

Biological Positivist Theories

Chapter Overview and Objectives

In this chapter, we introduce the theories offered by biological positivism. These theories focus on individual characteristics that are inherited and present at birth, such as biological and mental traits. Lombroso, Ferri, and Garofalo (known collectively as “the Italian Positivists”) attempted to explore these characteristics by applying the scientific method to the study of criminality. While the simplistic measurement of physical characteristics employed by early biological positivists failed to uncover the ultimate cause of crime, this work led to other, more nuanced approaches, suggesting that there are biological precursors that may make some people more prone to committing crime. Figure 3.1 provides a general overview of the approach we take in this chapter.

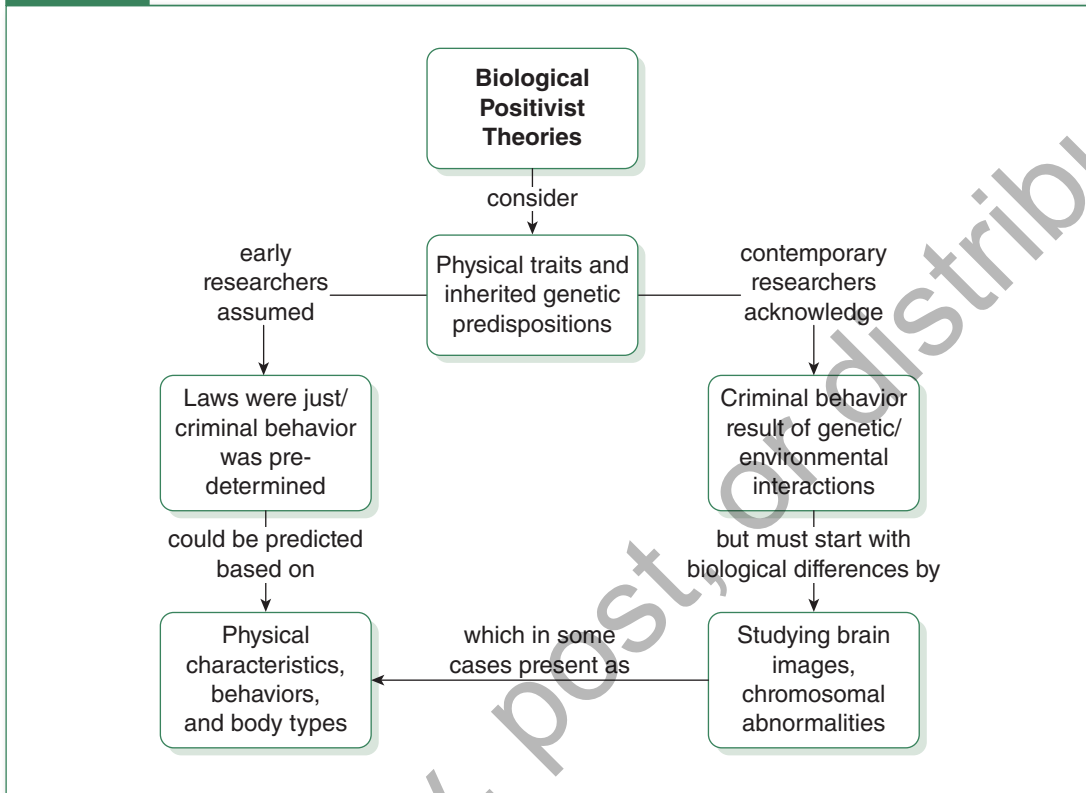
By the end of the chapter, readers should be able to:

- Understand the assumptions made by biological positivist theories
- Acknowledge the historical period in which these theories emerged
- Be aware of the level of explanation, problem focus, and scope of biological positivist theories
- Consider the historical and social context that gave rise to the biological positivist theories
- Explain the practical approaches and programs suggested by biological positivist theories

The Biological Positivist Tradition

As discussed in the previous chapter, in criminology and the other social sciences (e.g., sociology, psychology, and economics), **positivism** refers to the application of the scientific method to explain human behavior. Early criminological positivists were primarily biological theorists who sought to explain criminality by identifying physical characteristics and genetic differences that distinguish criminals from noncriminals. However, later theorists started to use psychological and social factors

Figure 3.1 Introducing Biological Positivist Theories of Crime



to explain criminal behavior and, in some cases, to identify potential delinquents and criminals. These theorists are referred to as psychological positivists and social or sociological positivists, respectively. In this chapter, we will discuss some of the earlier contributions from biological positivists, but we also explore contributions from psychological positivism, sociological positivists, and more modern biological and biosocial theories in subsequent chapters.

As you read this chapter, consider . . . there is increasing evidence that taking repeated blows to the head can lead to degenerative brain disease. This is not new information, of course. Forty years ago, researchers found that taking punch after punch as a boxer can lead to boxer's dementia. Today, large-scale studies on combat veterans' brains show that repetitive head trauma from improvised explosive devices could be doing the same to soldiers. Further, professional athletes from both the National Football League and National Hockey League have filed class action lawsuits against the leagues. These former players are requesting that a fund be set up for those who experience the

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negative side effects of repeated concussions. As you read this chapter, consider what concerns this raises for criminologists and criminal justice system practitioners. What are the implications for the wider society?

Seven Steps of Criminological Thinking

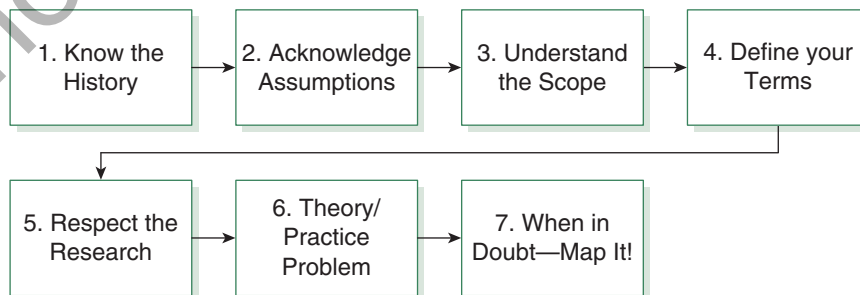
In every chapter, we present seven steps to understanding a theory or an approach to the study of crime. Figure 3.2 outlines the seven steps of criminological thinking.

History and Social Context of Biological Positivism

The origins of the positivist approach, the field of criminology, and really all of the social sciences can be traced back to the Enlightenment, or Age of Reason. This era was characterized by a collection of political, philosophical, and religious upheavals that occurred during the 17th and 18th centuries (Rafter, 2008). During the Late Middle Ages (ca. 14th century to 16th century), people begin to challenge the authority of the Catholic Church and the monarchies in Europe. Spurred by the invention of the printing press, many discovered philosophy and literature, shared new ideas, and rediscovered old ideas. The Renaissance, in part, was driven by a desire to study and better understand nature. The printing press and increased availability of books led to higher rates of literacy and more reading, which had a twofold effect. First, people begin to read key texts (e.g., the Bible) on their own instead of relying upon translations from church and government officials. Second, increased reading among the populace contributed to the proliferation of competing philosophies and ideas that caused people to question society and existing political hierarchies.

Of course, history rarely proceeds along a simple linear timeline, and some disagreement exists among scholars as to how and why the Renaissance occurred and as to what were the specific years of

Figure 3.2 Seven Steps of Criminological Thinking



the Enlightenment. Most, however, agree that the Enlightenment occurred toward the end of the Renaissance during the 17th century and continued into the 18th century. During this period, advances in medicine and science took place, there was an interest in reason and the rationality of man, and a newfound interest in establishing laws, legal systems, and individual rights.

The Enlightenment saw the emergence of the classical school, which viewed man as rational and possessing free will. Legal systems were built on the assumption that people acted to maximize their own pleasure and must be deterred from doing so by social control through laws and regulations. Enlightenment philosophers also offered many reforms to the existing system of justice, including imprisonment, clear legal codes, and clearly defined punishments designed to deter future criminal behavior by fitting the punishment to the crime. The basis for classical school thinking was covered in Chapter 1, and we will also revisit some of these ideas in Chapter 12 to understand how they laid the groundwork for modern theories based on deterrence and economics.

The approach embraced by biological positivists must be seen as a reaction to the free will perspective endorsed by classical school thinkers. This new interest in science gave rise to the three key forerunners to the early biological theories of criminal behavior. First, the early psychiatric work on moral insanity had an impact on biological positivism. These researchers were attempting to further explain how free will functioned and what caused some people to commit evil acts (Rafter, 2008).

Second, the emergence of physiognomy and phrenology preceded Lombroso's work on the criminal man (Savitz, Turner, & Dickman, 1977). **Physiognomy** refers to the belief that behavior can be predicted through a person's physical appearance. Swiss scholar and theologian Johann Kaspar Lavater was one of the pioneers in this area, and his work on physiognomy received almost as much praise as Lombroso's work (Bernard, Snipes, & Gerould, 2010). **Phrenology** refers to a system of reading the bumps on a person's head in order to learn things about his or her character. Viennese physician Franz Joseph Gall and his student Johann Gaspar Spurzheim are considered the main founders of this field (Rafter, 2008). While phrenology may sound quite silly to us and has proved to be scientifically lacking, it grew into a well-developed field (Savitz, Turner, & Dickman, 1977). It offered an explanation of criminal behavior when most were explaining crime through reference to evil or demonic possession. Further, in an era dominated by an extremely retributivist approach to crime, phrenologists were some of the early proponents of rehabilitation and treatment (Rafter, 2008).

Third, the emerging evolutionary perspective had a huge impact on the early biological positivists. This included not only the work of Darwin, but other evolutionary theorists such as Jean-Baptiste Lamarck, Herbert Spencer, and Francis Galton (Rafter, 2008). Gregor Mendel's work on genetics was also quite important to some of the early positivist studies of criminal behavior—in particular, those based on genetic inheritance, such as the family studies of Dugdale (1895) and Goddard (1913).

In 1871, Lombroso proposed his theory of atavistic man, which was very well received, especially in the United States where it became quite popular. At first, his ideas competed with phrenology over which theory best explained criminality, but Lombroso's theory and approach were embraced due to a variety of historical and social factors. Lombroso received support from the American Institute of Criminal Law and Criminology. This influential organization devoted more attention to his research, and his work was translated and distributed (Savitz, Turner, & Dickman, 1977).

In general, evolutionary and biological theories received much more support than other environmental theories (Taylor, Walton, & Young, 1973; Rafter, 1997). Lombroso also gained credibility by using Darwin's evolutionary theory to explain criminality. Evolutionary theory was quite popular at the time, especially in the United States. Finally, as others have also pointed out, Lombroso was

responsible for popularizing the medical model in the criminal justice system (Rafter, 2008). This approach viewed offenders as being sick or mentally ill rather than evil or morally lacking and said that they needed treatment rather than just punishment.

For better or for worse, this opened the door for experts to come in and “solve” the problem of crime. As a result, the state and the criminal justice system could exert far greater control over the populace. Lombroso’s theory offered a justification for imprisoning offenders beyond standard retributive goals (Taylor, Walton, & Young, 1973). While this may seem like a progressive shift on its face, some have contended that the retributivist system was actually more humane because the brutal punishments were administered quickly and efficiently without drawn-out trials and indeterminate periods of imprisonment for rehabilitative purposes (Foucault, 1977; Newman, 1983).

Assumptions of Biological Positivist Theories

Biological positivists assume that basic human nature is primal and instinctive and must be held in check through socialization. Thus, these theorists view humans as being naturally self-interested and hedonistic. This view is sometimes referred to as a Hobbesian assumption; the belief here is that a strong authority is required to protect people from themselves and others. This is based on an evolutionary view of humans: People are animals and are subject to the same natural laws as animals.

Biological drives and characteristics are viewed as being very important to understanding human behavior. As mentioned previously, the positivist approach must be seen as a reaction against the free will doctrine offered by classical school philosophers. In an oft-cited passage, one of the founders of positivist criminology contrasts his approach against that of the classical school:

We speak two different languages. For us, the experimental (i.e., inductive) method is the key to all knowledge; to them everything derives from logical deductions and traditional opinion. For them, facts should give place to syllogisms; for us the fact governs and no reasoning can occur without starting from facts, for them science needs only paper, pen and ink and the rest comes from a brain stuffed with more or less abundant reading of books made with the same ingredients. For us, science requires spending a long time in examining the facts one by one, evaluating them, reducing them to a common denominator, extracting the central idea from them. For them a syllogism or an anecdote suffices to demolish a myriad of facts gathered through years of observation and analysis; for us the reverse is true. (Ferri, 1917, p. 244)

Taylor, Walton, and Young (1973) have outlined the basics of the positivist approach. First, positivists believe that human behavior can be measured and quantified. Their hope is to discover causal laws like the physical sciences—through the measurement of phenomena. Second, positivist theorists strive for scientific objectivity or neutrality. Third, there is a belief in the determinism of behavior or the notion that human behavior is predictable and can be predicted based on some set of causal factors.

Biological positivists believe that there is a consensus in society with regard to laws and norms and that this corresponds to the needs of the system (Young, 1981). According to the positivist view, society consists of mostly “normal” people who represent the consensus. Deviants are perceived as the minority and exist at the margins of society (Taylor, Walton, & Young, 1973). This is a very binary

approach to society in that it is a very black-and-white view of the world: Criminal law determines what is right and wrong, and people caught violating criminal law are assumed to be in the wrong.

Problem Focus, Scope, and Level of Explanation of Biological Positivist Theories

The problem focus of these early biological theories is clearly on individual criminality and criminal behavior. Crime rates, the origins of criminal law, and activities of the criminal justice system are not key concerns in these theories. Instead, “This theory admits that biological, physiological, psychological and social influences all contribute to the creation of the criminal but that it is in the *individual* that the fundamental predisposition to crime is situated” (Young, 1981, p. 267). As noted in this quotation, there are different varieties of positivism, but the focus here is on the biological and physiological variety.

The scope of biological positivist theories is surprisingly broad. For various reasons, most people assume that violent criminal behavior has a stronger genetic link than nonviolent criminal behavior. However, twin and adoption studies have indicated a much stronger genetic link to petty crime as opposed to aggressive and violent crime (Anderson, 2007; Raine, 1993; Robinson & Beaver, 2008). This implies that biological factors may help make sense of aspects of both petty and violent crime. Indeed, there could even be a biological connection to white-collar crime. However, nearly every modern biologist would readily admit that the interaction between genes and environment must be examined. The level of explanation of these theories is clearly micro and individualistic since the theories focus on explaining individual criminality. As opposed to structural theories that consider broad or macro contexts, these theories focus on individual differences (Bernard & Snipes, 1996).

Key Terms and Concepts in Biological Positivist Theories

The Atavistic Man

Cesare Lombroso was a medical doctor who studied crime and is considered by many to be the father of modern criminology (Lilly et al., 2011). More specifically, he is credited with founding the field of criminal anthropology (Rafter, 2008). After studying medicine in Italy and Austria, he worked in a mental institution and then as a military physician. In 1876 he became a legal professor at the University of Turin. This was also the year in which he published his pioneering book titled *Criminal Man*. Lombroso laid out his theory in five different editions of this book over a period spanning more than 20 years (1876, 1878, 1884, 1889, and 1897). Over this time, he made constant modifications to his theory, and, in later editions, more social and sociological factors were taken into account. Lombroso’s explanation of criminality was based on evolutionary theory and suggested that criminals were less evolved than other people. He claimed to have come to this revelation while looking at the skull of an Italian brigand named Villella (Rafter, 2008). He describes this moment in the following passage:

This was not merely an idea, but a flash of inspiration. At the sight of that skull, I seemed to see all of a sudden, lighted up as a vast plain under a flaming sky, the problem of the nature of the criminal—an atavistic being who reproduces in his person the ferocious instincts of primitive humanity and inferior animals. Thus were explained anatomically the enormous jaws, high cheekbones, prominent superciliary arches, solitary lines in the palms, extreme

size of the orbits, handle-shaped or sessile ears found in criminals, savages and apes, insensitivity to pain, extremely acute sight, tattooing, excessive idleness, love of orgies, and the irresistible craving for evil for its own sake, the desire not only to extinguish life in the victim, but to mutilate the corpse, tear its flesh and drink its blood. (Lombroso, 1876, as cited in Taylor, Walton, & Young, 1973, p. 41)

Over the course of his career, Lombroso measured and catalogued the physical characteristics of a variety of populations, including normal people, the mentally ill, soldiers, and criminals. He compared his findings and discovered correlations between certain individual characteristics (many of them physical) and criminality. Lombroso suggested that criminals had stigmata or markers that could be easily observed (Gibson & Rafter, 2006). A complete list of these markers is presented in Table 3.1.

Today, many of these correlations between physical and behavioral characteristics appear to be ridiculous. However, some of these aspects, such as insensitivity to pain, lack of remorse, and lack of impulse control, are widely researched in modern criminology.

Lombroso used his findings to propose an elaborate classification system that evolved with each successive edition of his book. As mentioned previously, his primary contention was that many criminals, roughly 30% of them, were evolutionary throwbacks or born criminals. He said that these people were simply born this way and claimed that in many cases, moral insanity and epilepsy occurred alongside and were often connected to this type of criminality. For Lombroso, many people were not born criminals but were criminals of passion. These criminals committed crime in the heat of the moment or because of political views. This would include political revolutionaries or husbands who killed in the heat of passion because of an unfaithful wife (Gibson & Rafter, 2006). Later, Lombroso posited the existence of insane or mentally defective criminals. These were people who committed crime because they had low intelligence, were alcoholic, or had a hysterical and excitable personality.

In the final editions of *Criminal Man*, Lombroso refined the notion of occasional criminals, another broad classification, and identified several subtypes. Occasional criminals had no criminal traits but committed crime because of various situational and social factors. Pseudocriminals were minor offenders who were either implicated in crime indirectly or committed crime that was based on legal technicalities. Criminaloids were those who committed crime because of easily available opportunities. Habitual criminals became involved in crime because they lacked a solid education and

Table 3.1 Lombroso's Markers of Criminality

Features	Height/Weight/Skin/Eyes	Other Characteristics
Smaller, deformed skulls	Taller than average	Tattoos and piercings
Crooked noses	Heavier than average	Insensitivity to pain
Sloping foreheads	Dark skin	Lack of remorse
Large ears/protruding jaws	Dark eyes	Little control over passions such as drinking, gambling, sex urges

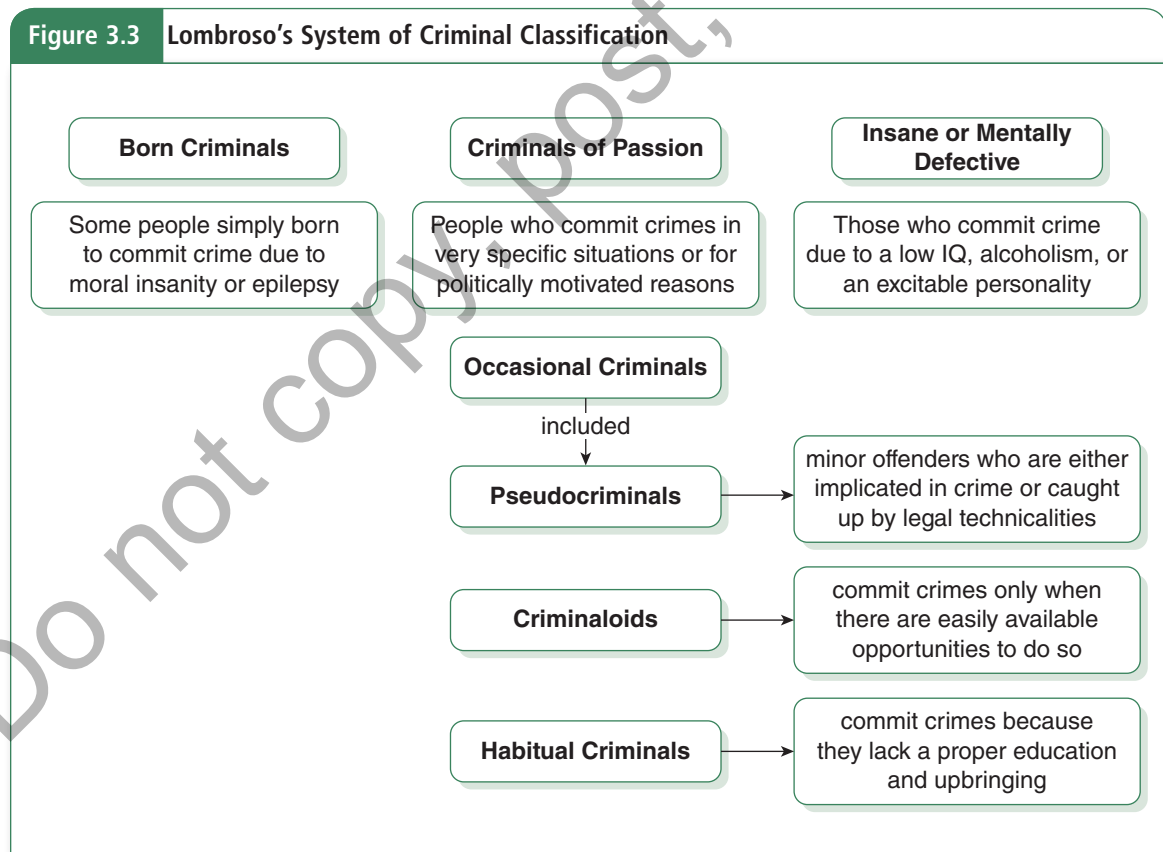
upbringing or were socially or materially deprived in some way (Gibson & Rafter, 2006). Figure 3.3 is a visual depiction of Lombroso's classification system.

A Theory of Natural Crime

The work of Raffaele Garofalo (1914) represents another important contribution to early biological positivism (Miller et al., 2011). Garofalo's ideas are based heavily on social Darwinism but are much less biologically oriented than those of his predecessor (Bohm & Vogel, 2011; Lilly et al., 2011). He proposed a universal definition of natural crime. Further, he suggested that society was similar to an organism and that crime was like a disease.

Much of Garofalo's (1914) work focused on the proper methods of dealing with crime and suggested practical approaches to reducing crime. He thought that criminals needed to be separated (or quarantined) and treated in order for their "disease" not to spread. If they proved untreatable, he believed criminals should be permanently incarcerated, exiled, or put to death. Garofalo believed that criminal offenses violated the two important moral sentiments of probity and pity. Probity

Figure 3.3 Lombroso's System of Criminal Classification



referred to our feelings about the property rights of others (i.e., property crime) while pity referred to our revulsion to the suffering of others (i.e., crimes against the person) (Taylor, Walton, & Young, 1973).

Body Types and Criminality

Lombroso's work and the work of the other Italian Positivists fell into disrepute during the 1920s and 1930s when sociological approaches to criminal behavior began to become popular. However, some researchers still maintained an interest in body type and further explored its relationship to temperament. Kretschmer (1925) identified three body types: the pyknic, or fat, which he thought was correlated to depression; the asthenic, or skinny, which he believed was connected to schizophrenia; and the athletic, which was also correlated with schizophrenia.

Building on Kretschmer's (1925) work, William Sheldon (1940, 1942) identified three types of physique, which he called somatotypes, and three related styles of temperament. **Endomorphs** are soft, round, and have a tendency to put on fat. They have a viscerotonic temperament that includes characteristics such as being laid back, easygoing, sociable, and generally extroverted. **Ectomorphs** tend to be linear, fragile, and have small, slight builds. They tend to be highly intelligent, are often plagued by ailments and allergies, and are generally introverted; their temperament is referred to as cerebrotonic. **Mesomorphs** have heavy bone and muscle development, large wrists, and larger bodies. They are active, dynamic, assertive, and aggressive; this is referred to as the somotonic temperament. Some people might refer to them as alpha males.

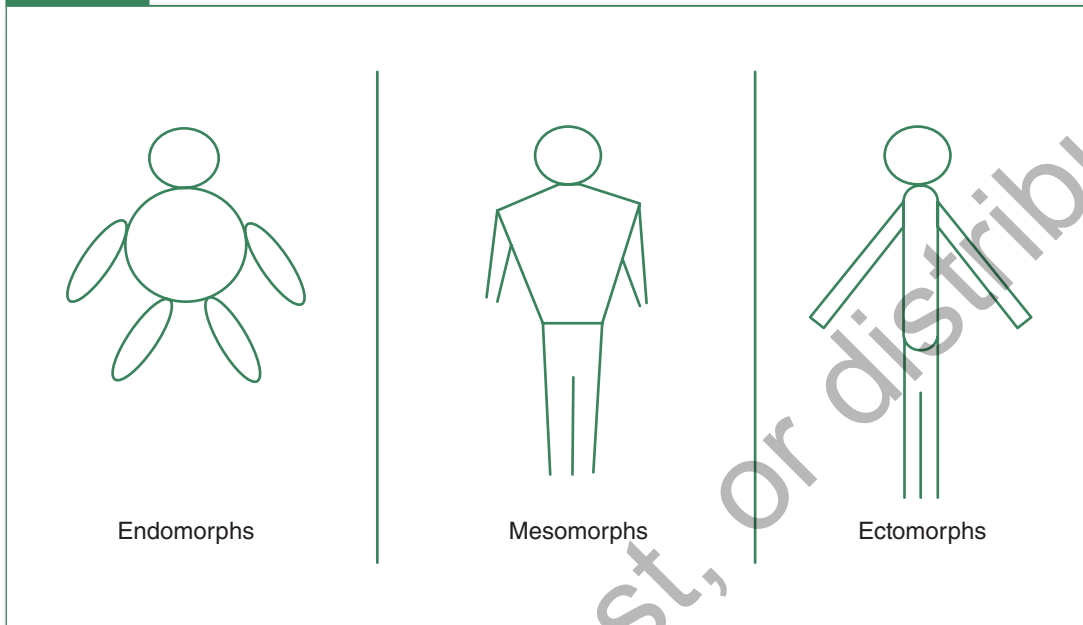
According to Sheldon (1949), the mesomorphic body type and somotonic temperament was most likely to produce criminal behavior. While it may sound overly simplistic, several criminologists have used Sheldon's somatotypes as a component of more complex integrated theories (Glueck & Glueck, 1950; Wilson & Herrnstein, 1985). Figure 3.4 provides one way to view these body types.

An Early Biosocial Theory of Criminality

Enrico Ferri, a student of Lombroso, did much to refine and elaborate upon Lombroso's theory and can also be seen as an early forerunner to modern biosocial approaches to crime. In his work *Criminal Sociology* (1896), Ferri proposed a classification that was based on Lombroso's findings and coined the term *born criminal*, which Lombroso used in later editions of *Criminal Man*. He also presented a theory that attempted to account for anthropological, physical, and social factors that gave rise to criminality and crime. Anthropological (or individual) factors explained basic criminality in people and were divided into three subtypes: organic constitutional factors, which included physical factors identified by Lombroso; mental constitutional factors, such as intelligence, disposition, and moral sense; and personal characteristics, such as race, age, sex, social status, and educational level (Ferri, 1896).

Ferri also focused on how environmental factors might influence crime. These included factors such as the climate, season, time of year, weather, and temperature in which the crime was committed. Social factors were macro variables that might influence rates of criminality. These included structural aspects such as population density, family conditions, educational opportunities, and activities/policies of legal systems. Ferri (1896) was careful to point out that it was important to understand and clarify how these various levels of explanation interacted and affected one another. Figure 3.5 offers one way to see these interactions.

Figure 3.4 Sheldon's Somatotypes

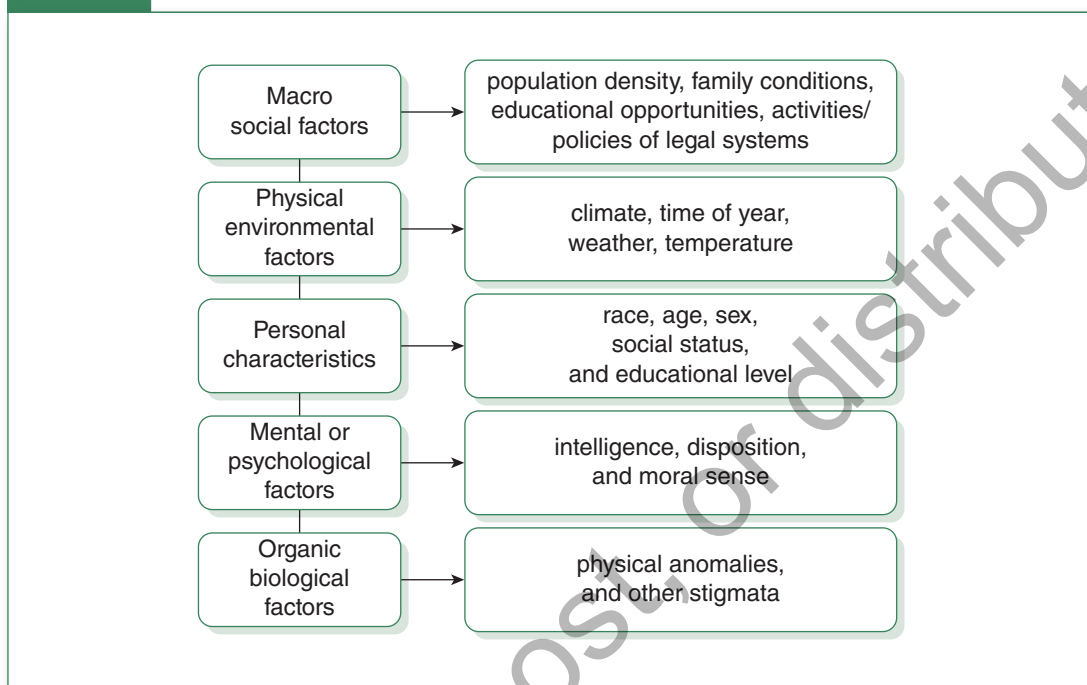


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The propositions that can be derived from biological positivism can be summarized as follows:

Theorist	Proposition
Lombroso (1876)	There are physical differences between criminals and noncriminals.
Lombroso (1876); Glueck & Glueck (1950); Sheldon (1949)	Criminal behavior varies with body type and size.
Ferri (1896); Lombroso (1876)	Criminal behavior is related to low intelligence or IQ.

Like Ferri, the work of more recent biological and biosocial criminologists such as Jeffery, Mednick, Ellis, Walsh, Raine, and others involves examining the interactions between biological precursors and environmental factors. As we will explore, to date modern biosocial theories have made very little use of existing sociological explanations of criminal behavior. This offers the potential for a range of new approaches to better predict criminality and study how best to mitigate the biological

Figure 3.5 Interactions and Criminality

predisposition toward a life of crime. As we will illustrate in later chapters, this also offers an opportunity to integrate theories across levels and between disciplines.

Research on Biological Positivist Theories

Research on a biological basis for crime has been a long-standing enterprise. From the measurement of skulls (phrenology) to the elaborate classification systems created by Lombroso (criminal anthropology), biological approaches to the study of crime have been both praised and maligned. While it is common to dismiss early biological positivist research, understanding the problems with past approaches is essential to thinking about how best to test and examine theories today. One way to view the role of biology and crime is to consider family, twin, and adoption studies. Studies such as these represent attempts to estimate the effect of familial relationships and the role of genetic influences on a host of behaviors.

One branch of biological positivism exists in the family and genealogical studies of Dugdale (1895) and Goddard (1913). Dugdale's study of the Juke family occurred very early; in fact, it predated Darwin's evolutionary theory. The Juke family exhibited a great deal of criminality over successive generations (approximately 50% of the members studied were criminals). In addition, many of the Jukes were involved in prostitution, were very poor, and suffered from innate depravity.

Dugdale (1895) believed that these characteristics were inherited but also thought that the environment could affect heredity. More important, he believed that criminality could actually be passed down through families.

Goddard (1913) examined the Kallikaks in a longitudinal study of two families fathered by the same man (in Goddard's words, "an upstanding man"). The mother of one family was a Quaker woman; the mother of the other family was (again, in Goddard's words) a "tavern wench." Members of the former family produced very little criminality, while members of the latter exhibited a great deal of criminality (Robinson & Beaver, 2008). Goddard disagreed with Dugdale's (1895) finding of inherited criminality. Instead he argued that

so far as the Jukes family is concerned, there is nothing that proves the hereditary character of any crime, pauperism, or prostitution that was found. . . . The formerly much discussed question of the hereditary character of crime received no solution from the Jukes family, but in the light of present-day knowledge of the sciences of criminology and biology, there is every reason to conclude that criminals are made, not born. The best material out of which to make criminals, and perhaps the material from which they are most frequently made, is feeble-mindedness. (1913, pp. 53–54)

As this quote implies, Goddard's (1913) research laid the groundwork for further research connecting intelligence and IQ to criminality that continues to this day. A problem for family studies is the inability to separate the genetic and environmental sources of variation. Thus, family studies are complicated by the question of whether nature or nurture is the stronger predictor of behavior. Therefore, given this complication, this section will focus on two other research designs that are better equipped to test for genetic effects.

As described above, Lombroso did a great deal of research while formulating his theory of criminality and his criminal classification scheme. However, there are several examples of more formal attempts to test his theory. For instance, Charles Goring (1913) published a large research study intended to refute "the superstition of Lombrosianism" (Rafter, 2008, p. 13). Goring was an English prison medical officer, and, like Lombroso, he used his position to take physical measurements (e.g., head size, color of eyes, and facial features) of 3,000 English convicts (Akers & Sellers, 2013). He then compared the measurements of the inmates to a control group of undergraduate students, soldiers, professors, and hospital patients. Notably, Goring used new statistical techniques to test theories pioneered by Francis Galton and his students, including Karl Pearson (Rafter, 2008).

Goring's (1913) research indicated that there were no clear statistical differences between the inmates and the other subjects, and he found that criminals could not be distinguished from civilians on the basis of physical characteristics identified by Lombroso. However, he did still believe that criminals were born with certain inherited criminal traits and that they were inferior to normal people. He conceded some environmental and social factors were involved, but he felt that these were much less important than inherited characteristics (Bernard, Snipes, & Gerould, 2010). Criminals were found to be shorter and skinnier on average than law-abiding citizens and seemed to have lower levels of intelligence or IQ on average. Goring's research also indicated that this finding varied based on frequency and length of imprisonment (Bernard, Snipes, & Gerould, 2010).

A few decades later, Ernest Hooton, a well-known anthropologist and professor at Harvard, conducted a massive study of 17,000 subjects in eight US states (Lilly et al., 2011). Hooton (1939) attempted

to provide support for Lombroso's theory and attacked many of Goring's (1913) methods and conclusions (Akers & Sellers, 2013). Like Goring, Hooton measured the physical characteristics of numerous inmates from a variety of correctional institutions (e.g., prisons, reformatories, and county jails). He compared the convict group to a control group of college students, hospital and mental patients, firemen, and policemen (Akers & Sellers, 2013).

Unfortunately, Hooton's methods were problematic, and his research assistants did not always take reliable measurements. Further, much of his analysis was based on ethnic and racial stereotypes. He thought he had found evidence that certain races were prone to committing particular types of crime. This is inherently problematic because it disregards the fact that his sample only contained those who had been caught and convicted of crimes (Rafter, 2008). In addition, this is an example of a tautology, or circular reasoning. In other words, the proposition stating that there were physical differences between criminals and noncriminals was never tested. In Hooton's mind, he knew the results before testing his theory, and he assumed his theory was correct (Akers & Sellers, 2013).

This is a clear inversion of the scientific method; the assumption of physical differences between criminals and noncriminals led Hooton to search for and find these differences. Again, he never really tested his theory—instead he *merely looked for evidence to support it*. When research amounts to cherry-picking evidence that supports one's own view or ideological starting point, scholarship suffers. Because of these shortcomings in his research, Hooton became a very controversial figure, as his methods and conclusions were regularly attacked by his fellow academics. Later in his career, he distanced himself from academia because of the poor reception to his work and turned instead to practical matters of concern involving the government and business (Rafter, 2008).

The fascination with constitutional factors and criminal behavior did not die with Hooton's research. Hooton had a well-known student by the name of William Sheldon who would go on to develop theories involving body type that we discussed earlier (Rafter, 2008). He also had two colleagues at Harvard by the name of Sheldon and Eleanor Glueck—one of the early husband and wife criminology teams. The Gluecks included some of these ideas in their multifactor theory of criminal behavior that was presented in *Unraveling Juvenile Delinquency*. The Gluecks (1950) were attempting to produce a multifactor theory of criminal behavior that combined Hooton's and Sheldon's ideas about constitutional factors and body types and more sociological explanations about family interactions.

Another approach involved studying twins separated at birth to disentangle the effects of biology and the environment. To further explain, it is easy to control for biology if both individuals are genetically identical. This method attempted to examine whether a given trait could be **heritable** or inherited. Monozygotic (MZ), or identical, twins are genetically identical, having 100% of their genes in common with one another. Conversely, dizygotic (DZ), or fraternal, twins are less genetically alike than MZ twins and are in fact no more alike genetically than siblings who are not twins.

One way to compare the behavior of twins is by measuring **concordance rates** among traits. Concordance rates refer to the likelihood that one twin will develop a trait similar to another twin, and they are expressed in percentages. Anderson explains the notion of concordance in the following passage:

If the concordance for a certain trait in monozygotic twins is determined to be 70%, then this means the chance of the other twin developing the trait is 70%. If we compare the concordance

rates for a specific trait between monozygotic (MZ) and dizygotic (DZ) twins—for example, if the trait is 70% in MZ twins but only 5% in DZ twins—then it would appear to have a heritable component. The twins who are genetically identical are much more likely to share the same trait than the twins who are not genetically identical. Therefore, the trait relates to genetics. If concordance rates were 70% in both MZ and DZ twins, then it would be an environmental effect, as the fact that MZ twins are genetically identical does not appear to make any difference. (2007, p. 92)

In other words, we assess the extent to which genetic factors are responsible for behavior by comparing the concordance between the different types of twins and the traits they possess.

In a review of 13 twin studies conducted up to 1993, Raine (2002) reports that although the studies vary widely in terms of age, sex, country of origin, and sample size, identical twins are twice as likely to have both engaged in criminal activity than fraternal twins (Raine, 1993). Additional twin studies by Slutske and her colleagues (1997) suggest that antisocial and aggressive behavior is far more likely in identical twins relative to fraternal twins, a finding that has been supported elsewhere (Eley, Lichtenstein, & Stevenson, 1999).

Adoption studies provide another way to understand the possible role of biology. They have some advantages over twin studies because they better address the problem of genetic versus environmental influences (i.e., nature versus nurture). For example, by examining offspring separated from their criminal, biological parents early in life and sent to other families, researchers can better assess whether these offspring will grow up to become criminal at greater rates than foster children whose biological parents were not criminal. This allows researchers to examine whether the influence of genetics or the social environment has more of an impact on behavior.

Mednick and his colleagues (1977) have conducted what are probably the most well-known studies of adoption and criminal behavior. This branch of research has helped give rise to the contemporary biosocial approach to criminal behavior and will be discussed in more detail in Chapter 14. Nearly all of the adoption studies conducted in Denmark, Sweden, and the United States suggest a genetic basis to criminal behavior (Raine, 1993). While there may be some question about whether less violent delinquency or more violent behavior is more commonly a function of genetic predisposition, it is difficult to ignore biology after reviewing the existing literature. Clearly, some biological traits make people more prone to criminal behavior, but criminal behavior also requires opportunities. Further, problematic traits thought to lead to crime (e.g., aggression, impulsivity) are always mediated through one's social environment.

Going beyond the question of whether criminality is heritable (and the result of certain genetic predispositions) or a function of one's socialization or upbringing, another recent approach looks at how brains develop as a result of chromosomal abnormalities. For example, XYY syndrome is characterized by an extra copy of the Y chromosome in each of a male's cells. XYY syndrome is associated with an increased risk of learning disabilities and delayed development of speech and language skills. Delayed development of motor skills (such as sitting and walking), weak muscle tone (hypotonia), severe acne, hand tremors or other involuntary movements (motor tics), and behavioral and emotional difficulties are also possible. This chromosomal change occurs as a random event during the formation of sperm cells. An error in cell division can result in sperm cells with an extra copy of the Y chromosome, and a child may have an extra Y chromosome in each of the body's cells.

In a recent cohort study (Stochholm, Bojesen, Jensen, Juul, & Gravholt, 2012), 161 men diagnosed with XYY syndrome were matched against others at risk and by age to examine rates of criminal convictions in Denmark between 1976 and 2006. The researchers found the incidence of convictions was much higher among men with XYY syndrome compared to controls in all crime types except drug-related crimes and traffic offenses. This incidence remained increased for certain crime types (e.g., sexual abuse, arson) even when adjusted for socioeconomic variables such as education, fatherhood, retirement, and cohabitation.

This study builds on older research suggesting that males with similar chromosomal abnormalities tend to have more difficulties at school, to be more mentally immature, to be more impulsive than their siblings, and to have more difficulty in forming relationships with others (Nielsen & Christensen, 1978). Many believe the direct causal connections between XYY syndrome and criminality have not been empirically proved. However, it is still important to be familiar with the controversy created by this research. In later chapters, we will discuss modern parallels to this phenomenon, including the use of the connection between criminality and the so-called warrior gene in recent high-profile court cases.

Another important development in this area is the recognition of the dangers of prenatal alcohol consumption by pregnant mothers. Fetal alcohol spectrum disorder (FASD) is a nondiagnostic term that covers a range of related birth defects resulting from prenatal alcohol exposure. Under this umbrella term are several diagnostic terms such as fetal alcohol syndrome (FAS), partial fetal alcohol syndrome (pFAS), alcohol-related neurodevelopmental disorder (ARND), and alcohol-related birth defects (ARBD). In practice, these may include physical, neurological, and psychological impairments, and those with FASD can present significant challenges for the criminal justice system.

While FASD is the most common form of preventable brain damage to infants in the Western world, the brain damage that results from prenatal exposure to alcohol is irreversible and results in lifelong challenges in learning, behavior, employment, and socialization (Fast & Conroy, 2004). Cases of partial and full FASD have been correlated to an increased incidence of comorbid neuropsychiatric disorders, including attention deficit hyperactivity disorder, learning disabilities, developmental disorders, anger, and social skill problems (Burd, Klug, Martsolf, & Kerbeshian, 2003).

Perhaps the most interesting research in this area is the result of significant advances in brain imaging techniques over the past two decades. A number of studies focused on brain imaging of violent and psychopathic populations have been undertaken (Raine, 1993; Raine & Buchsbaum, 1996; Henry & Moffitt, 1997). Reviews of these studies suggest that violent offenders have structural and functional deficits to the frontal lobe (located behind the forehead) and the temporal lobe (located near the ears). Subsequent research appears to confirm the idea that abnormal functioning of the frontal and temporal regions may predispose one to crime (Intrator et al., 1997; Kuruoglu et al., 1996; Seidenwurm et al., 1997; Soderstrom et al., 2000).

Practical Ramifications of Biological Positivism: The Good, the Bad, and the Ugly?

The Good: The positivists offered “progressive reforms” to the criminal justice system. More specifically, positivists suggested that rather than merely punishing criminals, we should attempt to treat them and rehabilitate them. This stemmed from embracing the medical model that views criminals as sick and criminality as similar to a disease (Rafter, 2008). Thus, our system started to change and

new practices were introduced. These include rehabilitation programs, parole, probation, and the recognition of the social lives and experiences of those in conflict with the law. This opened up the criminal justice system to experts such as treatment specialists, probation workers, psychiatrists, social workers, psychologists, criminologists, and others who often sought to help offenders with their problems (Taylor, Walton, & Young, 1973).

The Bad: Some have argued that this emphasis on institutional control through the application of the scientific method had negative consequences for society (Taylor, Walton, & Young, 1973; Foucault, 1977). The individualistic form of biological positivism we have been discussing here lends itself well to political manipulation because it can shift the blame from the society and system to the individual. For example, biological positivists characterize criminals as possessing some characteristic that makes them commit crime. This focus on individual characteristics ensures that any environmental issues or social inequalities that help breed crime are ignored: If we hold the individual responsible, we don't have to change society.

The Ugly: Darwin's cousin Francis Galton introduced the term *eugenics* in his book *Inquiries Into Human Faculty and Its Development* (1883) (Raftar, 2008). This term was based on work he did on inheritance of traits. He only advocated for positive eugenics, or the practice of encouraging fit people to have more children (Anderson, 2007). Negative eugenics was co-opted for political purposes by reformers in the United States, Britain, Canada, and Germany; by the early 20th century, this movement had become very popular. Reformers suggested everything from work colonies to compulsory sterilization for the "unfit" (Anderson, 2007). The unfit were defined as whomever society held hostility toward or looked down upon: immigrants, minorities, criminals, the mentally ill, and the mentally challenged, to name a few. The Nazi regime escalated eugenics measures and started to execute the unfit, who they described as being "life unworthy of life" (or *lebensunwertes leben*). Eugenics policies were also used in Stalinist Russia (e.g., T. D. Lysenko's "socialist biology") (Anderson, 2007), and movements continued in Canada and the United States until the 1970s.

Today, there is no question that repeated head trauma and concussions can result in chronic traumatic encephalopathy (CTE). CTE is a neurodegenerative disease that can cause depression, cognitive impairments, dementia, Parkinsonism, and erratic behavior. This disease can also lead to aggressive and violent behavior. Several high-profile athletes (e.g., Chris Benoit, Junior Seau, and Jovan Belcher), have recently committed violent crimes as a result of their injuries. If indeed this group of people and others who have suffered brain injury present a danger to society, the criminal justice system must respond. However, given the problems with past biological approaches in criminology, any response must be carefully considered.

Think You Get It?

Make a concept map or mind map of the main biological terms and concepts and the results of criminological research in this area. Use the instructions in Chapter 2 or make your own visual map. Based on the information in this chapter, which biological explanations appear to be the most important for the study of crime?

Figure 3.6 Seven Steps of Biological Positivism

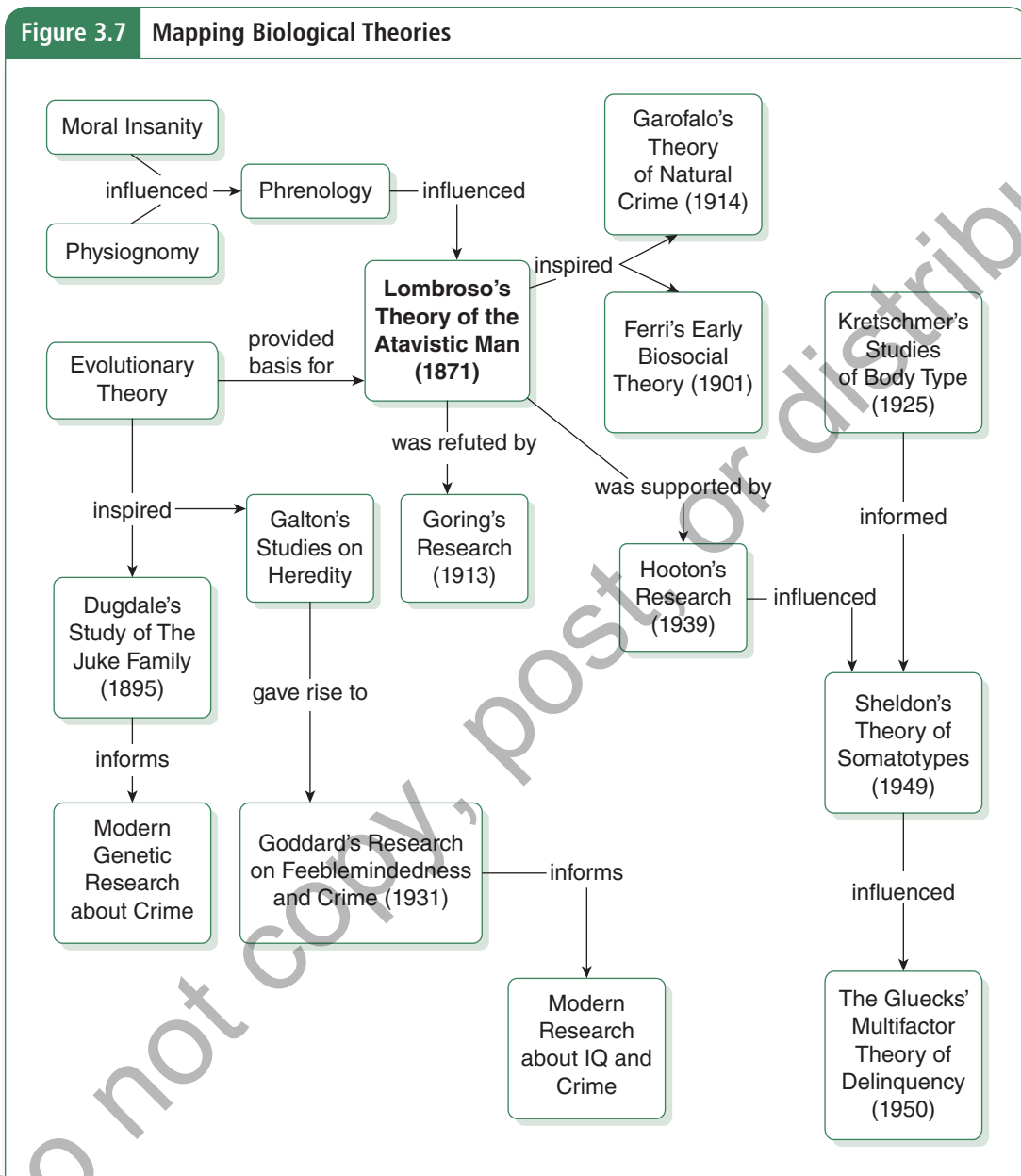
Seven Steps	Biological Positivism
1. Know the History	Emerged after the Enlightenment (ca. 1800–1900) as a reaction to the classical school; influenced by increasing popularity of science and evolutionary theory
2. Acknowledge Assumptions	The struggle for survival ensures that humans are naturally selfish; biological factors determine behavior; people are naturally conflict oriented but society is characterized by consensus
3. Problem Focus, Scope, and Level of Explanation	Focus on explaining criminality using individual differences (e.g., physical characteristics, body type, and intelligence)
4. Key Terms and Concepts	Criminals are atavistic men or evolutionary throwbacks; somatotypes; criminal behavior related to intelligence
5. Respect the Research	Family inheritance and genetic studies; criminality seems to run in families
6. Theory/Practice	Medical model, scientific experts, indeterminate sentences
7. Mapping the Theory	See Figure 3.7

Criticisms of Biological Positivist Theories

There are a number of criticisms levied against the biological positivist approach to criminology. The first of these involves the assumption that the criminal law is always right and those that break the law are always wrong. This appears to be a binary approach to society and the law. In some ways, categories of individuals (criminals and noncriminals) are essential; however, these approaches tend to accept without question or critical reflection the idea that the law always defines right and wrong. One issue that flows from this underlying assumption is that it allows the scientific authority ascribed to biological approaches to be used by racist-nationalists or other authoritarian regimes for their own political or ideological ends. The specter of Nazi Germany, Stalinism, and the existence of eugenics-based movements and their resulting policies (e.g., forced sterilization and euthanasia) can take on the appearance of a culturally or politically dominant group defining others as degenerate in one way or another.

Early biological positivist approaches look today like pseudoscience used to privilege the physical characteristics of some groups over others. Social Darwinism, or the application of “survival of the fittest” to human society, presumes a genetic source for a socially defined category of behavior. While thinkers associated with biological positivism brought about a revolution in how to study crime and criminal behavior, in retrospect, their contribution also assisted criminologists to identify some of the problems with simply accepting notions about human nature and the assumptions of the scientific method. For example, the faith in the scientific measurement of phenomena was belied by the problems of quantifying criminal behavior. It is clear that key variables were operationalized and defined for the purposes of

Figure 3.7 Mapping Biological Theories



measurement in ways that were inherently problematic. Concepts such as feeble-mindedness, inferiority, and even crime all require far more nuance and detail than the early theorists considered.

Other problems were methodological. Research was often based on small or inappropriate samples and failed to contend with the difficulty of operating from an objective, nonbiased vantage point

from which to assess society. The problem is that no matter how good our intentions are, humans are in the business of rendering value judgments. Put another way,

The [experts] must explain what is perceived as unusual in terms of the values associated by their audience as usual. . . . They circumscribe and negate the reality of values different from their own. They do not explain, but merely explain away. (Taylor, Walton, & Young, 1973, p. 33)

The belief that crime must be subject to discoverable causal laws fails to contend with economic and cultural factors. Early biological positivist approaches, with the exception perhaps of Ferri, failed to consider in enough depth the importance of interactions between genetics and environment for human behavior generally and criminal behavior specifically.

Research was also affected by an overreliance on official statistics and definitions of crime. Of course, a basic problem with using official statistics is the dark figure of crime. In other words, we do not catch everyone who violates the law, so not every criminal is correctly defined as such. This problem also interacts with definitions of crime. Again, biological positivists assume that the law defines right and wrong (Taylor, Walton, & Young, 1973). Carried to its logical conclusion, such an uncritical stance on the law and crime allows for horrible atrocities to be defined as normal as long as state definitions define these behaviors as such. Indeed, white-collar and corporate crime have traditionally not been taken very seriously, and many of these behaviors were not even defined as criminal until recently.

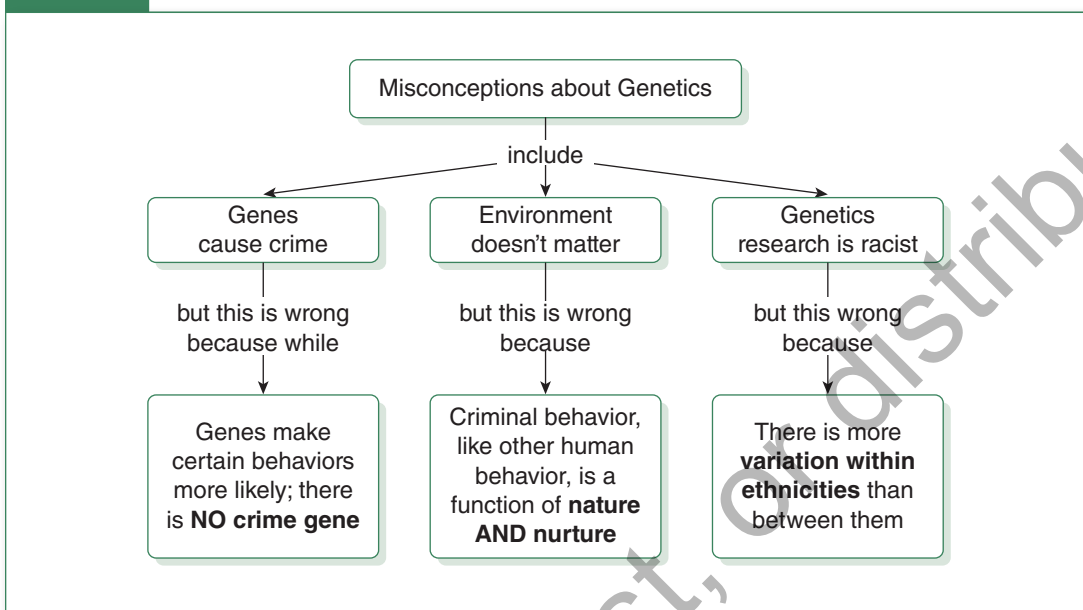
Research Example: Rethinking Biology and the Brain

As we discussed above, the advance of brain imaging techniques has changed the potential value of a biological basis for criminal behavior. While it is problematic that the tendency to treat biology as destiny can be used by those in positions of authority to “define” criminals without considering how definitions of crime change over time, efforts to brand all who consider biology and crime to be related as presumptive racists are also misleading. Understanding biology and crime requires first appreciating the role of genetics. One way to consider the problems and potential for biological positivist theories of criminology is to map some of the common misconceptions. Figure 3.8 provides an overview of these misconceptions, which were first presented by Raine (1993) and later reorganized by Robinson (2004).

Of specific interest in this section is the work of Raine (2002). Raine studies antisocial behavior from neuroscientific, developmental, and social perspectives. He and his colleagues focus on risk and protective factors for childhood conduct disorder, reactive and proactive aggression, adult antisocial personality disorder, homicide, and psychopathy. In their lab, Raine and his colleagues focus on structural and functional brain imaging, autonomic and central nervous system psychophysiology, neuroendocrinology, neuropsychology, and x-ray fluorescence. While Raine takes a biosocial perspective to his theorizing that integrates social, psychological, and environmental processes with neurobiological approaches, his research grew out of techniques that we can classify broadly as biological positivist. In the place of measuring skulls or classifying body types like the biological positivists discussed above, Raine’s work focuses on identifying and comparing areas of the brain between criminal and noncriminal populations. We will revisit Raine’s (1993, 2013) contributions to criminological theory in Chapter 14 when we discuss the biosocial theories of criminal behavior.

The first published brain imaging study of murderers (Raine et al., 1994) involved comparing the scanned brains of 22 murderers who pled not guilty by reason of insanity (or were otherwise found

Figure 3.8 Mapping Misconceptions and Genetics



incompetent to stand trial) to the brains of 22 normal controls who were matched with the first group on demographics such as sex and age. The key finding was that the murderers showed significantly poorer functioning of the prefrontal cortex, which is the part of the brain that controls

deeper and more primitive subcortical structures, such as the amygdala, which are thought to give rise to aggressive feelings. Prefrontal damage also encourages risk-taking, irresponsibility, rule breaking, emotional and aggressive outbursts, and argumentative behavior. (Raine, 2002, p. 57)

A recent study used brain scans to look at the anterior cingulate cortex, the part of the brain that is involved in emotion and decision making. Researchers found that if offenders had lower functioning in the anterior cingulate, they were twice as likely to reoffend in the next three years (Aharoni et al., 2013). Another study showed that males with a smaller volume of the amygdala—the part of the brain responsible for emotional responses and that generates feelings such as conscience, remorse, and guilt—were four times as likely to commit an offense in the next three years, even controlling for social background and a past history of violence (Kiehl, 2014).

Another approach looks at reported incidence of head injuries among incarcerated populations. Data suggest that the prevalence of a traumatic brain injury (TBI) in the past may be as high as 10 times that of the general population (Ferguson, Pickelsimer, Corrigan, & Bogner, 2012). In a recent meta-analysis, Farrer et al. (2013) surveyed studies of TBI using a delinquent juvenile sample. The researchers found that approximately 30% of juvenile offenders had sustained a previous brain injury and that the rate of TBIs within the juvenile offender population is significant, suggesting a relationship between TBIs and juvenile criminal behavior.

These developments may also be relevant given reports of the growing problem of criminal behavior in veterans. Elbogen (2012) and colleagues found that 9% of veterans who responded during the research reported an arrest since returning home from military service. While most arrests were associated with nonviolent criminal behavior resulting in incarceration for less than two weeks, those with probable posttraumatic stress disorder (PTSD) or TBI who reported anger/irritability were more likely to be arrested than were other veterans. The findings suggest that a subset of veterans with PTSD and negative affect may be at increased risk of criminal arrest.

Now that you've read this chapter . . . what do head injuries have to do with criminology? Prisoners suffer disproportionately from past traumatic brain injuries. For example, 8.5% of US nonincarcerated adults have a history of traumatic brain injuries (TBI), while approximately 60% of adults in US prisons have had at least one TBI, which is seven times greater than those not incarcerated. Given the large number of individuals in prison who might have been housed in psychiatric facilities in another era, perhaps prisons offer a means to combine prosocial educational opportunities with neuroimaging to explore which parts of the brain are activated during evidence-based rehabilitation.

Conclusion and Review Questions

In this chapter, we reviewed the major theories and ideas offered by the biological positivists. This included a review of the work of the Italian Positivists (i.e., Lombroso, Ferri, and Garofalo) and attempts to further test and refine these insights (e.g., the work of Goring, Hooton, and Sheldon). While in some ways these thinkers revolutionized criminology by introducing and applying the scientific method to the study of criminality, their work also had many shortcomings and negative ramifications. These include an overemphasis on physical characteristics as the ultimate cause of crime and a wholesale adoption of the law as the moral arbiter of right and wrong.

As we have seen, more modern examples of research done in this area include genetics and brain scan studies. While there is no question that different people respond to the world in different ways based on biological differences, the implications of such observations have not been embraced by the criminal justice system. Due to mounting evidence that biological differences matter, we will revisit emerging research later in this text. For now let's review the main concepts and arguments presented in this chapter.

CHAPTER REVIEW

1. List the assumptions made by biological positivist theories.
2. How did the historical period in which these theories emerged shape their early development?
3. What are the problem focus, scope, and level of explanation of these theories?
4. What social and historical factors gave rise to these theories?
5. What practical ramifications did these theories have?