

Introduction to Biology and Crime

Crime is not a new problem in society. Aristotle complained about the unruliness of youth. Cities in medieval times were always dangerous, and even today European castles are well stocked with the instruments of torture used in the suppression of crime (and political opponents) during the Middle Ages. Despite a wider choice of controls in those times than those available today, crime was never eliminated.

Crime is found cross-culturally. Tribal societies recognize the danger presented by men (and less often by women) who violate the trust of social relationships; such people are ostracized or treated even more brutally. Moreover, endemic levels of murder and spousal abuse characterize some tribal societies (Chagnon 1988). Yet we pay more attention to current headlines than to the historical and cross-cultural record of human unruliness. Delinquent gangs plague inner cities. Horrible shootings have occurred in middle-class schools. In a society that has mastered spaceflight and the instant communications of the Internet, we must still lock our houses, turn on our car alarms, and avoid city parks after dark. The inability to eliminate crime speaks of a complex social failure: Why is crime so persistent and recalcitrant to our best efforts at amelioration?

One answer to this question is that crime is a part of human nature, a legacy of evolution—something deep inside the older parts of the brain, those sections sandwiched between respiration and higher thought. As pointed out in *Demonic Males* (Wrangham and

2 *Biology and Crime*

Peterson 1996), males' propensity toward violence is noticeably shared by the common chimpanzee, in which males of one troop gang up on and kill a lone male of another. In a fictionalized account of this process, the novel *Brazzaville Beach* contrasted warring humans and warring chimpanzees in an imaginary African country (Boyd 1990). Are Belgian mercenary pilots aggressive because of a biological kinship with warring chimps?

This view of crime, a biological and evolutionary view, was prominent in criminology in the nineteenth century. The criminal (typically male) was seen as atavistic because the characteristics of his evolutionary ancestors appeared in him; he was a throwback to the apes. His eyebrows extended outward on bony bumps, his jaw was large, and his skull was misshapen. His face glares out from the pages of an old book with unbridled hostility. This representation of the criminal was widely accepted for a time, but extensive measurements of the facial features of actual criminals found them to be less atavistic and far more varied than the nineteenth century science of phrenology allowed. Empirical research is always a good antidote for misconceptions, even highly popular ones. After the late nineteenth and early twentieth centuries, the theory that a criminal is born into his propensity toward crime fell into disfavor.

This book is about biology and crime. It revisits the biological basis of criminality from the perspective of the modern sciences: behavioral and molecular genetics, neural imaging, evolutionary theory, and other new approaches. The argument that a biological basis exists for criminality raises several important questions. Seeking the answers to them is a focus of this book, even though the task cannot be completed here. These questions encompass whether criminal behavior is "normal" or "abnormal," whether the physiological effects are specific to criminality or are more general, whether crime is evolutionarily adaptive or maladaptive, and so on. Merely tagging a behavior as "biological" really says little about its substance. *All behavior is biological*, unless one is a dualist and believes in a mind separate from the brain: All behavior is represented in the brain, in its biochemistry, electrical activity, structure, and growth and decline. Behavior cannot occur without biology, anymore than a computer could be run without a material central processor made of silicon, fired up by real electrons in electrical current. The central issue is whether this biology helps us to understand criminal behavior. Is the phrase a "gene for crime" in any way meaningful, and if so, how?

This book cannot be a treatise in biology. It is said that a typical biology textbook introduces as many terms as a course in a foreign language. Because many people lack a background in biology, they are unprepared to discourse on these topics. This book cannot both tackle the biology of criminality and teach biology. I have tried to use biological terms sparingly and to define them as they are introduced; I have translated other concepts into a layperson's vocabulary. Anyone interested in this topic is encouraged to learn more about genetics and evolution, because the information in this book best benefits a prepared mind.

Neither is this intended as a comprehensive textbook. It is a primer because it surveys topics superficially and does not thoroughly review the research literature. The book contains the opinions of the author. Whereas most textbooks tend to speak with an air of complete and omnipotent authority, this one was not handed down from a mountaintop; rather, it was produced on a word processor (next to stale coffee and legal pads).

A book about the biology of crime must be about the biology of criminals—about their traits, physiology, motives, and so on. Yet what is or is not criminal varies somewhat across historical periods and cultures. Some social deconstructionists might say that crime is entirely an arbitrary cultural invention and that any identification of particular people as criminals is therefore purely arbitrary. Believers in the Ten Commandments would argue for the universality of at least some criminal acts. Murder and adultery, for example, are both prohibited throughout the world; in the United States today, one is a crime that carries serious penalties and the other is made illegal in many states by rarely enforced statutes. In almost any culture, if you steal someone else's food, kill your adversaries, or lie about your commitments, you violate both laws and social norms; in tribal societies, the norms are usually not codified as written laws, but they still exist.

In short, there is enough commonality among the kinds of acts that are socially prohibited to go forward. Furthermore, a socially constructed nature of a behavior does not prevent its genetic analysis. For example, classical music instruments were invented in Europe and are now used worldwide (excellent symphony orchestras are found in Japan; a Japanese bagpipe ensemble even performed in New York's St. Patrick's Day parade). Nonetheless, a twin study could be conducted of the biological basis of musicians' performance ability on classical instruments.

We could take another not entirely satisfying approach and define crime as “that which self-report crime scales measure,” much as intelligence (IQ) is sometimes called, “that which IQ tests measure.” This approach is certainly not a legalistic one, because not all acts listed on such scales violate the criminal code; for example, lying to one’s parents is offensive, but not necessarily criminal. In practical terms, however, we are often left with whatever method was used in any given study to measure crime.

Many of the traits we will look at are not criminal but are associated with a greater risk of committing criminal acts. Attention deficit hyperactivity disorder (ADHD), for instance, occurs in 3 to 5 percent of boys and increases the risk of criminal behavior when they grow up. Thus, by necessity, this book covers crime and criminal disposition—those characteristics associated with crime because of shared common causes. Despite these cautions, I can offer the following biologically oriented definition of crime: “Criminal acts are those acts intended to exploit people belonging to one’s own social group in ways that reduce their fitness.”

The smart thing to do at this point would be to leave this definition behind and move on, if only because any definition is bound to be imperfect and able to spark controversy. Nevertheless, here are my essential points. *Exploit* means to hurt or bring harm to. The acts harm others; violence clearly does so by causing death or injury, but theft takes away property and so causes an “injury” to a person’s future prospects. By *fitness*, I mean the ability to survive and raise a family. Can a crime reduce the fitness of someone who intends to remain celibate? Probably not, but I prefer a definition with an evolutionary flavor because it has the broadest possible application, to humans and to nonhuman animals as well. “In ways that harm them” could be substituted for “reduce fitness” for a more *Homo sapien*-specific definition. Intention is included in the definition to eliminate accidents that harm others. A momentary distraction that leads one motorist to rear end another is not a crime like robbing a Circle K store. The degree of conscious intention behind a crime, however, is again not self-evident and is worth further consideration. Finally, my definition focuses on group membership: Crime is directed against one’s fellows, people ordinarily belonging to the same tribe or country. This stipulation is made to distinguish criminal acts from warfare.

Although war is the occasion of violence and a source of much human misery, and although looting, plundering, and rape are not

infrequent companions of war, this book is not about war. War is recognized by a society as legally sanctioned; warriors are given medals and honors for killing the enemy. Two evolutionarily oriented scholars have equated crime with social parasitism, because a social parasite expropriates things of value (i.e., food) from another species and returns nothing (Cohen and Machalek 1988). In contrast, warriors protect society from possible destruction by another society and so are usually accorded great respect (warriors may also attack a weaker society, a less morally defensible use of violence). Nonetheless, there still may be some overlap between war and crime. Just as sports metaphors infuse the daily talk of men (and of fewer women), warlike motives may infuse some criminal behavior.

The young men in "Monster" Kody Scott's (under his new legal name, Shakur) *Autobiography of an L.A. Gang Member* (1994) fought gang "wars." Monster's gang faced off against a rival gang whose members were regarded as enemies; territories were staked out and claimed; and raids of reprisal were carried out into other gangs' territories. Members of a rival gang were ambushed by Monster and his gun-toting friends; some rival gang members were killed. If no military uniforms were issued and worn, if no state sanctioned this behavior, it was not altogether different from a small detachment of troops going behind enemy lines for a lightning strike. In both cases, an enemy is identified, a group of men make a raid (and train for it), and weapons are used to kill. The analogy to war actually seems closer than Gold's (1970) comparison of a delinquent gang to a "pickup" sports team. A pickup game involves teams of cooperating boys or men with some loyalty to one another. In toughly played basketball on a city hardcourt, though, no one gets killed. Whether a similarity of gang turf battles to warfare reveals a common psychological etiology or is only a metaphor is not altogether clear. However, this question must remain an open one as we consider biological influences on criminality.

The Heterogeneity of the Causes of Crime

Crime has many causes. Many different constellations of traits can predispose toward crime. Consider, for instance, the case of David Berkowitz, the infamous "Son of Sam." He terrorized New York City in the mid-1970s, sneaking up on young couples in parked cars and

shooting them. He killed six people and wounded seven. The city became so terrorized that women started to dye their hair lighter colors, because of a belief that Berkowitz favored brunette women as targets. According to Berkowitz, voices spoke to him and ordered him to kill. His acts were those of a madman who can be diagnosed as a "paranoid schizophrenic." His predisposition toward murder was not a garden-variety problem of low self-control, as described by Gottfredson and Hirschi (1990). Schizophrenia is a heritable psychological disorder. A whole book could be devoted to the role of the serious heritable mental illness in crime. That is not the emphasis of this book, however; although the major psychoses can lead a person to commit heinous crimes, such traits are probably not the most common ones that contribute to the criminal disposition. Low attention span, sensation seeking, aggressiveness, and, yes, low self-control probably cover more of the population engaged in crime. Thus, these traits will be given a greater emphasis in this book.

The book also devotes little space to consideration of how intelligence might influence crime. In general, criminals score somewhat more poorly on IQ tests than noncriminals do (Hirschi and Hindelang 1977). I see low IQ as augmenting the effect of other behavioral traits rather than as a core cause of crime itself. Most individuals of low IQ are law abiding, but in everyday life, people of lower intelligence may make, on average, poorer decisions about courses of action than people of higher intelligence do; they may be less able to handle the complexity of everyday life (Gottfredson 1997). Probably everyone makes poor decisions now and then—I can recall forgetting to turn off the main water valve inside a cabin basement while turning the water on outside, resulting in a short-term gusher. Yet the inability of low-IQ persons to adequately plan for the future and their choice of less than optimal responses on a daily basis may lead to more frequent poor life decisions. For instance, someone who has trouble keeping track of his or her finances is more likely to overdraw a bank account than someone who calculates accurately. However, a person who does not care much about the future is probably in worse shape than a poor calculator. Finally, a poor calculator who does not care much about his or her future is probably in the worst shape of all—and this person comes closest to possessing a criminal disposition.

A person's characteristics do not act in isolation. Crime is the result of myriad social influences, ranging from accessibility of criminal opportunity to membership in delinquent gangs. Thus, individual

traits must be viewed in a social context. Although this book emphasizes the individual level of analysis, social influences are examined in chapter 6. In summary, I am firmly of the opinion that there is not “one cause” of crime, nor just one solution for it.

Two Biological Perspectives on Crime

The biological approach to crime consists of two broad perspectives: behavioral genetics and sociobiology, or evolutionary psychology. Both seek out the roots of behavior in biology as well as in the environment, but they differ in their historical origins, primary research methods, and typical research questions.

Briefly, the nineteenth century founder of behavioral genetics was Francis Galton, an Englishman of many talents. He contributed the barometric maps used in weather forecasting to meteorology and the use of fingerprinting for individual identity to forensics. He wrote a best-selling travel book about his adventures in Africa (*The Art of Travel* 1872) and invented the correlation coefficient, a basis of modern statistics. His work on individual differences in personality and intellect led to behavioral genetics. In particular, he conducted a family study of genius to determine whether outstanding intellectual accomplishment was biologically inherited. His book on this topic, *Hereditary Genius* (1869), created a program for behavioral genetic research on intellectual ability. He also pioneered the twin and adoption study methods.

Following Galton’s interest in human traits, *behavioral genetics* is the study of genetic and environmental influences on individual differences in traits in humans and nonhuman animals. People differ in myriad physical and psychological traits—from shoe size to intelligence. Any individual difference in a measurable trait is grist for the mill of a behavioral genetic study. A measurable trait is called a *phenotype*, meaning that which can be reliably observed and measured about individuals. Thus, twin and adoption studies, the mainstay methods in behavioral genetics, can be used to detect genetic influences on variations in foot length, intellectual ability, or any other observable trait.

The nineteenth-century founder of evolutionary theory was Galton’s cousin, Charles Darwin. Darwin served as the naturalist and companion to Captain FitzRoy on the ship *Beagle*. The ship’s journey

of exploration through the Pacific led Darwin to the Galapagos Islands, off the coast of Ecuador. On these islands, he observed the varieties of finches, each with a beak best adapted to a particular food source, from thick, strong beaks for crushing tough pods to get at the nuts inside to thin, fragile beaks for picking soft seeds off the ground. He theorized, correctly, that the finches descended from one ancestral species of finch that had flown—or more likely was blown in a storm—from the mainland to the Galapagos. The radiation of the one ancestor into the great variety of finch species—now called Darwin's finches—that Darwin observed on the Galapagos Islands was part of the evidence that convinced him of the existence of an evolutionary process (Darwin 1859).

In 1975, the renowned Harvard biologist Edward O. Wilson wrote a book about the evolution of behavioral traits across animal species. He added a last chapter on the application of evolutionary theory to human behavior and coined the name *sociobiology* for this fledgling field. He argued that behavior can be understood as arising from biological evolution in that behavioral traits are adaptive—that is, traits that serve the functions of survival allow individuals to produce offspring, who themselves survive and reproduce to carry copies of their parental genes onward into future generations. Sociobiology became controversial, not in the least because Wilson imagined it swallowing up various social science disciplines, but also because of its ensuing social and political controversies. More recently, the field has come to be called *evolutionary psychology*, with a greater emphasis on how adaptation shapes thought and emotion rather than on social behaviors.

The evolutionary program of research is most concerned with the brain as an adaptive organ, shaped by evolution—much as evolution has perfected the eye to see the world, or the wing to hold a hawk aloft. This research focuses on universal behaviors, or on behaviors specific to males and females of a species that result from the adaptive problems faced by males and females over evolutionary time. This approach focuses on behaviors that affect the chances of survival and reproduction, such as aggression and altruism, and ignores those that may be a consequential domain of individual differences but not necessarily one closely related to behavioral adaptation, such as general intelligence. In terms of genes, this approach is more concerned with the effects of gene variants that are shared by all humanity and less concerned with genes that are polymorphic (i.e., that come in many

forms) and so differ among individuals, such as those that determine height or eye color.

Chapters 2 and 3 consider how the behavioral genetic and evolutionary theories contribute to our understanding of crime and criminal disposition.

Levels of Biological Analysis

Reductionism is seeking the explanation of complex scientific phenomena in simpler ones. In physics, equations are used to describe physical forces that exist under ideal conditions of vacuum and no friction. In biology, the impulse patterns of a single nerve cell are analyzed, even though the brain is composed of billions of nerve cells.

Reductionism has both good and bad qualities. On one hand, few sciences would have ever advanced without it. In chemistry, for instance, understanding of chemical reactions was greatly enhanced by describing them as reactions among the limited number of elements represented in Mendeleev's periodic table. In physics, Newton's laws of gravity allow plotting courses to the moon or Mars with pinpoint accuracy, although in the long run planetary orbits can become unpredictable because gravitational interactions among several planets and their moons can create chaotic motions. If science has taught us anything, it is that to understand nature: "Simplify, simplify, and simplify."

On the other hand, reductionism cannot solve all problems in science. Complexity theorists point out that by reducing phenomena to simple laws, we lose the effects of interactions at higher levels. In human affairs, predictions often fail. No one has found a surefire method of predicting the stock market's gains or losses or predicting the rise and fall of political states. No pundit predicted the rapid collapse of a dominant world power, the Soviet Union, in 1989. Although the mind is nothing more than electrochemical activity in the brain, the converse is untrue: No single neuron is the mind.

In biological reductionism, we look for specific changes in physiology that are associated with crime. Reductionism comes in softer and harder varieties. The more a single biological substrate relates to a physical or behavioral trait, the stronger the possible reductionism to a biological level of explanation. In the strongest form of causality,

just one gene and the protein molecule it produces are involved. Consider a neurological disorder, Huntington's disease. The inheritance of a single copy of a defective gene, from either one's mother or father, leads inevitably to this disease in adulthood. The first symptoms are usually uncontrolled movements in the arms and legs, forgetfulness, and personality change, followed by a general mental decline and then death. The causal sequence is the inheritance of one gene to one fatal disease. This is biological determinism at its strongest, a preordained fate knowable well in advance (and as of this writing still not treatable).

If only crime were so easy. But it is not. Crime does not have one specific cause in the brain. There are degrees of biological influence on behavior, from direct determinism to none (except in the loosest sense that all behavior is biologically instated). Biological influences on crime fall somewhere between these extremes. Each biological influence is a slight nudge, pushing in the general direction of a stronger criminal disposition. The more a biological influence increases the risk of crime or a crimelike behavior and nothing else, the more likely that its influence is specific to crime. One of the interesting questions about biological influences on crime is at how many levels reductionism will work. Can we move from personality traits to individual differences in physiology? Chapter 4 covers some physiological correlates of crime. As reviewed in more detail in chapter 4, a low resting heart rate in a brief laboratory test can anticipate later criminal behavior, but it is only a moderate nudge in that direction.

Physiological differences in the brain are partly a result of the inheritance of different variants of genes. Chapter 5 examines the contribution of molecular genetics to understanding crime. The degree of genetic determination of crime depends partly on how many genes have moderate effects on the risk of crime. The fewer the number of genes, the more each gene can tell us about the biological dispositions toward crime. At this time, no one knows how many genes might be relevant and how strong their effects are. In chapter 5, I examine several single-gene effects in more detail.

Environmental Influences

Chapter 6 considers sources of environmental influence on criminal disposition and crime rates. It opens by considering peer groups as

an environmental cause of crime. Peer-group members are alike in their crime rates, a resemblance that is partly a case of “birds of a feather flocking together” and partly an influence of one person on another. The discussion of peers is also a good context in which to consider a gene-to-environment correlation—that is, how people choose environments that reinforce their genetic predispositions. Family influences are considered in a context of genotype x environment interactions. The last section of the chapter deals with historical change in crime rates, which proceed at a more rapid pace than genetic change does. The historical record may reveal specific environmental and demographic influences on crime, but the complexity of historical time often clouds which new aspect of culture or demography was responsible for an increase or decrease in crime.

Chapter 7 steps into the most contentious ethical and legal issues prompted by biological discoveries about criminal disposition and by abuses of biological ideas in recent history. The chapter examines tension between medical and criminal justice models of crime. Although not widely acknowledged, medical treatments are often used with persons within the criminal justice system, especially with adolescents. Given advances in psychiatry, greater contact between the medical and justice systems is probably inevitable. Chapter 7 also covers a controversy about using biological tests to predict children’s future criminal behavior, much as biological tests are used to predict some medical disorders. In the nineteenth and early twentieth centuries, the eugenics movement proposed a restriction on the reproduction of the “unfit” as a possible remedy to a host of social ills, including crime. The chapter concerns about possible misuse of biological knowledge considers crime on behalf of a revived eugenics movement. Finally, the reader is encouraged to learn more about the biological bases of criminal behavior.

References

- Boyd, W. 1990. *Brazzaville Beach*. London: Sinclair-Stevenson.
- Chagnon, N. A. 1988. “Life Histories, Blood Revenge, and Warfare in a Tribal Population.” *Science* 239: 985–992.
- Cohen, L. E. and R. Machalek. 1988. “A General Theory of Expropriative Crime: An Evolutionary Ecological Approach.” *American Journal of Sociology* 94: 465–501.

12 *Biology and Crime*

- Darwin, C. 1859. *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. London: John Murray (Harvard University Press, 1975).
- Galton, F. 1869. *Hereditary Genius: An Inquiry Into Its Laws and Its Consequences*. London: Macmillan (Cleveland World Publishing Co., 1962).
- . 1872. *The Art of Travel*. London: John Murray.
- Gold, M. 1970. *Delinquent Behavior in an American City*. Belmont, CA: Wadsworth.
- Gottfredson, L. S. 1997. "Why *g* Matters: The Complexity of Everyday Life." *Intelligence* 24: 79–132.
- Gottfredson, M. R. and T. Hirschi. 1990. *A General Theory of Crime*. Stanford, CA: Stanford University Press.
- Hirschi, T. and M. J. Hindelang. 1977. "Intelligence and Delinquency: A Revisionist Review." *American Sociological Review* 42: 571–587.
- Shakur, S. 1994. *Monster: The Autobiography of an L.A. Gang Member*. New York: Penguin Books.
- Wilson, E. O. 1975. *Sociobiology: The New Synthesis*. Cambridge, MA: Harvard University Press.
- Wrangham, R. and D. Peterson. 1996. *Demonic Males: Apes and the Origins of Human Violence*. New York: Houghton Mifflin. ♦