PART XI

Environmental Criminology

Traditionally, theories of crime have focused on offenders and, in particular, on why some people are motivated to break the law. In contrast, environmental criminology is concerned not with criminals but with crime (Bottoms, 1994; Pease, 1994). Of course, for a crime to occur, there must be a criminal—that is, someone ready to offend. But there must also be another ingredient present for a criminal act to be completed: The person must also have the *opportunity to commit the crime* (see also Cloward, 1959; Cullen, 1984).

This simple observation—that is, that crime occurs only when an offender and the opportunity to offend are both present—has profound implications. Most traditional theories operate on the assumption that explaining opportunity is of secondary importance—that offenders are sufficiently motivated to find ways to break the law. Environmental criminology, however, shows that as an integral ingredient in crime, the presence or absence of opportunity shapes when and where crime events take place. The distribution of crime is thus influenced by the distribution of criminal opportunities (Cloward, 1959; Cloward and Ohlin, 1960).

Furthermore, this perspective opens up fresh ideas about *crime prevention*. Because crime is attributable to two elements—offenders and opportunities—it becomes possible to stop a crime from happening by removing either one of these two essential ingredients. Environmental criminologists suggest that manipulating opportunities is far easier than trying to make people less criminally motivated and thus is a more promising strategy for crime prevention (Clarke, 1980 [Chapter 49, Part XVII]). Thus, in their view, installing sturdy locks and an alarm system on one's house is a surer way to stop a burglary than trying to figure out how to turn a burglar into an upstanding citizen.

The term "environmental criminology" is really a catch-all term that encompasses a variety of different scholarly contributions (Brantingham and Brantingham, 1991). These works, however, share a common focus on two issues: (1) explaining crime events and (2) exploring the causal role of opportunity. The term "environmental" is often used as the organizing umbrella, because scholars investigate how features of the physical and social environment influence the availability of criminal opportunities and, in turn, the occurrence of crime. We should note that this approach to understanding crime could also be called "opportunity theory" (Wilcox et al., 2003, 2013 [Chapter 34]).

Routine Activity Theory

As discussed in Part X, rational choice theory argues that individuals choose to engage in crime. But as Felson (1986: 119) has stated, "People make choices, but they cannot choose the choices available to them." Some people are more likely than others to confront situations where the benefits of crime are high and the costs are low. The routine activity approach deals with the factors that influence the range of choices available to individuals.

According to this theoretical perspective, three elements are necessary for a crime to occur: *Motivated offenders* must come in contact with *suitable targets* in the absence of *capable guardians*. The last two elements—suitable targets and guardianship—are best seen as the core dimensions of criminal opportunity. They must co-occur for the opportunity for crime to be present (Cohen and Felson, 1979 [Chapter 31 in this part]; Clarke and Felson, 1993).

The routine activity approach takes the supply of motivated offenders as given. Instead, the perspective explains variations in crime by variations in the supply of suitable targets (e.g., expensive, lightweight merchandise) and capable guardians (e.g., neighbors, property owners, police). Suitable targets have to do with the benefits of crime, while capable guardians have to do with the costs. According to the theory, the supply of suitable targets and the presence of capable guardians are a function of our everyday lives, or "routine activities" (our family, work, leisure, consumption, and other activities). As a result, crime might rise in society not because of the emergence of pathological social conditions but simply because of changes in the normal ways people live.

For example, Cohen and Felson (1979) point to a major change in routine activities in the post–World War II United States: People are more likely to spend time away from home (e.g., women working). As a result, motivated offenders are more likely to encounter suitable targets in the absence of capable guardians. Thus, homes are left unprotected during the day and frequently at night, which creates opportunities for burglary. Meanwhile, individuals are more often in public locations—often alone on the streets at night—where they may fall prey to motivated offenders. Cohen and Felson discuss additional changes in routine activities during this time period, and such changes are used to explain increases in the crime rate through their effect on suitable targets and capable guardians (see also Clarke and Felson, 1993; Felson, 1995). Still, as Tittle (1995) points out, one challenge for the theory is to better specify which of our many routine activites are most relevant to the explanation of crime.

In this regard, Osgood et al. (1996) demonstrate that young adults who engage in a lot of "unstructured socializing with peers in the absence of authority figures" are more likely to engage in crime. Part of the reason for this is that they are more likely to encounter attractive opportunities for crime: Their peers provide materials (e.g., drugs, alcohol) and rewards for crime, and there are no authority figures to sanction crime.

Notably, at the same time that Cohen and Felson (1979) were formulating their theory, another group of scholars developed a very similar perspective called "lifestyle theory" (Hindelang et al., 1978). Based on victimization surveys, they noticed that certain people—such as young males—were more likely to be criminally victimized. They theorized that some groups in society tended to pursue lifestyles—or what Cohen and Felson would call "routine activities"—that increased their exposure to the risk of victimization (Garofalo, 1987). Thus, as with Cohen and Felson's approach, lifestyle theory suggested that crime acts were a function not simply of offenders but also of the routines that people followed on a daily basis.

Routine activity theory was originally applied to "direct-contact predatory offenses, when at least one person directly took or damaged the person or property of another" (Felson, 2001: 43), but it has since been extended to apply to a broad range of crimes (Felson, 1995, 2001; Forde and Kennedy, 1999). Overall, the data are generally supportive of routine activity theory, as evidenced in the selection by Cohen and Felson in Chapter 31 (see also Felson, 2002). There are some problems with measuring key concepts, and not all tests are equally supportive (for overviews, see Akers and Sellers, 2008; Birkbeck and LaFree, 1993; Garofalo, 1987; Madero-Hernandez and Fisher, 2013; Meier and Miethe, 1993; Tittle, 1995). Nonetheless, routine activity theory remains one of the

most widely known and influential perspectives in contemporary criminology.

Crime Pattern and Target Search Theories

Just because environmental criminologists are not concerned with explaining criminal dispositions or motivations does not mean that they are uninterested in offenders. But whereas traditional theorists explore how people acquire the general predisposition to break the law, environmental criminologists focus on how people actually commit crimes. Their theoretical concern is thus not with how individuals develop into criminals but with the situations that allow those predisposed to crime to realize their criminal potential. That is, how do potential offenders find opportunities to offend? How do they find attractive targets that lack capable guardianship?

Two major overlapping approaches to answering these questions are "crime pattern theory" and "target search theory"—both developed and refined by Paul and Patricia Brantingham over the course of the last quarter-century (Brantingham and Brantingham, 1981, 1993, 2013; see Chapter 32 in this part). These interrelated theories extend routine activities theory and start with the insight that offenders, who spend most of their time *not* committing crimes, have routine activities just like everyone else. In the course of everyday life, offenders travel within an "activity space," consisting primarily of (1) "nodes"—such as home, school, work, shopping outlets, places of leisure, and entertainment venues (e.g., bars); and (2) "paths," or the roads, walking paths, or transit systems that connect activity nodes. Based on the time spent at nodes and on paths within activity space, offenders develop "cognitive maps" or images of their environment (Taylor and Gottfredson, 1986). These maps give offenders an awareness of their environment and of where potential targets for crime might be found, thus serving to structure criminal opportunity and crime events in nonrandom, patterned ways (for a review, see Gialopsos and Carter, 2015).

Think for a moment about selecting a restaurant for a meal in the next hour. What options first come to mind? Most often, the roster of eateries will be clustered in geographic areas that are familiar to you—that are well within the cognitive map of your local environment and along the transportation routes between the nodes where you spend the most time. On a special occasion, you might choose a restaurant that involves a fair amount of travel into an area that might require directions to find. However, most often, people eat in places that are familiar and easily accessed.

Offenders tend to search for crime targets in a similar way. "Research generally finds that crime is highly patterned by daily behavior," observe Brantingham and Brantingham (1993: 10). "Crimes tend to occur in known places or near limited travel knowledge space." Although more lucrative targets might exist elsewhere—in more affluent neighborhoods, for example—offenders thus tend to limit their "search area" for victimization targets to near their nodes and travel routines. Brantingham and Brantingham (1993: 11) call this the offenders' "awareness space" (see also Brantingham and Brantingham, Chapter 32).

Routines thus structure crime in two ways. First, as offenders travel, opportunities for crime will simply present themselves—for example, a purse left unguarded or a car left unlocked. Second, as just intimated, when actively searching for a crime target, offenders wish to reduce effort and risk of detection. Within their "awareness space," they do not have to travel long distances to know where a potential target might exist. Further, the transaction of the crime itself becomes more predictable. They are better able to know where police patrol, when homes are left unguarded, and how to escape the crime scene quickly with few impediments.

In sum, the Brantinghams' perspective, as reflected in their crime pattern and offender search theories, is that offenders are not just motivated but search for targets in patterned ways.

Therefore, the intersection of victims and offenders that is necessary for crime relies not only on the routines of victims but also on the routines of offenders—the latter of which Cohen and Felson did not spend time on when positing routine activities theory.

This focus on the causal significance of victim *and* offender routines in crime pattern and target search theories is important for another theoretical reason: It deemphasizes the pathological nature of crime and instead shows how crime is embedded in the normal aspects of everyday life. This is not to say that people do not differ in their traits or experiences that create criminal motivations. Even so, when and where crime occurs is often regulated by more mundane features of people's lives—including the routine activities of potential offenders and their potential victims.

Defensible Space

While routine activities theory, crime pattern theory, and target search theory explain how opportunity emerges from the routine activities of offenders and victims, defensible space theory focuses on how opportunity is created by the design and layout of physical space. The origins of "crime prevention through environmental design," or CPTED, can be traced to influential, overlapping works by Jane Jacobs (1961), Elizabeth Wood (1961), C. Ray Jeffery (1971), and Oscar Newman (1972). Oscar Newman's *Defensible Space: Crime Prevention Through Urban Design* was particularly useful in articulating an explicit theory of the relationship between environmental design and crime.

Defensible Space was a study of urban residential housing communities, the various design forms they take, and the implications of design for crime. Though he mainly analyzed New York City communities for *Defensible Space*, related work took him to inner-city residential neighborhoods throughout the United States. Newman observed that urban, low-income residential communities experienced variable levels of crime and disorder. Some were crime-infested nightmares, while others were not. Given that the social composition of these various communities were very similar (i.e., in terms of income level, racial/ethnic composition, household structure, etc.), Newman surmised that the key to understanding the differences in crime across such communities could be found in their environmental designs.

Newman emphasized the importance of building heights within low-income housing projects, in particular. However, he also detailed how the heights of buildings within a community were related to other important physical design features such as layout of the buildings, proximity of the buildings and units within to street activity, the amount and type of recreational space, and construction materials. He noted that the most crime- and disorder-plagued low-income housing communities were those in which multiple high-rise buildings were the predominant form. Such developments, in which high-rise apartment buildings housed all or most residents, were abundant at the time Newman was writing *Defensible Space*. This architectural design for public housing had become quite popular in the middle of the twentieth century due to a particular vision of urban renewal. Specifically, many city planners of the time became enamored with the possibility of removing low-income residents from urban "tenement housing" and placing them in modern high-density, high-rise communities. Thus, mid-century low-income housing often consisted of dozens of high-rise buildings, each capable of housing thousands of residents; some such developments had residential populations the size of small cities. Over time, many of these developments became notorious for murder, drug dealing, and gang activity, in addition to deplorable maintenance and resultant physical decay. In fact, the social problems associated with these sorts of developments led to the eventual demise of most, as urban high-rise public housing communities became viewed as a social experiment gone terribly wrong.

In contrast to the high-rise public housing developments, Newman noted that low-income residential communities that consisted of low-rise (e.g. townhouse-style) or mid-rise buildings (e.g., garden apartments) tended to have fewer problems. According to Newman, the physical layout of the low-rise and mid-rise apartment buildings allowed their spaces to be more easily defended or controlled by residents. In short, the low- and mid-rise-style housing communities had space that was more *defensible*. Newman elaborated that defensible space was related to four principles: territoriality, natural surveillance, image, and milieu.

First, he defined *territoriality* as "the capacity of the physical environment to create perceived zones of territorial influences" (Newman, 1972: 51). In other words, territoriality is the extent to which a space conveys a sense of being "owned" or "private" and of having clearly designated purposes (i.e., people have a clear sense of how and when to use the space). Examples of physical features of spaces that help convey territoriality include boundary markers such as fencing, walls, sidewalks, and landscape borders as well as signs indicating the appropriate (or inappropriate) use of space (e.g., "No Parking," "Park Closes at Dusk"). In Newman's view, high-rise projects conveyed weak territoriality since hundreds—even thousands—of residents shared common doorways, lobbies, and outdoor "yard" space. In low-rise housing, in contrast, individual doors provided direct access to each of the residences, and apartments typically had front and/or back yard spaces that were uniquely associated with individual units. In the low-rise buildings, therefore, residents could more clearly define space as "their own." In mid-rise apartment buildings, corridor and yard spaces were shared, but among a relatively small number of families, thus still fostering a moderate degree of territoriality.

Newman defined *natural surveillance* as "the capacity of physical design to provide surveillance opportunities for residents and their agents" (Newman, 1972: 78). The height of buildings, the placement of buildings vis-à-vis the street and other buildings, the number of access routes in and out of an area, the height and placement of shrubbery or trees, and the presence or absence of alcoves, niches, or alleyways are examples of physical design features that affect the potential for resident-based surveillance. Developments that consisted of dozens of high-rise buildings clustered together within several entire city blocks simply did not provide strong natural surveillance, according to Newman. Many units within such developments provided no view of street activity or common areas (e.g., recreational space). In addition, the buildings' interiors were notorious for having many areas within that provided limited opportunity for surveillance (e.g., enclosed lobbies, enclosed elevators and stairways).

Image was defined by Newman as "the capacity of design to influence the perception of an area as unique, well-maintained, and non-isolated" (Newman, 1972: 102). The use of unique designs and distinctive materials in the building of a space, as well as the upkeep and maintenance of the space, convey the message that the area is being cared for, thus deterring incivility and making it more easily defended. Poorly maintained spaces, on the other hand, generate a negative type of distinctiveness—a negative stigma. Spaces with poor upkeep and negative stigma are perceived as vulnerable and are thus attractive to offenders. Newman felt that high-rise projects had much more of a stigma associated with them than low-rise public housing communities. He observed that the high-rise design—with multiple towers clustered together—stuck out as "different" from surrounding areas. At the same time, the generic, indistinctive finishes and furnishings characterizing all buildings and units within the area lent an institutional feel, lacking in character and positive image.

Also related to image is *milieu*, or the location of the space within the broader urban locale. Through the concept of "milieu," Newman was essentially pointing out that the environment surrounding a

particular community impacted that space's overall defensibility. Spaces that are adjacent to risky or troubled environments can experience "spillover," thus making their defensibility of their space that more challenging. In contrast, spaces that are surrounded by well-controlled environments enjoy a buffering effect—the adjacent "safe zones" make defending such spaces more manageable.

Overall, then, Newman suggested that spaces that provided territoriality, natural surveillance, positive image, and "safe" adjacency would be more easily defended by residents. His theory, therefore, assumed that the *physical* environment was important because of how it affected the *social* control exerted within. Newman, in fact, defined defensible space as "a model for residential environments which inhibits crime by creating the physical expression of a social fabric that defends itself" (Newman, 1972: 3). He saw territorial behavior—inhabitants taking primary responsibility for controlling behavior—as a latent characteristic of communities, like public housing projects. This latent territorial behavior only needed to be fostered through smart physical design.

Since the publication of his influential book, scholars have tested various parts of his theory. On the one hand, some research has shed doubt on the idea that certain physical design features foster a willingness on the part of residents to engage in social control (e.g., Donnelly and Kimble, 1997; Merry, 1981). For example, a famous study by Sally Merry observed the informal social control among residents of a public housing development that had numerous design features consistent with defensible space. Despite the physical design of the space, Merry reported that the community went largely "undefended." Instead of the physical design fostering strong informal social control, the racial/ethnic heterogeneity of the community had engendered mistrust among residents, thus stifling the potential for informal social control offered by the physical design.

On the other hand, a number of other studies have shown support for a link between physical design and crime. For instance, research has shown that communities that are proximal to highways, have a high number of access routes (i.e., through streets), and a high volume of traffic are at heightened risk of crime (Bernasco and Luykx, 2003; Greenberg et al., 1982; Taylor and Harrell, 1996). Overall, then, an enduring aspect of Newman's work is that there does appear to be a relationship between elements of environmental design and crime. However, the bulk of the evidence suggests that the reason for this relationship is because design can directly affect opportunities for crime (e.g., easy access to a plethora of targets). Less evidence to date supports Newman's posited mechanism—that design fosters informal social control among residents.

Multilevel Criminal Opportunity Theory

Collectively speaking, the environmental criminology perspectives discussed up to this point—routine activities theory, crime pattern and target search theories, and defensible space theory—suggest that crime opportunity is structured at multiple levels of analysis, thus accounting for observable clustering or concentration of crime events at these various levels of analysis. For example, the clustering of crime at the individual level exists in that a small group of people appear to be repeatedly targeted for crime victimization. These chronic repeat victims actually account for a large percentage of overall crime victimizations, and persistent differences in lifestyles and routine activities are thought to account for some of this clustering (e.g., Grove and Farrell, 2012; Lauritsen and Davis Quinet, 1995; Tillyer, 2014; Turanovic and Pratt, 2014; Turanovic et al., Forthcoming).

Clusters of crime also exist at "places" and along particular streets (for a review, see Braga, 2012). For example, a famous study conducted in Minneapolis in the 1980s by Lawrence Sherman and colleagues (1989) revealed that over 50 percent of the calls to police for service in one year were associated with just 3 percent of the overall

addresses or intersections in the city. Subsequent work has shown similar patterns of nonrandom crime clustering at small-scale units, including addresses and intersections as well as street blocks (Bernasco and Block, 2011; Braga et al., 2011; Brantingham and Brantingham, 1999; Groff et al., 2010; Weisburd et al., 2004, 2012). Crime concentration at such places is also attributed to crime opportunity, with some places thought to provide large supplies of suitable targets and/or weak guardianship of the place (referred to as "place management"; Brantingham and Brantingham, 1999; Madensen and Eck, 2013). In the defensible space tradition, crime concentration at particular places is linked to poor environmental design, which, in turn, leads to poor "ownership" of the place among residents (Newman, 1972).

The larger communities in which streets and places are situated can also structure opportunity. The ways in which an entire community organizes residences, work, school, leisure, and other activities affect the convergence of motivated offenders and suitable targets and the levels of guardianship community-wide (e.g., Felson and Eckert, 2016). For example, a community's residential density influences residential activity and, in turn, opportunities for crime throughout the community (Sampson, 1983, 1985; Smith et al., 2000). Communities can also structure criminal opportunity through their various land uses. Communities with much nonresidential land use (i.e., commercial property) are thought to be particularly opportunistic because they support high levels of public activity (e.g., Kurtz et al., 1998; Roncek and Maier, 1991; Smith et al., 2000; Stucky and Ottensmann, 2009; Wilcox et al., 2004). Such public activity provides an ample supply of suitable targets while also making effective guardianship more difficult.

As described in Chapter 34, *multilevel criminal opportunity theory* (MCOT), also referred to as "multicontextual criminal opportunity theory," explicitly states that criminal opportunity is provided at various embedded levels of analysis, such as those just mentioned above—at individual targets, at places, along streets, and in communities (see also Tillyer, 2010, 2015; Wilcox et al., 2003; Wilcox and Tillyer, Forthcoming). Therefore, MCOT rejects the tendency to consider crime opportunity at particular units of analysis in isolation. Instead, MCOT encourages the consideration of the interconnectedness of opportunity characterizing multiple levels of analysis. For example, MCOT suggests that opportunity characterizing one unit of analysis (say, individuals or places) might be reinforced or, conversely, canceled out by the opportunity (or lack thereof) presented by other units (say, streets or neighborhoods). Also, criminal opportunity at multiple levels might not work in an independent manner. Rather, opportunity might be something that emerges from the *interaction* between individual and contextual levels. In other words, factors presumably indicative of individual-level or place-level opportunity might not lead to crime events in the same way across different broader environmental contexts, depending upon the opportunity available in the context(s) in which individuals and/or places are situated.

To illustrate the notion of multilevel opportunity, let's consider a simple hypothetical example. Consider an offender named John who intends to commit a robbery. John lives close to a convenience store with an ATM machine outside. Very close to the ATM is a good place to hide from potential victims and bystanders while observing people stopping to get money. In short, the convenience store offers a good deal of *place-based opportunity* for robbery—the presence of the ATM offers suitable targets for robbery and the hiding spot minimizes effective guardianship. Additionally, the convenience store is located in a community with a good deal of commercial property as opposed to residential property, such that there are few residents living in the area, overseeing street activity, and serving as potential guardians. This means that the opportunity to rob is embedded in a particular community context—one that offers a good deal of *neighborhood-level*

opportunity for robbery. The opportunity provided by the convenience store and the opportunity provided by the broader neighborhood context in which the store is located combine to make this a particularly opportunistic situation for John to commit robbery.

There is research that supports the ideas expressed in MCOT. For example, research on offender decision making indicates that offenders select opportunistic targets and locations in a multistaged fashion (see Chapters 29 and 30, Part X; Chapter 32 in this part). First, offenders choose an area of town where they feel comfortable operating. For example, like John in the hypothetical example above, they tend to choose areas with a lot of pedestrians (potential targets) but few residents—or few residents engaged in informal social control of street activity (guardians). Thus, in this first stage of target selection, neighborhood-level opportunity is considered by offenders. Next, offenders select particular locations or targets within opportunistic neighborhoods. Here, characteristics of individual targets or specific locations are considered—characteristics that make them more or less suitable targets or opportunistic locations for crime (e.g., is there an ATM machine at the location; can the offender surprise the victim at the location?). At this stage, individual- or place-level opportunity is being considered.

Beyond research on target selection and choice location among offenders, a number of multilevel studies of victimization have been conducted that support the idea that individual-level and neighborhood-level opportunity impact victimization risk (for a review, see Wilcox et al., 2013). An early classic test of the notion of multilevel opportunity with respect to victimization risk was provided by Sampson and Wooldredge (1987). They analyzed data from the British Crime Survey in order to determine how risk of personal and property victimization was affected by both individual/household-level and neighborhood-level indicators of opportunity. They found that single-person households and households that were frequently left unoccupied were at greater risk for burglary victimization, thus supporting the idea that individual-level lifestyles and routine activities provide opportunities for criminal victimization. However, they also observed that community-level characteristics affected victimization risk. In particular, households in communities marked by high rates of family disruption (i.e., single-parent households), high rates of single-person households, low social cohesion, high rates of ownership of expensive goods, high rates of unemployment, and high proportions of apartments were at greater risk for burglary. Such findings support the idea that community context can affect the number and nature of perceived opportunities for burglary.

Other support for the theoretical ideas expressed in MCOT comes from analyses of data from the Seattle Victimization Survey, collected by Terance Miethe. These analyses are particularly noteworthy in that they provide evidence that individual-level and community-level opportunity structures interact in affecting crime and victimization events. Studies using the Seattle data have estimated *cross-level interactions* showing that the effects of household characteristics are related to burglary victimization differently, depending upon neighborhood characteristics. For example, studies indicate that household safety precautions (e.g., locking doors, using alarms) reduced burglary risk more among households in orderly, affluent neighborhoods compared to disorderly ones (Miethe and McDowall, 1993; Miethe and Meier, 1994; Wilcox Rountree, Land, and Miethe, 1994). The crime-deterrent effects of household precautions also appeared to be more pronounced among households in neighborhoods that exhibited high levels of informal social control and physical design features consistent with strong defensible space (Wilcox et al., 2007). Such findings support the idea that neighborhoods that appear to provide few overall opportunities for crime serve to reinforce or enhance place-level actions taken to reduce opportunity, thus reducing risk all the more.

A recent study by Deryol and colleagues (2016) provides further support for the place–neighborhood interactions implied in MCOT, but in relation to crime events at all types of city locations. Their multilevel analysis of locations nested within Cincinnati block groups revealed that the proximity of locations to drinking/liquor establishments (crime-generating nodes) or bus stops (paths) was more strongly related to the number of crime incidents experienced at the location, but the effect was especially pronounced in neighborhoods with high numbers of suitable targets, as measured by overall commercial density.

Finally, Marie Tillyer and colleagues have extended the application of MCOT to account for variation in the "quality" of crime and victimization events, beyond their very occurrence. First, they suggest that victimization events have situational characteristics, including bystander presence, that affect the severity of the incident. For example, bystander presence might provide less opportunity for severe victim injury even if it does not prevent the victimization incident itself (Tillyer et al., 2010). Further, Tillyer and Tillyer (2014) suggest that the effect of bystander presence diminishing the opportunity for victim injury is likely not the same across community context. Specifically, they theorize that the effect of bystander presence on victim injury might be substantially weakened in community contexts in which people, broadly speaking, are reluctant to intervene. In fact, Tillyer and Tillyer's (2014) analysis of national incident-level data on robbery events indicates that bystander presence was less effective in reducing victim injury in community contexts characterized by concentrated disadvantage.

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PART XII

Growing Up Criminal: Trait and Biosocial Theories

Cesare Lombroso's perspective was the dominant theory of crime in the early 1900s. As indicated in Part I, a central part of the theory argues that many criminals are less evolved than noncriminals, as evidenced by such physical features as large jaws and cheekbones, swollen or protruding lips, and an arm span greater than the individual's height. The primitive or savage state of such criminals is what causes them to engage in crime. Among other things, they are said to be impulsive, vengeful, and unconcerned with the welfare of others.

Lombroso's theory was discredited when subsequent research failed to find that criminals differ from noncriminals in terms of the physical features he listed. And biological theories fell into decline for many years.

Sociological theories came to dominate criminology by the mid-1900s and continue to be dominant today (see Crews, 2009; Ellis et al., 2008; Laub and Sampson, 1991). Such theories explain crime not in terms of differences between individuals but in terms of differences in the social environments to which individuals are exposed. Certain types of environments, including family, school, peer group, and community, are said to increase the likelihood of crime. Most of the theories covered in this text are sociological: They describe those social environments most conductive to crime and the reasons these environments foster crime. These theories typically make little or no mention of individual differences, with several explicitly stating that there are no individual differences between criminals and noncriminals. Criminals are said to be much like noncriminals except that they are in environments conducive to crime. Most criminologists have been quite reluctant to acknowledge the role of biological factors and individual traits in explaining crime (see Chapters 36 and 37 and the discussions in Andrews and Bonta, 2006; Andrews and Wormith, 1989; Beaver and Walsh, 2011; Fishbein, 1998; Robinson and Beaver, 2009; Wright et al., 2008a).

In recent years, however, some criminologists have begun to criticize the *exclusive* focus of many crime theories on the social environment. Like Lombroso, they argue that individuals may differ from one another in ways that influence the likelihood of crime and that these differences may be in part biologically based. The theories advanced by these criminologists, however, are much more sophisticated than Lombroso's. First, they focus on a broader range of biological factors, including genetic inheritance and "biological harms" such as head injury, exposure to toxins such as lead, and birth complications. Second, they better specify how these biological factors lead to crime. They do not argue that biological factors lead directly to crime; for example, no one argues that there is a gene that leads directly to crime. Rather, biological factors are said to affect the central and autonomic nervous systems in

ways that contribute to traits conducive to crime, such as impulsivity, sensation seeking, and irritability. Third, most biological theories now recognize that the social environment influences whether biological factors lead to the development of certain traits and whether these traits lead to crime. Birth complications, for example, may be more likely to result in crime among children in disrupted versus intact families. Modern work on biology and crime, then, recognizes the importance of the social environment, and that is why theories in the area are commonly described as "biosocial" (see Beaver and Connolly, 2015; DeLisi et al., 2010; Rudo-Hutt et al., 2015).

It is important for criminologists to consider biological factors and individual traits for three fundamental reasons. First, the failure to consider biological factors and individual traits may result in inaccurate estimates of the effect of social factors on crime. Biological factors and individual traits are often associated with social factors, so the failure to "control for" or take account of them can lead to biased estimates of the effect of social factors on crime. For example, researchers may find that parental abuse is associated with higher levels of delinquency. But genetic factors may increase the likelihood that parents engage in abusive behavior and may, when passed onto children, increase the likelihood of delinquent behavior. The failure to take account of genes may therefore lead researchers to overestimate the effect of abuse on delinquency (see Beaver and Connolly, 2015; Beaver and Walsh, 2011: 10; Wright et al., 2015a). Second, biological factors and individual traits may *interact* with the social environment to produce crime. In particular, traits may influence *how* individuals respond to their environment. Even though the social environment has an important influence on crime, we know that individuals often respond to the same environment in different ways. This difference in response may be due to differences in individual traits. A child with an irritable disposition or a low IQ, for example, may be more likely to respond to stressors with crime. Third, individual traits may influence the social environment in ways that increase the likelihood of crime. In particular, individuals with traits such as impulsivity and risk seeking may shape their environment in ways conducive to crime. For example, impulsive children may evoke hostile responses from family members, teachers, and peers. Also, certain traits may cause individuals to seek out or sort themselves into environments conducive to crime. Individuals who like risky activities, for example, may choose to associate with delinquent peers (see Chapter 38 in Part XIII). (Environmental factors may also influence individual traits, as we have seen.)

A complete understanding of crime, then, requires a consideration of biological factors, individual traits, and the social environment. This is true of efforts to understand group as well as individual differences in crime (Beaver, Barnes, and Boutwell, 2015). For example, research suggests that sex differences in crime are a function not only of environmental factors, but also of biological factors and individual traits (see Beaver and Nedelec, 2015; Beaver and Walsh, 2011; Moffitt et al., 2001; Walsh and Beaver, 2009, 2012). Among other things, females have lower rates of offending partly because they are higher in self-control than males. And sex differences in self-control are partly due to biological factors, such as differences in brain structure and functioning. The prefrontal cortex of the brain, responsible for the regulation of behavior, is larger and more active in females (Beaver and Nedelec, 2015; Rebellon et al., 2015).

The importance of considering biological, psychological, *and* social factors when explaining crime is forcibly made in Chapter 35 by Glueck and Glueck. They conducted a classic study on the causes of crime and delinquency, comparing 500 delinquents to 500 nondelinquents. The study was done at a time when sociological theories dominated the explanation of crime, but the Gluecks argued that biological and psychological factors also play an important role in the explanation of crime. Among other things, these

factors help explain why people often respond to the same environment in different ways. Some people in disorganized communities, for example, become criminals while others do not. The Gluecks argue that one must consider biological factors and individual traits to understand why this is so (and to fully explain crime). The Gluecks were somewhat limited in the biological factors they could consider, since they did not have access to contemporary research and methods in biology. The individual traits they list, however, have much in common with those listed by contemporary psychologists (compare the traits listed by the Gluecks to those listed by Caspi et al. in Chapter 37). In fact, the Gluecks helped inspire much of the recent biological and psychological research on crime, which is described in the remaining chapters of Part XII. Beyond that, they took a life-course approach, examining the way in which the causes of crime unfold from childhood through adulthood. Indeed, their work (and data) was a major inspiration for the contemporary life-course approach of Laub and Sampson, described in Chapter 39 (see also Laub and Sampson 1991, 2011).

Chapter 36 focuses on those biological factors that may influence traits conducive to crime, although this reading notes that such factors work with the social environment to produce these traits. Chapter 37 describes certain individual traits that contribute to crime. And researchers have developed integrated theories that assign a central role to biological factors, individual traits, and the social environment. Perhaps the best known is Moffitt's theory of life-course-persistent offending (see Chapter 38; Moffitt, 2006), but there are many additional examples (see Chapter 46 as well as Brennan and Raine, 1997; Farrington, 2005; Lahey and Waldman, 2005; Raine et al., 1997; Rebellon et al., 2015; Robinson and Beaver, 2009; Simons et al., 2011; Thornberry and Krohn, 2005). At the most general level, these theories state that (1) biological and environmental factors influence the development of traits conducive to crime, (2) traits conducive to crime influence the social environment in ways that increase the likelihood of crime, and (3) crime is most likely among individuals who possess traits conducive to crime *and* are in aversive environments (e.g., troubled families, delinquent peer groups).

Biological Influences on Traits Conducive to Crime

Evidence suggests that there may be a genetic component to those traits conducive to crime and that such traits may also stem from "biological harms" of a nongenetic nature, such as head injury, exposure to certain toxic substances, and some types of birth complications.

Genetic Influences on Crime

Researchers have tried to estimate the extent to which crime and those traits conducive to crime are inherited using three major methods: twin studies, adoption studies, and molecular genetic studies (for excellent overviews, see Baker et al., 2006, 2010; Beaver and Walsh, 2011; Benson, 2013; Crews, 2009; Dick and Todd, 2006; Ellis and Walsh, 2006; Raine, 1993; Rhee and Waldman, 2007; Rowe, 2002; Robinson and Beaver, 2009; Tuvblad, 2015; Walsh and Beaver, 2009, 2012; Wright et al., 2008b, 2015a). Twin studies compare identical twins to fraternal twins. Identical twins are genetically identical, while fraternal twins are about 50 percent genetically alike on those genes that vary among people (see Raine, 1993). It is assumed that twins—whether identical or fraternal—are exposed to the same environmental influences. If crime is genetically inherited, we would expect identical twins to be more similar in crime than fraternal twins. Most studies indicate that this is the case.

Adoption studies focus on children who were separated from their biological parents early in life. The traits of these children are compared to the traits of their biological parents. If crime is inherited, we would expect more crime among adopted children whose biological parents are criminal

than among adopted children whose biological parents are not criminal. Most data suggest that this is the case. For example, one large study in Denmark found that when neither adopted nor biological parents were criminal, 13.5 percent of the adopted boys had criminal convictions; when adoptive parents were not criminal and biological parents were, 20 percent of the adopted boys had criminal convictions (Raine, 1993). (Crime was most likely when both biological and adoptive parents were criminal—reinforcing the point that crime is a function of both biological factors and the social environment.)

Twin and adoption studies suggest that there is some genetic basis for crime, but they do not identify those genes that may influence the predisposition for crime. The field of molecular genetics examines variations in genes and relates these variations to body functions and behavioral traits. Recent research in this area has discovered several genes that may be related to traits conducive to crime, such as hyperactivity and impulsivity. We can expect much more research in this area in coming years (see Baker et al., 2006; Beaver and Walsh, 2011; Benson, 2013; DeLisi et al., 2010; Dick and Todd, 2006; Rowe, 2002; Tuvblad, 2015; Walsh and Beaver, 2009, 2011).

In sum, evidence suggests that crime is inherited to some degree. Studies suggest that about half of the variation in crime—and in those traits related to crime—is genetically based (Beaver and Connolly, 2015; Boisvert, 2015; Tuvblad, 2015). The remaining variation is explained by environmental factors. Interestingly, research suggests that "nonshared" environmental influences are much more important than shared influences. Consider two siblings. These siblings share certain environmental influences; most notably, they live in the same household and community—and so are exposed to many of the same family and community influences. But these siblings are also exposed to different or nonshared environmental influences. For example, they may associate with different peers. Also, their parents may treat them somewhat differently. Nonshared environmental influences appear to have a much larger effect on crime than shared influences. The implications of this finding for crime theory and research, however, are only just beginning to be explored. Nevertheless, genetic factors appear to play a substantial role in the explanation of crime.

At the same time, certain cautions are in order (see Beaver, Barnes, and Boutwell; Raine, 1993; Rowe, 2002; Tuvblad, 2015). Most notably, there is some evidence that genetic factors—and biological and psychological factors more generally—are most relevant to the explanation of what has been called "life-course-persistent" offending (see Chapter 38 by Moffitt). That is, these factors help us understand why some individuals offend at high rates over much of their lives. These high-rate, chronic offenders make up a small percentage of the population, but they account for a large share of all crime—including a majority of serious crime. Biological and psychological factors are said to be less relevant to the explanation of what has been called "adolescence-limited" offending. Most individuals commit a range of largely minor offenses during their adolescent years, and this adolescence-limited offending is said to be more strongly influenced by the social environment (see Chapter 38). However, biological factors have also been used to help explain such offending. Data indicate that the prefrontal cortex of the brain is still developing during adolescence. As a consequence, adolescents are less able than adults to control their behavior and emotions. This fact, in combination with the increased freedom and demands experienced by adolescents, may help explain adolescence-limited offending (Barnes et al., 2015; Ishikawa and Raine, 2003; Romer and Khurana, 2015; Walsh and Beaver, 2009; Wright et al., 2008b).

The fact that there appears to be some genetic predisposition for crime raises a major question: Why is it that some individuals have genes that predispose them for crime? Several gene-based evolutionary theories have attempted to answer this question. These theories all argue that genes

have an effect on traits conducive to crime and that *under some conditions* individuals with such traits "might be able to reproduce at fairly high rates," thereby passing their genes on to others. That is to say, certain traits conducive to crime may sometimes provide an evolutionary advantage (see Beaver and Walsh, 2011; Daly and Wilson, 1994; Ellis and Walsh, 1997, 2006; Jonason, 2015; Raine, 1993).

Certain of these evolutionary theories attempt to explain particular types of crime, such as rape, while others attempt to explain crime in general. All try to explain how people with genes promoting traits such as "pushiness" and "deception" may reproduce at high rates in certain circumstances. For example, "pushy" males, including those who rape, may be more likely to mate with multiple sex partners, particularly in large, impersonal societies where the likelihood of punishment for rape is low. Such males thus gain a reproductive advantage and are successful in passing their genes on to others.

"Biological Harms" and Crime

Evidence suggests that crime is also influenced by biological factors of a nongenetic origin, such as (1) the mother's poor health habits during pregnancy, including poor nutrition and alcohol and drug use; (2) certain types of delivery complications; (3) exposure to toxic substances such as lead; (4) poor diet; and (5) head injury (see Beaver and Walsh, 2011; Brennan et al., 1995, 2003; Denno, 1990; Ellis and Walsh, 2006; Perron et al., 2015; Raine, 1993, 2002; Robinson and Beaver, 2009; Scarpa and Raine, 2007; Wright et al., 2008b). One study, for example, found that the children of mothers who smoke during the third trimester of their pregnancy are more likely to engage in crime as adults (Brennan et al., 1999).

The Central and Autonomic Nervous Systems

Most researchers suggest that genetic inheritance and biological harms contribute to traits and crime through their effect on the central nervous system (the brain and the spinal cord) and the autonomic nervous system (which controls the heart rate and gland secretions, among other things, and influences the emotional reaction to stimuli). (For overviews, see Agnew and Brezina, 2012; Beaver and Walsh, 2011; Crews, 2009; Ellis and Walsh, 2006; Farrington, 1996; Hollin, 1992; Ishikawa and Raine, 2003; Ogilvie et al., 2011; Patrick and Verona, 2007; Raine, 1993, 2002; Rowe, 2002; Schug et al., 2015; Robinson and Beaver, 2009; Walsh and Beaver, 2012; Wilson and Herrnstein, 1985; Wright et al., 2008b.)

A number of possible effects have been explored. Genetic factors and biological harms may contribute to dysfunctions in the frontal lobe of the brain—which is involved in abstract thinking, planning, self-monitoring of behavior, and behavioral inhibition. Such dysfunctions, in turn, may contribute to such traits as hyperactivity, impulsivity, irritability, the reduced ability to learn from punishment, insensitivity/low empathy, difficulties in problem solving, and immature moral reasoning. Genetic factors and biological harms may also contribute to dysfunctions in the left hemisphere of the brain that have been linked to low verbal IQ scores. And biological factors may affect the autonomic nervous system, with data suggesting that criminals are underaroused. That is, criminals show less emotional response to stimuli (they are "physiologically 'drowsy,'" in the words of Bartol and Bartol, 1986: 69). This underarousal is reflected in their lower skin conductance (criminals sweat less in response to stimuli), lower resting heart rate, and slower alpha brain waves. This underarousal may contribute to such traits as impulsivity, sensation seeking, the inability to learn from punishment, and hyperactivity (Portnoy et al., 2014). Individuals who are underaroused are less affected by punishment and require more to stimulate them—which may cause them to become easily distracted, overly active, and in greater need of thrills/excitement.

Researchers are now investigating the ways in which genetic inheritance and biological harms

may affect the central and autonomic nervous systems. For example, recent data suggest that some of these factors may result in reduced levels of the neurotransmitter serotonin. Neurotransmitters allow for communication between brain cells and underlie all human behavior, thoughts, perceptions, and emotions. Reduced serotonin may lower one's level of inhibition, contributing to traits such as impulsivity and the reduced ability to learn from punishment.

Chapter 36 by Peskin and associates summarizes much of the recent research on biology and crime, including research on the genetic influences on crime, the impact of "biological harms" such as birth complications on crime, and the relationship between crime and the central and autonomic nervous systems. They note that biological factors likely affect crime through their impact on traits such as intelligence, impulsivity, and sensation seeking. (For further information, see Beaver and Walsh, 2011; Crews, 2009; DeLisi and Vaughn, 2015; DeLisi et al., 2010; Ellis and Walsh, 2006; Lahey et al., 2003; Patrick and Verona, 2007; Raine, 1993, 2002; Raine et al., 1997; Robinson and Beaver, 2009; Rowe, 2002; Rutter et al., 1998; Walsh and Beaver, 2012.)

Environmental Influences on Traits

It should be kept in mind that traits conducive to crime are also influenced by the individual's social environment (see Agnew, 1997; Caspi et al., 1994; Colvin, 2000; Gottfredson and Hirschi, 1990; Lahey and Waldman, 2003, 2005, 2007; Robinson and Beaver, 2009; Rowe, 2002; Wade and Cairney, 2006; Wilson and Herrnstein, 1985; Wright et al., 2008a). Whether individuals develop such traits depends on the socialization efforts of parents and others; for example, it depends on the extent to which parents try to teach or "instill" such traits as self-restraint and concern for others (as suggested above, biological factors influence the likelihood that individuals will successfully learn such traits). It may also depend on such things as the adversity of the individual's environment. Some have suggested, for example, that poor, inner-city residents who are mistreated on a regular basis are more likely to develop irritable dispositions (see Anderson, 1999; Bernard, 1990). Crime-related traits, then, are a function of the environment as well as biological factors.

It is often difficult to separate out the effects of environmental and biological factors in a precise manner. Many types of biological harm are a function of the social environment—such as one's social class. Lower-class individuals, for example, are more likely to be exposed to lead and have poor prenatal care (Denno, 1990; Walsh et al., 2015). Also, certain social factors, such as poverty and abuse, may directly affect the individual's biological state—including brain development and whether genes are expressed or get "turned on" (see Rutter et al., 2006; Walsh and Beaver, 2009, 2012; Wright et al., 2008b). At the same time, biological factors can shape one's social environment. Children with dysfunctions in their central and autonomic nervous systems, for example, may be more difficult for parents to raise. As such, they may be more likely to elicit negative reactions from their parents, including harsh discipline and abusive behavior (Beaver and Connolly, 2015). Further, it has been suggested that environmental and biological factors condition the effect of each other on such traits. For example, biological factors such as genetic inheritance and birth complications may be *more* likely to lead to the crime-related traits if the individual is in a poor family environment. Likewise, a poor family environment may be more likely to lead to such traits if the individual has a genetic predisposition for them or has experienced certain types of biological harm. Given the intimate relationship between biological and social factors, there is now some debate over whether it is possible to estimate the *separate* effects of genetic and environmental factors on traits and crime (e.g., the claim that genes account for 50 percent of the variation in crime; Burt and Simons, 2015; Wright et al., 2015b). The important point to remember is that

there is evidence suggesting that criminogenic traits and crime are a function of both biological and environmental factors (see especially Brennan and Raine, 1997; Lahey and Waldman, 2005; Raine, 2002; Raine et al., 1997; Robinson and Beaver, 2009; Rowe, 2002; Rutter, 1997; Rutter et al., 1998, 2006; Simons et al., 2011; Wade and Cairney, 2006; Wright et al., 2008b).

Individual Traits and Crime

Biological and environmental factors, then, may lead to traits conducive to crime. Several such traits have already been mentioned. Traits are "relatively stable ways of perceiving, thinking about, and behaving toward the environment and oneself" (Blackburn, 1993). For example, if a person regularly acts without thinking, we say that this person possesses the trait of impulsivity. Data suggest that several individual traits increase the likelihood of crime, including low verbal IQ, attention deficit/hyperactivity, impulsivity, risk seeking, irritability, insensitivity to others/low empathy, and poor social and problem-solving skills (see Agnew and Brezina, 2012; Andrews and Bonta, 2006; DeLisi and Vaughn, 2015; Dodge, 2003; Ellis and Walsh, 2006; Farrington, 1994; Farrington and Welsh, 2007; Jolliffe and Farrington, 2010; Jones et al., 2011; Lahey and Waldman, 2007; Lynam and Miller, 2004; Miller and Lynam, 2001; Nedelec et al., 2015; Robinson and Beaver, 2009; and Rutter et al., 1998 for overviews). Also, major mental illness increases the likelihood of crime and violence, although most people with a major mental disorder are not violent (Hodgins, 1995; Robinson and Beaver, 2009; Silver, 2006). Individuals with such traits and conditions are more likely to engage in crime in a particular situation, are more likely to elicit negative responses from others (which may foster crime), and are more likely to sort themselves into negative environments (which may foster crime). For example, irritable individuals may be more likely to respond to mild slights with aggression, provoke insults and challenges from others, associate with other criminals, and have poor employment histories.

Psychologists and others have argued that many of these specific traits are related to one another and that they often cluster in the same individuals. Several researchers have developed lists of related traits, with some researchers arguing that most of these traits cluster together into one "super-trait." Perhaps the best-known example is the collection of traits that characterize the "psychopath," which include impulsivity, sensation seeking, an inability to learn from punishment, irritability, and insensitivity/low empathy (see Blackburn, 1993; Lykken, 1995, 1996; many researchers now distinguish between different types of psychopaths, most notably primary and secondary psychopaths). Another well-known example is provided in Gottfredson and Hirschi's (1990) description of individuals who are low in self-control (see Chapter 15 in Part V). The super-trait of low self-control also includes many of the specific traits listed above.

Data increasingly suggest, however, that those traits related to crime cluster into a few super-traits. One such trait refers to the individual's cognitive abilities, especially verbal abilities. This trait is often measured by the individual's verbal IQ score, and it influences such things as the individual's social and problem-solving skills, academic performance, and ability to communicate with others (Lahey and Waldman, 2005, 2007; Nigg and Huang-Pollock, 2003). Other traits refer to the individual's temperament. Chapter 37 by Caspi et al. draws on the description of traits provided by Tellegen (1985), who proposed that the human personality can be described in terms of three super-traits: negative emotionality, constraint, and positive emotionality. This conception is well grounded in research and is widely accepted in psychology. As the Caspi et al. chapter demonstrates, there is good reason to believe that the super-traits of negative emotionality and low constraint increase the likelihood of crime. Several other studies also support this conclusion—although they sometimes use

different terms to describe these traits or they refer to closely related traits (e.g., Andrews and Bonta, 2006; Colder and Stice, 1998; DeLisi and Vaughn, 2015; Farrington and Welsh, 2007; Henry et al., 1996; Jones et al., 2011; Lahey and Waldman, 2005, 2007; Lynam and Miller, 2004; Miller and Lynam, 2001; Pratt and Cullen, 2000; Rothbart and Bates, 1998; Simons et al., 2011).

Individuals high in negative emotionality are more likely than others to experience events as aversive, to attribute these events to the malicious behavior of others, to experience intense emotional reactions such as anger to these events, and to respond to these events in an aggressive or antisocial manner. Individuals low in constraint are more likely to act on their impulses, including impulses of a criminal nature. Such individuals tend to be impulsive, are risk taking/sensation seeking, reject conventional norms, and are unconcerned with the feelings or rights of others. It is not difficult to understand why they would be more likely to engage in crime.

The Interactive Effect of Biological Factors, Traits, and the Social Environment on Crime

Whether individuals with a biological predisposition to crime or with the traits we have described actually engage in crime is often said to depend on the social environment. For example, individuals with a biological predisposition may engage in little crime if they are raised in a loving, supportive family environment but may engage in much crime if they are rejected and abused. Many argue that crime is most likely when individuals who are biologically predisposed to crime (or have crime-related traits) are in environments conducive to crime (the "dual hazard" prediction). Such environments might include families in which parents reject their children and treat them in a harsh manner or poor, inner-city communities plagued by a host of social problems, such as gangs and limited job opportunities. There are several reasons for the dual hazard prediction. For example, one popular argument states that traits such as IQ and negative emotionality influence the ability of individuals to learn how to behave in a noncriminal manner (Brennan and Raine, 1997; Nigg and Huang-Pollock, 2003). That is, some individuals have an easier time learning how to conform than others. But whether they learn how to conform also depends on their social environment. For example, do their parents and others make a good effort to teach them to conform? Crime, then, is most likely when individuals are biologically disposed to crime or have traits conducive to crime *and* are in unfavorable environments. Another popular argument states that these traits influence how individuals respond to temptations and provocations. For example, individuals low in constraint are more likely to take advantage of tempting opportunities for crime, while individuals high in negative emotionality are more likely to respond to provocations like insults with violence (Agnew et al., 2002; Dodge and Sherrill, 2007; Lahey and Waldman, 2005, 2007). Crime, then, is most likely among individuals who possess these traits and are in environments where the temptations and provocations for crime are abundant.

The dual hazard prediction has received much support (see Agnew et al., 2002; Baker et al., 2010; Beaver and Walsh, 2011; Brennan and Raine, 1997; DeLisi et al., 2010; Di Lalla and Bersted, 2015; Dodge and Sherrill, 2007; Keenan and Shaw, 2003; Lahey and Waldman, 2003; Raine et al., 1997; Robinson and Beaver, 2009; Rutter et al., 1998; Scarpa and Raine, 2007; Wright et al., 2001). For example, a study by Tibbetts and Piquero (1999) found that males with low birth weights were more likely to start offending at an early age if they came from low–socioeconomic status families. Not all studies find evidence for biosocial interactions, however. Further, some studies find that biological factors are most likely to lead to crime in advantaged rather than disadvantaged environments. For example, one study found that low heart rate was most likely to lead to crime among those from intact homes versus

homes broken by divorce or separation (Wadsworth, 1976; see also Baker et al., 2010; Benson, 2013; Raine, 2002; Scarpa and Raine, 2007). Such findings are usually explained by arguing that biological factors are most important when the "social push" for crime is minimal (i.e., when individuals come from environments where there is little pressure to engage in crime). Finally, certain recent research suggests that some individuals are genetically predisposed to be more responsive to the environment, such that they are more strongly influenced by both favorable *and* adverse environments. That is, such individuals benefit more when they are in favorable environments, such as loving and supportive families, and they are more likely to turn to crime when they are in adverse environments, such as harsh or abusive families (DiLalla and Bersted, 2015; Simons et al., 2011; Wright et al., 2015). Overall, however, the evidence tends to favor the proposition that crime is most likely when individuals are biologically predisposed to crime (or have traits conducive to crime) *and* are in environments favorable to crime.

Given these arguments, it is not surprising that researchers have developed integrated theories that state that crime is a function of biological factors, individual traits, the social environment, and the interaction between these factors. For example, Lahey and Waldman (2003, 2005, 2007) have developed an integrative theory focusing on the development of antisocial behavior. This theory states that crime is influenced by cognitive and temperamental traits, such as intelligence and irritability. These traits, in turn, are a function of both genetic and environmental factors. Crime is also influenced by the social environment, including the family and peer environment. Further, individual traits and environmental factors affect one another; most notably, those with traits such as irritability are more likely to evoke negative responses from others and sort themselves into environments that are conducive to crime. Finally, crime is most likely when individuals possess traits such as low intelligence and irritability *and* are in environments such as troubled families and antisocial peer groups. This combination of negative traits and environments often leads to early, frequent, and serious offending (see Chapters 38 and 46; Rebellon et al., 2015; Robinson and Beaver, 2009; Simons et al., 2011 for similar theories).

In sum, biological factors and the individual traits influenced by such factors play a central role in the explanation of crime. They influence the social environments in which people find themselves and play a major role in determining how people respond to such environments. In particular, they help us understand why only some of the individuals exposed to aversive environments, such as abusive families or antisocial peer groups, turn to crime. Nevertheless, most of the theories in this book do not devote any consideration to biological factors and individual traits. Rather, they simply focus on the effect of the social environment on crime. Sociological criminologists, however, are starting to devote much more attention to the role of biological factors and individual traits in their theories. And when reading the sociological theories presented in this book, you should ask yourself what role biological factors and individual traits might play in these theories. (see Beaver, Barnes, and Boutwell, 2015).

Consider social learning theory. Biological factors and individual traits influence the likelihood that individuals will be exposed to prosocial and criminal environments. Individuals who are low in self-control, for example, are more likely to be rejected by conventional peers and to select criminal peers as friends. Relatedly, biological factors and traits influence the learning experiences of individuals in prosocial and criminal environments. Those low in intelligence, for example, are less likely to be reinforced by school officials and employers. Further, biological factors and traits influence the susceptibility of individuals to prosocial and criminal learning. Some individuals, for example, are more likely than others to find the company of criminal peers reinforcing, to adopt the criminal beliefs of such peers, and to

model their criminal behavior (see Kretschmer et al., 2015; Vaske, 2015).

Likewise, biological factors and traits play an integral role in strain theory. They influence the exposure to strains. Those high in negative emotionality, for example, may elicit negative reactions from others, including parents, teachers, and employers. And they are more likely to end up in social environments where the likelihood of negative treatment is high, such as bad jobs and high-crime communities. Biological factors and traits also influence the reaction to strains. Some individuals are more easily upset by strains, are more likely to become angry when upset, and are more likely to cope in an aggressive or criminal manner (DeLisi and Vaughn, 2015; Stogner, 2015; Vaske and Boisvert, 2015; Winiarski et al., 2015).

Biological factors and individual traits also play a key role in control theories (Boisvert, 2015; DeLisi, 2015; Vazsonyi et al., 2015). There is good evidence that self-control, a major trait affecting crime, has a strong genetic basis. And individuals with traits such as low self-control and irritability are more likely to be low in *social* control (see Part V). Individuals with these traits are less responsive to the efforts of others to bond with them, supervise them, instruct them, and teach them beliefs condemning crime. In fact, individuals with these traits often frustrate and overwhelm others, such as parents and teachers, thereby undermining social bonds. Also, parents with these traits are less likely to form strong bonds to their children, properly supervise them, and provide them with the support necessary to do well in school and succeed later in life.

There is little doubt that future work will better integrate biosocial and sociological theories of crime and, in doing so, more fully explain crime.

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