

Foreword

When I was invited to write this foreword, my first reaction was that it was an easy task to decline because what I know about biological criminology can be written on the back of an aspirin with a crowbar. Yet that is also somewhat true for experts in biological criminology because the unknown is so vast compared to the known. And it is true for me with respect to macrocriminology, in which I consider myself well read. Few things are more complex than the neurophysiology of human brains. While I genuinely admire the brilliant people who do research on brains, my practical philosophy has tended to be that a deeply valuable understanding of how human brains work is not something that will be accessible to me in my lifetime.

This goes to the first strength of this book that it is very accessible. I did learn a lot from it, and I expect this will be true of other nonexpert readers. Criminology is richer for it. This is evocative writing that challenges readers with clarity of analysis. Chad, Michael, and J. C. successfully persisted and overcame my resistance because they used the same method I used in the 1980s when writing *Crime, Shame and Reintegration*. They persuaded me because I was pleased to see colleagues do this. I still think that when we work in a field where most questions are unsettled, unknown, or unknowable, there is virtue in

asking what are some of the consensually known facts of the field. And then we must keep modifying the theory to improve the fit of the theory to that list of facts. Of course, that is far from the only good method for theory development, but it is a useful method for shaping the process with explanatory discipline. That discipline is impressive in this book.

You do not have to be a feminist to think it is a weakness of a criminological theory when it fails to give an account of why, in all times and places we know about, men commit much more of most kinds of crime compared to women. We learn from the book that in mammals, but perhaps not in bees, mother/infant bonding is an adaptation necessary for survival. Moreover, “certain protective behaviors of mothers toward infants ‘appear to be hard-wired and not at all learned.’” We learn that the human brain evolved to facilitate important interpersonal skills that are useful for relationships.

There are big implications for understanding how our work can contribute to a better world by grasping those deep structures of human beings as relational animals—indeed, as storytelling animals. For me, for example, it motivates an interest in restorative relational justice and a decentering of the formalistic in justice. It can help us understand why men do the majority of the talking in formally legal courtrooms while, in restorative justice circles, according to Sherman and Strang’s (2007) Reintegrative Shaming Experiments (RISE), the actors who occupied the most speaking time were mothers of the defendants.

This book teaches us that work on mammals reveals a neurological component to “pair bonding” in adults as well. Life-course criminology, in the hands of practitioners like Robert Sampson and John Laub, suggests that marriage may be a primary factor in encouraging desistance from crime. For feminists, this goes to why biological criminology—indeed, why any criminology—is a dangerous game. Whatever we think about these biological foundations, mothering and marriage are burdened by gendered social and political overlays that enable one sex to dominate the other. Marriage is patriarchally structured in so many ways that privilege men. Men cannot breast-feed, but that becomes a foundation for lumping women with an unfair share of all manner of caring obligations toward children that need not be sexed.

Biological criminology here becomes a dangerous game from a feminist perspective. Yet feminism and biological criminology do a service in this because all criminology is normatively dangerous. The risk of biological essentialism simply makes that more visible. The law is always dangerous because it bans certain activities, including certain kinds of marriages, and because it provides for serious second-order deprivations of liberty in the way it responds to breaches of the law. So good theory in criminology must be integrative of normative and explanatory considerations. Another strength of this book is that it does this, and does it deftly.

This book is appropriately cautious—normatively—about the biological. Not only is it normatively hedged, but it is hedged in the explanatory sense by being a book on biopsychosocial criminology rather than biological criminology. That is, the book brings the biological back in (as it was in the nineteenth and early twentieth centuries) instructively for illiterates like me while not excluding psychosocial explanations. Chad, Michael, and J. C. do not set out to privilege biology or argue it is a better lens than others. Too much emphasis on the biological is as limiting as too much emphasis on the psychological or sociological. A great strength is the way the book introduces interactions among biological, psychological, and social explanations. It also considers toxins like lead that shape class variation but are not purely biological, psychological, or social; rather, they shape and are shaped by all three.

The book does not test a theory in the sense of an ordered set of propositions against the 13 “facts.” Rather, it persuasively explores the framework that a combination of the biological, the psychological, and the sociological will do better than one of these alone. It does not go far on applying the framework to crimes by organizations like states or corporations, as opposed to crimes by individuals. It does not consider the relevance of the biopsychosocial to even more macro questions, such as that raised in Robert Reiner’s 2020 book that social democratic societies perform better at crime control and justice than neoliberal capitalist or authoritarian capitalist societies.

The book’s discussion of the work of Terrie Moffitt (1993) and Gerald Patterson (2016) reveals the practical and liberating use of biopsychosocial explanation. For example, neurological difficulties help us

understand why some infants do not bond early with their parents, thus engendering thorny personalities. Parents become exasperated, relationships with the infant become strained, and multiple problems follow from the strained bond. Explaining this interactive complexity to mothers can help liberate them from their own, their family's, or their friends' simplistic explanations, such as "I am a bad mother" or "He is a bad child." We learn that meta-analyses of relational parenting programs show that interactions between parents and children can be improved, thereby improving well-being and self-regulation.

While most all of my 1989 "facts" have stood the test of time well, I look back on one as ill founded even then. This is that "crime rates have been increasing since World War II in most countries, developed and developing. The only case of a country which has been clearly shown to have had a falling crime rate in this period is Japan." Within three or four years of that being written, as this book points out, most developed economies had falling crime rates. Also, most former communist countries and most of Latin America and the Caribbean had rising crime rates during the ensuing decades.

Through the work of historical criminologists like Manuel Eisner, we see that England, the United States, and other countries have periods in their history where the homicide rate is 100 times as high as it is at other times. At any one point in time within one country, there are spaces that have crime rates 100 times as high as in other spaces. Biological differences give a poor account of why different spaces and times in the same country can have hundredfold differences in crime rates—and, indeed, why one country can have 100 times the homicide rate of some other countries when intercountry biological profiles (by sex, for example) are more similar than different. Actually, not only does biological criminology make a poor fit of this explanatory challenge, but so do all extant criminologies. The facts of variation across time and space are not as clear as I posited them in 1989. If we are to build a more potent biopsychosocial criminology, it must look the challenges and complexities of these facts more clearly in the eye than it currently does in the Global North.

The book also makes a good case for adding some new facts for which the evidence has become ever stronger in the past 30 years, such as that child maltreatment is associated with subsequent crime.

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This book was a pleasure to read and a treasure of learning for this reader. I congratulate the authors and wish you, in your reading, this treasure and this pleasure.

John Braithwaite
Australian National University

Introduction

*The Promise of Biopsychosocial Criminology
for Explaining the Facts of Crime*

On June 12, 2016, Omar Mateen opened fire on patrons of the Pulse nightclub in Orlando, Florida. When the gun smoke cleared, 49 people were dead and another 53 injured. Less than a month later, on July 7, in Dallas, Texas, military veteran Micah Johnson ambushed police officers, killing 5 before being killed by return fire. The following year, on October 1, 2017, in Las Vegas, Nevada (“Sin City”), Stephen Paddock killed 60 people and injured over 500 others when he used a semi-automatic gun to shoot concertgoers from a hotel window. Early the next year, on February 14, 2018, a gunman—Nikolas Cruz—walked into Stoneman Douglas High School in Parkland, Florida, killing 17 people and injuring 17.

These are just a few of the more than 100 mass public shootings in the United States that have occurred in the last 50 years, in which individuals have shot and killed at least four victims in one event (see Duwe, 2020). What could push an individual to take a loaded gun into a public space and unload round after round into innocent men, women, and children? Mental illness? Becoming stressed to the point of no return? There is no consensus in academia or in the public. However, three major issues have come to the forefront of discussions about this issue: (1) mental health, (2) gun availability, and (3) toxic masculinity.

Proponents of the mental health explanation argue that mass shooters suffer disproportionately from mental illness. The act of gunning down innocent people must involve some mental break with reality. Indeed, individuals with mental disorders are more likely to commit a host of antisocial behaviors compared to those with no history of mental health disorders (Silver, 2006). A sizeable proportion of mass shooters have a history of either documented or suspected mental illness (Duwe, 2020). Some critics have taken issue with this assertion, stating that if mental illness led to mass shootings, the United States would have higher levels of mental illness compared to other nations where mass shootings are rare; however, the data show no more mental illness in the United States than other wealthy countries (Kessler et al., 2009).

Alongside the mental health argument—a biopsychological perspective—are broader, more sociological or societal arguments for mass shootings. For instance, a number of commentators have noted the ease of obtaining guns in the United States compared to other countries. Statistics produced by Adam Lankford, an expert on mass shootings, indicate that while the United States 90 mass shooters from 1966 to 2012, no other country had more 18 mass shooters (Lankford, 2016). The United States has many more guns than most other nations, according to Lankford. Could it be that individuals who want to cause harm to others can do so more easily in the United States than in other countries? Perhaps the United States does not have more mentally ill people, but these illnesses coupled with easy access to deadly weapons produce the high level of mass shootings we now see. Figure 1.1 shows the trend in mass public shootings in the United States since 1976, which shows an increase at an elevated rate since the early 2000s.

Finally, the idea of toxic masculinity to explain violence has flooded intellectual and public spaces alike. Toxic masculinity refers to the identity men adopt under a patriarchal societal structure that promotes violence, manipulation, and control. Syed Haider (2016) specifically applied a toxic masculinity framework to the Orlando shooting mentioned previously. He concludes that Mateen's masculine identity turned toxic when he became disillusioned with violence. This disillusionment made Mateen not just angry but enraged, which led him to take lives in great numbers. Is it the patriarchal society in the

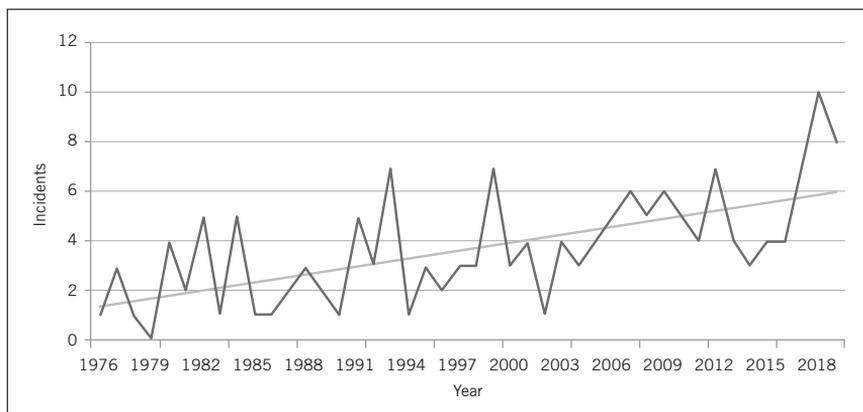


Figure 1.1. Mass Public Shootings in the United States, 1976–2019
(Source: James Alan Fox, Grant Duwe, and Michael Rocque as part of a project supported by a grant from the National Institute of Justice [2018-75-CX-0025].)

United States that breeds violent (mostly male) killers? Our contention here—and throughout this book—is that a confluence of factors (a proverbial stew) intertwines to create violence.

Criminologists, unfortunately, do not have all the answers to questions about what causes violence. Behavior is tricky, particularly in humans. However, we now have some pretty good ideas about why people do what they do. The evidence, as presented and discussed in this book, indicates that behavior is the result of a combination of biological, psychological, and environmental factors. Despite debates on how to best measure the specific combination of factors and attribute behavior to either genetics or the environment—or interaction between the two—study after study has supported the idea that genes combine with the environment in causing antisocial and violent behavior (Tuvblad & Baker, 2011; also see Polderman et al., 2015 for a massive review of studies). While it might not be easy to neatly separate genetic and environmental factors and their relative contributions to any trait or behavior, the important idea is that both genes and environments matter . . . and our job is to figure out how.

Criminology as a scientific discipline has traditionally progressed with a singular focus. Initially, in the late 1800s, when researchers began to examine crime with a scientific bent, they paid attention only

to biology (Rafter, 2004). Italian military psychiatrist Cesare Lombroso almost solely concentrated on biological factors responsible for behavior—at least until later in his career (Rafter, Posick, & Rocque, 2016). The tracks shifted in the twentieth century when criminology became synonymous with a sociological focus on the environment as the primary cause of behavior (Laub & Sampson, 1991). In this view, it is not the person but his or her environment that drives behavior. Both perspectives offered important, if at times outdated, views on the origins of criminal behavior (Rocque & Posick, 2017).

In recent years, criminology has reached a new junction that merges both these separate tracks. Biosocial criminology and biosocial criminologists focus on the environmental and biological factors that contribute to antisocial behavior. Importantly, they do not view these two domains as separate parts of an equation but as pieces of the same puzzle that fit together into a complete picture of the causes of crime/antisocial behavior. Environmental factors such as social stressors, relationships with antisocial peers, friend and family bonding, and drug use are among the most supported environmental mechanisms associated with poor behavior and are often the focus of biosocial research (see Beaver, Barnes, & Boutwell, 2015). Biological factors such as genes, hormone levels, neurotransmitters, and operation of the central nervous system are often a focal point of biosocial research and have been linked to various delinquent and criminal behaviors (see Raine, 2013).

Recently, researchers have begun to unravel the intricate ways that environmental and biological factors combine (or do not combine) to produce certain behaviors. For example, abuse and neglect are among the most powerful predictors of subsequent delinquent behavior; however, this relationship has been found to be dependent on the presence of a certain variant of the MAOA gene (Caspi et al., 2002). The relationship between having a criminally involved father and participation in the criminal justice system is robust across studies. But this relationship might be contingent on whether a child has a particular version of the DRD2 gene (DeLisi et al., 2009). Biosocial criminologists call these patterns gene-by-environment (G×E) interactions because they exemplify the many ways nature and nurture work together and are far from opposed to one another.

Along with direct genetic and environmental contributions to behavior, environmental factors have been found to lead to behavior via indirect routes through the brain. The brain, of course, is the only thing that directly influences behavior. Without it, we cannot act (indeed, we cannot live). Contrary to earlier beliefs, we now know that the brain is plastic, or still changing, through adolescence (Steinberg, 2014). This means the environment shapes the brain not only in childhood but through much of the first three decades of life. While it is true that the brain is not “infinitely plastic,” or malleable, to the same extent throughout life, there are some periods where the brain appears more receptive to change than others. This is important because adolescence has often been considered a time of “storm and stress,” with many changes in the teenage environment, including the growing importance of peers (Brown & Larson, 2009). How might the brain be differentially affected by the environments people encounter throughout their life? A very fascinating biopsychosocial question!

The questions of violence that criminologists seek to answer are not restricted only to explanation but also apply to intervention. We are learning more and more each day about how stressful environments can negatively influence brain chemistry, which provides additional information about why crime seems to be concentrated in certain people and particular places (McEwen, 2012; Rocque, Posick, & Felix, 2015). Yet this is not all bad news; it shows us how we can *help* people become more restrained and responsible throughout life. In criminology’s early years, when the focus was on biological factors, the prevailing wisdom was that there was little we could do to address the causes of crime short of unethical and inhumane policies such as eugenics (see Rafter, Posick, & Rocque, 2016). After all, so the logic went, if genes are responsible for much of behavior, and those genes do not change or vary over time, what else can be expected to reduce crime but incapacitation? Similarly, when sociological research came to dominate criminology, policies were single-mindedly focused on changing environments. Little attention was paid to why particular people react differently to different environments or what biological information may help design programs to reduce offending (Rocque, Welsh, & Raine, 2012).

Thankfully, the new era of biosocial research recognizes that both the environment and the body matter, and they matter in ways that

are mutually reinforcing (see Vaske, 2017). Thus, to understand why crime occurs, and what to do about it, both the environment and the body must be taken into account. New and exciting discoveries are regularly being made that enhance our understanding of crime and, importantly, how to reduce it, relying on both environmental and biological information. This approach is also in line with “mechanistic criminology”—the acknowledgment that explanations for crime must understand proximate causes for how behavior is produced—which is inherently integrative, multilevel, and multidisciplinary (Proctor & Niemeyer, 2019). In this vein, the label “biosocial criminology” is increasingly being replaced with the perhaps more accurate “biopsychosocial criminology.” In fact, a new division was developed within the American Society of Criminology under that name in 2017. Accordingly, we use that term throughout this book.

With this in mind, biopsychosocial criminology may hold the key to answering some of the most pressing questions in the field of criminology, a relatively new discipline that has accumulated a substantial body of research and established a few “facts” of crime and antisocial behavior. These are not the same as scientific facts from physics or chemistry, where the evidence is considered perfectly consistent across time and space. Rather, the “facts” of crime should be considered recurring themes that are observed across studies, throughout time, and over a wide range of geographic areas but without perfect harmony. We suggest that a biopsychosocial perspective must be used to explain the “facts of crime.”

In chapter 3 of his seminal and influential book *Crime, Shame and Reintegration*, the criminologist John Braithwaite (1989) describes 13 “facts” of criminology. These, he states, are “the strongest and most consistently supported associations in empirical criminology” (Braithwaite, 1989, p. 44). Any theory, according to Braithwaite, ought to account for these 13 facts. While biopsychosocial criminology is not a theory per se, it is a perspective on studying crime and criminality that may help move the field closer to accounting for the empirical findings Braithwaite carefully describes. As shown throughout this book, traditional criminology has offered some answers to these facts, but questions remain. Overall, there is little dispute in criminology regarding the existence of these facts; explanations for them are another matter. What do the facts mean, and how can we explain

them? The purpose of this book is to illustrate how a biopsychosocial approach to criminology addresses these questions and gets us a bit closer to answering them. In addition, it has been over 30 years since Braithwaite wrote his book, so we offer some updates to particular facts to bring them in line with recent research.

Plan of the Book

The 13 facts of crime are dealt with in this book one chapter at a time, with some inevitable overlap and, for clarity, some facts being combined or condensed into the same chapter. We hope to show how the biopsychosocial perspective in criminology is a profitable, and very powerful, tool of explanation. It is also our intention to highlight that biopsychosocial criminology should become the standard for criminology in general. We briefly introduce these facts here along with empirical research that supports these findings. In subsequent chapters, we use evidence from biopsychosocial criminology in answering these facts. At the conclusion of each chapter, we discuss outstanding questions—what we still do not know about the facts of crime.

First among Braithwaite's facts is that "crime is committed disproportionately by males." Regardless of the time and place, males commit far more crime—especially violent crime—than females. From serial killers to terrorists to run-of-the-mill delinquents, males get in more trouble than females. This finding cuts across time and place. Sociological theories contend that the disparity in offending is due to such things as the types of peers one hangs around, patriarchy, masculinity, and the different activities in which males and female engage (Hagan, Gillis, & Simpson, 1985; Messerschmidt, 1993; Warr, 2002). These theories are useful but seemingly incomplete. That males are more antisocial than females across time and place suggests something more than social context may be at play.

Notably absent from these explanations are the many biological differences between the sexes. Differences in behavior have emerged from evolutionary forces and genetic differences that control hormone processing and neurodevelopment. Sex hormones—such as testosterone and estrogen—have significant links to behavior, and other neurohormones, including dopamine and serotonin, function differently depending on biological sex (see Walsh & Vaske, 2015).

Physiological factors, such as heart rate, also appear to play a role (Choy, Raine, Venables, & Farrington, 2017). As will be seen, a person's biological sex often moderates the association between neurological function and behavior. A more powerful approach to understanding the gender gap in offending is a combination of biological, psychological, and sociological perspectives. We consider these points in the following chapters.

The second fact presented by Braithwaite is that “crime is perpetrated disproportionately by 15-to-25-year-olds.” From some of the earliest research on crime and criminality through contemporary developmental theories of behavior, researchers have noted a robust “age-crime curve” across cultures and across time (Gottfredson & Hirschi, 1986). To be sure, toddlers are often the most antisocial and “violent” in their own right (see Tremblay et al., 1999), but individuals between the ages of 15 and 25 commit the most crime as defined by the law. Early onset criminal behavior often begins in the early teen years and peaks in the late teens and early 20s. Following the mid-20s, there is a precipitous decline in criminal behavior. Since the publication of Braithwaite's book, criminologists have focused on this decline in crime with age—called desistance—with increasing rigor (for example, Rocque, 2017).

Several theories in the 1980s and 1990s sought to explain peak offending in late adolescence. Theorists argued that changing social environments were the cause of increases and decreases in criminality while others pointed to changing peer groups and routine activities. Youth in their late teens are increasingly seeking independence but remain trapped in a position of dependence and lack of freedom. Some sociological scholars have argued that this context provides the foundation for the peak in offending in late adolescence/early adulthood (Agnew, 2003; Greenberg, 1977). Developmental researchers highlighted changes in pushes and pulls toward crime in life domains and turning points in life that would protect against antisocial behavior.

More recently, neuroscientists have offered biosocial explanations that combine neurocognitive development with changing social environments. One such theory suggests that the adolescent brain is composed of two systems that develop on different timetables, resulting in adolescents experiencing heightened attraction to risk without heightened levels of self-control (Steinberg, 2010). Other explanations

have similarly relied on physiological factors, such as hormones, to better understand the age-crime curve.

The next fact recognizes that “crime is committed disproportionately by unmarried people.” Research in the 1980s showed a positive relationship between being unmarried and engaging in criminal activity (West, 1982). More recent research focused on this marriage effect concluded that being married is a protective factor for individuals (King, Massoglia, & MacMillan, 2007) and larger communities (Rocque, Posick, Barkan, & Paternoster, 2015a). A strong marriage can also act as a turning point where previously deviant individuals change course and desist from offending (Sampson & Laub, 1993; Sampson, Laub, & Wimer, 2006). From an environmental perspective, marriage may reduce crime for several reasons ranging from social control to cutting a person off from his or her potentially antisocial peers.

However, of late, some research has begun to question whether marriage has a causal effect on criminal behavior (Skardhamar, Savolainen, Aase, & Lyngstad, 2015). Instead, it appears that changes occurring prior to marriage may be more influential (Lyngstad & Skardhamar, 2013). A biopsychosocial explanation may help us understand what those changes are and why they make people (1) more amenable to meaningful romantic relationships, and (2) less likely to commit crime. Moreover, some biosocial work has indicated that marriage suppresses genetic effects on crime (Li, Liu, & Guo, 2015). Other research has suggested a link among marriage, divorce, and testosterone—marriage is found to reduce testosterone, which is linked to aggression (Mazur & Michalek, 1998). Clearly, the social control effect of a “good marriage” is not a sufficient explanation for why this institution appears to be associated with a reduction in crime.

Braithwaite’s next fact is that “crime is disproportionately committed by people living in large cities.” When considering street crime, people in urban areas contribute the most to crime rates. The “fact” that certain areas are disproportionately plagued by violence has been a long-standing criminological finding—one that was most elegantly illustrated by Shaw and McKay (1942). Many sociologically oriented theorists and theories locate this issue within the context of city life. Sampson, Raudenbush, and Earls (1997) argue that sections of the city are marked by disorganization, which makes trust and

collective action difficult when crime occurs, resulting in more crime and disorder.

Others, such as Anderson (2000), put forth arguments that explain violence as a reaction to street codes harbored by inner-city residents while others put the brunt of the blame on gangs and delinquent group activity (Matsueda & Anderson, 1998). Yet these sociologically oriented theories ran into difficulties when confronted with the reality that not all (or even most) people in urban areas are antisocial. Biosocial theories can reveal why particular people are most affected by their local environment. For example, an early study found that a combination of living in an urban area and having a criminal parent predicted antisocial behavior (Gabrielli & Mednick, 1984). Others have recently posited biopsychosocial perspectives to explain crime in cities—particularly through the lens of delinquent subcultures and brain chemistry (see Rocque, Posick, & Felix, 2015).

The fifth fact is that “crime is committed disproportionately by people who have experienced high residential mobility and who live in areas characterized by high residential mobility.” This fact is tightly associated with the previous one. When individuals move around the city at high rates and very frequently, it is difficult—if not impossible—to establish close ties with neighbors. Therefore, residents do not feel ownership of their neighborhood, do not consider their neighbors as friends and thus are not concerned with their well-being, and are not particularly invested in what goes on in the neighborhood they will likely leave in the near future. Collective efficacy, as Sampson and colleagues (1997) hypothesize, is low in these areas, resulting in high crime rates. Residential mobility is linked to poverty as well as to negative cognitive outcomes (Roy, McCoy, & Raver, 2014) and adverse childhood experiences (Dong et al., 2005).

Biopsychosocial research is also relevant, with genetics and selection effects helping explain residence in particular areas (Domingue et al., 2014; Sampson & Sharkey, 2008). To date, selection effects (a staple in evolutionary biology) have largely been ignored in criminology. However, there are various strands of research that can provide insight. One comes from evolutionary psychology, which has revealed an association between neighborhood context and individual-level traits and behaviors that are relevant to reproduction and survival. Interestingly, Daly and Wilson (1997) identified a correla-

tion between structural signals of violence and the choices made by individuals in those areas concerning mating strategies. More violent areas—meaning life expectancy is lower—tended to also have earlier timing of first births, suggesting individual-level mating decisions are (albeit almost certainly subconsciously) affected by the contextual conditions in which people live. Genomics/genetics research may also be relevant, as there is evidence to suggest that genetic markers linked to educational success are associated with social status and social mobility (Belsky et al., 2018). Although there is still a need to better integrate this work with sociologically focused explanations (e.g., Sampson & Sharkey, 2008), we believe the evidence is suggestive that biopsychosocial research can provide insight into the mechanisms that may underlie neighborhood selection/sorting.

The sixth fact is that “young people who are strongly attached to their school are less likely to engage in crime.” When young people are attached to their schools and care what their teachers think of them, they are less likely to jeopardize those bonds by engaging in poor behavior (Hirschi, 1969). Research shows that when students enjoy school and get along with their teachers, they are less likely to act delinquently (Agnew, 1985). From a sociological perspective, these relationships can be explained by social control or strain. When students like their teachers, they have incentives to act in prosocial ways so as not to jeopardize their relationships and futures. Failure in school may also induce the stress of not obtaining—or anticipating not obtaining—desired goals.

Biopsychosocial work can help us better understand why particular individuals are more likely to be attached to their school as well as become more fully engaged in that environment (Jacobson & Rowe, 1999). One particularly influential theory was put forth by Moffitt (1993; 2018). She argued that certain individuals are “life-course-persistent” offenders—in other words, they have difficulty relating to others throughout life. They are more likely to be irritable and impulsive early in childhood and act out in many contexts. Clearly they are not bonded to schools and also engage in antisocial behavior. In this case, neuropsychological difficulties might explain both crime and lack of school bonding. Cognitive ability is also a biosocial factor that can help illuminate the relationship between school attachment and crime (Sniekers et al., 2017). School may be challenging and aversive for someone with developmental problems or delays.

The seventh fact states that “young people who have high educational and occupational aspirations are less likely to engage in crime.” When adolescents and teenagers have something to look forward to and aspire to get a job and earn a living, they are, again, less likely to jeopardize those dreams by acting in ways that could get them in trouble, arrested, incarcerated, or injured. Individuals who do not aspire to much in life do not have much to lose and therefore are relatively uninhibited when it comes to engaging in criminal activity (Hirschi, 1969, 2004). Part of the idea of aspirations, which traditional sociological views do not recognize, is linked to the psychological concepts of present orientation and future discounting. The idea is that people who are more concerned with the “here and now” and less concerned with what the future will bring are more likely to act on temptations and seek gratification, often via criminal conduct (Nagin & Paternoster, 1994). A biopsychosocial view allows us to link this idea to aspirations—delinquents may tend to have lower aspirations for a reason (see DeLisi, 2015). They have less concern for a future they do not think about, and this orientation has much to do with how the brain is activated in certain situations.

The eighth fact is that “young people who do poorly at school are more likely to engage in crime.” Similar to the last few facts, those who are attached to school and their teachers are protected from engaging in crime. Those who do poorly, get bad grades, or eventually drop out are more likely to engage in crime (Hirschi & Hindelang, 1977). This link can also be seen in the recent rise of punitive discipline—such as suspension and expulsion—that increase offending (Mowen & Brent, 2016). If adolescents are not in school, there is a good chance they will replace school activities with deviant activities, including crime and violence.

The ninth fact is that “young people who are strongly attached to their parents are less likely to engage in crime.” One of the most replicated findings in the criminological literature is that individuals who are strongly bonded with their parents are less likely to be delinquent (Hirschi, 1969). This association has even been found in several cultures across the globe (Posick, 2013; Posick & Rocque, 2015). Hirschi (2004) posits that strong associations with parents are inhibitions that individuals carry with them in their daily lives and that act against poor behavior. In that sense, parents can act as supervisors of behavior when they are present and can be ingrained in a child’s

conscience even when they are not (what Hirschi [1969, p. 88] called being “psychologically present”).

Gottfredson and Hirschi (1990) argued that parenting is the key to developing childhood self-control; those with stronger social bonds will have higher self-control and lower levels of criminal behavior (Hirschi, 2004). This is a purely sociological take that draws on social control and social learning perspectives. Yet biopsychosocial research has questioned just how much parents influence children in general (Harris, 2009), in particular with respect to pouring self-control into their prefrontal cortexes (Beaver, Ratchford, & Ferguson, 2009; Wright & Beaver, 2005). Parents, it turns out, might only be able to do so much for instilling impulse control into children via the environment—they may have already set the pace with the genes they passed on. Further, some research has found that social control measures interact with gene variants to explain antisocial behavior (Guo, Roettger, & Cai, 2008). It may be the case that parents are close to children because of factors that also influence their children’s behavior; in other words, it is not *only* the parent-child relationship that is protective against crime (see also Christakis & Fowler, 2009).

For his tenth fact, Braithwaite states that “young people who have friendships with criminals are more likely to engage in crime themselves.” Mark Warr’s (2002) *Companions in Crime* presents a considerable amount of evidence that associating with delinquent peers increases one’s own criminal behavior. In Akers’s (2009) formulation of social learning theory, he suggests that peers can reinforce and motivate delinquent behavior. However, both Warr and Akers overlook *how* people are motivated and what it is about peers that has such a strong impact on behavior. Learning processes are strongly affected by brain structure and function. For instance, genes in the dopamine system (DAT1, DRD2 and DRD4, and COMT genes) substantially impact receptiveness to rewards (i.e., reinforcement) and punishment (Hahn et al., 2011). Clearly, then, to fully understand the learning process, social and brain science must be joined.

Eleventh, “people who believe strongly in the importance of complying with the law are less likely to violate the law.” People who believe in the legitimacy of and need for the law are more likely to follow the law. The work of Tom Tyler throughout the 1990s provided substantial support for this proposition (for example, see Tyler, 2003;

see also Jackson et al., 2012). When people believe the law is unfairly applied, unjust, illegitimate, or ineffective, they are not likely to follow it. On the other hand, the reverse is true. People follow the law when they see it as fair, legitimate, and effective in reducing crime and keeping people safe. The notion of belief in the law was also a part of Hirschi's (1969) social control theory, suggesting that legitimacy acts as a social restraint.

Readers may wonder how a biopsychosocial model can be applied to this fact of crime—but we will address this very underdeveloped issue in a separate chapter of the book. Recent work, for example, has shown that psychopathic traits (linked to biology) are related to feelings about procedural justice (Augustyn & Ray, 2016). As Anthony Walsh (2000) has shown, a sense of justice can be traced to our evolutionary origins. Feelings of being discriminated against can contribute to biological problems, including premature aging (Chae et al., 2014) and excessive inflammation (Brody et al., 2015). These factors contribute to crime through a process some have described as “criminal energetics” (Vaughn & DeLisi, 2018).

The twelfth fact is that “for both women and men, being at the bottom of the class structure, whether measured by socio-economic status, socio-economic status of the area in which the person lives, being unemployed, being a member of an oppressed racial minority (e.g., being black in the US), increases the rates of offending for all types of crime apart from those for which opportunities are systematically less available to the poor (i.e., white-collar crime).” Support has been garnered for the link between low socioeconomic status (SES) and crime, but not without controversy. However, it should be fairly obvious by now that violent crime is concentrated among those who live in impoverished areas. Regardless of sex, race, or age, individuals who live in poverty are more exposed to violence and more likely to participate in delinquent activities (Weisburd et al., 2004). Poverty may be related to antisocial behavior for a variety of reasons. Traditional sociological theories have focused on mechanisms such as an inability to attain the American dream (Merton, 1938) or frustration resulting from efforts to achieve middle-class standards (Cohen, 1955). Yet such theories often cannot explain the intermediary linkages between violence and poverty. Biopsychosocial perspectives can help us understand the effects of poverty on such things as brain

development (Barkan & Rocque, 2018; Johnson, Riis, & Noble, 2016) and emotion regulation (Kim et al., 2013). Those in poverty are also exposed to harmful environmental toxins to a greater extent in both urban and rural areas (Nevin, 2000; Thatcher et al., 1983). In addition, poverty may be related to toxic stress and adverse childhood experiences (ACEs), which are also related to later antisocial behavior (Poole, Dobson, & Pusch, 2018).

Thirteenth, and finally, “crime rates have been increasing since World War II in most countries, developed and developing. The only case of a country which has been clearly shown to have had a falling crime rate in this period is Japan.” Since Braithwaite’s 1989 book, crime rates have seen a surge and then a dramatic decline. In particular, since the early 1990s, crime dropped in the United States and other nations precipitously in ways we still have not been able to fully explain. The crime decline has been the subject of numerous debates, and scholars have suggested several factors that may have contributed, such as a booming economy, better policing tactics, and greater use of incarceration—all social/external forces (Zimring, 2007). Because of this crime decline, we amend Braithwaite’s thirteenth fact to cover crime trends in the twentieth and twenty-first centuries generally. We focus on how biosocial criminology can explain macro-levels inclines and declines of crime and violence over time and across places. For example, one fascinating possibility is that the decline in crime may be tied to a decrease in environmental lead levels, which have been linked to cognitive development and antisocial behavior (Sampson & Winter, 2018).

Given the evidence in support of these 13 facts, Braithwaite states that “most of the entries on this checklist would be uncontroversial to those familiar with the criminological literature” (1989, p. 50), and we agree. The debate is not on the existence of these facts but around why these facts have emerged. What is the etiology behind these facts? In other words, what explains the origins of these facts? We contend that traditional criminological (and, in particular, sociologically based criminology) only reveals part of the answer. Biological and psychological factors add another vital piece to this puzzle and cannot be ignored if we are to account for these facts with theory. Thus, our intent is to use biopsychosocial criminology as a unifying framework to enrich our understanding of the most robust, empirically based findings in the field of criminology.

The book is organized in the following manner: Chapter 2 begins our foray into applying a biopsychosocial lens to the 13 facts. This chapter explores how biopsychosocial work can help us understand gender/sex differences in criminal behavior and criminal justice outcomes. Importantly, we differentiate gender and sex, which helps illustrate where the biopsychosocial work applies compared to traditional sociological perspectives. Chapter 3 moves on to fact two, showing how a biopsychosocial perspective can help us understand the relationship between age and crime. We discuss why young people are disproportionately involved in crime but also consider why crime declines into adulthood.

Chapter 4 moves on to consider disadvantage and crime, from both individual and macro perspectives. Fact twelve is most relevant here, as it deals with disadvantage in terms of socioeconomic status on an individual and geographic level. Why does disadvantage lead to crime? How do the pressures of poverty push individuals, from a biopsychosocial perspective, into deviance? Chapter 5 addresses fact ten, which states that individuals with delinquent or criminal associates are more likely to engage in crime themselves. Generally, this finding has been explained via social learning theory. However, social learning has been criticized for ignoring selection, described by the saying “birds of a feather flock together.” Biopsychosocial perspectives may help us understand why these birds flock together. Chapter 6 addresses social bonds, incorporating facts three, six, seven, eight, and nine. Typically, social bonds have been utilized in a social control framework. While this is a sociological perspective, biopsychosocial work can help us understand why people may be naturally inclined to deviance and why social connections may restrain us from doing so.

Chapter 7 deals with stress and antisocial behavior. While a social-psychological approach, general strain theory, has often been applied to understand this connection, new research utilizing biopsychosocial information can provide more insight into how stress affects the body and subsequent behavior. This chapter applies to facts four and five, which consider stressful environments or situations and their influence on behavior. The last substantive chapter, Chapter 8, considers the influence of the police and crime trends. Police can affect crime via legitimacy, which applies to fact eleven, and crime trends applies to fact thirteen. Fact thirteen may be one of the more difficult

to explain from a biopsychosocial perspective, as it deals with long-term changes in crime rates, but here we will show how environmental changes, which affect the body, can impact crime rates. Chapter 9 offers some conclusions and predictions for what the future holds with respect to biopsychosocial criminology.

It should be noted here that several of the facts of crime can be discussed in multiple chapters in this book. We organized the chapters the way we did because it made sense to group certain theoretically related facts together, and other times we grouped the facts because we thought it was best for readability. In any case, it remains that biopsychosocial perspectives can address issues related to the facts of crime—and can do so broadly and comprehensively.

To close, it is worth revisiting a story told by Robert Hare (1993) in his book *Without Conscience*, in which he describes two twins who differed like “heaven and hell.” Despite both having a supportive family and growing up in a supportive environment (not to mention sharing the womb), the two sisters could not be more different. The catch? They were fraternal twins—sharing 50 percent of their DNA instead of 100 percent like identical twins. The origins of most behavioral traits—from depression to happiness to antisocial behavior—lie in a complex web of genetic and environmental (often unshared or unique) causes. To get to the bottom of people’s most perplexing behaviors, we must examine this web—and find out how to disentangle it.

The three of us believe this book is needed and can inform both academic work on the etiology of human behavior and practical approaches designed to reduce crime and make society healthier and safer. In these ways, it is intended to be read (and used!) by students, scholars, practitioners, and the general public. We hope this book sheds light on the factors related to criminal and antisocial behavior as well as exactly *how* those factors are related to behavior. Thus, each chapter concludes with a section on how the pieces of the crime puzzle fit together and which pieces remain missing. We also hope our discussion on violence prevention and intervention is useful to practitioners and academics alike who are interested in effectively addressing violent behavior and subsequent negative outcomes. Our intentions are to provide the best ways we know to study criminal behavior and intervene for the best chance to reduce violence in society.