities and crime model is the ecological version of general strain theory (GST) for explaining community differences in crime rates. GST interposes areal differences in stressors, strains, coping, and emotional states between community structural factors and community crime rates [6]. The theory has received some cross-sectional support [782].

The ecological GST model is in essence a collective stress and coping model. It has been applied to communities by researchers seeking to understand the impacts of technological and natural disasters on residents. In both the community disaster work and the work on stress and coping, short-term and longer-term responses and impacts are differentiated [405]. But temporal scaling concerns have yet to be examined. Communities can to an extent “bounce back” from some natural hazards, demonstrating resilience [554]. But chronic hazards over time impair the effectiveness of coping responses [245]. In short, if a community’s collective emotional response to strain is conceptualized as a response to stressors and culminates ultimately in higher offending and delinquency rates, the temporal structure of those responses is important.

It seems that the ecological version of GST can only be tested using longitudinal data linking lagged changes, that is, including Δ_1 , Δ_2 , and Δ_3 in a model. Theorists in this area have not yet provided guidance on what the appropriate lags should be for such causal testing.

THE BOTTOM LINE: LAGGED CHANGES

Research linking an earlier community change to a later community change potentially can provide substantial insight into what is causing what. If the changes are sizable and are operationalized so they capture recent ecological discontinuities, they can reflect Hawley/Bursik ecological niche redefinition, and relevant community level causes can be investigated. But theoretical specification proves challenging for those assuming methodological holism. The researcher needs not only to address the temporal ambiguities noted by Abbott but also to develop a picture of the relevant dynamics that can guide expectations about how long it takes one macro-level change to affect another later macro-level change.

Closing Comment

This chapter has highlighted confusions about temporal scaling as they apply to community criminology. The discussion has assumed methodological holism. Save for ecological deterrence work, researchers and theorists to date have failed to systematically test assumptions about temporal scaling. In one instance, routine activity theory, a sizable contradiction is evident between theoretically driven assumptions about temporal scaling and almost all ecological research purporting to test this model. Many of the temporal concerns highlighted here intertwine with the spatial concerns discussed in earlier chapters. These concerns about spatiotemporal interactions deserve attention in the future as well. The next chapter provides suggestions about some ways to reduce these temporal confusions by adopting metamodels that align with some version of methodological individualism rather than methodological holism.

Temporal Scaling II

A Temporally Dynamic Metamodel

Space and time are different aspects of the same thing such that it is difficult to experience one without the other.

—Amos Hawley, 1950

Overview

The previous chapter highlighted concerns about time from the perspective of methodological holism. These concerns reveal that some theories in community criminology are underspecified. They either overlook some time questions or make untested assumptions. These time issues are especially critical given the Hawley/Bursik perspective on ecological discontinuities in structure, culture, or crime. Such shifts, if substantial, reflect the redefinition over a period of a community's ecological niche, that is, a shift in how a community is positioned on that attribute relative to other communities in the ecosystem. Understanding the origins and consequences of these shifts is a critical concern for community criminology.

This chapter first points out correspondences between the time matters highlighted in the previous chapter and spatial concerns introduced earlier. Two main parallels are noted. At the very least, concepts of durational ambiguity and time horizon suggest a modifiable temporal unit problem (MTUP). This is analogous to the modifiable area unit problem (MAUP) widely recognized in geography. Further, the idea of time horizons and questions about the unity of time horizons imply that connections between indicators of different concepts in a conceptual model will be highlighted or masked depending on how the data are aggregated or disaggregated temporally. These broader implications parallel some implications arising from spatial scaling questions. This chapter attempts solutions to the temporal confusions raised in the previous chapter by explicitly framing the snarl in a corresponding metamodel. Metamodels corresponding to three different perspectives are developed: methodological holism, meso-level holism, and methodological individualism.

In addition, moving from theoretic to analytic matters, different conceptual orientations suggest different methodologies for analyzing change. Given realistic limitations on empirical data collection, community and crime researchers taking different conceptual orientations to change probably cannot use the same data-collection strategies. But what individual researchers can do is align their broader philosophy of inquiry, the specific temporal confusions they consider, and their analytic approach. Striving for such alignment seems worthwhile. Specific methodological and analytic options will be described for each of the three metamodel orientations.

To illustrate concretely the different dynamics involved as time matters play out under different conceptual orientations, a simple mediated SES–tolerance of deviance–delinquency model used in the previous chapter is further developed. The model can be partially operationalized using McKenzie’s data from Columbus circa World War I. Those data and that context also suggest potential dynamics linking three community changes in that time and place: socioeconomic status, tolerance of deviance, and delinquency.

This chapter and the preceding four have considered spatial and temporal concerns as independent problems for community criminology. But in reality, the two issues intersect, as reflected in Hawley’s quotation in the epigraph to this chapter. Considerable evidence from individual-level and macro-level work documents crime-linked spatiotemporal interactions. Key metatheoretical questions about spatiotemporal interactions are sketched in a short closing section.

Spatial and Temporal Scaling Parallels

Temporal scaling and spatial scaling each can be formally treated as an aggregation issue. Some of the same conceptual aggregation/disaggregation questions apply similarly. Hannan’s formal analysis of aggregation bias was explicitly designed to capture “averages taken over micro-units, groupings, and time periods” [316: 38]. Sizable metatheoretical implications follow from the parallel treatment for temporal and spatial aggregation.

The most obvious parallel is that temporal units, like spatial units, are modifiable [85: 312]. Consequently, a modifiable temporal unit problem (MTUP), potentially as troublesome as the well-known modifiable areal unit problem (MAUP), deserves consideration [542]. A second parallel is potential causes of spuriousness. “Temporal spuriousness” might cause relationships between “non-corresponding micro- and macro-variables” [316: 86]. Studies of the same spatial units using different time windows, either for static or changing attributes, can generate discrepant results. For example,

results using indicators aggregated by months may look different from results using yearly data. For this analytic reason alone, it seems wise to assume discontinuity rather than continuity across different temporal scales.

Abbott's discussion of time horizons and unity of time horizons provides additional rationales for assuming discontinuity across temporal scales. Imagine that a sizable number of communities in a particular region are experiencing significant ecological niche redefinition during a particular period on a predictor and an outcome. Both indicators are central to a particular theoretical model. Imagine further that the researcher has conceptual and empirical evidence suggesting *these* data will support the theory's central proposition. The expected empirical validation will appear if the researcher uses a theoretically appropriate time frame for operationalizing change. Then, the unity of time horizon assumption—"that causes and effects have meaningful fluctuation *over the same period*"—would be correct [1: 173]. But if the changes are calculated using a different, less theoretically appropriate change period, relationships between covarying predictor and outcome changes may be masked.

Even so, the unity of time horizon assumption may not be correct much of the time [1, 4]. There may be indicator issues. Particular indicators can create problems. "Time horizons fluctuate from variable to variable" [4: 175]. Discrepancies between predictor and outcome changes also may arise from different error structures, such as differing serial autocorrelation structures. But beyond issues with indicators, there are conceptual concerns. "Often time horizons differ for substantive, theoretical reasons" [4: 175]. What consequences follow? If the unity of time horizon assumption is not warranted, then aggregating data into different temporal units may highlight changes on some variables in a model while simultaneously masking changes on others.

In short, ecological researchers investigating change seem likely to find different empirical associations when data are temporally aggregated in different ways. It seems wisest to assume that observed relationships are likely to shift when data are temporally aggregated or disaggregated using different periods to capture changes. This seems an inescapable conclusion from Abbott's ideas about factors making the unity of time horizon assumption suspect. The same conclusion is strongly implied given conceptual parallels between spatial and temporal aggregation issues.

Introducing a Longitudinal Example: SES, Delinquency, and Tolerance of Deviance, Columbus (OH) Wards circa World War I

An example from Columbus (OH) circa World War I, partially operationalized with data, helps frame these temporal changes within the boat metamodel. Following the Hawley/Bursik approach described in the previous chapter, the goal is (a) to isolate ecological discontinuity or ecological niche redefinition, (Δ), from ongoing ecological continuity, for both predictors and outcomes; and (b) to model the connections between those changes. Because of data limitations in this example, it will only be possible to empirically investigate one unexpected change in the broader stated model. Nevertheless, the example illustrates how a metamodel helps organize temporal shifts within a particular theoretical frame.

Initial Community-Level Model

The model in figure 7.1 revises the cross-sectional SES \rightarrow tolerance of deviance \rightarrow delinquency model (chapter 6) into a fully mediated longitudinal one. Communities at some level are the units of analysis. Changes unfold over time at the community level. Over time, after community socioeconomic structure declines, residents' tolerance of deviance exhibits later increases; the latter leads to even later increases in delinquency incidence or prevalence. The model depicted assumes methodological holism.

Relevant Columbus Context circa 1917–1920: Issues and Data

Recall that the delinquency indicator in McKenzie's data, described earlier (chapter 3), covered from May 1918 to May 1919 and that the SES indicator was based on personal-property-tax returns for calendar year 1918. This section introduces indicators available for the mediating concept, changes in tolerance of deviance. Historical background clarifies how three different issues might have linked together in this region almost a hundred years ago.

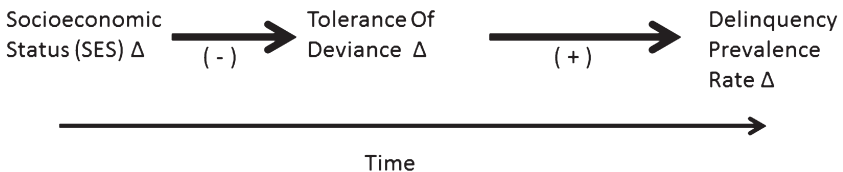


Figure 7.1. Fully mediated longitudinal SES \rightarrow tolerance of deviance \rightarrow delinquency change model. Methodological holism is assumed.

McKenzie gathered ward-level information about several votes on then-current social issues [492: 786]. In 1917, there were votes on alcohol prohibition, a poolroom ordinance, and women's suffrage. In 1918, there was another vote on prohibition and one on a law that would "prohibit employment of women in places where liquor is sold" [492: 787, table XXV]. Although McKenzie saw these issues as tapping neighborhood norms and mores, he clearly recognized the implications for lawbreaking. The Prohibition enforcement struggles which emerged later in large US cities in the 1920s seem foreshadowed by the following observation of McKenzie's.

After a campaign which varies in intensity according to the nature of the issue, a vote is taken and the result apparently accepted by both sides. The geographical distribution of the losing minority seems of little consequence. From the standpoint of law enforcement, however, it becomes a very significant matter whether one city neighborhood has imposed its will on a numerically smaller neighborhood entirely out of sympathy with the decision. Without the support of the local opinion of the neighborhood it becomes extremely difficult to enforce legislative enactments. If, on the other hand, the losing minority does not happen to be segregated in particular neighborhoods, but is evenly scattered throughout the city, the question of law enforcement is of a much more simple nature. [492: 786]

The women's suffrage movement and the women's temperance movement had a complicated relationship, following partially overlapping but separate paths, going back to the 1870s. Much activity on both issues happened in Ohio [72]. And of course, the two issues, women voting and alcohol prohibition, were considered nationally at around the time of McKenzie's data collection. The Nineteenth Amendment, allowing women the right to vote, was passed by the US House of Representatives and the Senate in 1919. The first states ratified the amendment on June 4, 1919, and Ohio ratified it on June 16, 1919. The Eighteenth Amendment, on alcohol prohibition and critical to the 1916 congressional elections, was passed by Congress in December 1917, ratified by sufficient states in January 1919, and implemented in January 1920. The Volstead Act, passed in 1919, was intended to maintain "wartime [alcohol] prohibition . . . until the Amendment came into force" [118: 55]. Prohibition was already in place to some extent by 1917, given wartime restrictions.

Pool halls may sound relatively innocuous today, but they were more troublesome when McKenzie was in Columbus.¹ It was not unusual during the early 20th century in the Midwest for a building with a legitimate pool hall or saloon on the first floor to host a brothel on the upper floors [603]. At

that time, in parts of nearby Canada, pool halls could be placed off-limits for males or females adjudicated delinquent [527].

Prohibition was seen as a moral and public-safety matter given (then) recent numerical increases in saloons. Further, with more manufacturing jobs, the chances were increasing that drunk workers staffing industrial-sized equipment in plants could harm co-workers as well as themselves [118].

McKenzie interpreted Columbus votes on these two matters as reflections of “mores, that is, questions involving conceptions of right and wrong” [492: 788]. Given the historical context of World War I-era Columbus, these three votes—alcohol prohibition, women working in saloons, and poolroom ordinances—seem at least somewhat comparable to recent indicators operationalizing tolerance of deviance. For example, Robert Sampson and Dawn Bartusch used the following four separate questions from the Project on Human Development in Chicago Neighborhoods (PHDCN) to gauge tolerance of deviance: “How wrong is it for teenagers around thirteen years of age to (a) smoke cigarettes, (b) use marijuana, (c) drink alcohol and (d) get into fist fights?” [639: 786].

A SHORT SPATIAL ASIDE

McKenzie presented the ward-level results on these votes as deviations from the citywide average [492: 787, table XXV]. He made the case that ward-level views linked to SES and ethnicity. But he also discovered that the geographical patterning was clearer at the subcommunity level—that is, the precinct level—and demonstrated this in a series of maps [492: 789–792]. Unfortunately, for the entire city, McKenzie included only data at the wider ward level for the social issues under discussion. It is recognized, given the spatial scaling matters discussed earlier (chapters 3–5), that the levels and dynamics shown at the ward level (macro-level) may well be different from those at the precinct-within-ward level (meso-level). That aside, the ward data still can illustrate temporal dynamics.

Cross-Sectional Connections

The ward-level deviations from the citywide average on the two 1917 votes that were most clearly law related, prohibition and poolroom regulations, were z-scored, averaged, and multiplied by -1 to create an indicator of tolerance of deviance. A higher score meant *less favorable* views about prohibition and *more opposition* to regulating pool rooms (Cronbach's $\alpha = .88$), that is, *higher* tolerance of deviance.

At the ward level ($n = 16$), both 1918 ward socioeconomic status (SES) and 1917 tolerance of deviance correlated as expected with the 1918/1919 delinquency rate. Delinquency was negatively associated with SES (Spearman's $r = -.78$) and positively with tolerance of deviance (Spearman's $r = .59$). Further, tolerance of deviance was lower in higher-SES wards (Spearman's $r = -.68$).

UNEXPECTED CHANGES IN TOLERANCE OF DEVIANCE

McKenzie does not provide data on changes in either SES or delinquency. But the timing of his indicators does permit capturing unexpected changes in tolerance of deviance. In 1918, Columbus voters rendered another verdict on prohibition and considered a law that would ban women working in places where alcohol was sold. A 1918 tolerance-of-deviance index was constructed using these two 1918 votes (Cronbach's $\alpha = .99$) following the same procedure as used for the 1917 index. Index shifts might be reflecting discontinuities in each ward's tolerance of deviance.

As one might expect, there was a tremendously strong correlation between the 1917 and 1918 tolerance-of-deviance scores (Spearman's $r = .979$). Nevertheless, when the 1918 index was regressed on the 1917 index and the residuals retained as indicators of ecological discontinuity, there were some sizable tolerance-of-deviance increases during the year, along with several smaller unexpected decreases.² Concentrating just on the largest unexpected increases in tolerance of deviance, two wards—9, west of the downtown with a low-income population and significant manufacturing, and 12, just north of the downtown and also host to some manufacturing—had 1918 tolerance-of-deviance scores that were about a quarter of a standard deviation higher than they “should” have been given their corresponding 1917 tolerance-of-deviance levels. It appeared, then, that voters in these two wards, compared to voters in other wards, demonstrated sizable upward ecological discontinuity on tolerance of deviance between 1917 and 1918. These two also had moderately high 1918–1919 delinquency rates. A longitudinal version of the tolerance-of-deviance model would suggest that those wards where tolerance of deviance was unexpectedly increasing from 1917 to 1918 may have been the same wards where delinquency prevalence was increasing at a slightly later point in time, perhaps from 1918 to 1919.

At this point, however, it is not possible to advance further using McKenzie's data. He did not provide indicators of changing SES or changing delinquency for these same periods. But using the conceptual framework of his example, we can outline longitudinal models oriented to different

metamodels. The next section examines specific changes, and processes linking changes, in a longitudinal tolerance-of-deviance and delinquency example. It illustrates the types of indicators needed and the types of processes that might be at work. The conceptual kernel of a longitudinal tolerance-of-deviance model is elaborated in three different ways: assuming methodological holism, assuming methodological individualism, and assuming meso-level holism.

Methodological Holism, Temporally Lagged Changes and Impacts

Figure 7.1, presuming it is describing changes at the ward level, represents an example of methodological holism: macro-level changes in SES lead to later macro-level changes in tolerance of deviance, which lead to even later macro-level changes in delinquency prevalence.³ What processes might underlie such connections? Although it is not possible to specify exact periods in which specific changes took place, it is possible to theorize shifts over time and connections between shifts. The challenges associated with specifying periods is taken up later, when the formally elaborated metamodel is introduced.

INPUTS, OUTPUTS, AND LINKS

Ma-IA: SES Change

Given the changes taking place in Columbus socially and economically during the period 1916–1920, it is plausible that significant SES change could have taken place at the ward level within a year. The city was expanding, trolley lines were extending, new middle-class areas in the outer city sections were opening, and in 1917 men joined the army to fight in Europe. In 1919, some of those men came back, and a serious flu pandemic struck. The other changes around prohibition and women's suffrage were noted earlier. The SES *ranks* of some of the older city wards closer to the downtown, that is, their ecological SES niches, may have slipped during specific years within this period, given expanding higher-income neighborhoods in the eastern and northern portions of the city. Conversely, the SES ranks of some outer city wards may have increased as new housing developments went up and streetcar lines reached them.

Ma-IA: Tolerance-of-Deviance Change

These macro-level economic changes at the ward level could have helped create *later* macro-level changes in tolerance of deviance. Socioeconomic

changes in wards suggest large-scale changes in population composition. Perhaps in older wards, near to the downtown and the capitol, house filtering processes resulted in households being replaced by in-moving households of even lower economic status. These in-migrating, lower-income households, compared to the households located there earlier, may have been less supportive of prohibition and more generally tolerant of minor legal infractions generally. Several reasons might be relevant. Perhaps the in-migrating as compared to earlier households were less well treated by police and other government agents. Or perhaps if the in-migrating households had higher proportions of foreign-born members; different cultural views in their country of origin may have linked to different views about alcohol matters.

In this model, the shift in tolerance of deviance occurs later rather than covarying with the SES shift. Once a sufficient number of in-migrating, lower-income households had arrived in the ward, newer residents may have more freely shared their views on social and political matters, leading to broader shifts in views at the community level.

Ma- Δ : Delinquency Change

Shifts in views about laws among adult householders might have been noticed by adolescents in the community. This may have led to shifts in the adolescents' actions and attitudes. The latter may have become manifest as later increases in delinquency. These changes, like the preceding shifts in household composition and tolerance of deviance, presumably took place widely within each affected community.

OPERATIONALIZING UNEXPECTED CHANGES

Figure 7.2 illustrates one way to operationalize sequential unexpected changes for the model just described. If earlier levels of the variable are controlled, what remains are unexpected changes, that is, residual variation. If these are sizable, they suggest ecological discontinuity in the niche held. The version shown assumes that each of the three unexpected changes in the model takes about twelve months to become evident. What this means is that it takes this amount of time for sizable shifts to appear in a substantial number of communities. It further assumes that once a preceding attribute has become manifest, its impact on an attribute placed later in the model surfaces in several communities another twelve months later. All these temporal assumptions may or may not be warranted. The point is simply to sketch how the unexpected changes can be operationalized and then linked. Questions about the "correct" change periods are addressed later.

Controlling for:

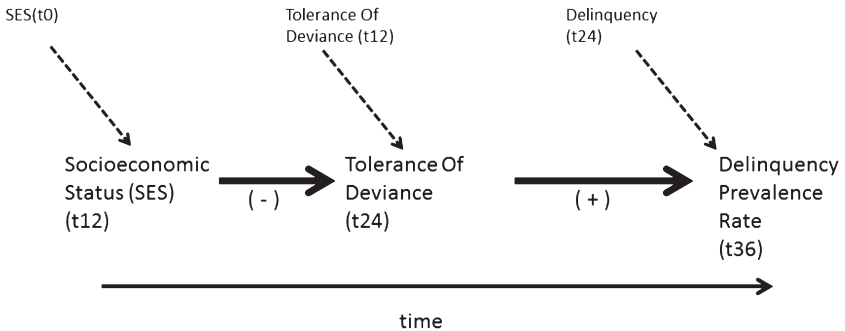


Figure 7.2. Operationalizing unexpected changes in a macro-level tolerance-of-deviance model. Time (t) is in months. Methodological holism is assumed.

Methodological Individualism, Temporally Lagged Changes and Impacts

We can take the same longitudinal model but apply the perspective of methodological individualism. Again, attributes, changes, and rationales linking changes are suggested. Questions about operationalizing shifts and about underlying assumptions follow. Given McKenzie's suggestion, precincts within wards are viewed as a critical intervening meso-level.

INPUTS, OUTPUTS, AND LINKS

Ma-IA: SES Change

As in the previous version, given the changes taking place in Columbus socially and economically during the period 1916–1920, it is assumed that significant SES changes could have taken place at the ward level within a year.

Me-IA: Tolerance-of-Deviance Change

McKenzie suggested that views on local social issues were formed at the small-group level, which for him was the precinct. “Of course the ward is too large a geographical unit to furnish a true picture of the details of local sentiment on these subjects” [492: 788–789]. “In the process of sifting and sorting of populations within a city, there is a tendency for people of similar mores to become grouped together in neighborhood association” [492: 791–792]. If significant changes on tolerance of deviance took place at the ward level within a year, as demonstrated by the earlier comparison of 1917 and 1918 tolerance-of-deviance indices, then some precincts within some wards certainly could have changed substantially during that same period. Significant

changes may have taken place in a matter of a few months in a sizable number of precincts within individual wards. In this model, precincts roughly correspond to spatial zones which may be more socioeconomically and culturally homogeneous than wider wards and which encapsulate important, local, face-to-face interactions between many residents.

Ma- Δ \rightarrow Me- Δ

The link illustrated here represents a modified macro-to-micro link between “specific structural positions . . . and specific individual attitudes, beliefs, and behavior” [444: 293]. Sociologists have vigorously examined such links [444]. The modification is that the views affected are those of small local groups, not individuals.

The relevant context dynamic is that if a ward was declining in relative SES, perhaps in part because of changing residential composition as noted earlier, within that ward, some precincts may have substantially shifted their views toward increased tolerance of deviance. Key local interest groups may have been important. If saloon keepers were powerful interest groups in some of these precincts declining relatively on SES, they may have convinced people that Prohibition would be bad for local business.

Now the question becomes, what happens next? Presuming methodological individualism, micro-level inputs and outputs probably refer to the perceptions, attitudes, sentiments, and behaviors of the adolescents themselves.⁴

Mi- Δ : Perceived Shifts in Adult Supervisory Practices

One possible changing micro-level input would involve adolescents perceiving shifts in adult supervisory practices. Adolescents might perceive shifts toward leniency in any of the following: restrictions on peers with whom they socialize; restrictions on places they may go or the times they may go there; and the willingness of neighbors to express concern about adolescents misbehaving to adult supervisory figures such as parents.

Me- Δ \rightarrow Mi- Δ

Shifts in local groups’ views about supervision, expressed through statements or actual changes in adult supervisory practices, affected individual adolescents’ perceptions of adult supervisory patterns.

Mi- Δ : Increased or Decreased Likelihood of Adolescents Coming to the Attention of Authorities Because of Delinquent Behaviors

The individual-level outcome of this model is changing delinquent behavior resulting in changing delinquency prevalence rates. Since the outcome in

question can be operationalized at the individual level, as well as a range of geographic levels if the data are geocoded, that outcome is captured here at the individual level.

Mi-I Δ \rightarrow Mi-O Δ

Adolescents' perceived shifts in adult supervisory practices resulted in engaging in more or more frequent delinquent behavior and, presumably simultaneously, being labeled delinquent by family court. Of course, there could be lots of additional in-between steps here involving shifts in adolescents' activity patterns: where they spend time away from the home, how much time they spend away from the home, with whom they spend time, their own views about illegal behaviors, and so on. Those additional mediating steps are potentially important but not included in the simplified metamodel here.

Me-O Δ

This is the same delinquency outcome, aggregated to the subward, that is, precinct, level. As noted earlier, McKenzie observed that delinquent density seemed to vary much more markedly at the precinct rather than the ward level. This observation supports the idea of an important in-between level.

Mi-O Δ \rightarrow Me-O Δ

This link simply models statistical aggregation of individual delinquent outcomes into precinct-level delinquency prevalence rates. But there can be associated complexities [81: 56–58]. For example, if the aggregated rates are particularly high, those rates may spawn additional related dynamics, such as increased allocation of charity social workers to high-rate precincts, and this more “intensive supervision” could increase probabilities of “detecting” delinquency. Of course, such spin-off loops would have their own temporal patterning.

Me-O Δ \rightarrow Ma-O Δ

The precinct-level shifts over time in delinquency prevalence rates resulted in ward-level shifts in delinquency prevalence rates. Again, this is just statistical aggregation to larger geographic units. But, again, there could be additional related complexities. For example, elevating precinct-level delinquency rates within a ward may have resulted in court and charity personnel “defining deviance down” in those wards, changing the threshold for delinquency. Given class-linked goals of public agents concerned with delinquency at the time, such a shift in views seems plausible [655].

For both of these last two links, additional related-but-not-metamodelled

dynamics seem plausible even though both of these links represent simple statistical aggregation over larger units—individuals to precincts to wards. Regrettably, however, theoretical guidance on how these potential dynamics might spin off is lacking.

Overall, methodological individualism, even with a model as simple as the one shown here, presents numerous timing questions. Those questions will be detailed in a later section, where the complete dynamic metamodel is specified.

Meso-Level Holism, Temporally Lagged Changes and Impacts

An alternative conceptual approach to the tolerance-of-deviance and delinquency example can be grounded in meso-level holism. The appropriate meso-level spatial unit might be precincts within wards, as has been assumed so far. Alternatively, it might be a more restricted spatial unit such as a streetblock (aka street segment). McKenzie's comment about spatial clustering of delinquent households within streetblocks, his observation of ethnic clustering by streetblock, and Burt's comments about high-deviance streetblocks in one outer-city section of London would support such a choice for this particular study context. Scholars of London in a somewhat earlier period have similarly suggested distinctive organization of residential groups by street [215]. If the perspective of meso-level holism is adopted, spatial unit choice is theoretically crucial.

A current research example appears in the longitudinal study of streetblocks in Seattle conducted by David Weisburd, Liz Groff, and Sue-Ming Yang. Their work suggests crime dynamics operating at this level that were relatively independent of broader community context: "We do not find evidence suggesting that the processes explaining crime patterns at street segments come primarily from higher geographic influences such as communities" [795: 173]. This emphasis on the relative independence of dynamics at the meso-level is what differentiates meso-level holism from a contextual model that anticipates impacts of the broader surround on the meso-level unit.

INPUTS, OUTPUTS, AND LINKS

Me-IA

Relevant meso-level changes (e.g., streetblock-level or precinct-within-ward changes) and the relevant change period will depend on the theory in question. For example, in the Seattle streetblock study, researchers examined impacts of yearly changes in demographic structure, land use patterns, truancy, and voting patterns [795].

Turning back to McKenzie's delinquency model, as a meso-level input, the researcher might model the same shifts in tolerance of deviance discussed in the two earlier metamodels. But the difference here might be that the researcher assumes that these shifts at the precinct level emerge for reasons that are independent of the socioeconomic changes in the broader surrounding region of the ward. The timing of the shift is addressed in the next section.

Me-O Δ

Relevant meso-level outcomes and the length of the period in which the change will appear depend, again, on the specific model. For example, Weisburd and colleagues typed street segments on the basis of how their crime levels changed over a fifteen-year period and used the specific type, captured over the entire period, as the outcome of interest [795].

Turning back to McKenzie's delinquency model, the meso-level output might be changes in delinquency prevalence or incidence at the precinct (subward) level. The timing of the change is addressed further later in this chapter.

Me-I Δ \rightarrow Me-O Δ

An unexpected predictor change at the meso-level, however defined, leads to an unexpected outcome change at that same level. In McKenzie's example, changes in tolerance of deviance at the precinct level over several months perhaps led to changes in delinquency prevalence rates. Note, as was seen with a perspective of methodological holism, that there are three time horizon questions. How long will it take for significant shifts to appear on a significant number of the spatial units' input scores? How long will it take for the same shifts on the outcome side? And how long will it take for the entire dynamic to cycle, that is, for changing inputs to set processes in motion which lead to changing outputs? Clearly, the time answers to these different questions will be linked to one another. Of course, if there is a mediating model with an intervening dynamic, then more time horizons are involved.

Interfacing Metatheory and Analysis

Now that examples of each type of temporally elaborated metamodel have been introduced, this section provides a general-purpose, temporally elaborated metamodel for each conceptual perspective. Realistic analytic possibilities likely to generate theoretical insights are outlined for each metamodel type.

Controlling for:

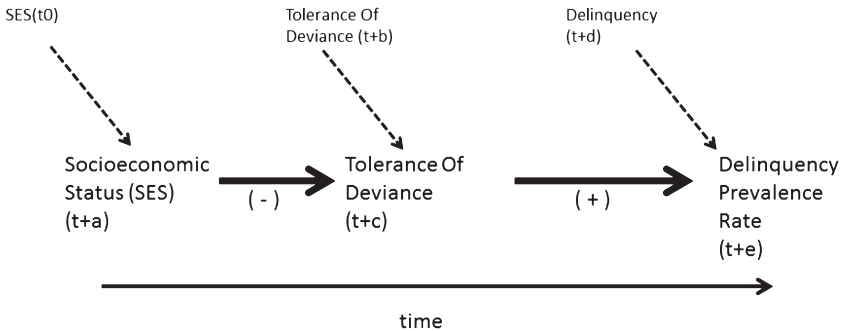


Figure 7.3. Operationalizing unexpected changes in a macro-level tolerance-of-deviance model. Time (t) is in months. Methodological holism is assumed. a, b, c, d, and e represent varying numbers of additional months.

Methodological Holism

THE TEMPORALLY ELABORATED METAMODEL

Figure 7.3 takes the macro-level delinquency model in the preceding figure and assumes that the time horizons for the different changes, and for the connections between changes, are not known. More generally, this is an example of how structural changes take place over time, leading to later cultural changes over time, leading to even later changes in a macro-level behavioral outcome.⁵ In the McKenzie example, macro-level units would be the sixteen wards in Columbus.

The unknown time horizons include the following:

- $t=0 \Rightarrow (t+a)$: the period in which a significant number of wards experience marked ecological discontinuity in socioeconomic status
- $(t+b) \Rightarrow (t+c)$: the period in which a significant number of wards experience marked ecological discontinuity in tolerance of deviance
- $(t+d) \Rightarrow (t+e)$: the period in which a significant number of wards experience marked ecological discontinuity in delinquency prevalence
- $(t+a) \Rightarrow (t+c)$: the period in which earlier ecological discontinuity in SES affects later ecological discontinuity in tolerance of deviance
- $(t+c) \Rightarrow (t+e)$: the period in which earlier ecological discontinuity in tolerance of deviance affects later ecological discontinuity in delinquency rates

The researcher would want to have in mind, based on both relevant theory and his or her understanding of local context, the expected temporal

duration for each of these five periods *before* beginning data collection. For example, can the researcher estimate, given relevant theory and local knowledge, about how much time needs to elapse ($t=0 \Rightarrow t+a$) before a significant number of precincts experience significant niche redefinition on SES? If the researcher does have well-grounded expectations for the durations of each of the five different periods listed and has sufficient resources and institutional cooperation, he or she can structure the research design accordingly, timing data collection to align with the estimated time horizons.

REALISTIC ANALYTIC POSSIBILITIES

Presuming Temporally Flexible Data

Regrettably, the researcher often may lack sound theoretically based and contextually relevant estimates for some or all of the five change periods. Lacking specific theoretical guidance, the researcher, if willing to use a grounded theorizing approach, still may have some flexibility. Databases accumulating information on a rolling basis might provide both structural and outcome indicators. For example, SES indicators may derive from individual transaction-based house sale prices, and arrest dates for delinquents may be available. If the researcher also has temporally flexible data for a mediating variable, then he or she can explore different timings, both for accumulating changes and for connecting different changes. In short, the researcher can start estimating connections and changes using different timings.

But the researcher is likely to encounter many situations which lack not only temporally flexible data indicators for all key elements of his or her model but also clear theoretical guidance about timing issues. In these instances, regardless of the structure of the macro-level metamodel, a crime regimes approach may prove helpful.

Crime Regimes

Richard Berk and John McDonald's recently proposed idea of crime regimes takes a well-known multivariate technique and applies it to a new problem: describing the shifts over time in crime for an entire *system* of community units [53].

The researchers begin with Q mode principal components analysis. This is different from the typical R mode principal components analysis in which cases (individuals, cities, countries) constitute the rows and different attributes (variables) appear in different columns. The typical R mode analysis generates components reducing the correlations between the attributes to a small number of (preferably orthogonal) linear composites. Principal

components scores for the cases describe the position of each case on each linear composite.

A Q mode analysis reverses the matrix. Now cases are the columns and variables are the rows. Loadings of the cases on the different generated linear composites represent the relationships between the cases (columns). Clusters of cases result. This technique has been widely used in a range of natural and social sciences; examples include grouping people by geographic preferences, characterizing relationships between world cities, and gauging inter-perceiver agreement in judgments about a range of high-density situations [283, 715, 716].

Berk and McDonald's contribution placed crime features at the city section level as the columns and periods as the rows. In their Los Angeles example, the city was divided into nineteen police sections, the time periods were weeks, and for each section two attributes—violent crime counts and lethality—were the time-varying (row-varying) attributes of city sections. The crime-weeks—*aggregated across city sections*—received principal components scores. The authors scatterplotted the two sets of principal components scores for the two resulting components (linear composites) “in variable, not geographic space” [53: 979].

When a crime regime is relatively stable for a period, the temporally adjacent principal components scores will cluster. When there is a shift to a different regime, a new cluster will form. In Berk and McDonald's example, the clusters were clusters of *weeks*, and Berk and McDonald called them “realized crime regimes.” They observed three temporal clusters over eight years of violent-crime data. For example, a period of moderately high violence and moderate lethality was followed by a later period of even higher violence but also markedly lower lethality. (See regions 1 and 2 in their figure 7 [53: 993]). The changing clusters indicated changing citywide patterns in crime attributes. Their analysis explored the temporally dependent relationship between violent crime volume and lethality.

The crime regime approach opens up a number of possibilities described by the authors. For example, if two adjacent cities have similarly realized crime regimes for a period followed by different crime regimes at a later period, what could be responsible for the divergence? Can citywide policing changes be reflected in shifting crime regimes?

More broadly, the approach seeks to capture what is happening in a variable rather than geographic space across time for an entire *system* of spatial units across a municipality. Further, the approach points out critical periods when that entire system may be shifting its crime patterns, thereby

encouraging the researcher to explore exactly what changes were taking place during that transition.

Translating back to the McKenzie example, an approach such as this could be used to pinpoint pivotal periods when delinquency dynamics were shifting. Monthly delinquency counts, monthly truancy counts, and monthly counts of new households being recognized as charity cases, for each ward of the city, could be the columns, and different months or yearly quarters could be the rows. Shifts in the clustering of principal components scores in a principal components space would indicate shifting delinquency regimes. The researcher could then investigate specifically what was happening in different wards of the city during those critical periods when delinquency regimes were shifting. Such an approach would isolate critical periods when macro-level dynamics shifted.

The focus of the regimes idea is on how an entire system of communities changes its crime or delinquency patterns over time. It does not identify what specific internal dynamics might be driving regime shifts. But it does focus attention on specific periods; the researcher can then intensively study those periods of regime change to identify potentially responsible dynamics.

The crime regimes idea treats unexpected ecological change differently than the Hawley/Bursik frame. It does not separate ecological discontinuity from ongoing ecological continuity for each attribute of interest for each macro-level community unit. As such, it does not conform to the metamodel for methodological holism. Instead, it looks at the entire *region* or ecosystem within which the macro units are embedded and pinpoints critical periods when the entire ecosystem was in flux.

To be clear, the crime regimes approach does not “solve” the time questions associated with methodological holism. Instead, it reframes those questions, encouraging the researcher to unpack what changes were happening and why in specific, highlighted change periods. Rather than trying to describe specific amounts of ecological discontinuity (ecological niche redefinition) for specific macro-level spatial units, it is trying to isolate periods when shifts across an entire system of communities were taking place. The researcher can then look more closely at those isolated periods to learn which, if any, communities within the ecosystem were simultaneously experiencing significant ecological niche redefinition.

Methodological Individualism

THE TEMPORALLY ELABORATED METAMODEL

The temporally elaborated boat metamodel is most complex when the researcher embraces some version of methodological individualism. The relevant time horizons for such a model appear in figure 7.4. The dashed arrows show the earlier attribute scores that are controlled, as in figure 7.3. So the top left of the figure is depicting unexpected changes in macro-level input evident at time $t+a$, after controlling for scores on that attribute at time $t-o$. Stated differently, the changes appeared between the time $t-o$ and $t+a$

The first type of time horizon question is simply how much time must elapse for significant ecological discontinuity to become manifest for a significant number of spatial units at different spatial scales ($t-o \Rightarrow t+a$; $t+b \Rightarrow t+c$; $t+h \Rightarrow t+j$; $t+k \Rightarrow t+l$). It seems plausible that lower-level units can change more rapidly than larger units [4]. This provides some minimal guidance about the differences between some of these time horizons. At the lowest level there are psychological changes affecting individuals on the input side (appearing between $t+d$ and $t+e$) and on the output side (appearing between $t+f$ and $t+g$).

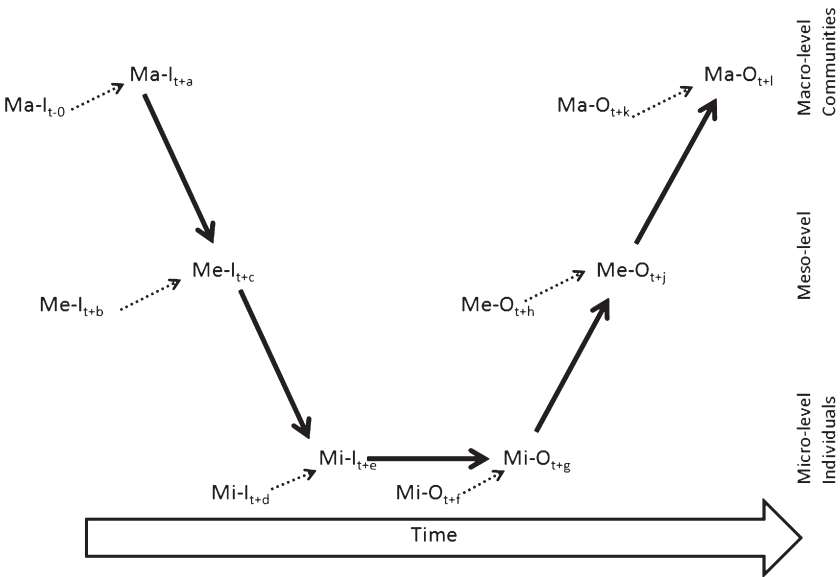


Figure 7.4. Operationalizing unexpected changes in a multilevel tolerance-of-deviance model assuming methodological individualism. Time (t) is in months. a, b, c, d, e, f, g, h, j, k, and l represent varying numbers of additional months.

The second type of time horizon question is, how long does it take for one change to affect another change at another level in the metamodel? On the left side of the metamodel, at issue is how long it takes for contextual impacts to be demonstrated. These are macro-level changes affecting later meso-level changes. The connection between the two periods, with earlier changes affecting later changes, is

$$(t-o - t+a) \rightarrow (t+b - t+c)$$

This suggests that macro-level changes on a chosen attribute taking place between $t-o$ and $t+a$ shape the volume and direction of meso-level changes on an attribute taking place between $(t+b)$ and $(t+c)$ for a smaller spatial community unit.

And there are meso-level changes affecting later micro-level changes. The connection between the two periods, with earlier changes affecting later changes, is

$$(t+b - t+c) \rightarrow (t+d - t+e)$$

On the right side of the metamodel, the horizon questions depend on whether the indicators at higher levels represent statistically aggregated versions of indicators at lower levels or something different at each level. If the micro-to-meso-to-macro output dynamics involve statistical aggregation only, then the indicators at each level are being aggregated over the same period. So the relationship between periods is

$$(t+f - t+g) = (t+h - t+j) = (t+k - t+l)$$

There is by definition a unity of time horizons question.

But in some models, the meso- or macro-level outcomes might not be simple statistical aggregations of lower-level outcomes. In these instances, how long it takes for a change at a lower level to affect a change at a higher level becomes an open question.

REALISTIC ANALYTIC POSSIBILITIES

Two limitations arise when translating a dynamic metamodel aligned with methodological individualism, such as depicted in figure 7.4, into empirical models. The first problem is the lack of theoretical guidance. Recent formulations of major communities and crime theories reveal few clues to help answer these time horizon questions. The second problem is likely data limitations. Even if clear theoretical guidance were available on these various time horizon questions, to empirically support the theory and test its temporal, spatial, and spatiotemporal assumptions, the researcher would need

all the theory-referenced indicators to be available in temporally continuous and geographically scalable form. Some indicators might be in this form, for example, geocoded calls for service with attached dates. But if even only *one* theoretically referenced indicator is not available in such a flexible format, the researcher is stuck. He or she cannot empirically investigate different change periods for different indicators and different timings to connect change periods in various ways. Many communities and crime models reference attitudes, behaviors, and sentiments, which are unlikely to be available in a temporally continuous and geographically scalable form. Sampson's collective efficacy models are a case in point [638]. Researchers cannot continuously collect sample survey data. What, then, are the best options?

Agent-based simulation models (ABMs) are recommended. Simulations have been applied to a wide range of social science and natural science issues [52, 167, 462]. Numerous applications in crime, criminology, crime prevention, and criminal justice have been found for simulations [23, 59, 206, 207, 218, 294, 354, 601, 752, 779, 846]. When the focus is on crime rather than criminal justice, ABMs are part of a broader simulation effort called computational criminology. Researchers in environmental criminology have been particularly active in this arena and have combined ABM approaches with GIS [93, 100, 101, 102, 267].

Researchers in both computational criminology and ABMs are developing and testing an increasingly complex array of varied ABMs [446]. The fast pace of and variations in model development prohibits even a rough outline of these efforts. At the most general level, in computational criminology that is agent based, agents are placed in a real-world-based street network, different locations in the network have different attributes, agents move through the simulated space over time and decide how to behave, and crime patterns emerge. Of course, simulations also can be carried out that do not have individual behaving agents but rather model events in time and space [602].

For our purposes here, geographically based ABMs prove particularly useful for three reasons. First, they align *theoretically* with the Boudon-Coleman variant of methodological individualism described here. Individuals are affected by context, process those impacts, and behave, their behavior in turn affecting the surround. Second, such simulations can address both the temporal scaling concerns described here and the spatial scaling concerns described earlier. Indeed, simulation work already has done this to some extent [294, 295, 296, 297, 299]. That earlier work, however, has not systematically addressed, from the perspective of methodological individualism, the temporal and spatial scaling questions raised in this volume. Third, such a systematic exploration could lead to a positive outcome. It could further

important theoretical developments in community criminology, especially about how cross-level connections work, both on the input and output sides. Short and Wikstrom and others have argued that clarifying these cross-level connections is crucial for further theoretical development in criminology [676, 813]. Figuring out these cross-level connections requires sorting out the temporal issues described here and the spatial issues described in earlier chapters. Agent-based simulations provide a systematic way to do this.

To help the reader get just a little closer to how these simulations work, consider the following simulation developed for robbery [294].⁶ Combining ABM and GIS approaches, Elizabeth Groff placed agents on the Seattle street network and moved them from street intersection to street intersection. A certain proportion of agents were inclined to offend, and those agents evaluated specific factors at intersections when deciding to offend. The choices of relevant parameters, and the values for parameters, were guided by both routine activity theory and rational-offender-based frameworks. The simulation systematically varied the amount of time agents spent away from home to see if theoretically expected impacts on robbery rates and patterns would emerge. They did.

Before leaving methodological individualism and simulations, two final points bear mentioning. First, simulations are not only complex themselves; determining the criterion validity of simulations, their ability to match real-world patterns, is similarly challenging [51]. Second, simulations which are both agent based and georeferenced do permit the examination of ecological discontinuity in the Hawley/Bursik sense. For example, if individual robberies or burglaries are being modeled, the researcher can divide the street network into spatial units corresponding to neighborhoods, pick two periods, calculate the crime rate in each spatial unit for each period, regress the later rate on the earlier rate, and retain the residuals to capture unexpected change. Such simulations become especially useful when the researcher focuses on spatial units changing dramatically between the two periods. Those changes can be traced back to individual events in the locales. The researcher might be able to unpack the cross-level dynamics leading to these shifts. Such investigation could be most illuminating.

Meso-Level Holism

THE TEMPORALLY ELABORATED METAMODEL

Metamodels aligned with meso-level holism often treat crime changes as an outcome rather than a predictor. Empirical work on hot spots, hot spot policing, and streetblock crime changes over time are cases in point [83, 84,

436, 615, 670, 792, 795, 796, 798, 799]. There are two key ideas in these models. (a) Conditions or changes in the conditions of these meso-level units affect crime in those same units. (b) Although there are dependencies, crime dynamics at the meso-level are substantially independent of what is happening at the more macro, community level [795: 173]. Within a single neighborhood, significant variation in, for example, streetblock crime changes may be found. If the meso-level unit is a free-standing sociobehavioral unit—which it might or might not be depending on a number of factors—such a view about the relative independence of meso-level dynamics aligns with micro-ecological principles [721].

The meso-level can be an important spatial unit from a practical perspective. Small-scale hot spots and somewhat comparable units such as streetblocks have been favored by policymakers because research has shown that police interventions taking place at these units can be effective for a time [687]. Policies focusing on hot spot or streetblock changes take a “small wins” approach, which has many advantages [789].

A temporally elaborated boat metamodel reflecting meso-level holism appears in figure 7.5. The model shown is a single-step model, in which a predictor leads to an outcome. A comparable mediated model is not shown but would be conceptually similar. Dynamics and attributes not of interest to this metamodel are gray, and dynamics and attributes of interest are in black. Community and individual dynamics, and how they connect to the meso-level dynamics, are outside the researcher’s scope of interest.

The change periods of interest on the input ($t+b - t+c$) and output sides ($t+h - t+j$) were described earlier when reviewing the temporally elaborated boat metamodel aligned with methodological individualism. What has been added here is a causal dynamic, taking place at the meso-level, linking changing causes with changing outcomes.

The additional time horizon question introduced here involves linking time change periods:

$$(t+b - t+c) \rightarrow (t+h - t+j)$$

Possible undergirding dynamics for a meso-level unit such as a streetblock, perhaps involving small-group, face-to-face interpersonal dynamics, have been outlined elsewhere [718: 166–196; 721].

How long will it take before a change in meso-level conditions affects a change in meso-level crime levels? The answer will probably depend on the condition that is changing, the broader context within which the meso-level unit is nested, the type of crime in question, and the responsible underlying dynamics. For example, a streetblock that has been the site of high-volume

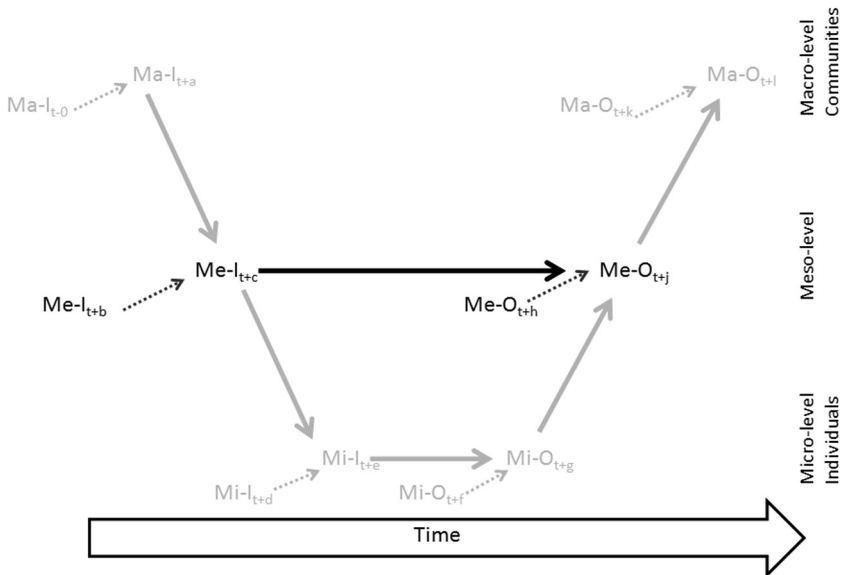


Figure 7.5. Temporally elaborated metamodel aligning with meso-level holism. Grayed-out model portions are not of theoretical interest.

drug sales is likely to shift in a matter of minutes if the changed condition involves the presence of police patrol officers [403]. By contrast, increasing numbers of vacant houses on a streetblock might not lead to increased outdoor drug sales on a streetblock until weeks, months, or even years have gone by [597]. Nevertheless, the answer to the question of how long this process takes to cycle is theoretically pivotal. More specifically, the amount of time it takes for one change of sizable magnitude, taking place in a large number of units, to affect a later change of sizable magnitude, in a large number of units, creates temporal boundaries for the underlying dynamics. Those boundaries may make some dynamics more plausible and others less plausible.

REALISTIC ANALYTIC POSSIBILITIES

Two widely known analytic approaches apply to metamodels aligned with meso-level holism: trajectory models and hierarchical repeated measures models. Each analytic approach has its own complexities and controversies. Each also reframes the question of how to identify ecological niche redefinition. The following material simply outlines the advantages and disadvantages of each as it applies to the temporal scaling concerns of this chapter.

Trajectory Models

Trajectory models, also called group-based trajectory models (GBT), semi-parametric group-based modeling (SPGM), nonparametric maximum likelihood estimators, and semiparametric mixed Poisson regression models, were adapted by criminologists from econometric models for duration data [335]. Initially, criminologists used the models to specify and differentiate criminal careers [418, 529].⁷ Offenders whose patterns of offending were similar over time were said to be following the same offending trajectory over time. The analysis groups offenders by trajectory [528]. The existence of different trajectories might support the idea of different types of criminal careers or the idea of career criminals.

This computational approach to capturing changes over time and generating groups based on those changes has proven as controversial as the concepts of criminal careers and career criminals [86, 280, 281, 289, 461]. One of the biggest points of controversy has been the question of how one interprets the resulting groups. Do the different trajectories represent statistical artifacts or conceptually meaningful groupings [289; 290; 291; 426: 109–114; 681]? Such doubts about how to view the resulting trajectories deepens when groupings can be constructed from random data or when group membership in different trajectories based on actual data sets cannot be predicted using theoretically relevant predictors. Bobby Brame and colleagues suggest that the meaning of the resulting trajectories can be addressed only in a specified theoretical context [86].

Career and trajectory ideas have diffused throughout community criminology. In the mid-1980s, the late Al Reiss proposed that communities had crime careers [591]. In a series of recent publications, Weisburd, Groff, and colleagues have used trajectory models to capture what could be interpreted as the criminal careers of Seattle streetblocks [303, 304, 794, 795, 799].⁸

To obtain these patterns, Weisburd, Groff, and Yang allocated crime incident reports from 1989 to 2004 to streetblocks after dropping reports geocoded to intersections or police buildings. Streetblocks were then grouped into one of twenty-two different trajectories based on similarities in how crime changed over time. These twenty-two trajectories were then placed into “eight developmental ‘patterns’” [795: 56]. Analyses showed that crime was spatially concentrated in certain patterns; membership in certain patterns was linked to locational risk factors; and, for some patterns, same-pattern streetblocks were likely to be found close to one another. These are all important and worthwhile findings; doubtless many more noteworthy findings will come from this study and others like it. Trajectory analyses provide

one way to operationalize a communities and crime metamodel embracing meso-level holism and focusing on temporal changes.

Given the focus of this chapter, however, the question arises: does a trajectory analysis help researchers address the specific temporal scaling questions linked to meso-level holism? If crime is an outcome in such a model, does this approach help specify the time horizon for the predictor change, the time horizon for the crime change, or the length of time for the predictor change to substantially affect the crime change in a large number of meso-level units? The latter question basically asks, how long does it take for the theorized process to cycle? The trajectories approach does not help much with such specification issues.

The reason that the trajectory approach *as typically applied* is not helpful for these specific metatheoretical questions is because it is intended for something else. It seeks to find an optimal number of groups based on the patterning of changes over time on the outcome variable of interest. Such an approach reframes three of the time questions considered here.

a. The question about time horizons for outcome variables disappears. An ecological trajectory model asks, given changing outcome scores over a period, what grouping of spatial units into similarly changing trajectories best describes the different types of changes nested within the overall changes? The question of how long it takes for a significant number of (meso- or macro-) units to demonstrate significant change on the outcome is not investigated. Rather, that question already has been answered by the researcher, given the examination period selected for observing changing outcomes. By selecting x many days, weeks, months, or years over which the outcome is observed, the researcher implicitly assumes that some sizable number of units have changed markedly over that time frame.

b. The question of how long it takes for a theoretical process to cycle, for a changing predictor to affect a later changing outcome, is not typically investigated. Instead, differences in the outcome pattern over time, revealed over a substantial period, are linked to static or changing predictors. Although there are steps an investigator could take to answer the cycling question by systematically altering the size of the outcome period and the temporal relationships between predictors and the outcome period, this is typically not done with trajectory analysis.

c. Conceptually, trajectory models frame change in a very different way. In the Hawley/Bursik frame, unexpected changes, if sizable, capture ecological discontinuity and ecological niche redefinition; such shifts are usually operationalized so they are independent of ongoing ecological continuity. In a trajectory model, however, continuity and unexpected change elements are

not separated out for each spatial unit. Consequently, the notion of ecological discontinuity (operationalized as unexpected change) does not apply.⁹

The Hawley/Bursik approach assumes that communities within a larger spatial unit such as a city constitute an ecosystem or a substantial fraction of an ecosystem. In this view, on an attribute of interest the position of each community *relative* to the entire set of communities is important. In contrast, a trajectory analysis of something like streetblock crime over years within a city seems to take away the broader idea of a shared ecosystem experienced by spatial units following different trajectories. There are simply different groups of streetblocks moving in different ways over time. If the shared ecosystem is no longer relevant, then ecological discontinuity reflecting ecological niche redefinition no longer makes sense. Ongoing ecological functional continuity does not make sense either. An ecological trajectory analysis of course can investigate lots of ecological and geographic factors. But a larger containing ecosystem is no longer necessarily assumed.

Suggesting that trajectory analysis as typically applied reframes these three conceptual communities and crime time matters is not meant as a criticism of applying trajectory analysis to community crime patterns over time. Rather, these points are intended merely to clarify how a trajectory approach thinks about time and ecology in ways that are different from the Hawley/Bursik approach used in this volume.

Individual Differences and Time: Extrapolating Raudenbush's View to Ecological Units and Time Matters

An alternative approach to addressing the temporal scaling questions under consideration is feasible. It builds on Stephen Raudenbush's point that models of individual longitudinal development can permit each individual to interact in a unique way with time [584]. This idea is an assumption behind a different type of analysis that has been applied extensively to individuals. As with trajectory models, this approach too has different names and different forms: for example, growth curve modeling or the multilevel / hierarchical / mixed models approaches to repeated measures data [150, 213, 586, 609].

In some circumstances, Raudenbush's premise seems appropriate for meso- or macro-level ecological units. Indeed, some studies with crime outcomes have done just this, allowing each community to interact with time in its own way. Work on temperature changes and robbery changes is just one case in point [695]. As will be explained shortly, if an analysis based on Raudenbush's premise is organized in a particular way, the time horizon and cycling questions posed earlier can be addressed.

Within this framework, researchers use one of two broad analytic approaches. One treats time as continuous. This involves estimating some combination of fixed and random parameters associated with linear, quadratic, or cubic temporal trends for a longitudinal data set [360: 104–106]. If the slopes of these parameters are allowed to vary across individual units—that is, some units can change more quickly than others over the data period or in a different direction—then the researcher can model how each unit changes over the entire period on the outcome. Each micro-level unit can interact with time in its own way. This approach does not assume underlying or latent groups within the longitudinal outcome data [584].

That predicted pathway is built for each unit from the parameter values for each temporal component and the corresponding intercept for each unit. For example, the linear fixed effect captures the average overall rate of increase or decrease for the period examined. The linear random effect captures each unit's departure from the average linear trend over time. Quadratic components capture whether a rate of change accelerated or decelerated at some point in the period. A b -weight is generated for the average linear trend and a departure from that b -weight for each unit. The quadratic components use time^2 as their predictor. Again, there is an average fixed effect describing the general curvilinear trend and random effects reflecting departures from that general trend. Cubic parameters reflect departures from linear and quadratic trends, capturing a shift in the rate of change, and use time^3 as their predictor. More simplistically, the quadratic component allows for one “bend” from a straight line in the predicted outcome trend over time, and the cubic component allows for a second “bend.”

For each spatial unit, applying the different fixed effect and random effect parameters resulting from the analysis generates a predicted pathway over time for each spatial unit on the outcome score. This information answers a number of questions. For example, which specific meso-level units had an average linear increase or decrease over the period which differed most from the average linear increase or decrease for all the streetblocks?

The individual growth curve approach can align with the Hawley/Bur-sik distinction between ongoing ecological continuity and discontinuity. Consider the following growth curve model of a crime outcome for a large number of meso-level spatial units. A researcher determines that both a fixed and random linear effect of time merit entry in the model predicting crime changes over time. In other words, there is an average linear trend and significant meso-unit-level departures from the average linear trend. Spatial units whose predicted linear rate of change is closely comparable to the average predicted linear rate are demonstrating ongoing ecological

continuity. Relative to other meso-level units, they are not getting either safer or more dangerous. Their ecological niches on this crime attribute are *not* getting redefined during the period. If the model does a good job predicting observed crime-rate changes, and there are few sizable residuals, geographic units conforming roughly to that average predicted rate of change will roughly maintain their relative ecological position on the crime outcome. By contrast, if a spatial unit's predicted linear rate of change differs markedly from the average linear rate of change, then that unit's relative outcome score will shift between the beginning and end of the outcome period. It will be in a different position in the crime ordering on that outcome. It will have demonstrated sizable ecological discontinuity during the outcome period, that is, ecological niche redefinition.

But there is a limitation to the growth curve approach to modeling crime change. Although the approach allows each unit to chart its own trajectory over time, it builds the model of that trajectory on the basis of the entire period under investigation. It does not allow an individual unit to have different values on a trend component for different subperiods within that overall period. In the case of a linear predicted trend with both random and fixed effects contributing to such a trend, there is just one average value for the trend component and one predicted individual value for each spatial unit. This may not suit the researcher's purposes. There are ways the researcher can isolate a particular period during which significant changes on the outcome scores of the meso-level units were likely to take place by conducting a hierarchical segmented or spline regression [548, 691]. In both approaches, time is separated into distinct pieces or epochs, with each epoch beginning and ending at a node.¹⁰

Metamodels and Spatiotemporal Interaction

Considering temporal scaling separate from spatial scaling is an artificial distinction, as Hawley's quote in this chapter's epigraph notes. Every crime occurs in a specific time at a specific place. Developing the two scaling issues separately permitted clear specification of the conceptual and associated analytic issues relevant to each domain. Hopefully, future metatheoretical examinations in community criminology will put that artificial boundary aside and carefully consider spatiotemporal aspects of community crime patterns.

Future theoretical and metatheoretical work in community criminology has a solid base on which to build. Much is already known about spatiotemporal patterning of crime. Work has documented how that patterning shapes various crimes [379, 579]. Conceptual work has begun linking spatiotemporal

behavioral geography tools to offender movement frameworks [581, 600]. These tools have recently become quite sophisticated, as the aforementioned work on computational criminology highlights [849]. Work on acquiring, analyzing, and conceptually organizing necessary community-level indicators affecting spatiotemporal patterns and accessibility also has progressed [302, 313, 314].

Theoretical hurdles present challenges to understanding spatiotemporal interaction. How do the specific ecological theories we employ address such interactions? Do the theories need additional elaboration? It is not unusual to find that parameters revealed by sophisticated statistical models and the implied dynamics sometimes outrun the very theoretical models being used [728]. There also are metatheoretical hurdles. How do we organize the tools we use to think about such theoretical matters? What types of approaches to metamodeling will work in clarifying the differences between model assumptions? How do we think simultaneously about temporal and spatial scaling? These and other important challenges merit future consideration from the scholars in the area.

Closing Comment

This chapter has pointed out similarities between conceptual concerns about aggregating and disaggregating data spatially and temporally. Temporal conceptual issues, especially questions about time horizons and unity of time horizons, have been under-theorized in community criminology. The boat metamodel can be elaborated into a dynamic model, one that takes change into account in a way that aligns with the broader ecological insights of Hawley and Bursik. A dynamic metamodel can be formulated in different ways so that it aligns with the researcher's conceptual worldview. Metamodels aligning with methodological holism, methodological individualism, and meso-level holism have been illustrated. Specific analytic approaches congruent with these different conceptual worldviews have been sketched. Future work on spatial and temporal scaling hopefully will build toward a more integrative metamodel capturing spatiotemporal crime dynamics.

Ecological Indicators

Model Comparisons and Establishing Meaning

Construct validation takes place when an investigator believes that his instrument reflects a particular construct, to which are attached certain meanings. The proposed interpretation generates specific testable hypotheses, which are a means of confirming or disconfirming the claim.

—Lee Cronbach and Paul Meehl (1955)

In construct validation the [variable] score is not equated with the construct it attempts to tap, nor is it considered to define the construct, as in strict operationism. . . . Rather, the measure is viewed as just one of an extensible set of indicators of the construct. Convergent empirical relationships reflecting communality among such indicators are taken to imply the operation of the construct to the degree that discriminant evidence discounts the intrusion of alternative constructs as plausible rival hypotheses.

—Samuel Messick (1995)

Construct validity is established through a long-continued interplay between observation, reasoning, and imagination.

—Lee Cronbach (1970)

Instead of probing a single specific model using only measures from that model, it seems preferable to us to pit different models against each other, including models predicated on other process variables highly correlated with, but conceptually distinct from, those in the neighborhood effects theory under test.

—Tom Cook et al. (1997)

The Concerns


Background: Comparing Mediating Models

In everyday life, we are always making comparisons to determine which option is better.¹ In my own case, although this may be a residue of my short

career driving for a messenger service decades ago, I usually consider anticipated travel volume and the number of stop lights when traveling locally and deciding whether to take route A or B to get to my destination. You may have evaluated two or more wireless phone plans recently to decide which was preferable, making a detailed comparison of data charges, coverage, phone features, and other contract elements. Community criminologists similarly make comparisons. Take the case of a community criminologist considering some ecological theories of delinquency changes which are mediating models. The longitudinal tolerance-of-deviance model discussed in the previous chapter is a case in point. Time advances from left to right and Δ represents changes.

$$\text{SES } \Delta \rightarrow \text{Tolerance of deviance } \Delta \rightarrow \text{Delinquency } \Delta \quad (\text{A})$$


A variation on such a model would make it a partially rather than wholly mediated model.



$$\text{SES } \Delta \rightarrow \text{Tolerance of deviance } \Delta \rightarrow \text{Delinquency } \Delta \quad (\text{B})$$

If applied to McKenzie's Columbus setting, the model now allows that changes in macro- or meso-level SES of a (respectively) ward or precinct has an independent effect on delinquency changes, separate from the effects of SES channeled through changes in tolerance of deviance.

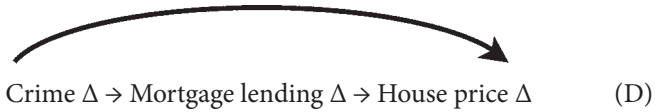
An ecological researcher might wonder whether a dynamic tolerance-of-deviance model predicting delinquency changes does better than a model positing changing collective efficacy as the crucial mediator [638, 645]. The alternative model might be of the form



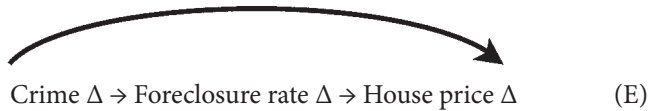
$$\text{SES } \Delta \rightarrow \text{Collective efficacy } \Delta \rightarrow \text{Delinquency } \Delta \quad (\text{C})$$

Macro- or meso-level mediating ecological models in which crime or crime changes serve as inputs and community structural changes as outputs are of the same form, except that the positions of crime and structure are reversed. An example would be the impact of crime on house prices [720, 748]. If there is such a causal relationship, mediating dynamics involving foreclosure rates or mortgage lending practices or other aspects of market dynamics might be relevant [43, 398, 510, 767, 830]. Here, too, comparisons are of interest. Again, assuming a fully longitudinal model, the researcher might be

interested in a model with mortgage lending practices as the crucial mediating dynamic:



Perhaps the researcher wants to see how well that model performs relative to a model positing shifts in foreclosure rates as the key mediating dynamic:



Such comparative testing is important. Finding empirical support for one theory does not necessarily promote that one over and above another theory, absent a test of the latter [566]. Blalock framed the issue as follows:

Tests of theories . . . will involve empirical tests of the derived theorems. Clearly if the theorems prove false the theory must be modified or the axioms of the theory even abandoned. But if they are true, one cannot claim that the theory has been “verified” unless all possible competing alternatives can be rejected. . . . Therefore we shall be in the unfortunate situation of having to proceed by eliminating inadequate theories, rather than ever really establishing any of them. This is of course a very general situation that is not peculiar to the social sciences. [66: 11–12]

In community criminology, however, systematic comparisons of competing alternative models are rarely done.² Why?

The Challenges, Briefly

This chapter, focusing mostly on the first type of mediating model, in which crime is the outcome, highlights two conceptual roadblocks to systematic comparisons of competing ecological communities and crime models. (a) Key indicators in several communities and crime models are plagued by semantic ambiguity [3]. In essence, different researchers connect the same indicators to different constructs. (b) Researchers rarely engage in systematic, multimethod ecological construct validation to clarify which indicators clearly belong to which constructs. Multimethod patterns of convergent and discriminant validation are rarely examined [135]. Of course, such

examinations are particularly challenging when examining spatially aggregated indicators.

Suggested Resolution, Briefly

The establishment of discriminant validity, a key part of the construct validation process, is needed but challenging to accomplish with data aggregated by geographic proximity. What is to be done? The suggested answer has two parts. The first is to adopt a unified perspective on the construct validation process [500]. This opens up the range of empirical relationships relevant to establishing construct validity. The second is to carry out the unified construct validation activities using a Boudon/Coleman boat metamodel aligned with methodological individualism.

Organization of Chapter

The next section documents the suggested semantic ambiguity in the area of social disorganization. A few examples are described, and then the results of a more systematic review are reported. Samuel Messick's unified perspective on construct validation is introduced, and those ideas are then placed within a boat metamodel aligned with methodological individualism. A hypothetical example applying Messick's unified construct validation approach is described.

Focus and Assumptions

This chapter focuses mostly on communities and crime partially or fully mediated models in which crime is the outcome and the mediating dynamics in the relevant models are based on individual-level dynamics. Such models can align comfortably with a Boudon/Coleman boat metamodel embracing methodological individualism [81, 168].³ This chapter assumes that the researcher has addressed the temporal and spatial scaling questions discussed in the earlier chapters.

Semantic Ambiguity: Definition, Varieties, and Example

Definition

Semantic ambiguity, as defined by Abbott, arises when researchers lack clarity about the specific constructs captured by specific indicators.⁴ "A given indicator" may be "attached to more than one concept. In such a case, one

measurable thing ‘means’ several things at once. . . . [This is] a situation where one fact means several things at once without those things resolving into any one meaning” [3: 361–362].

Varieties

Serious semantic ambiguity afflicts many theories in community criminology, including widely cited ones such as social disorganization (SD) and routine activity (RA). Two types of ambiguities afflict these theories. First, researchers may disagree about what particular cultural (as compared to structural) concept is captured by a particular indicator. For example, should a “perceived willingness to intervene” item reflect informal social control in a social disorganization / collective efficacy model, or “capable guardianship” in a routine activities model? Second, different researchers use structural community-level demographic or land use indicators as proxy indicators for mediating, cultural processes. Sometimes researchers will admit that the conditions are only proxies for mediating dynamics but go ahead and do the substitution anyway. The practice is incorrect for three reasons. Most obviously, demographic or land use variables do not capture the described conceptual processes. Further, community demographic structure or community land use patterns are broad setting conditions; each can facilitate the emergence of any number of specific processes relevant to any number of theories. Finally, if researchers fail to test the specified mediating models (setting conditions / structure → processes / cultural dynamics → outcomes) and lack discriminant validation for setting versus process indicators, they leave open the possibility that demographic setting conditions and proposed processes are not conceptually distinct [175].⁵ Scholars previously have warned routine activity, social disorganization, and anomie theorists about the indefensibility of this second, confusing practice [122, 278, 649]. Nevertheless, as will be demonstrated for the one area of social disorganization, it continues.

Example

THE CONCEPT

Social disorganization theory has, of course, a convoluted and controversial interpretive past. But there does seem to be agreement on key elements [122].

The current formulation of social disorganization assumes that the breadth and strength of local networks directly affect the effectiveness of two forms

of community self regulation. The first reflects the ability of local neighborhoods to supervise the behavior of their residents, . . . informal surveillance, . . . movement governing rules, . . . direct intervention. . . . The second form of community self regulation implicit in the notion of social disorganization reflects the socializing, rather than supervisory, capability of a neighborhood. [122: 527, 529]

Several of these elements were captured in one of the most widely cited social disorganization articles, which used the following to reflect social disorganization processes: having friends nearby; participation in local organizations; and perceptions of troublesome unsupervised teen groups—the latter reflecting an *inability* to regulate the behavior of locals [641].

SELECT EXAMPLES

What follows are just a few examples of indicator/concept slippage from social disorganization research.

- A study of 342 gang homicides in Newark (NJ) concluded, “the social disorganization measure did not predict gang homicide” [565: abstract]. At the census-tract level, four demographic variables (e.g., percentage unemployed) “conceptually tapped into the poverty dimension of social disorganization,” and three demographic variables (number of racial/ethnic groups in tract, population size, and percentage living there less than five years) “addressed other dimensions, such as residential mobility, ethnic heterogeneity, and urbanization” [565: 202]. The study included no indicators of the intervening mechanisms described by social disorganization theory [122].
- A study of violent and property crime rates in nonmetropolitan counties sought to test the idea “that predictors of crime from social disorganization theory exert different effects on violent and property crimes at different levels of population change in nonmetropolitan counties” [35: abstract]. In some places, the authors preserved the distinction between setting conditions and mediating properties: “Conceptually, crime is indirectly a function of county structural characteristics (SES, residential mobility, population heterogeneity), and these measures affect crime indirectly through their impact on county social organization and social control” [35: 379]. But the authors later maintained that the demographic setting conditions were relevant largely because of the unmeasured mediating properties: “We maintain that counties with high levels of poverty, income inequality, unemployment, and female-headed households suffer a structural disadvantage in the community resources needed to achieve formal and informal connections among

members so as to realize common values and work toward solving or preventing social problems” [35: 380]. No data relevant to this assertion were presented. The researchers found a positive effect of resource *dis*advantage on crime rates, with more powerful impacts in counties losing population, and concluded, “a model based on social disorganization is useful for explaining crime in rural America” [35: 390]. No reference was made to potentially competing theoretical frameworks. The study included no social disorganization variables [122].

- A study of youth crime rates used census demographic “structural factors which represent the cohesiveness and informal social control of a community” [374: 37]. More specifically, “in order to capture the level of social disorganization in a community, five concepts were operationalized—socioeconomic status, residential instability, urbanization, ethnic heterogeneity, and supervision” [374: 38]. Percentage of single-parent families was used for the latter. The study included no social disorganization variables referencing key processes [122].
- A study of sex-offender residence found “RSOs (registered sex offenders) are likely to live in areas with greater social disorganization” in census tracts in two Florida and Kentucky counties [526: abstract]. “Based on the traditions of social disorganization theory . . . the following characteristics were assessed: the percent of households in the tract that are headed by females, the percent of the homes in the census tract that are owner occupied, the median household income, and the median housing value in the tract” [526: 339–340]. The study contained no indicators of social disorganization processes [122].

A number of studies do not completely overlook the differences between land use or structural setting conditions and intervening social disorganization but do skirt the issue. They do this by arguing that the impacts of demographic or land use setting conditions have strong implications for one particular theory, such as social disorganization [385: 197, 203; 546: 86; 547: 138]. They fail to mention that these same setting conditions have strong implications for a number of other theories as well.⁶

A Broader Examination

To gain a broader perspective on how widespread this semantic ambiguity was in social disorganization research, the following search was conducted. Using *Web of Science*, all publications from its social science database appearing between January 1, 1995, and January 21, 2010, with “social disorganization” (SD) in the title were listed and reviewed. Fifty-four articles

surfaced. Eleven were dropped from further analysis either because the outcome was not crime/victimization/delinquency or a reaction to crime or because the article did not address social disorganization theory as used in community criminology. Of the remaining forty-three, forty providing empirical analyses were retained. These studies considered outcomes ranging in spatial scale from individuals to large spatial units such as states or MSAs. Three solely conceptual pieces were dropped from further consideration.

Following Bursik, an indicator was classified as reflecting social disorganization if it captured one or more of the following attributes or processes: willingness to intervene, local organizational participation, features of local social networks, other features of local social climate, perceptions of disorderly conditions, or some indicator combining one or more of these features. Of the forty studies, only eight (20 percent) included indicators clearly referencing social disorganization related processes and *only* referencing disorganization related processes. Theoretically misaligned operationalizations of social disorganization far outnumbered instances of theoretically congruent operationalization.

In short, at least for this one relatively popular communities and crime model, for the period considered, semantic ambiguity appears widespread. The vast majority of studies using this perspective failed to tie the social disorganization concept solely to theoretically appropriate indicators. Serious semantic ambiguity afflicts researchers on this topic more than two decades after Bursik's clarification of the central threads in this concept.⁷

Problems Created by Semantic Ambiguity

Important theoretical and practical consequences arise from the semantic ambiguity. Researchers cannot conduct a systematic program testing alternative theories of community crime outcomes. If the semantic ambiguity affecting social disorganization afflicts other key constructs in other prominent models explaining community-level crime outcomes, this prevents researchers and policymakers from learning which theory does better. Finally, those who are interested in developing community prevention programs have little guidance about which theory better serves as a foundation for developing crime prevention program models.

Construct Validation

If researchers want to determine which indicators go with which constructs and resolve these semantic ambiguities, what do they do? Typically, they

engage in a process of construct validation, paying special attention to multi-method patterns of convergent and discriminant validity. As highlighted by the Cronbach quote in the third epigraph to this chapter, this is an ongoing process of hypothesizing, observing, reflecting, and reiterating.

The Typical Approach

Researchers seeking to establish the scientific quality of their indicators are concerned about two groups of qualities: reliability benchmarks, validity benchmarks, and, of course, the relationship between the two.⁸ Construct validity is one type of validity.

Construct validation is a process of establishing that designated empirical indicators largely or solely reflect one particular underlying construct chosen by the researcher, rather than alternative constructs.⁹ The process helps the researcher establish the meaning of the indicator in question [356]. No one single test establishes such validity, but rather validity inferred depends on evidence accumulated across a series of investigations; both inductive and deductive processes are relevant [186]. The pattern the researcher hopes to see is that (a) the selected indicator correlates *strongly* with other accepted indicators of the *intended* construct and (b) the selected indicator correlates only *weakly* with accepted indicators of *other* constructs. The former is called convergent validity, the latter discriminant validity [135]. This pattern is seen in the hypothetical pattern of correlations in the multimethod-multitrait matrix (MTMM) in figure 8.1. The term “multiconstruct, multimethod” matrix (MCMM) can be used to refer to the matrix since interest extends beyond just psychological traits.

Note the following. To move the construct validation process forward, *both* patterns of convergent and discriminant validity should appear. Just learning that the anticipated indicators of one construct cluster tightly does not answer the question of whether that construct is empirically separable from its conceptual cousins. Just learning that those same anticipated indicators of one construct prove independent of indicators of a closely related construct does not answer the question of whether the anticipated indicators of the targeted construct closely covary. In addition, it is vital, if at all possible, that the anticipated patterns emerge when multiple data sources generate indicators for each construct. Otherwise monomethod bias creates problems [30; 174: 66]. Finally, given the dynamic, longitudinal perspective developed in the previous chapter and carried over here, it follows that the search for patterns of convergent and discriminant validation should use dynamic indicators. That is, key indicators should reflect changes over time,

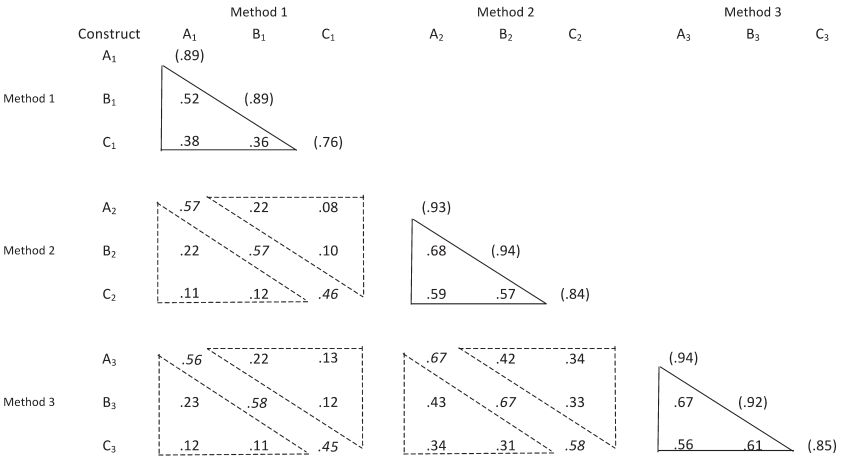


Figure 8.1. Synthetic multiconstruct-multimethod matrix. Adapted from Campbell and Fiske [135: table 1]. The three sets of italicized values reflect cross-method validity coefficients. Figures on diagonals, in parentheses, represent reliability coefficients. Each heteroconstruct-monomethod triangle is enclosed by a solid line. Each heteroconstruct-heteromethod triangle is enclosed by a broken line.

not cross-sectional relationships. Cross-sectional patterns of association can differ markedly from patterns of changes [443: 180].

Two points about the broader, conceptual background behind construct validation activities deserve mention. As noted in the quote from Messick in the second epigraph to this chapter, construct validity does not imply *strict* operationism [233, 235]. One does not assume that one's underlying construct of interest is captured by and *only* captured by the specific indicators used. The chosen indicators are "part of an extensible set" of indicators that *could* be used as alternative or complementary indicators. Further, in some situations, construct validity matters less. It is not in question for an attribute if accepted benchmark indicators are available for the underlying quality or dynamic in question. This is why Messick links construct validity with other types of validity. With criterion validity, a researcher seeks to learn how well the indicator in question links to a well-accepted benchmark indicator for the same construct. The indicator in question might be, for example, survey items about arrestees' drug use in the past forty-eight hours, and the benchmark or criterion variable might be the results of arrestees' urinalysis. A researcher could examine how well different questions about drug-use patterns link to urinalysis outcome scores and, depending on the results seen,

argue for the construct validity of some of the questions used on the basis of links observed. To put this point differently, construct validity comes to the fore as a question “when an investigator believes that no criterion available to him is fully valid.” In such a situation, the investigator “perforce becomes interested in construct validity because this is the only way to avoid the ‘infinite frustration’ of relating every criterion to some more ultimate standard” [187: 282].

Messick’s Unified Perspective on Construct Validation

The traditional MCMM approach, however, presents problems for data intended to test communities and crime theories. Neighborhood-based samples have limitations. Because of these, it may not be possible for researchers to separate different aspects of neighborhood structure from one another. Constructing a sample in which race and SES are relatively independent, for example, may be enormously challenging [562]. Even more problematic may be collinearity between indicators of demographic structure and those of key mediating processes. This may make it extremely challenging to separate the two, thus hampering efforts to establish discriminant validity [175: 117]. Also impairing efforts to establish discriminant validity are the already-discussed effects of aggregating data based on geographic proximity (see chapter 4) [69]. Given these and other difficulties, pursuing standard construct validation procedures in community criminology by assembling and evaluating a multiconstruct-multimethod matrix seems an extremely daunting goal.

Adopting Messick’s unified perspective on construct validation, however, reduces difficulties [500]. It opens up a wider range of relevant empirical patterns for construct validity considerations. Messick argued that beyond links reflecting convergent validities, discriminant validities, and criterion validities, other features of how key indicators link to other parameters are relevant to construct validation. Framed in the context of psychological testing, he put the argument for a broader perspective this way:

Historically, primary emphasis in construct validation has been placed on internal and external test structures—that is, on the appraisal of theoretically expected patterns of relationships among item scores or between test scores and other measures. Probably *even more illuminating in regard to score meaning* are studies of expected performance differences over time, across groups and settings, and in response to experimental treatments and manipulations. [500: 743, emphasis added]

Messick's unified perspective on construct validity argued that other types of validity, such as criterion and content validities, and other observed differences are *themselves* part of establishing construct validity. Investigating these other validities could provide evidence relevant to the two major threats to construct validity:

Construct underrepresentation, [in which] the assessment is too narrow and fails to include important dimensions or facets of the construct, [and] . . . *construct-irrelevant variance*, [in which] the assessment is too broad, containing excess reliable variance associated with other distinct constructs as well as method variance. . . . Both threats are operative in all assessments. Hence a primary validation concern is the extent to which the same assessment might under-represent the focal construct while simultaneously contaminating the scores with construct-irrelevant variance. [500: 742 emphasis added]

Considerable construct validity discussion in psychology has centered on interpretations of individual-level test scores. Nevertheless, the same points pertain to interpretations of community-level indicators. For example, in a study of state-level ecological models of high school crime rates, Gary Gottfredson applied the test of construct irrelevance [279: 316]. He found that the high school crime-rate model predicted other outcomes conceptually unrelated to the intended outcome about as well as it predicted the intended outcome. Introducing theoretically irrelevant outcomes is an important model-testing step.

Messick's expanded treatment of construct validation proposed six different aspects of the process and linked the *interpretation* of indicators to their *consequences* as well as their correlates and criterion-related links.¹⁰ The important point of Messick's work in the current context is this: researchers seeking to establish the construct validity of particular indicators need to take a wide-ranging perspective and pay attention to a number of empirical patterns.

Combining Three Ideas

What Is Being Integrated

This section weaves together three ideas: Messick's unified perspective on construct validation, the need for comparative theory testing, and the

dynamic boat metamodel aligned with methodological individualism and introduced in the previous chapter. Integrating these three notions suggests an empirical construct validation program for specific theories relevant to community criminology.

There are two parts to this hypothetical program: first, assessing convergent and discriminant validities of features at different levels in the model and, second, and as described by Messick, assessing additional links. Each link in a simplified dynamic boat metamodel ($Me-I\Delta \rightarrow Mi-I\Delta$; $Mi-I\Delta \rightarrow Mi-O\Delta$; $Mi-O\Delta \rightarrow Me-O\Delta$) deserves attention as part of the *broader connections* of interest from a unified perspective on construct validation.

The example that follows assumes several points. (a) The researcher has resolved the foregoing spatial and temporal scaling questions discussed in earlier chapters. (b) A longitudinal framework is used, with ecological discontinuity operationalized following the Hawley/Bursik perspective. (c) The researcher seeks to compare just a small number of competing theories, preferably less than a handful. (d) The researcher has indicators which are at least somewhat specific to each of the key constructs in each of the theories being tested, even if convergent and discriminant validation cannot be tested with an MCMM.

In this example:

- Construct validation efforts are pursued by complementing a traditional focus on convergent and discriminant validities with Messick's unified perspective and attention to additional links. Regardless of whether the results of the MCMM suggest strong convergent and discriminant validities or not, examining additional links is important. Both the traditional links and the additional links inform about construct validity.
- The investigation separately examines the attributes of and links connecting each element in the boat metamodel corresponding with the theory under consideration.
- Each link in the metamodel chain is investigated independently. Understanding how context or neighborhood effects work and understanding the roles of agency represent separate, albeit related, dynamics [815]. Those context and agency dynamics are themselves separate from the within-person processes taking place over time.
- For each of the three link types in the simplest boat metamodel aligned with methodological individualism, the researcher examines the *relative* strength of indicators from *different* theories. This is a key starting point for contrasting the strengths and weaknesses of complementary theories.

Working through an Example

Two simplified longitudinal models, one relying on a key construct in social disorganization theory, the other on a key construct in routine activity theory, are considered. The outcome modeled is larcenies from motor vehicles. In this simplified model, the relevant ecological dynamics are at the meso-level, operationalized as the streetblock; relevant micro-level dynamics are at the individual level. Broader impacts of macro-level community structure on streetblocks may or may not be relevant but simply are excluded here in order to present a straightforward hypothetical example. More complex models, of course, will require more points of examination. The metamodel describing each of these theories' organization appears in figure 8.2.

THEORETICAL SPECIFICS: MODEL SETUP

The outcome ($Me-O_{\Delta}$) captures changes over time in the number (or rate) of larcenies from motor vehicles while those vehicles are parked on particular streetblocks. Larcenies from motor vehicles owned by those who live on the streetblock as well as larcenies from motor vehicles owned by others are all of interest. Δ indicates an unexpected change occurring between an earlier period and a later period (e.g., between time $t-o+f$ and time $t-o+g$. The *extent* of that period depends on the specific variable in the model.)

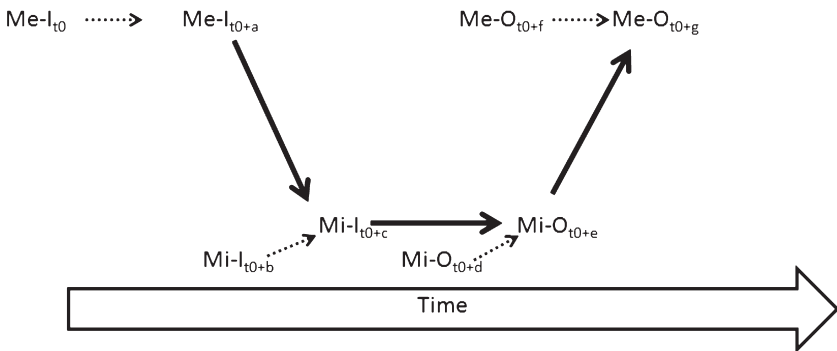


Figure 8.2. Generic two-level dynamic metamodel aligned with methodological individualism. Meso-level (upper row in figure) represents streetblocks; micro-level (lower row in figure) represents individuals. Macro-level inputs and outputs are not shown in order to simplify the example. Dashed lines connect periods over which unexpected changes accumulate. For example, the meso-level input represents scores at time $t-o+a$ after controlling for scores on the same variable at the same level at time $t-o$. Different letters (+a, +b, +c . . .) indicate different amounts of time passing since time $t-o$.

The meso-level input ($Me-I_{\Delta}$) is changes in the percentage of nonresidential land use on streetblocks. Imagine that the neighborhoods in which these streetblocks are located are experiencing two major shifts. An ongoing, citywide neighborhood-transformation initiative generates significant demolition of some housing structures. Further, recent zoning changes in the city spur conversions of multifamily units into mixed commercial/residential land uses [489]. Thus, over a two-year period, many blocks are seeing changes with increasing vacant lots and increasing small businesses on primarily residential blocks.

The micro-level input ($Mi-I_{\Delta}$) which has shifted because of the change in land use patterns ($Me-I_{\Delta}$) is local social legibility. Separate from the construction confusion, various environmental psychology and criminology models would anticipate reduced social legibility on streetblocks as a result of increases in nonresidential land uses such as small commercial stores and attendant increases in foot traffic [38]. Depending on neighborhood context, the researcher also might anticipate that demolition of abandoned structures and their replacement with vacant lots reduces social legibility. Such lots might be widely used for such activities as washing/waxing cars, kids playing games, or teens or adults hanging out and drinking [704]. Dynamics arising from these land use shifts might create on-streetblock shifts in pedestrian volume and activity mix. The latter could contribute to decreased social legibility at the individual level.

The social construct at issue is not social ties or cohesiveness or perceived similarity with neighbors or sense of community or related social dynamics, although these undoubtedly also link to local social legibility. Rather, the focus is the extent to which a resident householder on the streetblock knows or recognizes by face or name the people he or she sees there.

Assume that the researcher hopes to contrast two elements of two different theories: the “willingness to intervene” (WTI) component from social disorganization / collective efficacy theory, and the “capable guardianship” (CG) component from routine activity theory.¹¹ It is hypothesized that both of these dynamics will be shifted due to the land use changes and the consequent shift in social legibility. Changes in WTI and CG, therefore, serve as individual-level outcomes ($Mi-O_{\Delta}$).

Following the strong inference guide, the researcher has arranged it so that each theory makes a different prediction about the $Mi-I_{\Delta} \rightarrow Mi-O_{\Delta}$ link, that is, the impacts of changed social legibility on either changed WTI or changed CG [566]. The researcher expects that decreased social legibility will lead to *weaker* WTI because of increased uncertainties about who belongs on the streetblock. The uncertainties could be reflected in increased doubts

about whether specific individuals seen on the street are legitimate users, that is, residents, law-abiding visitors to specific households, or law-abiding patrons of on-block or nearby businesses. At the same time, impaired local social legibility may heighten residents' worries about the reliability of co-residents. Doubts about whether co-residents would do something if they saw something may lead some residents to feel more responsible for managing, keeping an eye on, and responding to what is happening in the area immediately around their own property. So the researcher may expect that impaired social legibility leads to *stronger CG*.¹²

The researcher recognizes that numerous other dynamics relevant to other theoretical models also could be set in motion by land use changes on streetblocks. Therefore, it is important, if the researcher wishes to present his or her research as a test of specific components of either social disorganization / collective efficacy theory or routine activity theory that these theoretically irrelevant but plausibly related dynamics be controlled. After carefully considering theories beyond the two under consideration here, the researcher has decided that the strongest competing theoretical framework is fear of crime / perception of risk [239, 414, 415, 850]. The researcher has decided to include and control for indicators relevant to key constructs in that competing framework.

Further, the researcher has carefully considered and monitored additional ecological changes which could prove relevant even though outside the dynamics highlighted by each of the two central theories considered. For example, target attractiveness is a key component of routine activity theory. On a streetblock with a large number of home sales or apartment renovations, it is plausible that significant gentrification could take place in a short period. This could change the mix of vehicles parked on the streetblock. Changing nonresidential land uses nearby but off the streetblock similarly could affect the mix of vehicles parked at different times of the day or week. Changes in the parked mix could alter offenders' perceptions either that those vehicles on the focal blocks contain worthwhile theft targets or that they are alarmed. Gentrification could shift other local dynamics as well, including those involving local community groups' relations with police [724: 346–354]. Again, additional relevant indicators would be desirable for these ancillary dynamics so that controls could be as comprehensive as possible.

INITIAL CONSTRUCT VALIDATION ASSESSMENT

For indicators linked to each of the two constructs, WTI and CG, the researcher has examined *individual-level* multiconstruct, multimethod convergent and discriminant validities, *focusing on changes taking place over a*

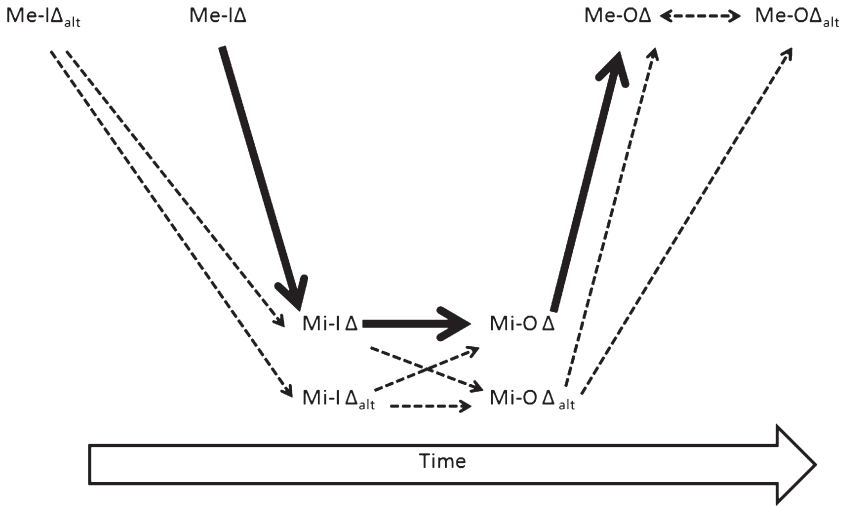


Figure 8.3. Metamodel links deserving attention as part of a unified construct validation effort investigating key indicators.

*specified period.*¹³ Regardless of how satisfactory or unsatisfactory that pattern of results was, Messick’s unified perspective urges the researcher to investigate additional links.

ADDITIONAL CONSTRUCT VALIDATION LINKS RELEVANT TO A UNIFIED PERSPECTIVE

Figure 8.3 describes the metamodel approach to examining additional links. Solid lines represent the metamodel links suggested by social disorganization theory. Dashed lines represent relevant links from the main competing theory, routine activity. More specifically, if the WTI component of social disorganization / collective efficacy is the primary focus and the CG portion of RAT the primary alternative framework under consideration, then indicators in the figure are as follows:

- Me-IΔ changes in land use patterns on the streetblock
- Mi-IΔ individual-level changes in social legibility
- Mi-OΔ individual-level changes in willingness to intervene (WTI)
- Me-OΔ streetblock changes in numbers of larcenies from parked vehicles
- Me-IΔ_{alt} other potentially influential streetblock changes, for example, shifts in organizational climate or residential composition

$Mi-I\Delta_{alt}$	individual-level changes in fear/perception of risk if the alternative model is a fear/risk one; if the alternative model is RAT, the input is the same as under SD
$Mi-O\Delta_{alt}$	individual-level changes in capable guardianship (CG)
$Me-O\Delta_{alt}$	changes in alternative, ecological outcomes

For social disorganization / collective efficacy theory, the core links to be examined include the following:

- $Me-I\Delta \rightarrow Mi-I\Delta$: Streetblock-level increases in nonresidential land uses link *negatively* to later individual-level changes in local social legibility.
- $Mi-I\Delta \rightarrow Mi-O\Delta$: Individual-level changes in social legibility link *positively* to later individual-level changes in willingness to intervene around incidents/scenarios plausibly related to larceny from motor vehicles; for example, declining social legibility links to declining WTI.
- $Mi-O\Delta \rightarrow Me-O\Delta$: Individual-level changes in willingness to intervene in the scenarios noted earlier link *negatively* with later changes in rates or counts of larcenies from motor vehicles on the streetblock.

Suppose that all three of these above links received empirical support in the direction expected for each. The researcher might be ready to conclude, especially if satisfactory convergent and discriminant validities were obtained earlier, that the chosen theory has passed all tests and been validated.

Such a conclusion, however, would be premature. Connections involving indicators from alternative theories are needed both to gauge the completeness of the key theory as specified and to gauge its merits relative to potential competitors. Some of the additional pieces of the pattern to be considered include the following.

- $Me-I\Delta_{alt} ==> Mi-I\Delta$: This link describes the impact of *other* ongoing streetblock-level changes on changes in individual-level social legibility. Examples of changes from outside the theory might be changes in the residential composition of the block due to any number of factors.

What is crucial in terms of theoretical diagnostics is the strength of this link ($Me-I\Delta_{alt} ==> Mi-I\Delta$) *relative* to the $Me-I\Delta \rightarrow Mi-I\Delta$ link. If one of the purposes of the version of social disorganization / collective efficacy theory tested by the researcher was to deepen our understanding of social disorganization / collective efficacy processes as shaped by key land use parameters, the theoretically central link (\rightarrow) should be much stronger than the link(s)

from outside the theoretical domain (\Rightarrow). Should links from outside the domain prove equally strong or stronger, it suggests that the researcher needs to extend the theory. For example, broader consideration of stratification or political economy might be merited [365, 450]. In other words, testing these alternative links provides a potential guide for needed further theoretical elaboration.¹⁴

$Mi-I\Delta \Rightarrow Mi-O\Delta_{alt}$: This link might address the impacts of changes in social legibility on changes in CG. Suppose the researcher finds that this link is statistically significant and in the anticipated direction. Decreasing social legibility over time is associated with later increases in capable guardianship.

The element of routine activity theory being investigated appears relevant, and this suggests we examine more closely the relationship between CG and WTI. Perhaps CG's strengthening is spurred by exactly the same social changes weakening WTI. Perhaps the two dynamics, WTI and CG, are "compensating" for each other at the individual level. Perhaps social disorganization theory and routine activity theory each provide an *incomplete* picture of the impacts of changing social legibility on resident-based dynamics relevant to this crime outcome.

But more broadly, construct implications also depend on the *patterning* of links. For example, if the impacts of changes in CG on changes in larceny from motor vehicles ($Mi-O\Delta_{alt} \Rightarrow Me-O\Delta$) are stronger than the theoretically central link between changes in WTI and changes in larcenies from motor vehicles ($Mi-O\Delta \rightarrow Me-O\Delta$), this would raise questions about the *relative* value of one theory versus another, at least for this outcome. This information is crucial from the unified construct validation perspective.

$Mi-O\Delta_{alt} \Rightarrow Me-O\Delta_{alt}$: Individual-level changes in CG link to ecological changes in an alternative, ecological outcome.

For example, suppose that a noncrime, ecological outcome is considered, such as some feature of the overall pattern of streetblock activity. It might be the incidence of young children playing outside, unsupervised, on the streetblock at certain times of the day or week. Or it could be another crime outcome, but one quite different in nature from larceny from motor vehicles. For example, it might be the presence of open drug dealing on the streetblock.

The connection of the individual-level outcome from the alternative theory (e.g., CG from routine activity theory) with an alternative outcome,

especially if that noncrime outcome indicator relies on a different data source than does the larceny from motor vehicle data, could be important. Suppose the link is strong. It speaks to whether the CG / routine activity dynamics are telling us about crime dynamics or about broader residential dynamics, which just also happen to prove relevant to crime. It speaks to the range of streetblock features shaped by changes in CG at the individual level.

Testing what happens with an alternative ecological outcome is especially important for the test of construct irrelevance. Theoretically key individual-level outcome changes should not connect to ecological outcomes that could not plausibly link theoretically to those same dynamics. If such connections do emerge, some form of temporal spuriousness could be operating.

Take this one step further. Suppose the researcher adds into the mix individual-level indicators of changing fear / perception of risk. Suppose further that after exploring different connections with other individual-level changes, following the same procedure described earlier to test different links in the metamodel, the researcher concludes that the relationship between different individual-level changes has been misspecified. The researcher's examination of additional links suggests instead that the individual-level relationships among changes shown in figure 8.4 are the most appropriate. (Of course, this is just one plausible rearrangement of the individual-level model.)

If such alternative modeling were suggested by the links observed, then there are implications for the *meaning of the indicators* involved. *Ultimately, this is what construct validity is all about.* More specifically, it appears that all three of these individual-level outputs in the boat metamodel are best conceptualized as consequences of changing fear levels. Examining links between the focal theoretical model of interest and indicators from alternate theoretical frames (figure 8.3) informs about construct validity. The unified perspective states that the patterns are relevant even if all these indicators have excellent convergent and discriminant validities. The new information

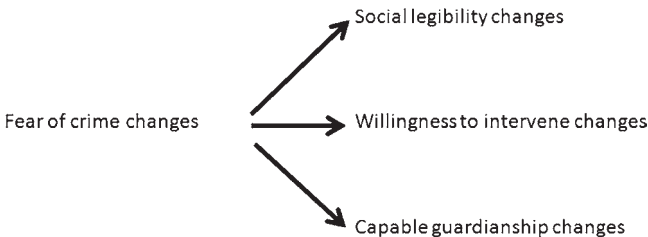


Figure 8.4. Potential alternative theoretical modeling of individual-level dynamics suggested by unified construct validation process.

leads the researcher to reexamine the *conceptual* relationships between the four constructs shown. Such a reexamination would require additional longitudinal data permitting the researcher to understand better the ordering of the different changes.

Closing Comment, Including the Broader Agenda

This chapter has drawn attention to two limitations in community criminology. At least in some theoretical frameworks, confusion abounds regarding how to operationalize key constructs. There is, to use Abbott's term, substantial semantic ambiguity [4]. Further, there have been few systematic attempts to compare the relative adequacy of different theoretical perspectives [741]. Such comparisons have been hampered in part because of semantic ambiguity. Both these matters can only be resolved by careful attention to construct validation efforts.

A two-phase approach has been recommended for pursuing construct validation. Both phases presume that the researcher has resolved the temporal and spatial scaling concerns described in earlier chapters, has indicators for each key construct derived from multiple data sources, and has data available which can be organized into a dynamic, longitudinal boat metamodel as described in chapter 7. In the first phase, the researcher examines patterns of multimethod convergent and discriminant validity for key indicators in the theory of interest, and preferably for competing theories as well. The investigation is conducted separately for each different segment of the metamodel (e.g., Ma-I Δ , Mi-I Δ , Mi-O Δ , and Ma-O Δ). Once these have been established, following Messick's unified construct validation perspective, there is a second phase in which each of the links in the model is investigated both for the model of interest (\Rightarrow) and potential competing models ($==>$) with a similar metamodel structure. Then, as Cronbach described in the third epigraph to this chapter, "reasoning and imagination" come into play. When we examine links crossing levels of explanation, we learn more about how different causal mechanisms connect at different levels. So, ultimately, the kinds of investigations recommended by Messick's unified construct validation approach serve the broader goal of developing an integrated criminology. With such an approach, further progress on Short's levels of explanation project might be achieved [674; 676; 813: 4; 815: 129–130; 822].

Selectivity Bias

Metamodels, Selection Effects, and Neighborhood Effects

Determining whether there are neighborhood effects on individual behavior poses formidable methodological difficulties but equally important conceptual challenges. The conceptual issues are thornier than the methodological ones.

—Marta Tienda (1991)

All social science problems are difficult, almost by definition. The easy questions were answered long ago.

—Christopher Jencks and Susan Mayer (1990)

Mechanisms consist of entities (with their properties) and the activities that these entities engage in, either by themselves or in concert with other entities. These activities bring about change, and the type of change brought about depends on the properties of the entities and *how the entities are organized spatially and temporally*.

—Peter Hedstrom and Petri Ylikoski (2010)

Neighborhood Effects or Selection Effects? Two Fictional Examples

Over five seasons of *The Wire*, David Simon's Baltimore City-based TV series, viewers saw characters returning to their homes, neighborhoods, families, and friends after significant periods in jail or prison.¹ Writ large, the series captures the terrible human toll on city life exacted by the decline of manufacturing in the US economy [732]. In season 3, Dennis "Cutty" Wise is released from prison, having served fourteen years on a murder conviction. Cutty's reentry arc, continuing over the next two seasons, involves trying to find work; opting to go back to work for Avon Barksdale, a high-level drug dealer; taking part in a drive-by shooting that goes awry; leaving the drug business; working in lawn care; and setting up a local gym. What happens to Wise over the last three seasons of the series presents an example of how someone can change, whether through maturation or something else, even when returned to the same neighborhood where he used to commit crimes.

Other characters during the series leave neighborhoods for a range of reasons: they are told to go elsewhere by family members or drug bosses, they hide out with family on the remote and rural Eastern Shore, landlords evict them, stop-snitching arsonists burn them out of their homes, or officials place them in juvenile halfway houses or jail. Middle schooler Namond gets out of his neighborhood and away from his be-a-man-and-sell-drugs mother in season 4. Under the tutelage of former police officer “Bunny” Colvin and his wife, Namond trades drug dealing for high school debating. Namond’s life course and exit strategy in the last two seasons and Cutty’s zigzagging reentry adventures during the last three seasons present two longitudinal narratives raising complex questions about causal impacts of community contexts.

These narratives also raise questions about selection effects, the topic of this chapter. Although more detailed definitions of different types of selection effects will be offered later, roughly speaking, when a researcher seeks to identify the impacts of changing a spatial context, such as moving to a new neighborhood, on individual-level outcomes, selection effects refer to selectivity bias. This bias can be created when some unidentified individual-level features, which correlate with the outcome, also correlate with entering or exiting a specific spatial context. When adolescent, drug-dealing Namond gets out of his neighborhood, moves in with a stable adult influence, switches schools, and gets his life on track, how much of his criminal desistance is *causally* driven by the changes in household, residential, and schooling contexts? How important are those moves to his straightening out? Can those impacts of context be separated out from other changes such as his maturation or changes in his social bonds? In academic parlance, does Namond’s desistance arise in part from changing home, neighborhood, and schooling contexts, that is, neighborhood context effects? Or does it arise in part from who he is and how others react to him because of that, that is, nonneighborhood selection effects? Namond is smart, observant, and witty. Perhaps it is those qualities that inspire former police district commander “Bunny” Colvin to take him in. Who Namond is causes Colvin to “select” Namond and place him into new contexts. That nonrandom selection process, rather than the new contexts, may have been causally central to Namond’s desistance from crime.

Focus and Organization of the Chapter

Focus

This chapter on selection effects presents three related but distinct dynamics: nonrandom selection into spatial contexts; nonrandom selection into

nonspatial, usually social contexts; and extracommunity impacts of selection effects. Each dynamic creates its own causal interpretation difficulties and is associated with its own type of metamodel. The goals of the chapter include placing each type of selection effect into its corresponding metamodel, thereby clarifying interpretive challenges; providing background both on how a researcher can learn if some of these selection effects are operative and on some recent discussions about neighborhood effects; commenting on the shortcomings of the treatment of selection effects in individual-level criminology; and, finally, suggesting that how community criminologists attend to selection effects will depend on the specific theoretical models employed.

Stating this last point differently, it may not be possible to determine the best approach to selection effects at the metamodel level. This is not just because selection effects contain different threads. And it is not just because different researchers adopt different types of metamodels. Most pertinent is that how a researcher incorporates selection effects should align with the particular theoretical model employed in a particular investigation. Ideally, the researcher develops a selection submodel that is theoretically congruent with the particular theory being used. Specific solutions to concerns about selection are likely to emerge *only* in specific theoretical contexts. All this chapter seeks to do is outline the concern in its different forms and to note possible approaches.

Organization

Different approaches to selection and different types of selection are sketched. Three different varieties of incidental selection dynamics are outlined: those affecting spatial community or subcommunity contexts, those affecting nonspatial (usually social) contexts, and those affecting supracommunity contexts. Each of these links to a different type of metamodel. Further, each of these three types of incidental selection dynamics presents distinct conceptual and analytic challenges. A closing comment suggests that researchers, at the outset of their investigation, simultaneously consider the potential relevance of all three varieties of selection effects. Which selection dynamics are deemed relevant, and how they are incorporated, will depend not only on the type of metamodel used by the researcher but also on the specific theories being tested.

A Multidisciplinary Challenge

The challenge presented by selection effects is broadly relevant to a range of social science disciplines concerned with connections between place and behaviorally linked outcomes. For example, scholars both in health and place and in environmental psychology have recently argued that this matter prevents a deeper conceptual understanding of dynamics in their fields [223, 626, 627, 628, 835]. Among social scientists, scholars in economics have the most experience dissecting selection problems. Community criminology can benefit by looking outward and learning about scholarship in other disciplines on this topic.

Orienting Preliminaries

Three Different Approaches to Selection Effects

Part of the challenge posed by selection effects is that the dynamics can be approached in different ways. At the level of metamodels, there are three possible orientations.

Approach A: Nonrandom spatial selection as nuisance to be controlled in order to get a clearer estimate of neighborhood impacts on individuals. Scholars with this focus see the nonrandom sorting of individuals or households into communities as both a methodological problem and a theoretical blind spot. These researchers are often interested in link 1 or link 4 in the Boudon-Coleman metamodel. Until the relevant dynamics are theoretically formulated and empirically assessed, processes by which spatial contexts influence individuals, such as William Julius Wilson's concentration effects, will not be clearly revealed [744, 833]. For example, many scholars concerned with identifying the impacts of neighborhood context and school context on human development adhere to this view on selection [107]. This view also is held by those who recognize self-selection of individuals into or out of programs or settings as a threat to internal validity in quasi-experiments [174: 53].

Approach B: Incorporating nonrandom nonspatial selection dynamics into individual-level models. This perspective suggests that nonrandom selection into nonspatial contexts deserves an individual-level statistical submodel which becomes part of and gets attached to an individual-level theoretical model. These researchers are often interested in link 2, individual-level dynamics along the bottom portion of a Boudon-Coleman metamodel. How potential female wage earners select themselves into or out of paid employment outside the home or how selection processes at earlier stages of criminal justice processing condition decision-making at later stages are

just two examples [50, 334]. Many researchers in both criminal justice and criminology have adopted this perspective on selection. It will be suggested here, however, that the latter group has undertheorized the relevant selection dynamics.

Approach C: Individual-level or ecological spatial outcome linked to non-random selection is of central interest. Scholars investigating mobility, migration, land economics, and housing see nonrandom selection effects as processes of central disciplinary interest rather than as problematic, pernicious confounds [9, 109, 214, 251, 252, 253, 257, 277, 442, 474, 476, 696, 698, 699, 831, 840]. For example, understanding the timing of moves from an origin, the choices and constraints around destination selection for movers, and the mating up of people and households with housing are central intellectual concerns for migration and housing researchers. Some urban sociologists have pointed out broad, societal-level consequences, suggesting that these dynamics can contribute in important ways to continuing and intensifying economic, racial, and ethnic disparities across urban communities in a locale [638, 646]. In short, selection for many of these researchers represents a core disciplinary concern. With this approach, the selection-linked outcome at either the individual or macro-level may be of primary theoretical interest.

In community criminology, different approaches have been adopted for different questions. Approach C, for example, is implied in Min Xie and David McDowall's research looking at effects of victimization on mobility [853]. Approach A is implied in Susan Clampet-Lundquist's and Douglas Massey's attempt to delineate selection dynamics operative in the MTO (Moving to Opportunity) study [152]. Approach B is implicit in much of the work on criminal justice theory and selection reviewed by Shawn Bushway [130].

These three different approaches describe three different ways a researcher can construe how selection effects are operating in his or her research context. *Although all these approaches address selection effects, from the meta-model perspective, these are three distinctly different matters despite the shared name.* Those metamodel differences are highlighted later in this chapter.

If these three different facets of the selection problem are three distinct matters, documenting one facet does not mean that the other facets are irrelevant. For example, documenting how selection is a social process maintaining intercommunity differences on race and SES (Approach C) does not make spatial and nonspatial selection dynamics (Approaches A and B) irrelevant for models predicting an individual-level outcome such as delin-

quency involvement. Relevant aspects of selection, and how to address them, depend on the specific theory being tested. The following sections describe how each of these three approaches either implies a different metamodel or connects in different ways with a metamodel or extends a metamodel.

Distinguishing the Two Broadest Types of Selection Effects

In addition to the three conceptual approaches to selection, a researcher also would do well to consider the ways selection might be manifest in his or her data and research setting. This requires distinguishing between selectivity bias, truncation, and censoring. In a particular research setting, the broadest distinction is between *explicit* selection on the dependent variable (truncation) versus *incidental* selection on the dependent variable (selectivity bias) [271]. “When the selection process is explicit (as opposed to incidental), a sample is *truncated* when *observations* with values of the dependent variable beyond a given bound are completely excluded” [256: 411]. A subset of cases has been deliberately excluded from the sample, on the basis of scores on the outcome variable.² The population of interest has been narrowed, with sample narrowing as a consequence [162: 1]. The process is assumed to be deterministic.

Incidental selection on the dependent variable, or selectivity bias, is, by contrast, probabilistic. It happens “when the likelihood that an observation appears in the sample is a stochastic function of the dependent variable” [256: 410].³ Scores on the dependent variable link probabilistically to scores on predictor attributes of the cases being or not being selected. Incidental selection can result either in samples with *incidental truncation* or in *censored* samples. “For incidental truncation, the sample is representative of the entire population, but the observations on the dependent variable are truncated according to a rule whose errors are correlated with the errors from the equation of interest. We do not observe y [the outcome] because of the outcome of some other variable, which generates the selection indicator, s ” [39: 266–267]. With a censored sample, data are missing on the outcome, but other information on the case is available.⁴ Relationships between selection types and sample types are shown in figure 9.1.

Some examples may clarify the differences. Suppose you are working with a colleague on election precinct-level delinquency prevalence rates over several years in Columbus, Ohio, for males aged ten to seventeen. Your colleague is on-site and has agreed to send you both the relevant annual delinquency data and annual census estimates of demographic characteristics.

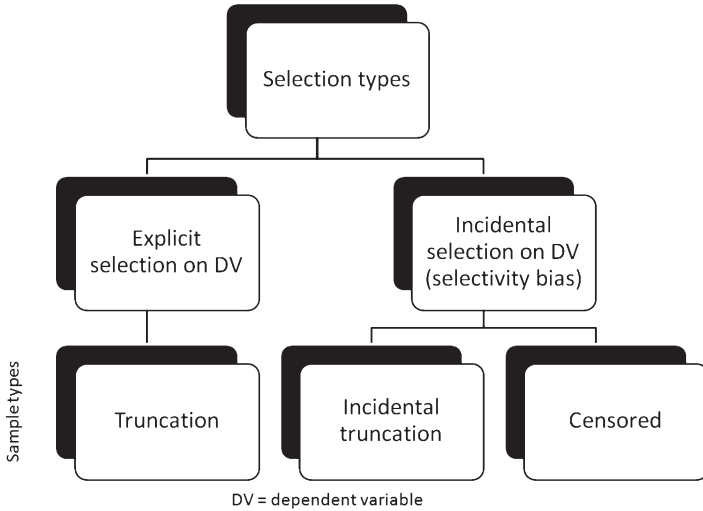


Figure 9.1. Relationship between selection types and resulting sample types.

Your colleague sends you the data but in an accompanying note explains that he *excluded* all *precincts* from the file if the delinquency prevalence count in any of the studied years was zero. In this case, you have *explicit selection* on the dependent variable, resulting in a *truncated* sample.

Suppose instead when you open up the file, you find a note from your colleague explaining that he *excluded* from the file all *precincts* where the number of male residents aged ten to seventeen in any of the study years fell below twenty. He was concerned that any resulting prevalence rates for such precincts would be “too unstable,” and thus those precincts should be banned from the study. Those precincts for those years are simply excluded. Imagine further, for this example to work, that it is plausible that having a young male population of less than versus more than twenty in a year linked to delinquency prevalence rates. Your colleague has engaged in *incidental selection*, resulting in a sample with *incidental truncation*.

Now consider a third scenario. You open up your data file sent by your colleague, but this time you find a different note. He sent along the data for all precincts for all years, but he censored the data in the following way. If the number of males aged ten to seventeen in any of the study years fell below twenty, he *replaced the delinquency prevalence rate with a missing value*. Here, he has engaged in *incidental selection*, resulting in a *censored* sample.

Either incidental or explicit selection is problematic because each changes

the relationship between predictors and the outcome [271]. One of the best known demonstrations of this impact comes from the economic work modeling women's wages and the impact of education on earnings. Education shapes the chances of out-of-home female labor-market engagement. At the same time, once the woman engages in the out-of-home labor market, education also shapes her earnings from that engagement [333, 334]. Unless women's self-selection into and out of the market is modeled, endogeneity problems arise. The following definition helps explain endogenous/exogenous and the endogeneity problem.

Something is endogenous to a system if it is determined within the system, and exogenous if it is determined outside. It is relatively straightforward to determine whether a variable is endogenous or exogenous to a theoretical model. However, there is always an *empirical* question as to whether the model is adequate and thus whether variables that are theoretically exogenous are in fact endogenous to the system being modeled. . . . In statistical regression models the exogeneity of the "independent" variables, or regressors, is assumed. But this may be false and problematic if a regressor is correlated with the error term. The "problem of endogeneity" arises when the factors that are supposed to affect a particular outcome, depend themselves on that outcome. [243, emphasis added]

Selection Dynamics: How to Metamodel, How to Gauge

With these preliminary, broad-gauge considerations taken into account, attention turns to specific ways that selection effects can be incorporated into different metamodels.

Approach A: Effects on Spatial Contexts

ALTERING THE METAMODEL

Figure 9.2 shows a dynamic boat metamodel and two levels of context, macro- and meso-level, with a selection submodel added within a dashed box.⁵ The selection submodel starts with static or changing intraindividual factors (Mi-Other, Mi-Other Δ). The two arrows emerging from these intraindividual factors suggest that they somehow influence which specific macro- or meso-level contexts the individual enters. If the macro- and meso-context levels are perfectly spatially nested within each other, both these influences could be operative. For example, there might be something about the person

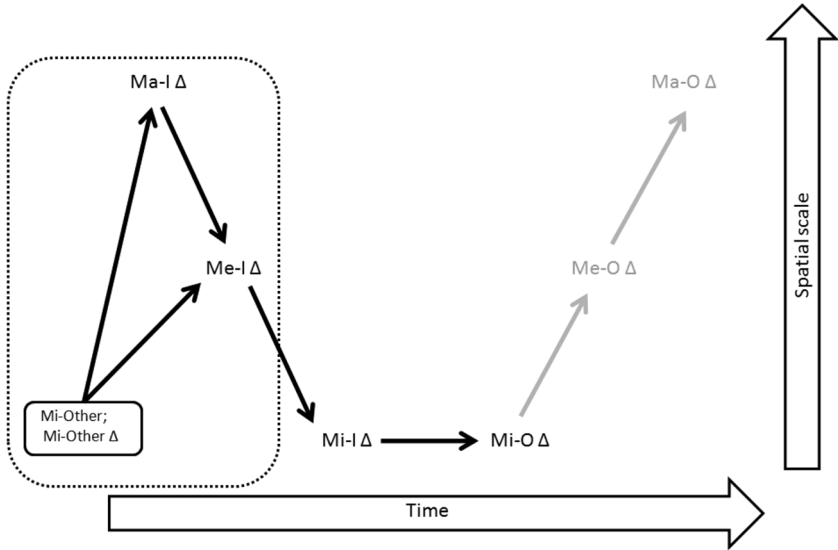


Figure 9.2. Boat metamodel and submodel showing nonrandom spatial context selection under Approach A. Selection submodel is contained within dashed rectangle. Grayed-out portions of the model are not of substantive interest.

or the person's household that shapes not only neighborhood destination but streetblock destination as well. Impacts of household income or individual race, ethnicity, or age come to mind as potential shaping factors. These relevant intraindividual-level factors have a nonrandom association with the dependent variable of interest in the main model at the individual-level (Mi-O Δ). It is that nonrandomness that makes these factors problematic. Further, the process connecting scores on these intraindividual attributes to specific spatial contexts is presumably most often arising from incidental rather than explicit selection.⁶

The right-hand side of the metamodel is grayed out because often these ecological outcomes are not of interest to the researcher pursuing Approach A. Often such a researcher is interested in just estimating the determinants of individual-level outcomes.

These intraindividual factors, or changes in them, were present *before* the individual entered the spatial contexts of interest. They were preexisting conditions. Adding these causally relevant preexisting conditions significantly shifts the causal structure of the longitudinal boat metamodel in three ways. The depicted contextual impacts of macro-level inputs (Ma-I Δ) are—potentially—no longer impacts of exogenous factors. Rather, they may

be impacts shaped by earlier factors not previously considered part of the model (Mi-Other(Δ)). If the preexisting conditions, or changes in them, correlate with the residualized outcome reflecting unexpected change (Mi-O Δ -residual), then there is an endogeneity problem associated with the macro-level or meso-level contextual predictor (Ma-I Δ or Me-I Δ). In addition, observed impacts of macro-level context on meso-level context (Ma-I Δ \rightarrow Me-I Δ) may be altered once the impacts of preexisting conditions or condition changes are taken into account, for example, Mi-Other(Δ) is added to the model. Finally, the contextual impacts of the meso-level factors on the individual-level inputs (Me-I Δ \rightarrow Mi-I Δ) similarly may be altered.

As a thought illustration, consider the effects of community contexts on recidivism or reintegration of released offenders. The question of where released felons reside while reentering society is likely to depend on numerous felon characteristics including time incarcerated, severity of offense, length of offending career, family and social support networks in place at the time of release, financial well-being of the felon and his or her family and networks, and more. It is plausible that outcomes, whether recidivism or reentry success indicators, will depend on some of these characteristics of the released felon. It is also easy to imagine many ways that those same characteristics could shape the specific community location, or series of locations, where the felon resides following release. Unless these shaping dynamics can be estimated, we cannot gauge impacts of neighborhood context on reentry or recidivism [744].

STATISTICAL TESTS FOR SELECTION

How does a researcher know if his or her data harbor an endogeneity problem which might be caused by explicit or incidental nonrandom selection? Econometricians frame the matter in terms of learning whether certain assumptions about the statistical model being used have or have not been violated. If they have been violated, that suggests an endogeneity problem; that is, predictor scores may be somewhat dependent on outcome scores. This could arise from selection dynamics and raises questions about the causal ordering in the model. If the assumptions are not violated, the predictors are exogenous to the outcome, thus establishing exogeneity, which is the opposite of endogeneity.⁷

Cross-Sectional Data Structure

Criteria of Exogeneity

Imagine a typical cross-sectional contextual model of self-reported delinquency scores (Y) that includes a neighborhood-level (N) as well as an

individual-level predictor (I).⁸ A conceptually close published example can be found in Dana Haynie and colleagues' investigation of the impacts of neighborhood context on adolescent violence using the Adolescent Health data set [332]. Ignoring the admittedly important distinctions between multilevel or mixed effects regression models and plain regression models, the contextual regression model is

$$Y = A + B_1 * I + B_2 * N + U \quad (\text{Eq. 9.1})$$

Whether a model includes contextual as well as case-level predictors or just the latter, econometricians pose a number of tests of model features. Is the model estimated a structural model capturing a causal relationship [844: 49]? If so, the zero conditional mean assumption must be met: there must be no relationship between residuals (U) and scores on the predictors [844: 50, eq. 4.3].

$$E(U|I, N) = 0 \quad (\text{Eq. 9.2})$$

At various ranges of each of the different predictors, the most likely expected residual value on the residualized outcome is zero ($E(U) = 0$). More importantly, there is no relationship between the predictors and the residuals, either at the neighborhood (N, k predictors) or individual (I, j predictors) levels [844: 49, eq. 4.2]:

$$\text{Cov}(I_j, U) = 0 \text{ and } j = 1 \dots j \quad (\text{Eq. 9.3})$$

$$\text{Cov}(N_k, U) = 0 \text{ and } k = 1 \dots k \quad (\text{Eq. 9.4})$$

If these conditions are met in this cross-sectional model, then the predictors are "necessarily exogenous" [844: 50]. This implies that "each regressor is uncorrelated with U [the residuals]" [844: 72].

A typical regression model examining this assumption requires testing residual correlations with all predictors. In a multilevel model, it means testing both level 1 (individual level in this example) and level 2 and 3 (macro and meso-level in this example) residual links with corresponding predictors. Regrettably, such analyses are rarely reported. So one relatively easy change in practice is for reviewers and editors to mandate these analyses on a routine basis.

Causes of Endogeneity

Endogeneity arises when one or more predictors in the model are *not* exogenous. Three classes of conditions in a cross-sectional design can give rise to endogeneity [69: 147–195; 844: 50–51].

a. *Errors in variables.* These arise because measurement errors in one or more predictors may correlate with observed outcome scores. For example, the same data-gathering tool such as a survey or an administrative data source may be used to derive scores for one predictor and the outcome. With an administrative data source, data collection, cleaning, and updating procedures may generate measurement errors on predictors that link to outcome scores. This is one way monomethod bias (see chapter 8) can cause problems.

b. *Omitted variable bias.* A variable (Z) which simultaneously influences both one or more predictors and the outcome variable has been omitted from the model. It is through this mechanism that selection problems surface. This is the well-known spurious correlation problem [68: 469–475].

c. *Simultaneity.* The third source of endogeneity creating violations of the zero conditional mean assumption is simultaneous ongoing influence between a predictor and the outcome. The outcome and one or more predictors simultaneously may shape one another through bidirectional (nonrecursive) causal processes.

Responses to Endogeneity

Given these three sources, how does one proceed if endogeneity is verified? With cross-sectional data, there are various modeling solutions [69]. Typically in econometrics, one locates a variable or set of variables, available in the data set but not included in the theoretical model, and uses those to construct an instrumental variable (IV) for the predictor (X_1) that is correlating with the residuals (U). Key properties of the variable or variables used as instruments are high correlations with the variable (X_1) that they are replacing and much lower correlations with the outcome and with other variables in the theoretical model. There are a number of limitations with the IV approach, however, and these are noted in online appendix B.

Longitudinal Designs

When working with longitudinal data—for example, a panel design with repeated observations over time for the same units—identifying potential selectivity bias becomes more challenging and involves a number of highly technical issues. Econometric researchers have given the most careful consideration to detecting and addressing possible selectivity bias and the accompanying possible endogeneity problems [39: 266–275; 844: 254–269]. The reader is advised to consult those works. Most importantly, as noted in the earlier quote on endogeneity, this is an *empirical* question and cannot be resolved theoretically. The researcher simply needs to investigate.

Neither Inherently Cross-Sectional nor Longitudinal:

Arising from Missing Variable Problems

Some sources of selection problems are neither inherently longitudinal nor inherently cross-sectional. Selection problems can arise when one or more factors create missing data for some people on either the predictor or outcome variables [844: 560]. The missing information could arise from any number of dynamics including “incidental truncation, attrition in the context of program evaluation, and general nonresponsive” [844: 560]. It is in this form that the selection problem has been widely studied in labor-market economics, and techniques developed there have been applied to criminal justice and criminology generally [50, 333, 334].

Summary

This subsection sought to introduce a definition for nonrandom selection effects by briefly referencing how econometricians decide whether a predictor satisfies the exogeneity assumption in a cross-sectional context. Detailed discussion of testing that assumption in a longitudinal context was avoided, given the highly technical analytic issues. Just a few comments were offered on the types of selection dynamics that can operate (deterministic versus probabilistic), the types of samples that can result (truncated, incidentally truncated, or censored), and some of the ways the issue can be addressed. The two most important ideas in this section were the following. In some data situations, the researcher can readily check to see if there is an endogeneity problem arising from selection. Second, whether an endogeneity problem arises is an *empirical* question and is thus deserving of close examination. Questions of selection effects simply cannot be resolved theoretically.

AN ALTERNATE VIEW: DOCUMENT NEIGHBORHOOD EFFECT TRANSMISSION DYNAMICS

Some researchers have suggested a different approach for thinking about separating neighborhood effects from selection effects. This approach requires capturing specific, postarrival neighborhood processes with empirical indicators. In effect, this approach seeks to document the specific processes by which spatial contexts are thought to exert influence. Specific pathways of contextual influence are empirically estimated. This approach is a complement rather than an alternative to the analytic approaches described in the preceding subsection for exploring the possibility of an endogeneity problem.

Overview: The Ideas and the Challenge

Four postarrival types of processes have been proposed as potential carriers of neighborhood effects [376, 479]. Each of these mechanisms will be sketched shortly. Some scholars describing these have suggested that it has proven extremely difficult to separate which of these processes might prove influential [376: 115]. Other scholars have suggested that the separate influences can be untangled [744: 249]. Resolution requires conceptual clarification. “Efforts to determine *which* transmission mechanisms are more germane for specific behavioral outcomes” are needed [744: 249, emphasis in original]. In other words, there has been insufficient theoretical specification of the particular processes which “carry” influences of spatial context.

The position taken here is pessimistic about disentangling the operations of different postarrival processes underlying neighborhood effects. Here is why. The data required to document this set of four processes are extraordinarily onerous and unlikely to be met with real-world data sets when the spatial context in question is on the scale of communities, the focus of this book. Further, the pattern of findings required to document each mechanism is relatively complex, adding further analytic challenges. One example of these documentation difficulties for one transmission process will be given for illustrative purposes. The conclusion suggested is that rather than empirically documenting postarrival processes, researchers should investigate other potential ways to resolve the selection versus neighborhood effects question. Agent-based simulations (chapter 7) may prove helpful here.

The Four Processes

In a review focused on the race and SES impacts of schools and neighborhoods on adolescent outcomes, Christopher Jencks and Susan Mayer suggested four processes, three of which described social dynamics and one which described largely psychological dynamics [376]. Marta Tienda has called these “transmission mechanisms” for neighborhood effects [744: 249]. Potentially, all these mechanisms could be operating simultaneously. Different transmission mechanisms emphasize different influences. For example, the three addressing social dynamics are the following: (i) *epidemic models* which “emphasize [within-community] peer influences”; (ii) *collective socialization models* which “emphasize the role of indigenous adults”; and (iii) *institutional models* which “emphasize the role of outside adults” [376: 113].

Take the example of a youth stealing or not stealing cars. The three social processes could each emphasize a different local process leading to this outcome. (i) “Epidemic models focus on the way in which peers influence one

another's behavior, and they assume 'like begets like.' If children grow up in a community where a lot of their neighbors steal cars, for example, the children will be more likely to steal cars themselves" [376: 113]. This process has overtones of differential association theory [339, 355, 425, 588, 709]. (ii) The collective socialization model would suggest that adolescents will steal cars if the adult, respected role models in the community did that growing up, and those same models currently encouraged such behavior among adolescents. This has overtones of intergenerational cultural transmission. (iii) The institutional model would suggest that to the extent adult socialization agents originating outside the community—teachers, police officers, recreation-center personnel—discourage such criminal activities and are effective at communicating with community adolescents, there will be less auto theft by local teens [376]. This has overtones of a formal control model. (iv) The fourth mechanism, *relative deprivation*, focuses on psychological rather than social dynamics. It is the only one to assume that having more affluent people living nearby is disadvantageous. Relative deprivation crime models have been extensively researched, and those studies have not lacked controversy [388, 505, 550, 551]. Recent ecological work on concentration effects makes exactly the opposite argument [562].

Relative deprivation models assume that people judge their success or failure by comparing themselves with others around them. . . . The same logic also applies to children. . . . Some children who do not compete successfully respond by trying harder; others drop out of the competition. The relative frequency of these two responses depends on a wide range of factors, which are not well understood. . . . The theory of relative deprivation is a theory about individual psychology that purports to explain when people judge themselves successful and unsuccessful. It interprets deviant behavior as a by-product of these individual judgments. [376: 116]

According to this model, teens living in a community with many affluent neighbors or near a community with affluent residents would be more motivated to steal cars as a way to respond to their own feelings of being unsuccessful.⁹

Limits in Thinking about Transmission Dynamics

As already pointed out, theories about community impacts have insufficiently specified relevant transmission dynamics, given a particular theory and a particular outcome [744]. A second deficit in conceptualizing how

these mechanisms apply has been failure to consider individual differences [376: 123–124]. Thinking about which individuals would be more or less likely to be affected by local factors has been considered extensively by situational action theory [814]. Many theorists of neighborhood effects, however, appear to overlook the potential importance of person x context interactions in this area.

Neighborhood effect transmission mechanisms, albeit more spatially focused, have close affinities to a variety of contextual and non-contextually-based criminological theories including ecologized general strain theory, social disorganization, and differential association, among others [6, 122, 496, 709]. By ecologizing and spatially delimiting these processes, however, the evidentiary requirements become much more substantial, as does the pattern of results needed for convincing the researcher that these mechanisms might be operative.

An Example of Data Requirements

Imagine that one did observe a neighborhood effect of changes in a community structural factor (e.g., SES) on serious male delinquency prevalence as an individual-level outcome ($Ma-IA \rightarrow . . . \rightarrow Mi-O\Delta$). Focusing just on relatively broad contagion process, what types of data would be needed to verify that contagion might be a responsible transmission mechanism?

Tienda suggested, “models that posit contagion processes as key mechanisms producing neighborhood effects should represent these using *direct* measures of interaction, such as measures of social networks, rather than average measures derived from behavioral outcomes that presumably are produced by residential patterns” [744: 250]. This is a start, but much more is needed, especially if the model addresses change. A suggested list follows of the data elements that would be needed in order to make the case that this mechanism might be “carrying” an effect of a changing community attribute (e.g., SES Δ) on shifts in initial male delinquency involvement.

1. The analysis would need to be restricted to adolescents who had lived for a minimum period in the community where they resided at the time of their first officially recorded delinquency act. Of course, if there are duration ambiguity problems (chapter 7), any choice of a minimum neighborhood exposure period seems arbitrary. Nevertheless, the adolescents would need to be exposed to the locale for some specified period before the hypothesized dynamic could operate [376: 162]. Otherwise, the effects observed could be a result of mechanisms carrying over an effect of the previous community of residence.

2. The researcher would need to establish that the following conditions applied for adolescents who have been living in the community for a substantial period and have become delinquent: (a) the rate at which they interact with prodelinquency peers¹⁰ who live or hang out in the community is higher than the rate at which they interact with prodelinquency peers who live and hang out outside the community; and (b) prodelinquency peers in the community hold respected or valued positions in the adolescent's peer group. Point (2a) establishes that the influential network is located within the community of interest, rather than outside it. Point (2b) makes it more likely that the prodelinquency members of the *within*-community network will be influential.

3. For adolescents who have been living in the community for a substantial period and adjudicated delinquent, as compared to age- and sex-similar peers also living in the community for a substantial period but *not* adjudicated delinquent, (a) *within-community* social networks would include a higher fraction of prodelinquency peers, and/or (b) prodelinquency peers in social networks would hold more central positions and/or would be more valued and/or would be socialized with more frequently. Consider this example: Delinquent involved and noninvolved male adolescents in a community were equally engaged with prodelinquency individuals in local (within-community) networks and/or held those same individuals in comparable esteem. At the same time, a neighborhood effect of community fabric on delinquency was observed. If these conditions were in place and the neighborhood effect observed, the suggested contagion mechanism probably cannot be involved in causing that neighborhood effect.

4. Changes in these specified features of community networks, or changes relative to out-of-community network changes, should be evident in a theoretically specified period prior to initial individual-level official delinquency events. This is the cycling issue raised in chapter 7. That theoretically specified period for the community network changes can partially overlap with but cannot occur after the dynamics captured in the individual-level portion of the specified theoretical model. Stated differently, the changes in the community-level network features (Ma- Δ or Me- Δ) must be taking place before or during the period used to capture the individual-level dynamics (Mi- Δ \rightarrow Mi- Δ).

Data Requirements and Other Transmission Mechanisms

The foregoing suggestions are just for documenting one of the four proposed mechanisms. All four of these processes, or some subset of the four, could be involved in "carrying" a neighborhood effect. The other mechanisms

require additional data indicators. For the three other mechanisms, the data requirements are similarly complex. In the interests of brevity, they are not presented here.

Suggested Conclusion: Transmission Mechanisms and Neighborhood Effects

Conceptually, there are three challenges for verifying that the specified processes actually serve as transmission mechanisms for neighborhood effects. First, as already noted, clear models describing differential susceptibility to community conditions have yet to be developed. Many researchers appear to assume equal susceptibility across individuals. This is probably not correct, given what we know from some other person \times situation models of crime acts [814, 821]. Theoretical elaboration describing differential susceptibility seems needed.

Another challenge, already noted by researchers, is figuring out which transmission mechanisms are relevant to which outcomes. It is possible that multiple mechanisms are simultaneously relevant to a single outcome. This too is a theoretical concern. Researchers working with a specific theory expecting neighborhood effects should specify *which* dynamics might be relevant and why [744].

A third challenge, also theoretical, is articulating how these documented transmission mechanisms link to the full model under investigation. There are three possible arrangements. Documented transmission dynamics could become additional predictors in the model of the individual-level outcome. Theoretically, the impact of the contextual predictors (Ma- $I\Delta$ or Me- $I\Delta$) should be markedly reduced once the researcher includes mechanism indicators. Ideally, all the mechanisms discussed here would be assessed. A second possibility is to retain only that portion of each transmission mechanism which can be predicted by one or more changing community attributes (Ma- $I\Delta$ or Me- $I\Delta$). This effectively substitutes the context-linked transmission mechanism for the impact of context change. A third possibility would be to develop a separate selection submodel and to apply the appropriate corrections for selection in the main model.

Finally, turning from theory to measurement, the operationalization requirements look substantial. It seems to this author that they are so substantial that the four transmission mechanisms are unlikely to all be adequately operationalized in a large number of independent studies where each study has a large number of communities and captures changes over time. If so, this leads to the question, what other alternatives are there? Attention turns next to the randomized experiment as an alternative.

DO RANDOMIZED EXPERIMENTS OFFER AN ALTERNATE ANALYTIC APPROACH?

True experiments involving randomized assignment have long been championed as one type of research design that overcomes selection problems [210, 211]. If initial probabilistic equivalence can be established between treatment and control groups, that removes the selection problem. Of course, the quality and fidelity of true field experiments has improved enormously in the past two to three decades [625, 791]. Nevertheless, serious questions have arisen in criminal justice about what *actually* happens when random assignment takes place in criminal justice settings and whether experiments might “miss the target” [272]. Analogous concerns have arisen in community criminology around one recent large-scale field experiment.

MTO: Selection Bias within an Experiment

For criminologists interested in community impacts, as in criminal justice, there appear to be gaps between the hypothetical and actual value of true experiments in the field. This is illustrated with the current discussion around the MTO (Move to Opportunity) study. MTO is a five-city demonstration project. Resident households in HUD public housing communities were randomly assigned to three conditions: they could receive a rental voucher which stipulated that the destination location had a low poverty rate (< 10 percent), they could receive a traditional voucher to encourage relocation out of a public housing community, or they could receive no voucher. The first group was considered the experimental treatment, the latter two were control groups. Later evaluations revealed complex patterns of findings for relocated adolescents [151, 399, 453, 454, 455, 544].

Of most interest here are four points about the study. There was some slippage between aggregate versus individual-level outcomes. For example, as a group, people in the experimental group appeared to be in better communities later: poverty, victimization, and perceived disorder were lower, for example [152]. But individual adolescent outcomes presented a more mixed picture, one that also varied by gender [399]. Some groups of adolescents fared worse on some outcomes. Also, there appeared to be selective uptake within the experimental group. But selective uptake aside, among those who did take the voucher and move, subsequent mobility patterns differed [152]. Thus, the experiment contained multiple sources of selection bias: “selective acquiescence to the experimental manipulation” and “selective outmigration” [152: 121]. Further, it was not clear how necessary, useful, or insightful it was to attempt to correct for these selection biases within the broader

experiment and whether analyses of all those in the experimental group, regardless of whether they took the treatment, were sufficient [454]. Finally, questions arose about the extent to which MTO should be considered a study of “neighborhood effects” [637]. Even though many in the treatment group moved to new locations, the restricted range of neighborhoods out of which households in the treated group moved and other limitations of the study design and sample suggested that it might be a stretch to consider the study a test of neighborhood effects.

The gendered and complicated impacts on adolescent nonschool social behaviors suggested by analyses of MTO interim data have been echoed in other experimental evaluations of changing social contexts [197: 478]. This point takes us back to Jencks and Mayer’s suggestion two decades ago: we need to know more about how changing community context is differentially relevant, or relevant in different ways, to different types of individuals. This is also a fundamental premise of situation action theory [814].

In summary, randomized social experiments such as MTO may assist in removing some of the concerns around selection effects raised in this chapter. But those same studies, unless conducted within a theory that explicitly considers person x environment interactions, can be difficult to interpret when they reveal patterns of differential impacts.

COMMENT ON NEIGHBORHOOD EFFECTS, SELECTION, AND EXPERIMENTS

The literature considering different ways that neighborhood effects might operate and different techniques to control for potential selection effects is advancing rapidly. Researchers can mount increasingly sophisticated investigations such as those examining the impacts of multigenerational neighborhood effects [664]. At the same time, the vigorous debate about the relative merits of observational versus experimental studies continues unabated. These matters require close attention to theoretical specification, careful consideration of observed data properties, and use of appropriate—and, where possible, alternative—analytic techniques [24]. Figuring out how to proceed will depend on the specific theoretical context and features of the specific data set examined. Finally, there is a danger here of missing important selection dynamics by focusing on the wrong spatial selection issues. Recent work with juvenile shooting victims suggests that the paths selected by adolescents as they move within and outside their neighborhood contribute in important ways to risks of victimization [37]. So there are wheels within wheels. Within neighborhoods, various destinations at various times of day and week are

selected, and individuals select varying routes between various destinations. How these three broader varieties of spatial selection affect different outcomes in the community crime sequence remains to be pinned down.

Approach B: Effects on Nonspatial Contexts

Attention turns now to the second set of selection dynamics: impacts of nonspatial contexts. These cover a wide range of different situations: social, institutional, program, or treatments contexts. This type of selection effect has been widely considered in criminal justice research concerned with controlling for selection dynamics arising from earlier stages of processing. For example, if one is trying to estimate impacts of parole versus nonparole release on reconviction, one would want to control for the factors making parole selection more likely. That is, the researcher wants to separate the parole effect from the selected-for-parole effect [221]. Explicit and incidental selection processes are both of interest [130]. For this type of selection situation, Berk's work is foundational [50]. As with the other types of selection dynamics, a theoretically grounded approach to selection is needed (figure 9.3).

ALTERING THE METAMODEL

The corresponding dynamic metamodel for this type of selection appears in figure 9.4. The added selection submodel appears in the dotted rectangle.

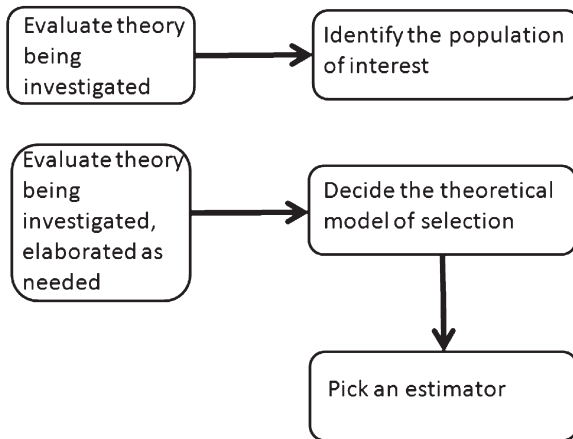


Figure 9.3. The process of identifying and operationalizing a selection submodel for Approach B dynamics. Adapted from Bushway et al. [130: 154, figure 1].

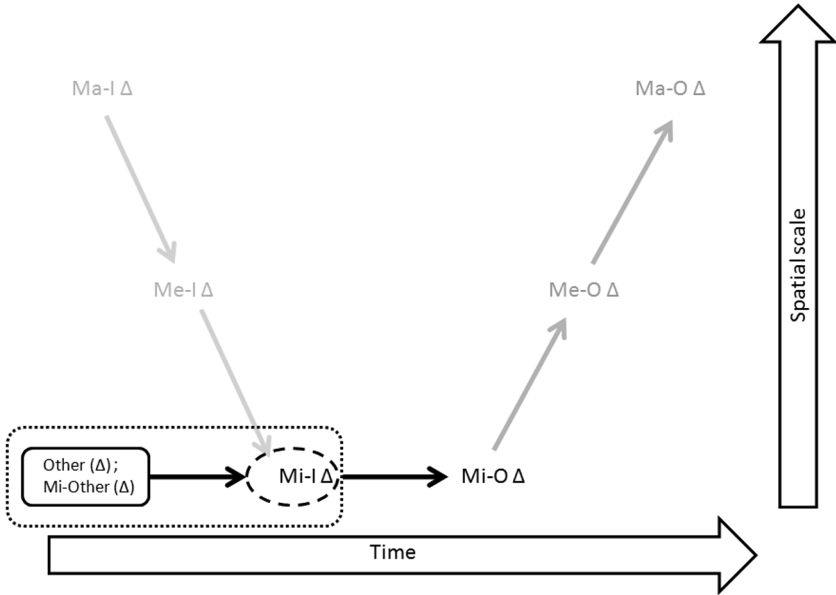


Figure 9.4. Metamodel in which selection effects arising from nonspatial contexts are of interest. Outcome focus is at the individual level. Selection model is contained in dotted rectangle. Grayed-out portions of the metamodel are not of substantive interest.

Features of the model no longer of interest are grayed out. The submodel can be read as follows. Other features of the individual (Mi-Other) or changes in other features of the individual (Mi-Other Δ) result in the individual, at the time reflected in the scores of individual-level predictor variables, being in a particular nonspatial context (e.g., released on parole versus released after sentence completion; associating at a minimum frequency with one or more age-similar delinquent peers). That nonspatial context is represented by the dashed ellipse around Mi-I Δ . The factors shaping that context need not necessarily be individual level. They could be nonrandom factors separate from the individual, such as program-assignment decisions (Other(Δ)). The modeling which captures the impact of changing individual-level predictors on changing individual-level outcomes (Mi-I Δ \rightarrow Mi-O Δ) controls for this temporally prior selection process.

Broadly, several features of the metamodel merit notice. It is no longer a boat or even partial boat metamodel because there is no reference to spatial context. The focus is simply on individual differences. The dynamics crossing spatial levels are grayed out because they are not relevant. In addition, although perhaps depending on the specific way selection is taken into

account, the selection predictors (Mi-Other(Δ), Other(Δ)) need to be somewhat different from the predictors used in the main model (Mi-I Δ). This is an exclusion restriction. Ideally, these exclusions are theoretically derived [130]. Further, the way this type of selection links to the metamodel is quite different from when the context was spatial. Yet they are both called selection. Finally, what is shown here can apply to both explicit and incidental selection processes.

RESPONSES TO SELECTION: ACCOMPLISHMENTS AND LIMITATIONS

A range of available analytic procedures take selection effects into account. Which technique to use, how to apply it, and the implications of different usages constitute another highly technical literature, which is skipped here [50, 130, 131, 522, 706, 837]. The following comments offer only a general outline of the approaches and issues.

Following what is done in econometrics, criminal justice researchers often develop a two-stage model. In the first portion of the model, the researcher models the factors that select the individual into or out of a specific non-spatial context. The researcher can then incorporate the results of this selection analysis into the main model. There are some areas where these selection models—theoretically and analytically—are relatively well understood. How potential female wage earners select themselves into or out of paid employment outside the home is a case in point [60, 334]. In criminal justice, much is known about the legal and extralegal factors leading cases to be retained for subsequent stages of processing [26, 232, 387, 751, 843].

Three challenges confront researchers addressing nonspatial selection. (1) *Analytic*: The researcher needs a selection submodel whose predictors are distinct enough from those of the main model that they satisfy the exclusion restriction. Of course, the selection submodel also needs to do a good job of predicting selection. (2) *Theoretical*: The researcher needs a selection submodel aligning theoretically with the main model being tested. Ideally the submodel would be derived from that main model. The theory being used may need elaboration to provide compelling rationales for the selection submodel predictors (figure 9.3). (3) *Statistical*: The researcher needs to apply the correct technique.

Scholars assessing criminal justice work in this area suggest that the latter two challenges have not been met. Rather, the correction for selection “has typically been implemented in a mechanistic (and often incorrect) way to deal with the acknowledged selection problems. In general, there have been few attempts to model the selection process. . . . There has also been little

independent progress in the development of criminal justice theory” [131: 409–410]. Researchers looking at other areas beyond criminal justice suggest that the problem is broad, afflicting other disciplines also concerned with practical outcomes [384]. “The literature on how to deal with selection bias has not yet found its way to the practice of the applied researcher” [24: 21].

SELECTION AND THEORETICAL SPECIFICATION

Bushway’s criticism that criminal justice researchers often pay insufficient theoretical attention to selection processes applies to some criminologists as well. This section notes specific ways theory in this area has been insufficiently developed [740].

Definitions of Selection That Are Too Narrow

Studies considering selection in nonspatial contexts sometimes define the selection process too narrowly. For example, an analysis of crime among participants in the Dunedin (New Zealand) study argued that respondents self-selected into different social groups, creating either prosocial or antisocial peer groupings. Selection into these groups was seen as driven largely by levels of self-control [847: 322, figure 2]. Such an approach effectively equates all relevant selection dynamics with a relatively narrow set of social ties. Such a focus may be too narrow. It implies that these social choices drive *all* other selection dynamics: where an individual goes, with whom, and when. In this view, individual choices or habits around how much time to spend with delinquent or criminally involved others in unsupervised places, a key exposure dynamic in situational action theory, emerge *solely* from preceding social selection processes [821]. Stated differently, this view ignores selection dynamics linked with spatial context (Approach A).

Such a view seems oversimplified. The presumed complete overlap of social and spatial selection should be investigated empirically rather than assumed. An individual may decide to spend more or less time in a criminogenic setting depending on mood, affiliation with people outside his broader selected social group, parental restrictions, or ongoing variations in local activities, including what has or has not happened recently in the setting in question. To put the point most generally, there could simultaneously be one or more selection dynamics operating with respect to multiple nonspatial contexts (Approach B) and one or more selection dynamics operating with respect to spatial contexts (Approach A). The author is not aware of any research assessing this possibility. Statistical models of cross-classified effects, allowing the separation of, for example, neighborhood from school

effects, or multiple membership models, outline ways these multiple selection dynamics might be analyzed once theorizing and operationalization has advanced [110, 585].

Presumption of Spatially, Temporally, and Outcome Invariant Selection Pressures

Treatments of selection effects in the criminological literature generally presume temporal and spatial stability. Selection processes, once set in motion, often are expected to play out in uniform ways across space, time, and different outcomes. For example, Bradley Wright and Jean Marie McGloin in some publications seem to assume that intrapersonal factors drive social selection dynamics and that these social selection dynamics have general effects on delinquent or criminal behavior [488, 847]. They presume—apparently—that these selection effects are broadly influential across a range of deviant, delinquent, or criminal behaviors and across a wide array of settings and times. This may or may not be correct. An alternative plausible assumption is that the likelihoods of entering various locations at various times could depend on time- and/or place- and/or group-dependent selection dynamics.¹¹ Such selection dynamics might extend beyond or complement the selection dynamics linked to just one network.

Selection Not Modeled Separately

Researchers sometimes amalgamate the selection equation with key theoretical equations. The relationship between low self-control and affiliation with deviant peer groups is a case in point. Control theory and the general theory of crime both argue that the “feathering” comes before the “flocking” [281, 352, 353]. “Following the control theory tradition, we have argued that the correlation [between respondent delinquency and peer delinquency] is a combination of selection effects (people associate with people like themselves) and measurement errors (regression and contamination—the tendency of people to ascribe their own tendencies to their associates)” [353: 66].

If selection is explicitly modeled, under most circumstances two analytic components are required: modeling of the selection and modeling of the key outcome after taking the first into account. In the examination of impacts of deviant peer groups on delinquency, it would seem advisable to use longitudinal data, treating entry into deviant peer groups with a selection submodel that is separate from the main model predicting delinquency. Researchers sometimes do not do this [488]. Not separating the two phases may, depending on the specific theoretical context, run the risk of muddling selection dynamics with dynamics related to the outcome of interest.

Location of Selection Dynamics

Typically, and the general theory of crime is a case in point, selection dynamics are framed as intraindividual [281]. Theorists and researchers alike presume that individual differences along some physical, psychological, or behavioral dimensions facilitate some individuals self-selecting into groups or settings where delinquent or criminal behaviors may be more likely. Intrapersonal attributes such as low self-control could lead the adolescent to affiliate with peer groups frequently involved in delinquent or criminal activity or to spend significant amounts of discretionary time in unsupervised locations where surrounding adult collective efficacy is low.

Selection dynamics, however, might be more complex, arising from transactions between individuals and groups or between individuals and settings. Further, both spatial and nonspatial context selection dynamics could vary over time. For example, an individual's willingness to enter some criminogenic locations may depend on features of the place itself, on the individual, on the particular time, on surrounding conditions including who else is present, and on interactions between intraindividual and extraindividual factors. A less risk-averse teen may be more willing to go unaccompanied into a club which is a known hangout of troublemakers. A more risk-averse teen may go only with one or more close and trusted peers.

Implications for Individual-Level Dynamics

The foregoing discussion has substantial implications for the Mi- Δ \rightarrow Mi-O Δ link(s) in the metamodel. In theoretical contexts in which it is plausible that selection dynamics are operative, this link cannot be appropriately specified unless the following conditions are met. (1) Theoretically congruent, theoretically prior, selection-relevant dynamics are considered, preferably in a selection submodel. (2) The selection submodel is theoretically distinguishable from but also theoretically congruent with the main model. (3) The results of that submodel are properly applied to the main micro-to-micro model link.

Approach C: Selection as a Contributor to Macro-Level Extracommunity Differentiation

A third approach aligns community criminologists with scholars in other fields interested in the ecological impacts of selection. This stance focuses on "the social consequences of residential selection. . . . The question becomes how individual decisions *combine* to create spatial flows that define the ecological structure of inequality, an example of what Coleman . . . more broadly argued is a major underanalyzed phenomenon—micro-to-macro relations"

[646: 2]. The emergent ecological outcome of interest may align either with a locational attainment model or a place stratification model.

The latter model suggests that competition, especially political competition, “normally reinforces the existing [between-place] stratification because initial advantages—translated into political power—can be maintained” or even strengthened [449: 406]. It is a dynamic grounded in political economy [450]. This is an ecological concept and dynamic. Ecological outcomes (Ma-O) could be the pattern of stratification over a set of communities or the position of individual communities in a hierarchy. The stratification model has proven useful in explaining barriers to racial integration for African Americans [147].

“Locational attainment” refers to cross-level processes and the factors linking individuals to higher-status locales. Richard Alba and John Logan “mean the term to denote an analysis that would focus on how the characteristics of individuals . . . are linked to some feature of their communities” [11: 1389]. For example, in one of their studies focusing on “the conditions under which suburbanization brings desegregation,” the outcome of interest was “the percentage of non-Hispanic whites among residents” at the community level [11: 1389]. In effect, they traced links between individual-level demographics (Mi-I) and desegregating suburban community composition, a macro-level outcome (Ma-O). Another perspective is the spatial assimilation model, “which asserts that individuals convert socioeconomic gains into higher-quality housing, often by leaving ethnic neighborhoods for areas with more whites; for immigrants it also involves acculturation” [147: 176]. This model has been applied to mobility and segregation dynamics affecting non-whites who are not African American.

The race/ethnic specificity of selection dynamics and subsequent ecological outcomes sometimes surfaced in Robert Sampson and Patrick Sharkey’s analysis of PHDCN mobility patterns. For example, they found that whites and Latinos but not African Americans were more likely to move out in response to changes in racial mixing in the original neighborhood. They also found differential impacts on destination selection across ethnic/racial groups. Further, exposure to violence increased the odds among African American movers of selecting a destination outside Chicago [646: 21, table 4]. But, in contrast, for *all* groups, current neighborhood quality, captured with median income, appeared to be adversely affected by both exposure to violence and the number of family members having a criminal record [646: 17, table 3]. Sampson and Sharkey’s findings taken together point to individual self-selection actions generating broader, ecological consequences.

Self-selected mobility in response to local conditions reproduces and often intensifies ecological stratification.

Ironically, then, neighborhood conditions appear to matter a great deal for influencing neighborhood selection decisions, suggesting a different kind of neighborhood effect—*sorting as a social process*. Profound residential stratification . . . is reproduced as the complex result of choices actively made by movers and stayers in every racial/ethnic group. . . . This perspective views individuals as making heterogeneous choices and revealing their preferences about where to reside, with the parameters of choice tightly bounded by the stratified landscape in which choices are made. [646: 26–27]

Sampson and Sharkey have produced a valuable insight. Digging below this broader conclusion, however, unearths several complexities. The relevant underlying theoretical model may depend on the racial/ethnic group and the actual metropolitan area as well [147]. In addition, the roles of specific conditions likely to be of most interest to readers of this volume, such as exposure to violence and the presence of known offenders, may depend on the outcome in question and/or the specific racial/ethnic group considered. The Sampson/Sharkey perspective on how self-selected mobility in response to neighborhood conditions reproduces and perhaps intensifies ecological stratification has obvious implications for theories of urban and regional stratification and for mobility studies.

What are the main implications for community criminology? First, local crime and community-level criminal justice agency actions are both implicated. These conditions, as experienced by individuals and households, shape individual-level mobility-related outcomes. Researchers can build on these implications to better specify how crime and justice agency actions alter individual community quality, broader patterns of community inequalities within a municipality, or supracommunity inequalities across a broader region. In addition, the specifications just described may prove highly contingent. Thus, the process of theoretical elaboration is likely to proceed slowly, because it must address individual \leftrightarrow context connections. Finally, in such models, over an extended period, it is plausible that local crime and justice agency experiences alter mobility patterns. It is also plausible that the resulting community or supracommunity features across a region such as segregation or economic inequality in turn shape later local crime levels and local justice agency actions such as removal and return rates. In other words,

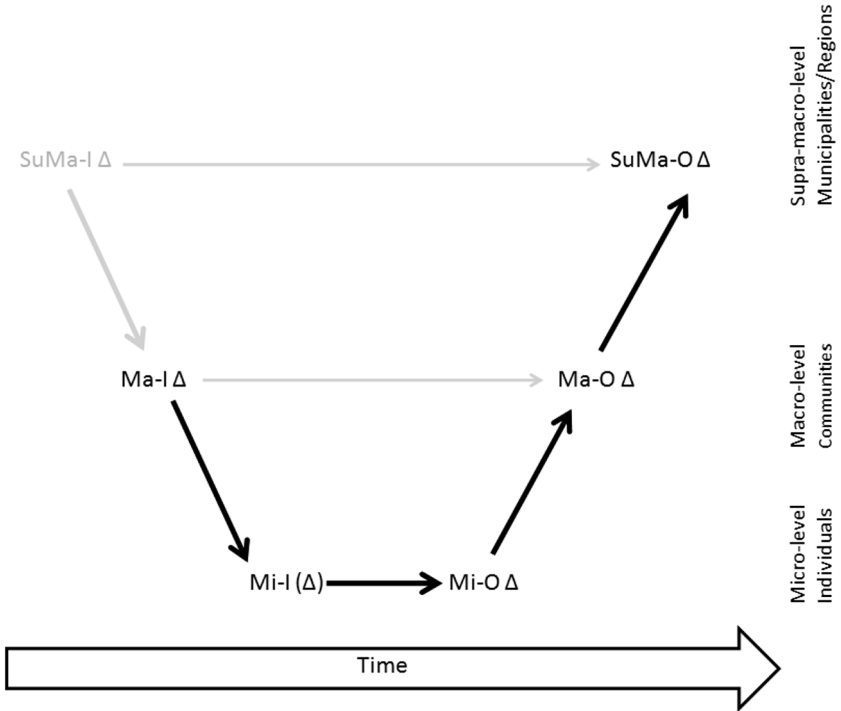


Figure 9.5. Relevant portion of boat metamodel when selection is seen as a social process with ecological outcomes, as described by Sampson and Sharkey. Portions of the metamodel not of interest are grayed out.

when an extended time frame is considered, such models require consideration of crime and justice agency actions as *both* cause and effect.

How do we incorporate Approach C into the boat metamodel? Figure 9.5 highlights relevant dynamics. To understand selection as an *ecological outcome* requires understanding the micro \rightarrow macro mechanisms, shown here in two parts. Individual-level or household-level outcomes ($Mi-O\Delta$), such as leaving a community, municipality, or metropolitan area, change community structural fabric ($Ma-O\Delta$). How sizable those macro-level structural changes are, in terms of ethnic, racial, or socioeconomic status, will depend on a range of factors. One of Sampson and Sharkey’s main points is that those changes may be less than expected, leading to “the self-reinforcing cycle of inequality” and durable neighborhood differences [638: 308]. It is also clear that these differences at the community level create broader spatial differentiation, labeled here as a supramacro-level outcome ($SuMa-O\Delta$). If Latino

Chicagoans from Latino nonpoor neighborhoods transition to beyond-Chicago, white, nonpoor destinations more often than do black Chicagoans from black, nonpoor neighborhoods, the community-level patterning of race/ethnicity across the Chicago metropolitan area shifts over time [646: 24, figure 4]. In Chicago, as elsewhere, patterns of suburban, metropolitan desegregation differ along race, ethnic, and subethnic lines [10, 11].

Individual-level inputs shape individual migration outcomes; if the individual moves to a different neighborhood, then from Sampson and Sharkey's perspective, a change has occurred (Mi-O Δ). Intra-neighborhood migrations are not of interest from this perspective. This outcome captures not just moving out of the origin community but also the qualities of the destination community, especially the similarities and dissimilarities between the two locations, origin versus destination neighborhoods, along socioeconomic and racial/ethnic dimensions. A complex web of individual-level inputs (Mi-I(Δ)), some of which may be stable (e.g., race) and some of which may be time varying, help predict these individual-level outcomes. Shifts in time-varying individual factors can arise from intrapersonal as well as contextual factors. The latter may include neighborhood structural factors (e.g., recent neighborhood racial change) and perceived neighborhood cultural factors (e.g., reported exposure to violence). Sampson and Sharkey's work suggests that structure and culture both play important roles [638: 298–302; 640].

Two portions of this expanded boat metamodel have not been explicitly modeled in the work by Sampson and Sharkey on migration. Both these portions are grayed out in the figure. Potential direct influences of macro-level community features and/or feature changes on community changes (Ma-I(Δ) \rightarrow Ma-O Δ) and parallel impacts at the supramacro, for example, municipality or MSA, level (SuMa-I(Δ) \rightarrow SuMa-O Δ) are not tested. This exclusion, of course, aligns with the researchers' concentration on micro \rightarrow macro pathways.

Closing Comment

This chapter assumes that the community criminologist has resolved the spatial and temporal scaling matters and construct validation concerns described in previous chapters. If so, and only if so, the researcher is ready to develop a conceptual approach to selection effects congruent with the specific theories being tested or developed. The broadest lesson of this chapter is that questions about selectivity bias only can be solved in the context of specific theories and outcomes. There is no one answer or approach at the level of metamodels.

In fact, and this is the second broad lesson of this chapter, there are three different ways that selection can create concerns at the level of metamodels. This suggests three different approaches to the broader issue of selection. One of these approaches does not “solve” the other two, nor is one approach inherently superior to either of the other two. Rather, these are just three different, distinct facets of the same cluster of issues. Different approaches focus on different mechanisms or sets of mechanisms. In community criminology, previous researchers have failed to appreciate the distinctiveness of these three aspects of selection. They also have not yet clarified under what conditions multiple aspects of selection are simultaneously relevant.

Approach A controls for spatial selection effects to gain cleaner estimates of the effects of community context on individual-level outcomes. This approach may be of most interest to community criminologists interested in documenting effects of community crime rates or crime-rate changes on noncrime, individual-level outcomes (links 1 and 2 in the boat metamodel). There are two routes to these cleaner estimates. One requires documenting and controlling for theoretically relevant, pre-community-arrival, individual-level attributes. The researcher hopes that once these prearrival factors are controlled, neighborhood effects remain significant. The second route requires documenting post-community-arrival, theoretically relevant dynamics linked to the outcome of interest. The researcher must decide how many of the four proposed postarrival dynamics transmitting neighborhood effects are relevant. He or she hopes to find that these postarrival dynamics “carry” or mediate the previously observed neighborhood effects. Both of these routes may require significant theory expansion by the researcher. Further, both routes present monumental and perhaps insurmountable operationalization challenges if empirical estimates are sought.¹² Agent-based simulation models may prove helpful in light of such operationalization challenges. With Approach A, there is one bright spot. In some circumstances, researchers can conduct routine residual checks to learn whether this type of selection effect is even a problem.

Approach B seeks to control for nonrandom selection into nonspatial contexts. This approach may be of most interest to researchers simultaneously considering spatial and social contributions to delinquency, offending, or victimization outcomes for individuals. Building on work in other disciplines, especially econometrics, criminal justice researchers appear to have made some headway using this approach. Some scholars have suggested, however, that some of those efforts to model and control for selection dynamics have been undertheorized and/or inappropriately conducted. Researchers concerned with individual-level criminological rather than

criminal justice outcomes have just started taking nonrandom selection into account. Some researchers may have adopted oversimplified assumptions about how selection operates. Such assumptions need testing.

Approach C investigates selection as a social sorting process with ecological consequences at the community level and at higher spatial levels such as municipalities and metropolitan areas. Individual actions, such as moving out of a neighborhood or out of a city, generate, at broader spatial scales, durable ecological consequences. They reinforce or exacerbate spatial inequalities along racial or economic lines at multiple spatial scales. In Hawley/Bursik terms, they maintain ecological continuity at the ecosystem level by strengthening differences between different ecological niches within a region. Work exploring this approach suggests that even researchers whose models align with methodological holism probably at some point would be wise to consider selection dynamics. This approach is likely to be of interest to community criminologists interested in tracing out the processes by which community crime conditions alter intra- and intercommunity structural patterns across time and space.

Which of these three approaches to selection is relevant, how the relevant approach should be modeled, and whether multiple approaches might be needed in one theoretical model depend on the specific outcomes and theories being investigated. There is no “solution” at the level of metamodels. Regardless of whether a researcher’s model aligns with methodological holism, methodological individualism, or something in between, his or her model should—if possible—be tested for possible selection effects and, depending on the results, elaborated to include a selection submodel.

Integration and Metatheoretical Concerns

Is Progress Possible?

It's a bit of an embarrassment not to understand 95 percent of the universe!

—Chris Impey, Professor and Deputy Head, Department of Astronomy, University of Arizona, on dark matter and dark energy (2010)

One of the most persistent yet elusive goals of the criminological enterprise has been the development of a “full” perspective that integrates structural, psycho-social, dynamic, and situational factors into a logically consistent, all-encompassing model of crime. . . . The development of such a framework is much easier to advocate than it is to actualize.

—Robert Bursik (2001)

Any sociologist influenced by scientific protocols knows that gathering aggregate-level data is by itself only a partial achievement. One must eventually make inferences about real people acting in concrete situations.

—Sudhir Venkatesh (2012)

Organization of the Chapter

This closing chapter summarizes some of the broader purposes of the volume. It then connects some of the main points highlighted in the volume with specific purposes. Further, it considers, in the very broadest terms, why this approach rather than another one? Alternative metatheoretical approaches are noted along with reasons for not adopting them. Third, a final section looks forward. In part, this section is a response to what is sure to be the reaction of many readers to the materials in this volume: don't you think you're asking a little much? I readily admit that I am asking a lot on the part of community criminologists. I am asking many of them to get out of their comfort zones, to grow skill sets, to become part of collaborative teams

with broader analytical and theoretical foundations, and to deepen their conceptual analyses. Any of these changes are likely to spawn discomfort. But if this field is to advance in terms of both its prediction and understanding capacities, there are bound to be growing pains. In order to specify how this growing might work, I speculate on research and career choices made by a hypothetical newly tenured professor in a department of criminal justice, criminology, or sociology. I then offer a closing reflection.

A Look Back

This entire volume has simply sought to clarify a small number of issues, located at the interface of conceptualization and measurement in community criminology. These matters apply to a wide array of theories, so the approach adopted here emphasizes metamodels, tools for how we construct, compare, and generally organize conceptual frames. The arguments here, at their broadest, suggest that community criminology can progress theoretically and provide sound policy advice only if researchers carefully and systematically address the concerns described in this volume. These concerns are also metatheoretical because they pose fundamental questions about our ideas regarding the causes of social changes and individual behaviors related to crime in communities.

The current effort is symmetric in that it considers both the causes and the consequences of community crime rates. Embracing both causes and consequences implies that researchers should integrate their theorizing with developments in other fields such as political economy, urban sociology, and the like. Metaconcepts such as structuration and concepts such as use value and exchange value may prove particularly helpful for sorting out consequences of community crime rates.

In order to convince the reader that the enterprise undertaken here was needed, the following points were suggested. The sturdiest covariates of community crime rates highlighted in a meta-analysis less than a decade ago confirm some of the same patterns witnessed empirically with delinquency in the first quarter of the 20th century. Researchers pursuing ecological research with only cross-sectional ecological indicators run the risk of continuing to find things we have known for close to a century. Further, conceptual missteps or fallacies in our thinking, some also addressed in the first quarter of the 20th century by leading scholars at the time, continue to be overlooked. Finally, some current scholars who have argued for the irrelevance of spatial and temporal scaling for some rates of violent community crime appear to have overstated their case.

Complex Crime Sequences in Communities

One of the broad ideas developed here (chapter 2) was that researchers need to think in a more complete way about crime dynamics within a community. In their stance toward community crime variables, many researchers seem to have adopted a stance of strict operationism that borders on being atheoretical.

Further, focusing just on one or two crime rates leaves a lot out. The case was made that in any community at any given time, there are three crime sequences that are simultaneously unspooling: delinquents and delinquency, offenders and offending, and victims and victimization. Of emerging importance is a key insight from current coercive mobility scholarship that local justice agency actions are deeply woven into each of these sequences. As each sequence shows, by the time the sequence arrives at an official delinquency or offense or victimization incidence rate, types of data widely used in community criminology, a lot has happened that involves actions of local justice agencies.

Therefore, challenging though it may be, it is recommended that community criminologists, regardless of whether they are interested in causes or consequences of community crime rates, seek to include indices of local criminal justice agency actions: removal rates, return rates, supervision rates, and rearrest rates would seem to be some of the most crucial. In the US anyway, given historically unprecedented and spatially and racially stratified increases in incarceration and supervision rates in the latter decades of the 20th century, inclusion of such indicators would seem to be imperative. Without such indicators, critics can make a case that any communities and crime model is theoretically underspecified and therefore potentially misleading.

Context and Agency Both Considered through Boat Metamodel

This volume sought a perspective which would align with two of the most key theoretical challenges in social science theorizing for those who favor methodological individualism: understanding how context and agency actually operate. The context question asks, how is it that a surround affects an individual? This is the macro-to-micro link. There are many different ways to frame an answer. Situational action theory, for example, concentrates on an individual's perception/choice processes in particular situations. The agency question asks, how is it that smaller-scale units, such as individuals or small groups, can affect larger social units? This is the micro-

to-macro link. Again, many alternative approaches are feasible. Both questions contain significant conceptual challenges to our thinking and assumptions (chapter 3).

The approach taken here was to adopt and elaborate the Boudon-Coleman boat metamodel (chapter 4). When used within a framework of methodological individualism, it offers a heuristic that includes but also clearly separates the context and agency issues. The two most fundamental ideas within this framework are that all aggregate outcomes emerge initially from the behavior of individuals and that all individuals are shaped by their immediate societal context. The implication is that any causal model focusing only on aggregate relationships risks overlooking or perhaps misunderstanding macro-to-micro and micro-to-macro dynamics and the causal roles they play. As discussed in chapter 3, these issues have been the topic of vigorous debate in the philosophy of social science.

Spatial Scaling

The boat metamodel used here organizes spatial and temporal scaling issues pertaining to community criminology. These two sets of issues often have been misunderstood or overlooked, resulting in conceptual confusion (chapter 4). For both sets of issues, researchers are urged to make scaling decisions about their data units that are theoretically consonant and contextually relevant, and to attend to the links across the different points of the temporal or spatial range.

The metamodel adopted and the conclusions of other scholars of aggregation issues clearly favor the discontinuity as opposed to the homology assumption across different spatial or temporal scales (chapter 3). Given the stance on spatial and temporal scaling adopted here, an ongoing research stream arguing for invariant relationships between demographic covariates and some violent crime rates is called into question *if* a strong version of that argument is assumed.

The boat metamodel provides helpful and specific ways for conceptualizing spatial autocorrelation dynamics (chapter 4). The heuristic organizes spatial error dynamics, spatially lagged outcome dynamics, and spatially adjacent predictor dynamics in clearly separate ways. It also encourages spatial researchers to unearth the origins of these various spatial dynamics.

One other point about spatial scaling: the boat metamodel poses questions for current advocates for place criminology (chapter 5). This emerging, largely meso-level research stream within environmental criminology may not provide the analytic simplicity suggested by its proponents, may lead to

misleading conclusions unless cross-level dynamics are appropriately considered, and may contain within it fundamental confusions about whether places cause crimes or merely host them.

Temporal Scaling

Temporal scaling questions (chapters 6 and 7), which parallel spatial scaling questions in many ways, appear overlooked by many community criminologists. Consequently, many theories are afflicted with either durational ambiguity questions, time horizon questions, or both. Such questions create conceptual confusion and limit the possible policy utility of theories.

The Hawley/Bursik ecological perspective (chapter 6) raises questions about any communities and crime analysis based solely or partly on ecological cross-sectional variables. In order to separate the portions of variables associated with ongoing ecological continuity versus ecological discontinuity, it was recommended that researchers concentrate on longitudinal models.

Interim Solutions and Simulations

The levels of empirical detail required for addressing the temporal and spatial scaling issues discussed here are probably not going to be matched by most, if any, currently available data sets. Ways to get there in the future are considered later in this chapter. But alternative methodological approaches, especially geographically situated, agent-based simulation models, may prove helpful for preliminary testing of these scaling questions (chapter 7). In fact, some of this work already has begun in a number of areas including routine activity theory, drug-market dynamics, and police prevention effectiveness. Issues of data paucity should not foreclose the vigorous examination of the temporal and spatial scaling issues discussed here. Of course, the simulations that community criminologists build in the future ultimately must be validated against observed data patterns at some level of specificity [51]. Qualitative data can be used either as a construction or validation frame [354].

Separate from questions about temporal and spatial scaling are two other broad issues preventing progress in the communities and crime research area: construct validation concerns and selection effects.

Construct Validation

Confusion about construct validity is apparent in research that attaches static demographic or land use indicators to constructs specifically referencing

social dynamics (chapter 8). For at least one theory, social disorganization, systematic review of recent publications revealed widespread semantic ambiguity as reflected in indicator/construct mismatches. A research program, framed within a dynamic boat metamodel, could begin to answer some of these important construct validity questions. A two-step program was suggested. It would start with the traditional focus on convergent and discriminant validities. Then, building on recent insights in the unified construct validity approach, it also would examine a range of links for the key theory of interest *and* for competing theories.

It is vitally important to establish construct validity for key indicators in key community criminology theories. Until this is accomplished, attempts to gauge the relative merits of two different theories will be like using a rubber ruler for measurements.

Selection Effects: Three Distinct Dynamics

Selection effects (chapter 9) due to the nonrandom selection of individuals or households into communities present an enormous conceptual challenge to interpreting any communities and crime model. Viewed from the vantage of the dynamic boat metamodel, they present three separate areas deserving attention.

On the macro-to-micro input side of the boat metamodel, selection effects represent potential alternative explanations for any macro-to-micro impacts observed. Researchers have suggested post-context-arrival mechanisms which might carry neighborhood effects. If impacts from these mechanisms were observed and context impacts concurrently diminished, it would decrease the chances that observed context effects arose largely from selection effects. It was suggested, however, that the data and analytic requirements for operationalizing all four of the described postarrival mechanisms transmitting neighborhood effects are extremely daunting and unlikely to be realized by most researchers.

On the “floor” of the boat, concerned with individual- or household-level processing, researchers have considered selection into nonspatial contexts. Efforts to date, however, appear limited in several respects and in need of further conceptual development.

Traditionally, true experiments have been proposed as ways to “solve” the nonrandom selection effects question arising from either spatial or nonspatial contexts. Recent work with data from a significant randomized project, Move to Opportunity (MTO), suggests that multiple levels of selection may operate even within a true experimental design. Experts disagree on

whether that matters. The implication is that true, large-scale experiments are unlikely to definitively resolve questions about selection effects versus *neighborhood*-context effects. This is not only because of such studies' limited applicability to key community criminology questions. It is also because of dynamics ongoing within experiments.

Selection effects prove relevant in a third way by shaping micro-to-macro links. Selection dynamics appear not only to arise from ongoing structural differentiation and inequalities across communities but also to cement and even deepen some of those inequalities. This approach views selection not as a nuisance but rather as a dynamic playing a key role in ongoing ecological differentiation at the community and supracommunity levels.

Three modest suggestions for dealing with selection effects were offered: that researchers routinely conduct the residual analyses which can reveal whether selection is a problem for some data structures; that researchers separate the three different ways selection contributes to different parts of the boat metamodel and focus accordingly; and that researchers try and address the selection problem within the specific theory being investigated, conceptually articulating a selection submodel congruent with the theory under examination. Multiple aspects of selection may be simultaneously applicable, depending on the researcher's purpose.

Other Views

Are there metaperspectives that could have been adopted besides the Boudon-Coleman heuristic developed here? Absolutely [81: 30–32]. Numerous other paradigms could have been elaborated [410]. A naturalistic or positivistic view aligned with methodological holism, for example, ignores questions about human intention and rationalized human behavior and concentrates simply on the relative strengths of different ecological correlations. This approach requires considerable caution [836: 126]. Community criminologists have been led astray in the past using this approach [278].

Another paradigm is to keep the focus on what is happening at different levels but to adopt a positivistic view of strict operationism, rejecting ideas such as intention, motivation, or expectation and giving up on the idea of “understanding” what is happening [81: 31; 106; 233]. Such a strict operationism directly contravenes Messick's view about constructs and indicators [500].

The author strongly encourages other community criminologists to develop other metaperspectives on the topics addressed here. Metamodels provide a grammar for talking about theories. In the same way that there

are many different languages and grammars on the planet, there are many approaches to developing metamodels.

Differences Arise from two Alternative Social Science Worldviews

Schisms between different approaches to metamodeling are widely recognized in social science disciplines such as sociology and psychology. In sociology, Boudon contrasts the “Weberian paradigm of action,” which is more likely to be paired with methodological individualism, with a Durkheimian structuralist view, which is more likely to be paired with methodological holism [81]. Most ecological community criminologists have followed a Durkheimian view. Many are likely in the future regardless of the perspective developed here. That is as it should be in a pluralistic research universe. The important question is whether the Durkheimians can hold to their views and at the same time adequately address the roadblocks to conceptual progress identified in this volume.

Another reason for disagreement on metatheoretical perspectives is because of the effort involved in embracing the view promoted here. It is going to require a lot of work on the part of a lot of researchers, not to mention substantial research funding. The latter may not be forthcoming in the present economic environment.

A Look Ahead

The foregoing challenges notwithstanding, if I was a newly tenured professor in a criminal justice, criminology, sociology, or political science department and was interested in making it my life’s work to unpack the problematic features of community criminology outlined here, how would I proceed? How would I map out the next two-plus decades of my research career around these topics?

I would situate myself in an urban or metropolitan context that had several features: a sizable city with cooperative police, parole/probation, and correctional and juvenile justice agencies. “Cooperative” means that they are willing, after I have earned their trust and proven useful to them, to develop data-sharing agreements. Data in GIS format are essential for aggregating and disaggregating spatially and temporally in different ways. Developing those agreements could take at least three to five years if I was starting from scratch in a new location. It also would help if these departments had strong management information systems (MIS) departments or reported their data up the chain to a reliable regional or state agency, also willing to cooperate,

so that multiple jurisdiction issues could be addressed. As Bursik has pointed out, the relevant ecosystem current in urban areas is probably the metropolitan region [121]. The more coverage of a metropolitan region the better, although this multiplies data and cooperation difficulties enormously.

I would start building a research team that was both multidisciplinary and skilled in a range of research techniques. Particularly crucial are skills with geographically based agent-based simulations. Expertise in multilevel / mixed effects modeling, preferably from a spatial epidemiologic perspective, also would be pivotal. Given the discussion about alternative technologies including behavioral observation and visual anthropology, a willing collaborator with skills in those areas would be desirable as well. A skilled qualitative researcher would be needed to help build grounded theories of crime dynamics in settings. Ideally this person would be a well-trained anthropologist. Someone in political science, planning, social work, urban studies, or urban sociology would be needed to work on deciding about levels of community, to carry out community mapping if feasible, to think about extracommunity dynamics, and to make estimations about what alternative spatial units at different levels might be appropriate. It also might be possible to draw in a wider range of collaborators from other institutions who could work on pieces of the puzzle.

With that team in place, and with data coming in from the various agencies, we could begin to capture and describe key features in the three crime sequences described in chapter 2. At community and subcommunity levels, we could begin modeling how the crime, criminal, delinquent, delinquency, removal, return, and supervision rates behaved over time and space and linked to one another. It would probably take a substantial data period, at least three to five years, to begin to isolate the interesting places and times wherein changes were taking place rapidly, and to gain insight into the connections within and across sequences. The crime regimes approach may prove helpful for identifying key periods when components in the community crime sequences shift markedly in the broader ecosystem.

Using annual estimates about demographic position and changes at theoretically appropriate community and subcommunity levels, we could begin to describe relative ecological positioning on key niches and how some communities might be shifting over short-term time scales. These short-term demographic analyses could be complemented by longer-term analyses capturing, for example, the past two or three decades of change. Equally crucial would be detailed, thick, localized descriptions by an ethnography/anthropology team. Systematic land use indicators could be collected and changes monitored. The same analyses would be conducted on the individual por-

tions of the crime sequence identified. Depending on the volume and patterning of the elements in the three crime sequences, it may be necessary to work within significant spatial and/or temporal constraints, especially when the focus is on changes.

Next up could be getting panel designs in place, probably for just a sample of communities in the region, concentrating on a mix of stable and fast-changing locales. In addition to a regular adult resident survey, surveys of geolocated delinquents, geolocated nondelinquent youth, and geolocated ex-felons and parolees would be desirable. Recent work by Doug Wiebe, Chris Browning, and others using stream-of-behavior geolocated data from adolescents could prove essential.

Each of these panels presents significant funding and methodological challenges. It would probably not be feasible, given management and funding challenges, to mount all these panels at once. It might be necessary to develop them in phases. Features of the panel designs for each of these groups (e.g., frequency of assessment) could be driven substantially by the parameters estimated from the situated, agent-based simulation models after those models have been validated against qualitative or quantitative data. Obviously the funding resources required would be tremendous, clearly requiring that much team effort be devoted to fund-raising efforts.

Such a data set could permit estimating models along the metamodel lines outlined in this volume, for specific communities and crime theories. Although there is no one set analysis which would allow us to test everything, it should be possible across a series of analyses to gauge each of the attributes and links in the tested theory and, as importantly, to gauge the relative merits of different theories in community criminology.

In short, is it doable? Yes. Will it require keeping together a large disciplinarily diverse academic research team and a substantial funded effort over a significant multidecade time frame? No doubt. But might we learn a lot? Absolutely.

Closing Comment

James Murphy, the inventor and front man for LCD Soundsystem, has described himself as an “optimistic curmudgeon” [524]. This volume, similarly, is both curmudgeonly and optimistic.

The curmudgeonly part highlights ways that community criminology research seems to be missing the big picture. We are still getting too excited about things we knew ninety years ago. Some ideas keep returning, and some study designs keep recurring, but they are not helping to solve some of the

most fundamental riddles in this area: understanding how context works, understanding how agency works, and putting this together properly in a situated and longitudinal context, across a range of spatial and temporal scales. The concerns in this volume suggest that there is a lot we do not really know empirically about how our models work. Some (many? all?) of my esteemed professional colleagues may find my harping on these deficits irksome and a violation of academic canons of good form.

The optimistic part believes that researchers are willing to look critically at what they do, to learn new skills, and most importantly, to read widely and think deeply about what they are assuming, in very fundamental ways, about their approaches. Hopefully other (some? one?) equally esteemed professional colleagues will find these topics, and the prospects of progress, invigorating. Ideally, colleagues and future colleagues inspecting this volume will appreciate the intimate and crucial links between conceptualization, measurement, and analytic approaches. I have been profoundly impressed by Blalock's relentless attention to this intersection in his own writings and am convinced that these concerns are crucial. They also are insufficiently considered in our field in part because of the false dichotomy between theory and methods.

Will the obstacles to advancement described here be successfully overcome by future scholars? Will the curmudgeonly portion of my views about the future of community criminology be borne out? Or the optimistic part? It depends on numerous factors. So, like so much else in life, the answer is, "Not sure!" [7].

ABOUT THE ONLINE APPENDICES

This book comes with two appendices that further detail the methods described in this book. They can be accessed online at <http://nyupress.org/Taylor/AppendixA.pdf> and <http://nyupress.org/Taylor/AppendixB.pdf>.

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NOTES

NOTES TO CHAPTER 1

1. Many of these definitions [184, 189, 315, 389, 471, 711] highlight that (a) people live there, (b) it is more familiar or recognizable to its residents than locations farther away and that recognition may be externally recognized and politically represented, (c) within the neighborhood, there may be some degree of social recognition or interaction among some fraction of the households living there, (d) nonresidential land uses and amenities contribute to or detract from the quality of neighborhood life, and (e) it is a geographically delimited locale, even though there may not be strong agreement among all residents about exactly where it begins and ends, depending on a range of housing, land use, and political factors [242; 724: 303–316].
2. Of course, the very idea of how to establish causal claims and what counts as cause and the roles of human motives are themselves complex and debated [372, 834]. What is presented here is just one stripped-down perspective on these matters.
3. Scale, “spatial size or extension in time,” is “analytically independent” of complexity [377: 60]. Although this is certainly the case, in adapting the boat metamodel to the problems under investigation here (chapter 3), the link between macro versus micro and scale will be emphasized. It will be argued that scale and complexity, albeit independent, are de facto strongly linked given the range of spatial and temporal scales under consideration here.
4. See chapter 4 for further discussion.
5. Karl-Dieter Opp numbers this link 3 [543]. My numbering here follows Coleman [168: 8].
6. “Because aggregates [aggregate properties of macro-level units] have meaningful individual analogues, it is tempting to conceptualize them as individual properties and consequently to couch theory at the individual level. Aggregates, however, also have many of the characteristics of structural and global properties [of macro-level units] that make them meaningful properties of [macro-level] social units: aggregates frequently manifest a pattern of variation across social units and over time that reflects the organization of those units” [444: 295–296].
7. Some depictions of the boat metamodel show this link as a dashed arrow to indicate that its causal status is in question. That assumes some form of methodological individualism.
8. Douglas Porpora suggests that “social structure refers to one of the following: 1. patterns of aggregate behavior that are stable over time; 2. lawlike regularities that govern the behavior of social facts; 3. systems of human relationships among social positions; and 4. collective rules and resources that structure behavior” [568: 196]. According to Porpora, these are different conceptions of social structure, which have varying degrees of merit [568]. Different views about what social structure is create different ideas about how to test for causal impacts of social structure [569].

9. A viewpoint suggesting societal roles drive behavior assumes man is primarily sociological—"homo sociologicus." The term is associated with German sociologist Ralf Dahrendorf [190]. He contrasts this view with other views of human nature, such as economic man (maximize gain/profit, minimize pain/loss), biological man (my genes/hormones/meds made me do it), and psychological man (my unconscious made me do it). Dahrendorf's view may erroneously present human nature as over-socialized [848].

NOTES TO CHAPTER 2

1. Of course, many ecological crime researchers are aware of the limits of officially recorded or self-reported crime indicators aggregated by geographical proximity [427, 428, 429, 469, 470]. This awareness, however, focuses largely on statistical, analytical, and operational problems and prospects, such as, for example, the denominator problem [322]. Researchers less frequently address links with concepts.
Of course, there has been a stream of criticism focusing on structural flaws in officially recorded crime indicators [714]. Such flaws are to be expected if one accepts a sociolegal perspective for how law behaves [61, 62, 63, 571, 572]. To some extent, self-report procedures can counter these structural flaws [347, 677, 742]. The discussion here builds on earlier scholarship about structural flaws.
2. Of course, there are numerous—too numerous to list here—outstanding scholars who have thought in penetrating ways about community crime levels. But reading empirical articles in first-rate journals reveals the rarity of such reflective scholarship.
3. Given very short distances between juvenile residence and crime sites and the low numbers of juveniles in Baldwin and Bottoms's study, they left the ecological distinguishability of juvenile prevalence versus incidence rates as an open question.
4. This refers specifically to the individual trips made by *different* individuals [378]. The set of trips made by *one* individual may or may not follow a distance decay function [755].
5. Following Stanley Turner, a distance decay function for offense or delinquency locations when a single person is involved is of the form $Y_i = a(r_i + k)^{-b}$, where "Y_i is the cumulated proportion of events per unit area, a is a scale factor relating to the unit of measure of distance, r is the distance [usually from the home residence of the offender or delinquent], k is a constant estimated from the data and is very small with respect to the range of r" [758: 21–22].
6. White noted that embezzlers' average distance, 2.79 miles, was higher than the property average and explained, "The embezzler is likely to hold a responsible position in order to have access to money, and because he holds a responsible position he receives a comfortable income. Persons with comfortable incomes in Indianapolis are likely to live in one of the better residential areas which are 2 to 7 miles distant from the central business district, where embezzlement usually occurs" [807: 507].
7. The variable *k* in the equation in note 5 captures this buffering out.
8. More recent work, however, suggests that the evidence for the buffer zone out from the home is mixed [71, 300].
9. Bureau of Justice Statistics table "Key Facts at a Glance: Correctional Populations" (online: <http://bjs.ojp.usdoj.gov/content/glance/tables/corr2tab.cfm>; accessed 6/16/2010).
10. Each year's population of prison admissions from each census block was multiplied

- by the cost per year of housing them, estimated at \$30,000 for New York State in 2003, and by the number of years in each prisoner's minimum sentence.
11. The author is indebted to an anonymous reviewer for this suggestion.
 12. Nor has work to date figured out how to address the well-known crime-rate-denominator problem when considering incidence rates [75, 322]. This same problem applies when constructing any type of delinquency incidence rate. Facilities that draw juveniles, such as schools, commercial centers, and club venues, play important roles in shaping juveniles' activity fields [819]. Yet they are not located randomly in urban or suburban space. Viable methodologies exist for geolocating such acts [37].
 13. Rodriguez's work group mean centered all individual-level predictors [607: 400]. Therefore, it was not possible to gauge whether these ecological differences would persist net of compositional differences across communities [644]. She did *not* make a case that remaining ecological differences were significant. Further, these remaining differences were *not* theoretically central to her line of inquiry.
 14. Rodriguez's model shows a significant chi-squared value, suggesting ecological variation in the outcome at the zip code level [607: 404, table 3, Model 1]. But since individual-level predictors were group mean centered, it is not clear if the ecological variation would remain significant subsequent to controlling for compositional effects [644].
 15. Compositional differences across locations in juveniles and incidents *were* controlled in this study because individual predictors were grand mean centered.
 16. A recent review of sentencing research generally finds a "burst" of work in the past decade describing impacts of context on sentencing *outcomes*, leading to the conclusion that "what kind of sentence one gets, and the factors that predict why one gets it, in significant part depends on where one is sentenced" [764: 13–14]. Some work also has investigated connections between sentencing outcomes, such as length of sentence, and some community characteristics [765]. One study on death-penalty outcomes, in an improvement over most research, did geographically situate cases [552]. But sentencing work does not appear to have started addressing systematically the connections between community characteristics and *transitions* to different points in the adult sequence.
 17. This point touches on an extraordinarily complicated and contested area in criminological theory constellating around several questions: Do criminal careers exist? In what sense [529]? If criminal careers do exist, are they more than the age-crime curve [280, 281]? What determines persistence versus adolescent-limited offending [513, 642]? The only point being made here is that, generally, for some groups, there are connections between adolescent delinquent versus nondelinquent status and the likelihood of adult offending at age eighteen and beyond [839].
 18. One element not included at the front end of this sequence is anticipated geographic targeting by authorities. One might suggest that communities of color with high delinquency prevalence rates would be communities where criminal justice agencies are more alert or are more likely to seek out known delinquents, now turned adults, when looking for suspects. Recent ethnography by Alice Goffman in Philadelphia supports this suggestion [270]. Another recent ethnography, by Jamie Fader, also in Philadelphia, followed youth formerly found delinquent and placed away from the community; she observed the significant effort that many of these young men invested in trying to stay out of trouble with authorities [225]. So although an

- ecological differential in surveillance appears to be supported, it is not strictly speaking relevant here because the initial adult rate depends on *self*-reported offending.
19. For simplicity, the sequence jumps over pretrial processing including bail decisions, absconding, and the fugitive issue more generally [273].

NOTES TO CHAPTER 3

1. Available through the Internet Archive Universal Library: <http://www.archive.org/details/youngdelinquentoo1158mbp>; accessed 8/24/2009.
2. From March 31, 1922, to March 31, 1923, “1,158 children were the subject of proceedings under the Children or Education Acts,” and of these, “barely 30 percent were committed to industrial schools,” which would be about 347. This is different from the group of “778 young persons charged with punishable offenses,” of whom about 15 percent were sent to “reformatories” [129: 20].
3. Burt secured the addresses and organized these by electoral divisions. These numbers were then aggregated up to the borough level across metropolitan London. Aggregation was done because poverty data were not available at the electoral-division level. To derive a denominator, Burt used the total number of schoolchildren “on the rolls of the Council’s schools” [129: 70]. The capacity of the four industrial schools was “about 480 boys and 57 girls” [129: 70].
4. Burt did not give actual numbers of delinquents by borough, just percentages. Bear in mind that these numbers of mapped and aggregated delinquents, however, may not have been the most serious delinquents. Burt’s numbers *excluded* the most serious delinquents “charged with punishable offenses” [129: 20], a fraction of whom were sent to reformatories.
5. Controversy about the strengths and fallacies of human ecology emerged early and continues [2, 382, 570].
6. Background on charity relief to the poor in Columbus around the time of World War I is in order. Associated Charities of Columbus (ACC) was an example of then-popular city-level charity organizations whose focus was generally on eliminating poverty and the associated social, family, and health problems [785: 4]. The Columbus group, circa 1917, was involved in both penal reform and juvenile court reform [495]. But it also had been, since 1903, the arm which dispensed welfare funds to poor families and individuals [116: 122]. Associated Charities cooperated with other city and private agencies to learn about needy cases and dispensed about \$9,000 per year for “outdoor relief” *for the entire city* [116: 123]. Given inflation, this 1916 amount would be equivalent to about \$193,334 in 2013.

The relief involved a system of vouchers, countersigned by ACC and city personnel in the Public Safety Department, for food and coal. The vouchers were then taken to vendors. The system was considered cost effective and progressive at the time, in part because the involved personnel were professionals and not political appointees. ACC also kept track of all relief delivered by other agencies in the city so as to coordinate relief and avoid duplicative investigation by visiting field workers.

7. These cases “indicate the number of families within the neighborhood who were actually obtaining relief from official sources at the time of . . . investigation” [492: 500]. These numbers “do not give an accurate conception of the extent of poverty” because such a small fraction of poor families received relief [492: 500]. Only “a small percentage of the families below the poverty line actually come to the attention of the

- relief agencies of the city” [492: 501]. During the period May 1, 1918—May 1, 1919, 893 “homes of dependents” were recorded and mapped. These were all “‘official cases,’ i.e., they are the more permanent and serious cases with which their organizations have to deal” [492: 166]. Given this last comment about “serious cases,” it may be appropriate to view these dependency data for this location at this period as indicators of extreme disadvantage [406].
8. My choice of this example research stream, “LMC research,” should not be misunderstood [482: 215]. The work of Land and colleagues, especially Patricia McCall, is chosen because these researchers, to their credit, provide far more clarity about what assumptions are at stake than do many of their ecological colleagues. Further, their work has proven highly influential in the field, as demonstrated by more than five hundred citations to the original work and a recent issue of *Homicide Studies* devoted to comparable studies [482]. Many features of their approach are shared by a large number of colleagues, so the research questions raised here apply to an extremely large number of ecological crime researchers examining different issues, not just Land, McCall, and colleagues.
 9. The partialling fallacy is not just an analytic problem; it *originates* as a conceptual problem. When multiple predictors are considered “without a theory, there is no way of telling what is conceptually distinct and what is not. Consequently, variables are often introduced as controls that are not meaningfully different in terms of what would constitute an appropriate theory. These variables so closely approach being identical with one of the variables already in the zero order relationship that controlling for them becomes tantamount to partialling that relationship out of itself” [278: 932]. Partialling “that relationship out of itself” is committing the partialling fallacy.
 10. The resource deprivation/affluence component mixed family structure, race/ethnicity, and SES. The following variables had sizable ($\geq .50$) loadings on this complex component: “median family income, the percentage of families living below the official poverty line, . . . the Gini index of family income inequality, . . . the percentage of the unit population that is black and the percentage of children age 18 or under not living with both parents” [416: 943].
 11. There are of course other studies considering community-crime relationships at different levels of aggregation [509, 547, 842]. John Hipp’s work on perceptions of crime and disorder at different scales also is most important [348]. Those studies are not considered here because the purpose is to look at this one study, and subsequent comparably designed ones, as an illustration of specific issues related to spatial scaling concerns for community criminology.
 12. Recent work cautions against aggregating across different crime types [17].
 13. Some later publications in this research stream, however, sometimes appear to conflate these two terms. In McCall and colleagues’ city-level replication of Land et al.’s original study, they speak of “consistent and invariant findings” and “relatively invariant relationships” [483: 225].
 14. A variety of statistical techniques can be used to assess the comparability of a set of coefficients across different samples. Tests also are available for testing whether individual coefficients are similar [553].
 15. This concentrated disadvantage variable “represents economic disadvantage in racially segregated urban neighborhoods” and includes “percentage of families below the poverty line, percentage of families receiving public assistance, percentage of

- unemployed individuals in the labor force, percentage of female-headed families with children, and percentage of residents who are black" [521: 527].
16. Land, McCall, and colleagues may have made it more likely that their results would suggest stationarity because in their analyses they opted not to retain the entire principal components solution. Rather, they focused just on the two largest principal components, constructed indices using only large loadings from those components, and then supplemented the components with key remaining individual variables. What happened to the components with smaller eigenvalues? These smaller principal components can be important for establishing stability of demographic structure [373: 75]. Were those portions of the principal components solution which were discarded linked to linear composites in the covariate space which were less stable between periods? McCall and colleagues anticipate this concern by emphasizing that the purpose is merely to build indices based on sizable principal components, not to discover underlying factors or structure [483]. But the distinction between components and factors does not reduce the relevance of construct validity questions raised here.
 17. Two studies from Chicago merit mention. Hunter found stability and instability in demographic structure looking at natural areas from 1930 to 1960. Roughly the same factors emerged in the different decades, but the composition of some of them shifted in important ways from decade to decade [364]. Bursik, also looking at Chicago's natural areas but for a slightly different set of decades (1940–1970), used more rigorous tests of invariance. His finding suggested marked change in the structure from decade to decade [119].
 18. Although in some places Land and colleagues describe their effort as simply one of covariate space simplification, in other places they also seem to be treating their indices as fundamental dimensions of community when they discuss their impacts in the context of key theories, such as William Julius Wilson's concentration of poverty effects [832]. In short, they do appear to assume correspondence between at least one component-derived index and underlying concepts.
 19. Although McKenzie's later statements on ecology revolved around larger-size communities composing sections of a city or a region and longer-term shifts in community economic, demographic, and attitudinal characteristics, his earlier work clearly recognized the relevance of streetblock dynamics [493: 362–363, 610, 611, 612, 613]. Of course, that may have been due in part, as he himself recognized, to the dependence on the trolley lines of the households in some parts of Columbus and the predominance of the central business district as a job, shopping, and entertainment destination. Such dependencies of community life on transportation networks and land use are, of course, key elements in the human ecology framework [329: 7].
 20. Galtung labels this a "contextual fallacy," but I reserve that term for a more recent technical and conceptual problem described by Robert Hauser (see later in this chapter) [262: 47].
 21. Sociologists distinguish between three types of group properties: aggregate, based on information derived from individuals and aggregated; structural, describing the relationship between individuals and the group; and global, describing emergent cultural features of the group [437].
 22. The boat metamodel conceptualizes this dynamic with a link $1 \rightarrow$ link 2 chain of processes.
 23. The mathematical derivations for the argument here appear in Hannan [316].

24. This variable could be in many different forms, for example, distance of ward centroid from the location of City Hall.

NOTES TO CHAPTER 4

1. The alignment here of spatial scale with the micro-macro dimension is congruent with Mouzelis's discussion of the micro-macro dimension [523: chapter 1, appendix A]. As geographic scale increases, it is likely—but not necessary—that macro aspects reflecting institutions, structures, and norms increase in causal relevance, and micro aspects of individual actors and face-to-face interactions decrease in causal relevance. “Causal powers of people are radically different from those of structures” [523: 192]. Large-scale geographic units have micro aspects, and small-scale geographic units or individuals have macro aspects. So system or actor essentialism are both avoided [523: 275].
2. “Extralocal,” aka supracommunity or extracommunity, is used here in a more predominantly spatial sense and a more spatially restricted sense than Sampson's use. He recognizes that nonspatial dynamics at very broad structural levels can create supra-community effects. But in both our uses, the idea of “a neighborhood's neighbors” figures prominently [638: 61].
3. This capability is explicitly anticipated in Coleman's action model underlying his version of the boat metamodel. The action model permits “modeling multilevel systems, in which systems at one level are actors at the next higher level” [168: 933]. For example, although a household or a streetblock may represent the context or system within which delinquency-related dynamics evolve, the household or streetblock may be conceptualized *itself* as a corporate actor. “If the outcome of an event is regarded as an action, and the system of actors and resources in which the outcome is generated is regarded as an actor, this gives the elements necessary to conceptualize a corporate actor” [168: 933].
4. Alternate, meso-level geographic units may sometimes geographically cross-cut macro-level communities, e.g., primary school catchment areas. This is to be expected given the previously mentioned imbricated nature of local social groupings. But incorporating crosscutting community layers creates additional analytic and conceptual complexities.
5. I have not tested, for either Burt's or McKenzie's data, if delinquency *residuals* from their models demonstrate statistically significant patterns of spatial dependence. Nonetheless, such a pattern seems plausible given both their arguments about the clustering of raw delinquency rates and the fact that both specifically mentioned features of adjoining areas.
6. GeoDa, for example, generates a lambda coefficient, “the spatial error parameter,” and associated standard error [143: 136].
7. Jerry Ratcliffe provided this very helpful example.

NOTES TO CHAPTER 5

1. Some of the ideas in this chapter have appeared elsewhere in a different form [726].
2. These different types of prevention come from the public health literature. “Primary prevention generally involves the prevention of diseases and conditions before their biological onset” [775: 979]. “Secondary prevention generally consists of the identification and interdiction of diseases that are present in the body but have not

progressed to the point of causing signs, symptoms, and dysfunction” [775: 1083]. “Tertiary prevention generally consists of the prevention of disease progression and attendant suffering after it is clinically obvious and a diagnosis established” [775: 1186–1187]. Steven Lab has applied these terms to different types of community crime-prevention programs. Tertiary prevention therefore applies to spaces that already have high crime rates; secondary prevention applies to spaces that are at risk of becoming high-crime-rate locales; and primary prevention applies to spaces that are neither high crime nor at risk of high crime [412].

3. In this quote, “hot spot” has become an adjective rather than a noun. Using “hot spot” as an adjective substituting for the adjective “high crime” would align more closely with the relativistic procedures used to define and bound these regions.
4. Recent publications have adopted the term “street segments” rather than “street-blocks.” The latter term is used here because it aligns better with everyday usage (“On my block I know everyone”). Further, it more clearly implies the bounding by cross streets at both ends. A streetblock could contain multiple street segments (one or more T intersections on the streetblock).
5. A “synomorphic” relation is one in which the setting hosts, facilitates, and ensures that a particular variety of activities take place in that setting at specified times and for specified durations.

NOTES TO CHAPTER 6

1. Web of Science, citation report, for Hawley’s *Human Ecology*, conducted by the author, October 18, 2012.
2. The processes of neighborhood development, differentiation, and transformation are much more complex than suggested here [126: 5–12; 268; 660; 661; 713].
3. Some sociologically literate readers may question the very idea of a community serving “functions,” with its overtones of Talcott Parson’s functionalism. Recent scholarship, however, finds much that is defensible in such Parsonian views [523: 240–241].
4. The functions served by communities relate to sustenance through variables such as occupational prestige, SES, and unemployment [327: 167]. But these are proxies for position relative to many features of locale including transportation to jobs, good schools, and family amenities including safety. Many dependencies across communities are noneconomic [327: 179].
5. “Rent, operating through income, is a most important factor in the distribution and segregation of familial units” [327: 282]. In the US, post-World War II, house values in many communities have assumed the importance attributed earlier to rents.
6. For simplicity, spatial dependencies are ignored at this point in the discussion, and normally distributed crime rates are (unrealistically) assumed just to keep the idea forefront.
7. Of course, alternative analytic approaches including time series and interrupted time series (e.g., ARIMA models) are also plausible. Translating the parameters of those models into the ecological framework, however, is not developed here, although it seems doable.
8. This separation already has proven important empirically. Recent work suggests that the stable and changing components of crime can have differential influences. For example, each affects average community house prices in different ways [748]. This

- study, albeit most helpful and insightful, regrettably was unable to resolve the durational ambiguity issue because of how crime change was operationalized.
9. David Greenberg and colleagues have raised concerns both about IV with cross-sectional data and about time series models and have argued strongly in favor of cross-sectional panel models [290, 291].
 10. For a corresponding fictional example, track the episodes in seasons 3 and 4 of *The Wire* touching on Cutty's release and return home.
 11. As of June 7, 2014, Web of Science reports only fifteen citations to this critique, excluding two by this author. Even some of the research which *has* cited this critique has ignored its admonition about temporal scaling [525].
 12. "When the idea is to test effects that occur in *places*, as the theory suggests, then place-specific changes in an array of characteristics across time are needed. It is rare to have such data" [158: 167].

NOTES TO CHAPTER 7

1. Of course, there is the famous song "Ya Got Trouble" from the 1957 musical *The Music Man*, which describes the many ways pool halls encourage a wide range of delinquent and dissolute actions in River City, Iowa. Just a sampling: "Shirt-tail young ones, peekin' in the pool hall window after school / Look, folks! / Right here in River City / Trouble with a capital 'T' / And that rhymes with 'P' / And that stands for pool!"
2. A regression with an n of only 16, and without controls for spatial adjacency, is obviously problematic in numerous respects. These results are meant solely for illustrative purposes.
3. This example follows McKenzie's original work and focuses on delinquency prevalence. Clearly there may be implications for delinquency incidence rates as well. These are not developed here.
4. If the micro-level refers to households with adolescents, attributes and dynamics involving supervisory figures could be involved as well. The rest of this hypothetical example just describes one way the model could be further specified using the perspective of methodological individualism. There are numerous alternatives.
5. Of course, it is also possible, indeed likely, that behavioral changes like crime changes exert later influences on structural changes [120]. In other words, the figure shown continues to the right, starting again with SES. That complexity is not shown here.
6. Researchers have recently applied ABM/GIS models to burglary as well [58, 465].
7. The models also are making headway in political science [380].
8. To be clear, these researchers avoid such controversial terms as "community criminal career" and instead talk about "developmental crime patterns at places" [795: 193].
9. Yes, the model may recover one or more trajectories reflecting consistent very low (or zero) streetblock annual crime rates, as Weisburd and colleagues' analysis does [795: 56–58]. The model also may recover trajectories reflecting stable crime patterns over time of low-, moderate-, or high-crime rates, as Weisburd and colleagues' analysis does [795: 58–62]. But such an approach does *not* assume that these stable patterns over time reflect, conceptually, ongoing ecological continuity in the Hawley/Bursik sense of occupying a relatively consistent ecological niche over time. Rather, the different stable patterns just "reinforce the importance more generally of recognizing the heterogeneity of crime trends within larger geographic units such as a city" [795: 62].

10. The difference between the two approaches is how the different segments within the broader period are put together. While segmented or piecemeal regression results in sharp shifts in the slopes of the time (or other predictor) coefficients at nodes, with spline regression, the function is “continuous at the nodes” [693: 270]. “Spline functions are smooth piecewise polynomials” [693: 270]. Using the “+ function,” it is possible to assign specific coefficients for linear or quadratic or cubic time components to each specific segment or epoch [691]. The details of how this work get highly technical and are skipped here.

NOTES TO CHAPTER 8

1. The author is indebted to Professor Per-Olof H. Wikstrom for bringing up and conversing at length about several of the issues described here. The author also thanks Jaime Henderson for compiling and coding the studies described in the systematic review section.
2. Thomas Bernard and Jeffrey Snipes disagree with the view here stressing the importance of comparative theory testing. They suggest, “comparative testing of criminological theories . . . may only rarely be appropriate” [54: 339]. Their view, however, was framed in the context of testing theories couched at different levels against one another. “Structure/process theories [macro-level] cannot be tested against individual difference theories because . . . the level of the data analysis must correspond to the theoretical argument” [54: 339]. On this point, I agree with them. But one theme throughout this volume has been how to grow and assess theories spanning multiple levels.
3. If the reader’s conceptual worldview aligns with methodological holism or meso-level holism, the approaches suggested here still apply. It is just that the application probably is more challenging.
4. The term “semantic ambiguity” originated in literary criticism almost a century ago [222].
5. Tom Cook and colleagues framed this problem as follows for typical survey samples from urban neighborhoods in one city:

The second issue with circumscribed samples concerns the possibility of limited discriminant validity between demography and process. . . . The ability to test mediational models supposes the ability to differentiate empirically between a neighborhood’s demographic and process attributes. Otherwise, the process variables cannot be shown to function in the more causally proximal role that mediational theories assign them. As far as we are aware, this hypothesis has not been tested, so we cannot reject the possibility that neighborhood demographic and process measures are all exemplars of a single, latent higher-order construct—something akin to ‘neighborhood quality’ [175: 117].
6. Of course, these inappropriate conceptual substitutions are understandable given so much research linking demographic and land use setting conditions to crime and delinquency outcomes at the community level. More specifically, in the case of demographics, others have described the relevance of community SES, racial or ethnic composition, family composition, and stability for a broad range of sociopolitical, cultural, social psychological, and economic consequences, many of which may link to crime and/or delinquency and/or victimization [120, 125, 126, 128, 180, 188, 406, 450, 486, 520, 562, 630, 631, 643, 648, 833]. Given the multithreaded impacts of each of

these demographic components, each has been tied to a broad set of outcomes. Low community SES, for example, has been interpreted to generate, among other things, frustration, inability to access external resources, inadequate internal social resources, the presence of large numbers of potential offenders, and other aspects of routine activities or institutional profiles [6, 165, 278, 478, 520, 546, 563, 649]. Land use patterns generally, including not only the patterning, density, and types of nonresidential land uses but also street traffic patterns and residential structure types, can influence a host of diverse processes including but not limited to informal control, upkeep or lack thereof, densities and patterns of guardians and potential victims, and neighbors' and outsiders' space use patterns [38, 88, 90, 95, 319, 320, 321, 411, 610, 611, 612, 613, 614, 615, 616, 738]. Specific local land uses can interact with potential offenders' perceptions and behaviors in complex ways [704]. Given all these connections, it is easy to understand how these inappropriate conceptual substitutions arise. But it does not make them acceptable.

7. A cursory, unsystematic examination of recent scholarship in routine activity and lifestyle theories of victimization suggested that semantic ambiguity also may be similarly problematic for studies testing those theories. Whether this is the case awaits systematic review.
8. In parts, this section reprises points made earlier by the author [719: 148–153].
9. There are several foundational references on construct validity [135, 187, 500].
10. Those six aspects were content, substantive, structural, external, consequential, and generalizable [500].
11. Of course, each of these theories has a large number of other important theoretical threads. One thread of each is examined here in order to create a simple exposition.
12. Because it is the individual resident's outdoor property and the immediately adjacent locations, it is guardianship, not place management, that is affected.
13. For WTI, the researcher has surveyed residents with the usual items asking about hypothetical willingness to intervene in some manner if disorderly, mischievous, or criminal behaviors were witnessed. Several of these items focus on passersby looking into cars parked on the street, leaning on cars, and the like. Individual-level behavioral observation data were obtained as well. Trained research confederates traveling in pairs which were racially appropriate to the neighborhood moved through sampled streetblocks at times and weather conditions when residents were likely to be home and outside and intentionally dropped litter directly in front of sampled households [40, 845]. They then moved on at a slow pace and waited to see if someone in the sampled household responded. After dropping litter at all sampled households, they picked up all litter not previously drawn to their attention by someone in a sampled household. The research confederates' being prompted to pick up the litter counted as the residents' being willing to intervene. (Prompts to pick up litter from nonsampled households could be tracked and used as streetblock attributes.) Survey data from sampled households permitted controlling for household size and likelihood of someone being home at assessment times.

For CG, multiple methods also were used. Survey questions included those such as the following: "Do you lock your car when it is parked out on the street in your neighborhood?" "How important is it to be able to park your car right in front of your house?" "How important is it to you to be able to park your car somewhere on the street where you can look out and see it?" "On a typical weekday evening, if your

car is parked in front of your house/apartment, how often do you look out to check on it?” “How about on a typical weekend evening?” “On a typical weekday evening, if your car is not parked on the street where you can see it from your house—say it is around the corner—how likely is it that you will go out and check on the car during the evening?” “How about on a typical weekend evening?” “If you were out of town for some reason, and you had to leave your car parked at home in front of your house, how likely would you be to ask a neighbor to check on it to be sure it was okay?”

Behavioral observation data collection for CG involved trained research confederates in pairs moving repeatedly through the streetblock on randomly selected dates under specified weather conditions which made it likely that residents would be outside. Following training, the groups moved slowly and acted rambunctiously, veering close to and looking into cars as they moved along. If residents said something to the group or if they perceived intentional surveillance from others on the block, the research confederates pressed a dedicated handheld device that noted the location where this occurred; the downloaded GPS information, accumulated over repeated trials on each study block, allowed the researcher to estimate how much surveillance existed near each sampled respondent’s address. Since a large number of research confederates were trained and employed in the study, the groups of confederates reconstituted for different trials, and confederates adopted different clothing styles at different times, it seemed unlikely that residents’ responses would be keyed to identification of specific confederates.

14. Of course, in the case of social disorganization theory, this is what Robert Sampson and W. Byron Groves did in the late 1980s with their systemic version [641]. That version, however, did not answer key questions about political economy / social control links, and this remains an area of some conceptual confusion in this theory, as highlighted later by scholars in this area [126: 52–57].

NOTES TO CHAPTER 9

1. Portions of this chapter were developed in collaboration with Per-Olof H. Wikstrom and presented at the 2008 (St. Louis) and 2009 (Philadelphia) annual meetings of the American Society of Criminology.
2. The first known example was Francis Galton’s 1897 analysis of trotting horse track times. Horses whose mile times exceeded 2.5 minutes were not recorded [162: 2].
3. “A stochastic process is simply a probability process” [203: 648].
4. “The main difference between censoring and truncation is that [the] censored object is detectable while the object is not even detectable in the case of truncation” [25].
5. This boat metamodel with a selection submodel appears somewhat similar to the modified boat metamodel presented by Wikstrom and colleagues in their situational action theory (SAT) [821: 30–43]. There are, however, important differences in how selection issues are framed as the “causes of the causes” in SAT and the treatment here. Some of these differences between SAT’s treatment of selection and the treatment here arise from the different version of the boat metamodel used in SAT. There, the lower left-hand portion refers to an individual in a setting. Here, by contrast, the same location of the metamodel refers simply to individual attitudes, sentiments, perceptions, intentions, or behaviors which have been influenced by geographic contextual factors and will play some causal role in shaping later, individual-level outcomes.

6. This assumes the spatial context is residential and not institutional.
7. This section follows the approach outlined by Jeffrey Wooldridge and uses his equations [844]. U = residuals or unknown, characterized as e (error) in Hawley/Bursik equations.
8. In this example, a single predictor can stand in for a vector of predictors.
9. Of course, routine activity theory would not see relative deprivation but rather an abundance of valuable targets.
10. "Prodelinquency peers" could be delinquents who already have been adjudicated delinquent or who report values favoring or expressing a tolerance for delinquent activities.
11. Gerald Suttles in his Addams-area ethnography provided examples of such selection dependencies involving such places as a public-use park and a local pizza parlor [710].
12. The concerns noted here to some extent reprise earlier conceptual worries about contextual analysis, voiced several decades ago [324, 325].

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