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Article *in* Journal of Criminal Justice · February 1998

DOI: 10.1016/S0047-2352(97)00050-0

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TABOO UNTIL TODAY? THE COVERAGE OF BIOLOGICAL ARGUMENTS IN CRIMINOLOGY TEXTBOOKS, 1961 TO 1970 AND 1987 TO 1996

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ABSTRACT

In American criminology throughout most of the twentieth century, biological arguments that link biochemistry, genetics, and/or neurophysiology to crime have been viewed as taboo: unthinkable and unmentionable. Despite this reputation, biological perspectives have resurged in the last two decades, reshaping theory and research in criminology. This article examines the changes in the taboo image of biological arguments in fifty-five introductory criminology textbooks: twenty published from 1961 to 1970 and thirty-five appearing from 1987 to 1996. The data show that the taboo surrounding biocriminology appears to be diminishing in textbooks: Newer texts devote more coverage to biological perspectives and are more likely to claim that there is at least some empirical evidence supporting these arguments. Furthermore, criminology textbooks that embrace interdisciplinary orientations are less likely to depict biological arguments as taboo than books that endorse sociological, and especially critical sociological, orientations. © 1998 Elsevier Science Ltd

INTRODUCTION

It is often observed that the modern discipline of criminology originated at the dawn of the twentieth century in the biological theories endorsed by such European thinkers as Enrico Ferri ([1892] 1917), Raffaele Garofalo ([1885]

1914), Charles Goring (1913), and especially Cesare Lombroso (1876, [1912] 1968). (See also Sellin, 1992; Wolfgang, 1972). These thinkers believed that criminal behavior is associated with such inherited characteristics as physical stigmata (Lombroso) and mental deficiency (Goring). Beginning in the 1930s, however,

criminologists in the United States voiced considerable suspicion about the biological theories of crime that dominated European thought. American criminologists with advanced degrees in sociology increasingly saw crime as the result of social disorganization and social learning, not inherited physiology or feeble-mindedness (Gibbons, 1994). By mid-century, biological explanations for crime were passé, disreputable, and perhaps even taboo. They were unthinkable and unmentionable (Gordon, 1980; Jeffery, 1980; Sagarin, 1980). Describing this taboo, Sagarin (1980:9) remarked that criminologists who claim there are biological predispositions to crime “are often given short shrift, their ideas are dismissed with derision, [and] they are in other ways subject to an informal collegial punishment, perhaps short of ostracism, but nonetheless unwelcome.”

In the last few years, however, biological explanations of human behavior have enjoyed a tremendous resurgence in popularity among academicians. A major impetus behind this renewed interest in the general social sciences was the publication of E. O. Wilson’s (1975) path-breaking *Sociobiology: The New Synthesis*, a complex attempt to explain human behavior as a combination of genetic factors (nature) and social learning (nurture). In criminology per se, the appearance of James Q. Wilson and Richard J. Herrnstein’s (1985) *Crime and Human Nature*—an ambitious effort to explain criminal behavior as a product of rational choice and genetic constraints—signaled a renewed recognition that biological factors have some role in crime causation.¹

This article examines the coverage of biological arguments in introductory criminology textbooks. It begins by briefly (1) tracing the origins of the taboo status of biological explanations of crime in American criminology from the 1930s and (2) reviewing modern theories and research that offer empirical evidence in support of biological explanations of crime. The quality and the quantity of the coverage of biological arguments in criminology textbooks is then analyzed to determine if the authors depict these perspectives as taboo. Altogether, fifty-five textbooks were studied during two time periods: 1961–1970 and 1987–1996. These peri-

ods permitted the comparison of the coverage in textbooks before and after the renewal of interest in biological explanations for crime. The evidence shows that the taboo image of biological perspectives appears to be slowly dissipating in the introductory criminology textbooks.

THE ORIGINS OF THE TABOO

Although criminology arguably originated in the theories of biological positivism chiefly proposed by such European scholars as Ferri ([1892] 1917), Garofalo ([1885] 1914), Goring (1913), and Lombroso (1876, [1912] 1968), the 1930s witnessed a dramatic shift in criminology in the United States away from nature arguments and toward nurture perspectives. During the 1930s, American sociologists waged a successful turf war against biologists, psychologists, and physicians, wresting criminology from its biological roots, to make the growing field a specialty within the larger discipline of sociology (Gibbons, 1994). Part of this struggle involved the repudiation of biological explanations of crime, arguments antithetical to the emerging radical nurture perspectives of the sociologists.²

Unquestionably, the eminent scholar Edwin H. Sutherland was the leading turf warrior in sociological criminology during this period. From his first volley against biological arguments in a 1931 publication titled “Mental Deficiency and Crime” (a book chapter attacking attempts by psychologists like Henry H. Goddard to connect low intelligence quotient (IQ) scores to crime and delinquency), to his final broadside criticism of the somatotype arguments in William Sheldon’s (1949) *Varieties of Delinquent Youth: An Introduction to Constitutional Psychiatry* (in a scathing posthumous review essay published in 1951), Sutherland waged a vigorous and relentless campaign against biological perspectives. By the time of his death in 1950, Sutherland had succeeded in virtually obliterating biological thinking from mainstream criminology.

Sutherland’s most influential dismissal of biological explanations for crime appeared in his extremely influential textbook *Principles of Criminology*. Beginning in the fourth edition, Sutherland (1947) rejected biological arguments

by proclamation in principle one of his differential association theory: "*Criminal behavior is learned*. Negatively, this means that criminal behavior is not inherited, as such" (Sutherland, Cressey, and Luckenbill, 1992:88). More an attempt to eliminate the discussion of biological arguments by fiat rather than by logic or through empirical evidence, seven subsequent editions of the textbook contained this statement. Generations of criminology students (some of whom were future professors) memorized this principle so that even if criminal behavior was not learned, the taboo of inherited criminality was.

In certain circles, sociologists continue the denunciation of biological explanations for crime. Some of the most strident criticisms today come from sociological criminologists who endorse critical perspectives (see Katz and Chambliss, 1995; Platt and Takagi, 1979; Taylor, Walton, and Young, 1973). Because they believe that crime and the law are fundamentally shaped by structural relations in the political economy—with particular emphasis on inequalities in class, race, and gender—critical criminologists reject nature arguments in favor of radical nurture orientations.³

One of the criticisms that critical criminologists level against biological arguments is probably deserved (e.g., the claim that these theories are aimed mostly at explaining street crime, and neglect white-collar offenses; Platt and Takagi, 1979). More problematic is the tendency for critical criminologists to politicize biological explanations of crime, linking these perspectives to sexism, racism, and immoral eugenic policies (see Katz and Chambliss, 1995; Platt and Takagi, 1979). For example, Platt and Takagi (1979) condemn biological approaches as forms of "scientific racism." Sadly, the twentieth century witnessed several cases of despicable state sponsored interventions implemented in the name of eugenics—including the forced sterilization of retarded women in mental hospitals in southern American states in the 1920s and the 1930s and Adolf Hitler's genocidal policies in German occupied nations during World War II—although associating these atrocities with modern biological studies of crime and other human behaviors is a "fallacious device"

that should be "transparent to thoughtful persons" (Gordon, 1980:57). It is no more reasonable to connect biological theories of behavior to the actions of Hitler than to blame the theories of Karl Marx for the extermination of millions of peasants in the Soviet Union under the rule of Joseph Stalin.

The historical tendency for sociologically trained and oriented criminologists to dismiss nature explanations of crime—and for critical criminologists to associate these arguments with sexism, racism, and fascism—fostered the taboo image of biological perspectives in criminology. In recent criminology textbooks, the theoretical orientations embraced by authors (e.g., interdisciplinary, critical sociological, and non critical sociological perspectives) logically should influence how they depict biological theories of crime.

MODERN BIOCRIMINOLOGY: THEORIES AND RESEARCH

The resurgence of interest in biological explanations of crime—or biocriminology—has taken numerous forms, involving innovations in theories and research. Here, some of these developments are briefly surveyed.

Most of the important theoretical innovations in biocriminology were anticipated by E. O. Wilson's (1975) pathbreaking book *Sociobiology: The New Synthesis*, which was an attempt to explain human behaviors as combinations of inherited predispositions (nature) and environmental influences (nurture). Modern biocriminological theories take this sociobiological approach: Typically, they involve complex mixtures of nature and nurture explanations. As such, these theories are examples of the modern trend in criminology toward integrated theories of crime (see Akers, 1997; Lilly, Cullen, and Ball, 1995).⁴

A harbinger of modern integrated approaches in the development of biocriminology in Europe appeared in Hans J. Eysenck's (1964, 1977) *Crime and Personality*. Eysenck argued that criminal behavior is a product of inherited neurological characteristics that affect temperament and socialization patterns. Specifically, genetic

differences in nervous systems can result in higher levels of extraversion (a craving for stimulation caused by slow cortex arousal), neuroticism (the inability to handle anxiety and stress), and psychoticism (social insensitivity and unemotionality), three factors in human temperament that Eysenck (1977) associates with criminality. In particular, low cortex arousal levels cause extraverts to respond with indifference to the aversive consequences (punishments) associated with inappropriate behavior (criminality), while driving them toward exciting and stimulating social environments that often involve hedonistic, delinquent, and criminal interactions. Combinations of poor conditionality and high needs for stimulation draw extraverts toward criminal behavior.

By blending a rational choice perspective with biological arguments, James Q. Wilson and Richard J. Herrnstein's (1985) *Crime and Human Nature* presented perhaps the most influential integrated theory in biocriminology in the United States. Wilson and Herrnstein argued that prospective offenders confront decisions between criminal and noncriminal behaviors; they reach decisions based on rational calculations of self-interests. Human rationality, however, is limited by three biological constraints, including genetic predispositions toward impulsivity, aggressiveness, and low intelligence. Offenders often make poor decisions—engaging in high cost and low reward street crimes—because these genetic constraints limit their rationality. Although Wilson and Herrnstein (1985) marshalled an impressive array of evidence to support these claims, this book has been harshly criticized by some criminologists with backgrounds in sociology (Cohen, 1987; Gibbs, 1985).⁵

Following the publication of *Crime and Human Nature*, a plethora of integrated approaches have incorporated biological factors. Some notable recent examples include Moffitt's (1994; see also Moffitt, Lynam, and Silva, 1994) argument that there are two classes of adult criminals: life-course persistent offenders (whose antisocial behavior is based on neurophysiological abnormalities) and adolescent limited offenders (mentally healthy persons who learn antisocial behaviors through adolescent experiences). Booth and Osgood (1993:93) claim that criminality

among adult males is linked to high levels of testosterone, but suggest that this relationship "is mediated by the influence [during adolescence] of testosterone on social integration and on involvement in juvenile delinquency." In an ambitious attempt to link evolutionary factors to street crime, Ellis (1987, 1990) contends that inherited "r-selection" reproduction patterns (involving promiscuity and aggression), in interaction with such social factors as poor nurturing, divorce, and poverty, explain the disproportionate rate of violent crimes committed by lower-class, urban males.

Another pivotal development in recent biocriminological theory and research has been the publication of numerous literature reviews and meta-analyses that examine the findings from many previous individual studies that relate biological factors to crime and delinquency (for example, see Denno, 1989; Ellis, 1984; Fishbein, 1990; Hirschi and Hindelang, 1977; Mednick, Moffitt, and Stack, 1987; Moffitt, 1990; Reiss and Roth, 1993; Shah and Roth, 1974; Walters, 1992; Walters and White, 1989; Wilson and Herrnstein, 1985). Because these literature reviews/meta-analyses attempt to reach general conclusions by interpreting numerous specific studies, they are particularly compelling sources of evidence concerning recent developments in biocriminology. These analyses fairly consistently show that there is at least some empirical support for a number of biological explanations of crime, although a recurring theme is that methodological and research design shortcomings have plagued much existing research (see especially Reiss and Roth, 1993; Walters and White, 1989).

Recent research advances in biocriminology have occurred in three specific areas: biochemistry, genetics, and neurophysiology (Ellis, 1988). The biochemical studies examine the relationship between such factors as nutrition/diet and/or endocrine/hormonal imbalances and crime and delinquency. With respect to diet, there has been much speculation that hypoglycemia and cerebral allergies triggered by certain food substances (e.g., milk, eggs, chocolate, and corn) lead to aggression and antisocial behavior (Mawson and Jacobs, 1978; Virkunnen, 1986). In a Finnish study, for example, Virkunnen (1986)

found that habitually violent offenders were significantly more likely to be hypoglycemic than a control group of nonoffenders. A comparison of crime statistics in fifty-three countries by Mawson and Jacobs (1978) disclosed a statistically significant direct relationship between per capita corn consumption and homicide.

Studies of the relationship between hormonal imbalances (high testosterone levels) and violent crime are ancient in criminology, dating back to the 1920s (Schlapp and Smith, 1928). More recent endocrine research has centered on connecting both premenstrual syndrome (PMS) in women and high testosterone in men to violent outbursts (crime and suicide; Booth and Osgood, 1993; Dalton, 1971). In a study of female prisoners, Dalton (1971) concluded that PMS and/or menstruation often caused crime, although Horney (1978) disputed this finding, claiming that the stress of crime and subsequent arrest might have provoked menstruation among the women in Dalton's analysis (rather than vice versa). More persuasively, a study of 4,462 Vietnam War-era military personnel showed a strong positive relationship between testosterone levels in males and adult crime and deviance (although this association was mediated by involvement in juvenile delinquency in adolescence and by degree of social integration; see Booth and Osgood, 1993).

In criminology, inheritance/genetic studies predate endocrine research, extending back to the primitive family lineage histories of Dugdale ([1877] 1910), Goddard ([1912] 1955), and others (see Rafter, 1988). Modern genetic research on crime traces its origins to the early attempts by Goddard (1914) to link intelligence quotient to crime, and the later efforts by Lange (1930) to relate criminal concordance to twins. Although a number of literature reviews confirm a negative relationship between intelligence quotient and delinquency (Hirschi and Hindelang, 1977; Wilson and Herrnstein, 1985), recent research by Denno (1985) and Menard and Morse (1984) suggests that low intelligence only contributes to crime among youths who are placed in vocational tracks and otherwise negatively labeled in school.

More important tests of the relationship between genetics and crime appear in modern twin and adoption studies. Research in Denmark

(Christiansen, 1977) and the United States (Rowe, 1986; Rowe and Osgood, 1984) shows higher rates of criminal concordance among monozygotic (identical) twins than dizygotic (fraternal) twins, although this might be attributable to the fact that identical twins are raised more similarly by their parents than fraternal twins (Fishbein, 1990). Compelling studies comparing the criminal records of adopted children to biological and adoptive mothers (Crowe, 1972) and fathers (Hutchings and Mednick, 1977) show higher concordance to biological parents than to adoptive parents, strongly suggesting a genetic link to crime. (A particularly extensive research literature exists on the relationship between genetics and crime. For critical summaries of this research, see Walters [1992] and Walters and White [1989]. For more sympathetic reviews, see Fishbein [1990], Ellis [1984] and Wilson and Herrnstein [1985]).

Neurophysiological (or brain and nervous system) research in criminology dates back to speculative studies that related adult criminal behavior to juvenile encephalitis (Bond and Appel, 1931). Research in the 1980s linked electroencephalogram (EEG) abnormalities to crime in a sample of Danish youth (Mednick et al., 1981) and blunt head trauma (often suffered in motor vehicle accidents) to homicide in a study of American juveniles on death row (Lewis et al., 1988). Promising recent developments include studies that connect attention deficit disorder (ADD) and minimal brain dysfunctions (MBD) to poor school performance and juvenile delinquency (Moffitt, 1990, 1994; Moffitt, Lynam, and Silva, 1994), and enzyme deficiencies resulting in neurotransmitter abnormalities in the limbic system to academic and disciplinary problems among young males (Ellis, 1991).

It is crucial to note that biochemical, genetic, and neurophysiological factors are inevitably interrelated; as one example, Jeffery (1990) claims that low IQ (and delinquency) in adolescence may be traced to lead poisonings and protein deficiencies that harmed the brain development of infants (especially in lower-class neighborhoods). Furthermore, these are not the only biological factors that have been related to crime; in particular, miscellaneous studies have conceptualized physical features separately from

genetics, associating such factors as somatotypes/body types (Glueck and Glueck, 1956; Sheldon, 1949), facial attractiveness (Cavior and Howard, 1973), and even hair color (von Hentig, 1947) to delinquency and crime.

RESEARCH DESIGN

The changes in the coverage of biological arguments in introductory criminology textbooks were examined for two periods, 1961–1970 and 1987–1996. The earlier period was chosen because it closely preceded the reemergence of biological theories and research on crime in the mid-1970s (see Hippchen, 1977; Mednick and Christiansen, 1977; Shah and Roth, 1974). The latter period was selected to maximize the currency of the recent textbooks examined in the study.

All known introductory criminology textbooks published in the United States during these two periods were included in the study.⁶ When more than one textbook appeared from 1987 to 1996, only the most recent edition was examined. Altogether, fifty-five textbooks were analyzed: twenty published from 1961 to 1970 and thirty-five appearing from 1987 to 1996. (See the appendix for a complete list of the books included in the study.)

To determine if textbooks depicted biological perspectives as taboo, the books initially were examined to discover the quantity of coverage—in number of pages and percentage of space—devoted to these arguments. It was anticipated that the resurgence of interest in biocriminological theories and research would result in greater textbook coverage.

Because of inaccuracies in textbook indexes, all fifty-five books were read in their entirety to determine the extent of coverage. Because textbook authors sometimes discussed biological arguments in only a few sentences at a time scattered over many pages, length of coverage was measured in inches of print rather than in pages. For data summary, coverage-in-inches measurements were reconfigured to make page length treatments the reported unit of analysis.⁷

The positions of textbook authors on the empirical evidence supporting biological explanations of crime also were analyzed. These positions were classified on a nature–nurture continuum as follows: (1) little or no empirical support for nature explanations (i.e., criminal behavior is almost entirely or is entirely explained by social learning and social environmental factors); (2) some empirical support for nature explanations, but mostly support for nurture; (3) nature and nurture explanations have about equal empirical support; (4) some empirical support for nurture explanations, but mostly support for nature; and (5) little or no empirical support for nurture explanations (i.e., criminal behavior is almost entirely or is entirely explained by such biological factors as biochemical, genetic, or neurophysiological abnormalities). Altogether, fifty-one of the fifty-five textbooks (or 92.73 percent) could be classified into one of these positions; three books did not take a position on the evidence, and one book completely ignored biological arguments. It was expected that the older textbooks and those newer texts that devoted less page coverage to biological arguments would be more likely than other textbooks to take the position that there is little or no empirical support for nature explanations of crime.

To check the reliability of textbook classifications on the nature–nurture continuum, a random sample of sixty-eight excerpts reflecting the various positions were given to two independent coders for reclassification. The inter-coder reliability correlation coefficients calculated on the three sets of classifications were .94, .93, and .90, well above the conventional cutpoint of .75 used to determine acceptable reliability in thematic content analysis (see Budd, Thorp, and Donahew, 1967).

Another way to determine if textbooks depicted biological perspectives as taboo was to look for statements linking these arguments to sexism, racism, fascism, and/or genocidal policies of eugenics as practiced in Hitler's Germany (Gordon, 1980). All coverage of biological arguments in the fifty-five textbooks was carefully searched for these claims. Textbook authors linking biological explanations of crime to sexism, racism, and/or fascism were assumed to consider the subject taboo.

The theoretical orientations of the recent textbooks were examined to see how they related to the amount of space that authors devoted to biological arguments and the positions that authors took on the empirical evidence supporting nature explanations. It was anticipated that textbooks that endorsed sociological orientations, and especially critical sociological perspectives, would be less likely than textbooks that embraced other, mostly interdisciplinary orientations to devote extensive page coverage to biological arguments and to take the position that there is at least some empirical evidence supporting nature explanations.⁸

The newer textbooks also were examined to see if they discussed and mentioned supporting empirical evidence relating to five selected areas where recent theoretical and research advances have been made in biocriminology: biochemistry, genetics, neurophysiology, integrated theories, and literature reviews. It was expected that textbooks that took the position that there is little or no empirical support for nature explanations, along with textbooks that embraced sociological orientations, and especially critical sociological perspectives, would be less likely than other books to discuss and to mention supporting empirical evidence relating to these five areas.

Finally, recent textbooks were carefully searched for miscellaneous mistakes, inaccuracies, and/or distortions that authors made in the coverage of biological arguments (other than the claim that there is little or no empirical evidence supporting nature explanations). It was anticipated that textbook authors who claimed that there was little or no empirical evidence supporting nature explanations, and possibly those endorsing sociological—and especially critical—orientations, would be more likely to make mistakes in coverage than other authors.

FINDINGS

Table 1 compares the twenty criminology textbooks published from 1961 to 1970 and the thirty-five texts published from 1987 to 1996 by the amount of pages devoted to biological arguments. Some increase over time appeared in this

coverage: While no book during the earlier period devoted over 10 percent of its space to biological arguments, three books published recently did so (Bartol, 1995; Jeffery, 1990; Masters and Roberson, 1990). The older books devoted a total of 226.9 pages (or 2.45 percent of the space in the texts) to biological perspectives; the average book covered these arguments in 13.31 pages. The newer books devoted 808.77 pages (or 4.56 percent of their space) to biological approaches; this was an average of 23.11 pages per book. The percentage increase in page coverage in the textbooks was statistically significant ($t = 2.23$, $df = 29$, $p < .05$). These data suggest that the resurgence of interest in biological approaches in criminological theory and research has resulted in greater coverage of these topics in recent textbooks.

Table 2 surveys the positions of criminology textbooks for both time periods about the empirical evidence supporting biological explanations of crime. Again, these positions were classified on a continuum as follows: little or no empirical support for nature explanations; some empirical support for nature explanations, but mostly support for nurture; nature and nurture explanations have about equal empirical support; some empirical support for nurture explanations, but mostly support for nature; and little or no empirical support for nurture explanations (along with no position on the evidence and no discussion of the evidence). Table 2 shows a distinct change in thinking among criminology textbook authors about the merits of biological arguments; while 75.00 percent (fifteen) of the textbooks published from 1961 to 1970 claimed there was little or no empirical support for nature explanations, only 37.14 percent (thirteen) of the textbooks appearing from 1987 to 1996 took this position. Over one-half of the recent books (nineteen, or 54.29 percent) claimed there was either some support for nature explanations, or that nature and nurture explanations were about equally supported by the empirical evidence; only 15.00 percent (three) of the earlier textbooks were classified in these positions. Importantly, the shift in the criminology textbooks away from the position that there is little or no empirical support for nature explanations was statistically significant (chi-square = 9.09,

TABLE 1
THE COVERAGE OF BIOLOGICAL ARGUMENTS IN CRIMINOLOGY TEXTBOOKS, 1961–1970 AND 1987–1996

<i>Percentage of coverage in textbook</i>	<i>Text (year of publication/total pages devoted to the coverage of biological arguments)</i>
1961–1970 textbooks (<i>N</i> = 20)	
0.00 to 0.99	Haskell and Yablonsky (1970/4.93); Lunden (1967/0.93); Savitz (1967/0.67)
1.00 to 1.99	Bloch and Geis (1962/6.86); Bloch and Geis (1970/6.00); Knudten (1970/12.27); Sykes (1967/2.50); Turk (1969/2.14)
2.00 to 2.99	Caldwell (1965/20.57); Cavan (1962/17.14); Gibbons (1968/11.87); Johnson (1964/20.40); Johnson (1968/21.33); Reckless (1967/22.53); Sutherland and Cressey (1966/17.47); Sutherland and Cressey (1970/14.94)
3.00 to 4.99	Hartung (1965/12.31); Taft and England (1964/22.80)
5.00 to 9.99	Quinney (1970/15.83); Reckless (1961/32.80)
10.00 or more	
1987–1996 textbooks (<i>N</i> = 35)	
0.00 to 0.99	Albanese and Pursley (1993/1.87); McCaghy and Cernkovich (1987/0.00); Sykes and Cullen (1992/3.81); Yablonsky (1990/5.73)
1.00 to 1.99	Barlow (1993/11.60); DeKeseredy and Schwartz (1996/7.57); Galliher (1989/6.93); Gilsinan (1990/5.20); Mannie and Hirschel (1988/6.29)
2.00 to 2.99	Conklin (1995/18.40); Gibbons (1992/16.13); Hagan (1994/17.60); Livingston (1996/17.60); Sacco and Kennedy (1996/10.13); Siegel (1995a/18.29); Sutherland, Cressey, and Luckenbill (1992/17.71)
3.00 to 4.99	Adler, Mueller, and Laufer (1995a/19.88); Adler, Mueller, and Laufer (1995b/19.88); Andrews and Bonta (1994/11.75); Bartollas and Dinitz (1989/27.33); Beirne and Messerschmidt (1995/22.40); Glick (1995/17.73); Meier (1989/20.13); Quinney and Wildeman (1991/5.87); Reid (1994/26.00); Siegel (1995b/18.29); Voigt, Thornton, Barrile, and Seaman (1994/25.53)
5.00 to 9.99	Chambliss (1988/38.00); Brown, Esbensen, and Geis (1996/32.00); Holman and Quinn (1992/26.00); Schmallegger (1996/34.59); Vito and Holmes (1994/26.40)
10.00 or more	Bartol (1995/70.93); Jeffery (1990/127.60); Masters and Roberson (1990/73.60)

$df = 1, p < .01$). Together, the data in Tables 1 and 2 suggest that while biological explanations for crime were once taboo topics among criminology textbook authors, these arguments have received more extensive and favorable coverage in recent textbooks.

This impression is confirmed in a survey of quotations from the textbooks. As noted earlier, among the authors of the older books, Sutherland and Cressey (1966:81, 1970:75) spearheaded the rejection of biological arguments in principle one of the differential association per-

TABLE 2
THE POSITIONS OF CRIMINOLOGY TEXTBOOKS ON THE EMPIRICAL EVIDENCE SUPPORTING BIOLOGICAL EXPLANATIONS, 1961–1970 AND 1987–1996

<i>Period</i>	<i>Positions</i>						
	<i>Little or No Support for Nature Explanations (n%)</i>	<i>Some Support for Nature, but Mostly Nurture (n%)</i>	<i>Nature/Nurture About Equal (n%)</i>	<i>Some Support for Nurture, but Mostly Nature (n%)</i>	<i>Little or No Support for Nurture Explanations (n%)</i>	<i>No Position on Evidence (n%)</i>	<i>No Discussion of Evidence (n%)</i>
1961–1970 (<i>N</i> = 20)	15/75.00	3/15.00	0/0.00	0/0.00	0/0.00	2/10.00	0.00
1987–1996 (<i>N</i> = 35)	13/37.14	14/40.00	5/14.29	1/2.86	0/0.00	1/2.86	1/2.86

spective: “*Criminal behavior is learned*. Negatively, this means that criminal behavior is not inherited, as such.” In an evaluation of the somatotype theories of William Sheldon (1949) and Sheldon and Eleanor Glueck (1956), Sutherland and Cressey (1966:128, 1970:118) argued that “heredity has not been demonstrated to have any connection whatsoever with criminal behavior.” They ridiculed the mesomorphy explanation for delinquency and crime, calling it “a new phrenology” (Sutherland and Cressey, 1966:131, 1970:120).

Openness to biological arguments was unusual among other older books; Caldwell (1965:223) stood virtually alone when he wrote: “Heredity is a factor in criminal behavior—and an important one—just as it is a factor in all human behavior.” More typical dismissals of biological perspectives included the claim of Reckless (1967:382) that criminologists “in the United States do not accept the contention of criminal biologists . . . that there are hereditary predispositions to crime,” and Taft and England’s (1964:80) assessment that biological theories “are utterly inadequate to explain how it is that much of the behavior of even hardened criminals is conventional and law abiding.” Gibbons (1968:137) characterized biological research on crime as “unfruitful,” and added that “whatever the explanation of lawbreaking, it is not to be found in defective heredity, biological taint, or in . . . other [similar] formulations.”

Note the dramatically changed tone in the most recent edition of Gibbons’ (1992:16) textbook: “There is empirical evidence that lawbreaking is often the product of biological, psychological, and sociological factors operating [together] in complex ways.” A plurality of recent textbook authors conceded that, although crime is mostly socially caused, biological factors at least play some role in criminal behavior. According to Livingston (1996:333): “The [social] environment cannot explain everything. Some criminals have fairly enduring biological and psychological characteristics that are different from the rest of us.” Glick (1995:113) remarked that biological factors “explain certain aspects of delinquency and criminality,” but, nevertheless, are inadequate explanations “for the bulk of criminal activities and behavior.”

Among those who suggested that nature and nurture factors have roughly equal explanatory power were Adler, Mueller and Laufer (1995a:92, 1995b:92), who asserted that “today the proposition that human beings are products of an interaction between environmental and genetic factors is all but universally accepted.” Masters and Roberson (1990:25) remarked that “today it is thought that psychological, biological, and sociological factors contribute to criminal behavior alone or in combination.” They added: “When we analyze what causes crime, we must be eclectic and provide room for many different factors, all bearing a direct or indirect relationship to criminality. The truth is that psychological, biological, and sociological factors all contribute to criminality” (Masters and Roberson, 1990:26).

Still, there were a number of recent textbook authors who rejected biological explanations of crime. Chambliss (1988:208) compared these theories to alchemy, concluding they were “unscientific and false.” He claimed that despite “two hundred years of research and theorizing, [there is] no lasting evidence that there is a causal relationship between biology and criminality” (Chambliss, 1988:207). Others dismissing biological arguments were DeKeseredy and Schwartz (1966:192), who claimed that “biological and psychological theories have very little empirical support,” and Voigt et al., (1994:188), who concluded that “most criminologists continue to be reluctant to accept any biological theories of criminal behavior, and they generally do not support genetically based arguments.”

A common strategy used by criminologists to discredit biocriminology is to link these arguments to sexism, racism, fascism, and especially the genocidal policies of eugenics practiced in Hitler’s Germany (see Gordon, 1980; Jeffery, 1980; Sagarin, 1980). Sadly, twenty recent criminology textbooks (57.14 percent)—including thirteen books that took the position that nature explanations of crime have at least some support—in various ways made these connections.⁹ For example, Hagan (1994:145) remarked:

In the same year that [E. A.] Hooton’s work appeared [1939], Hitler had already built experimental gas chambers in mental hospitals and in a two-year period ‘extirpated’ (murdered) 50,000 non-Jewish Germans, a grim prophecy of what

was in store for millions of Jews, Eastern Europeans, and [other] groups the Nazis considered to be *Untermenschen* ('subhumans').

In commenting on the somatotype arguments of Sheldon (1949) and the Gluecks (1956) DeKeseredy and Schwartz (1996:180) noted that "North American scientists who had witnessed the horrific consequences of Adolf Hitler's racial superiority notions in World War II were not warm toward racial arguments on criminals." Finally, Voigt et al. (1994:142) wrote: "The possible association of biocriminology with genetic engineering, World War II Nazi experiments and exterminations, and other racist ideologies warn of some of the political abuses of scientific theories and research."¹⁰ These arguments undoubtedly have fostered the taboo image of biological perspectives among criminologists and their students.

Returning to quantitative comparisons, Table 3 reports the relationships between the page coverage of biological arguments in recent textbooks and the positions of authors on the empirical evidence supporting biocriminology and the theoretical orientations of textbooks. The upper half of the table shows that there was an inverse relationship in the books between the empirical support that authors ascribed to nature arguments and the page coverage devoted to the topic (this association was statistically significant: chi-square = 672.57, $df = 3$, $p < .001$). The six textbooks that attributed the most empirical support to biological arguments on average devoted almost forty more pages to the topic than the twenty-seven books that attributed the least support to these arguments (specifically, 56.32 pages compared to 17.37 pages).

TABLE 3

PAGE COVERAGE OF BIOLOGICAL ARGUMENTS IN CRIMINOLOGY TEXTBOOKS, 1987-1996, BY POSITION ON EMPIRICAL EVIDENCE AND THEORETICAL ORIENTATION^a

	<i>Total Pages Devoted to Biology</i>	<i>Percent of Total Pages Devoted to Biology</i>	<i>Number of Pages Covering Biology Per Text</i>
Position of textbook on empirical evidence supporting biological explanations			
Little or no support for nature explanations ($n = 13$)	183.99	3.02	14.15
Some support for nature, but mostly nurture ($n = 14$)	285.02	3.52	20.36
Nature/nurture about equal ($n = 5$)	210.29	9.36	42.06
Some support for nurture, but mostly nature ($n = 1$)	127.60	26.47	127.60
Little or no support for nurture explanations ($n = 0$)	—	—	—
Theoretical orientation of textbook			
Sociological ^b ($n = 14$)	213.10	3.02	15.22
Critical ($n = 7$)	90.87	2.91	12.98
Non critical ($n = 7$)	122.23	3.11	17.46
Other orientation ^b ($n = 19$)	593.80	6.02	31.25
Totals	806.90	4.77	24.45

^aThese comparisons delete the textbook that did not take a position on biological explanations and the textbook that did not discuss these arguments (see Table 2). $N = 33$.

^bSee note 8.

The bottom of Table 3 reports how the theoretical orientations of textbooks related to the page coverage devoted to biological arguments (see Note 8). As anticipated, textbook authors who embraced sociological orientations in general devoted significantly fewer pages to biocriminology than textbook authors who endorsed other, mostly interdisciplinary orientations (chi-square = 81.25, $df = 1$, $p < .001$). The average book written from a sociological perspective covered these arguments in 15.22 pages; the typical book embracing some other orientation devoted 31.25 pages to biocriminology. Interestingly, textbooks that endorsed both critical and noncritical sociological perspectives covered biocriminology in less space than the other textbooks (for critical/other orientation books, chi-square = 45.75, $df = 1$, $p < .001$, for the noncritical/other orientation comparison, chi-square = 48.38, $df = 1$, $p < .001$).

Table 4 examines how the theoretical orientations embraced by textbook authors influenced their positions on the empirical evidence supporting biological explanations of crime. While sociologically oriented textbooks in general were more likely than books that endorsed other perspectives to take the position that there was little or no support for nature explanations (chi-square = 6.29, $df = 1$, $p < .02$), this conclusion must be quickly qualified. Textbooks that embraced noncritical sociological perspectives were just as likely as books endorsing other, mostly interdisciplinary orientations to

claim there was at least some empirical support for nature arguments (chi-square = 0.16, $df = 1$, $p > .05$). In contrast, all seven textbooks that endorsed critical sociological perspectives claimed there was little or no empirical support for nature explanations of crime (for critical/other orientation books, chi-square = 13.07, $df = 1$, $p < .001$). Although sociologically oriented textbooks fairly consistently devoted little space to biological arguments (see Table 3), the authors of these books did not consistently share the opinion that biocriminological perspectives do not have merit: Only the textbook authors who endorsed critical sociological perspectives rejected biocriminology outright.

Table 5 reports the coverage that the newer criminology textbooks devoted to the five selected areas—biochemistry, genetics, neurophysiology, integrated theories, and literature reviews—where recent advances have been made in biocriminology. The textbooks were most likely to discuss and to mention supporting empirical research linking genetics and crime (e.g., twin and adoption studies; see Hutchings and Mednick, 1977; Rowe and Osgood, 1984), and least likely to discuss and to mention evidence from important literature reviews/meta-analyses (e.g., Ellis, 1984; Fishbein, 1990; Reiss and Roth, 1993; Shah and Roth, 1974). Although most textbooks (91.43 percent) discussed integrated theories of crime that incorporate biological factors (especially Wilson and Herrnstein, 1985), fewer (57.14 percent) mentioned empiri-

TABLE 4

The Positions of Criminology Textbooks, 1987–1996, on the Empirical Evidence Supporting Biological Explanations by Theoretical Orientation of Textbook^a

Theoretical Orientation of Textbook	Positions				
	Little or No Support for Nature Explanations (n/%)	Some Support for Nature, but Mostly Nurture (n/%)	Nature/Nurture About Equal (n/%)	Some Support for Nurture, but Mostly Nature (n/%)	Little or No Support for Nurture Explanations (n/%)
Sociological	9/64.29	5/35.71	0/0.00	0/0.00	0/0.00
Critical	7/100.00	0/0.00	0/0.00	0/0.00	0/0.00
Non critical	2/28.57	5/71.43	0/0.00	0/0.00	0/0.00
Other Orientation	4/21.05	9/47.37	5/26.32	1/5.26	0/0.00

^aN = 33.

TABLE 5
COVERAGE OF BIOLOGICAL ARGUMENTS IN CRIMINOLOGY
TEXTBOOKS, 1987–1996, SELECTED AREAS

Area	Coverage	
	Topic Discussed (n/%)	Supporting Empirical Evidence Mentioned (n/%)
Biochemistry	26/74.29	19/54.29
Genetics	32/91.43	28/80.00
Neurophysiology	27/77.14	20/57.14
Integrated theories	32/91.43	20/57.14
Literature reviews	21/60.00	18/51.43
Totals	138/78.86	105/60.00

cal research supporting these arguments (e.g., Moffitt, Lynam, and Silva, 1994). About three-quarters of the textbooks noted arguments linking biochemistry (e.g., nutrition or hormones) and neurophysiology (e.g., electroencephalogram or neurotransmitter abnormalities) to crime, but only slightly over one-half mentioned empirical research supporting these claims (e.g., Booth and Osgood, 1993; Mawson and Jacobs, 1978; Mednick et al., 1981).

Table 6 examines how the positions on the empirical evidence supporting biological arguments and the theoretical orientations of textbooks were associated to the coverage devoted to all five selected areas surveyed in Table 5. Not

surprisingly, the top of Table 6 shows there were inverse relationships between the empirical support that textbook authors generally attributed to biological explanations and whether they discussed the five selected areas (chi-square = 21.87, $df = 3$, $p < .001$) and mentioned supporting empirical evidence for the areas (chi-square = 45.82, $df = 3$, $p < .001$). In other words, textbook authors who denied the importance of biological arguments relating to crime also conveniently ignored the important recent research and theoretical advances in biocriminology.

The bottom of Table 6 shows the relationships between the theoretical orientations of the textbooks and the coverage devoted to all five selected areas. Sociologically oriented textbooks in general were less likely than books that endorsed other, mostly interdisciplinary perspectives to discuss the five areas (chi-square = 7.65, $df = 1$, $p < .01$) and to mention empirical evidence supporting the areas (chi-square = 29.19, $df = 1$, $p < .001$), but, once more, these findings require qualification. Textbooks that embraced non critical sociological perspectives were just as likely to discuss the areas as books endorsing other orientations (chi-square = 0.02, $df = 1$, $p > .05$), but they were less likely to mention empirical evidence supporting the areas (chi-square = 4.78, $df = 1$, $p < .05$). Text-

TABLE 6
COVERAGE OF ALL FIVE SELECTED BIOLOGICAL AREAS IN CRIMINOLOGY TEXTBOOKS, 1987–1996, BY POSITION ON
EMPIRICAL EVIDENCE AND THEORETICAL ORIENTATION OF TEXTBOOK^a

	Topic Discussed (n/%)	Supporting Empirical Evidence Mentioned (n/%)
Position of textbook on empirical evidence		
supporting biological explanations		
Little or no support for nature explanations	43/66.15	20/30.77
Some support for nature, but mostly nurture	65/92.86	57/81.43
Nature/nurture about equal	24/96.00	22/88.00
Some support for nurture, but mostly nature	5/100.00	5/100.00
Little or no support for nurture explanations		
Theoretical orientation of textbook		
Sociological	52/74.29	28/40.00
Critical	20/57.14	6/17.14
Non critical	32/91.43	22/62.86
Other orientation	86/90.53	77/81.05
Totals	138/83.64	105/63.64

^aThese comparisons delete the textbook that does not take a position on biological explanations and the textbook that does not discuss these arguments (see Table 2). $N = 33$.

books that endorsed critical sociological perspectives were much less likely than books written from other perspectives both to discuss the areas (chi-square = 18.72, $df = 1$, $p < .001$) and to mention empirical evidence supporting the areas (chi-square = 44.96, $df = 1$, $p < .001$).

Finally, recent textbooks were searched for miscellaneous mistakes and/or distortions that authors made in the coverage of biological arguments.¹¹ Altogether, over one-half of the books (nineteen, or 54.29 percent)—including Adler, Mueller, and Laufer (1995a, 1995b), Beirne and Messerschmidt (1995), Chambliss (1988), Conklin (1995), DeKeseredy and Schwartz (1996), Gilsinan (1990), Holman and Quinn (1992), Livingston (1996), Mannle and Hirschel (1988), Masters and Roberson (1990), Meier (1989), Quinney and Wildeman (1991), Siegel (1995a, 1995b), Sykes and Cullen (1992), Vito and Holmes (1994), Voigt et al., (1994), and Yablonsky (1990)—made one or more errors in coverage. Among the more innocuous mistakes, four books (Chambliss, 1988; Holman and Quinn, 1992; Sykes and Cullen, 1992; Vito and Holmes, 1994) claimed that Cesare Lombroso failed to use control groups in his studies of atavistic stigmata among prison inmates (Lombroso [1876, (1912) 1968] used comparison groups of Italian army officers; Wolfgang, 1972). Eight books (Adler, Mueller, and Laufer, 1995a, 1995b; Gilsinan, 1990; Mannle and Hirschel, 1988; Masters and Roberson, 1990; Vito and Holmes, 1994; Voigt et al., 1994; Yablonsky, 1990) made minor mistakes in citations, such as misspelling E. A. Hooton's name as Hooten (Adler, Mueller, and Laufer, 1995a:64–65; 1995b:64–65; Vito and Holmes, 1994:101; Voigt et al., 1994:172–173). Four books incorrectly cited James Q. Wilson and Richard J. Herrnstein's *Crime and Human Nature* (1985): two books gave the wrong year of publication (Masters and Roberson, 1990:101; Yablonsky, 1990: 430), two books misspelled Herrnstein's name (Gilsinan, 1990:110, 120; Yablonsky, 1990:430), and Mannle and Hirschel (1988:88) mistakenly referred to the book as *Crime and Human Behavior*.

Among the more substantive distortions, Siegel (1995a:140; 1995b:140) contradicted himself by first claiming that “sociobiologists view

the gene as the ultimate unit of life that controls all human destiny,” but then adding “sociobiologists view biology, environment, and learning as mutually interdependent factors” (the second claim is the correct one). Quinney and Wildeman (1991:91) condemned Wilson and Herrnstein's (1985) approach as “monocausal”; in fact, Wilson and Herrnstein proposed a complex, integrated theory that unifies rational choice and biological perspectives. Beirne and Messerschmidt (1995:504–506) claimed that the lack of evidence supporting the “XYY chromosome” connection to crime shows that genetic factors cannot explain the relationship between gender and crime (whatever their merits, XYY chromosomal arguments address differences in criminal tendencies between men with different genetic compositions, not between men and women).

By overlooking particular studies, six books (Conklin, 1995; DeKeseredy and Schwartz, 1996; Livingston, 1996; Mannle and Hirschel, 1988; Masters and Roberson, 1990; Meier, 1989) reached erroneous conclusions about the associations between biology and crime. In their discussion of IQ and crime, Mannle and Hirschel (1988:81–82) claimed there was no recent evidence supporting an inverse relationship; the latest study they cited was published in 1948 (for more recent evidence, see Denno, 1985; Hirschi and Hindelang, 1977; Menard and Morse, 1984). Masters and Roberson (1990:243) claimed that somatotype studies (the mesomorphy research of Sheldon [1949] and the Gluecks [1956]) “have been conducted on males. There are also different female body types, and how they relate to criminal conduct has not been examined.” (Actually, somatotype explanations for female delinquency and crime are abundant; for research linking early onset of puberty, precocious development, and obesity to female delinquency, see Cowie, Cowie, and Slater, 1968; Konopka, 1966.) Finally, four books mistakenly argued that—in comparisons of different age-groups (Livingston, 1996:336; Meier, 1989:127) or nationalities (Conklin, 1995:138; DeKeseredy and Schwartz, 1996:188–189)—biological research cannot explain macro level patterns in aggregate crime data. The former claim overlooks the fact that genes and hormones affect

people differently at different ages (for example, one explanation for the inverse relationship between age and criminality may be the decline in testosterone levels of older males; see Booth and Osgood, 1993). Furthermore, dietary differences among cultures partially could account for differences in the crime rates among nations (see Mawson and Jacobs, 1978).

When examining these mistakes by the positions of textbooks on the empirical evidence supporting biocriminology and by theoretical orientation, a few conclusions emerged. Textbooks that took the position that there is little or no empirical support for nature explanations were more likely to make mistakes in the coverage of biological arguments than other books (chi-square = 6.44, $df = 1$, $p < .02$). Otherwise, there were no statistically significant differences in mistakes between textbooks that adopted other, mostly interdisciplinary perspectives and books that embraced: (1) sociological orientations in general (chi-square = 0.45, $df = 1$, $p > .05$); (2) noncritical sociological orientations in particular (chi-square = 0.13, $df = 1$, $p > .05$); and (3) critical sociological orientations in particular (chi-square = 2.88, $df = 1$, $p > .05$).

In general, the data reported here suggest that biological arguments and explanations for crime were taboo in earlier criminology textbooks, but the situation today is more complex. Modern criminology textbooks that claimed there was at least some empirical evidence supporting nature arguments fairly extensively covered biocriminology. Furthermore, although many recent textbooks sadly linked biological explanations of crime to sexism, racism, and fascism, only those that embraced critical sociological perspectives routinely dismissed these arguments and offered little coverage. Books that embraced noncritical sociological orientations usually acknowledged the empirical evidence supporting nature explanations, although they offered little coverage of biocriminology. Textbooks that rejected strict sociological orientations to endorse other, mostly interdisciplinary perspectives recognized the empirical evidence supporting nature explanations and devoted considerable space to biocriminology. The taboo surrounding biological explanations of crime seems to be dissipating, at least in criminology textbooks.

SUMMARY AND RECOMMENDATIONS

Throughout most of the twentieth century in American criminology, biological explanations of crime have been viewed as suspect at best and taboo at worst. Notwithstanding this reputation, biological perspectives have experienced a major resurgence in the last two decades, reshaping theory and research in criminology. This article examined the changes in the taboo image of biological arguments in fifty-five introductory criminology textbooks: twenty published from 1961 to 1970 (before the explosion of new theories and research) and thirty-five appearing from 1987 to 1996.

The taboo surrounding biocriminology appears to have diminished in the textbooks: compared to the older books, newer texts devoted significantly more coverage to biological perspectives, and were significantly more likely to claim that there is at least some empirical evidence supporting nature arguments. Sadly, twenty recent books link biological explanations of crime to sexism, racism, and fascism, a common tactic used by some criminologists (especially those embracing critical perspectives) to discredit these arguments. Furthermore, textbooks that endorsed other, mostly interdisciplinary orientations devoted more coverage to biocriminological arguments and were more likely to claim that these arguments had at least some empirical support than books that endorsed sociological orientations, and especially critical sociological orientations.

For course adoption purposes, eight recent textbooks deserve praise for unusually good coverage of biocriminology: Adler, Mueller, and Laufer (1995a, 1995b), Bartol (1995), Bartollas and Dinitz (1989), Brown, Esbensen, and Geis (1996), Jeffery (1990), Reid (1994), and Schmallegger (1996). All of these books: (1) devoted at least 3 percent of their space to biocriminological topics (see Table 1); (2) acknowledged that there is at least some empirical evidence supporting nature explanations of crime; (3) discussed and mentioned supporting empirical evidence for all five selected areas (biochemistry, genetics, neurophysiology, integrated theories, and literature reviews) where recent advances have occurred in biocriminology; and (4) con-

tained only minor (if any) mistakes in coverage (e.g., fairly inconsequential misspellings of surnames). Drawbacks to four of these books (Adler, Mueller, and Laufer, 1995a, 1995b; Bartollas and Dinitz, 1989; Brown, Esbensen, and Geis, 1996), though, were the links they made between biological arguments and sexism, racism, and fascism.

Interestingly, of the eight recent textbooks that offered the best coverage of biocriminology, none endorsed a critical sociological orientation and only one (Bartollas and Dinitz, 1989) endorsed a noncritical sociological orientation. This may portend the future of biological explanations in criminology textbooks: Assuming that criminology increasingly becomes an interdisciplinary field—severing its traditional, exclusive ties to sociology—the taboo of biological approaches probably will continue to diminish in these books.¹²

ACKNOWLEDGMENTS

We wish to thank Ms. Judy Lestansky for her indispensable assistance in the completion of this article, and two anonymous reviewers for their helpful comments on an earlier draft.

NOTES

1. Hans J. Eysenck's (1964, 1977) *Crime and Personality*—a work that attributes criminal behavior to a combination of neurological factors and socialization history—preached the revival of interest in biological explanations of crime. At least initially, though, Eysenck's arguments enjoyed more popularity and greater acceptance in Europe than in the United States (but see Bartol, 1995).

2. Of course, many of the criticisms that American sociologists leveled against Ferri, Garofalo, Goring, Lombroso, and other early biological positivists were deserved. Certainly, Lombroso's (1876, [1912] 1968) misguided attempts to relate such "atavistic" stigmata as small skull size, large jawbones, and canine-like teeth to criminal behavior, and Goring's (1913) failure to support his claims that criminals were mentally deficient by administering the newly developed Binet-Simon IQ test to his samples of English convicts and London men were easy targets for the attacks of skeptical sociologists. Any objective observer must acknowledge the abundance of wrongheaded theorizing and poorly designed research in the early development of biological perspectives in criminology.

3. For these same reasons, feminist criminologists also usually dismiss biological explanations of crime (see Leonard, 1982; Rafter, 1988, 1992).

4. Integrated theories combine different theoretical orientations and perspectives in an attempt to create more

powerful explanations of crime and delinquency (Akers, 1997; Lilly, Cullen, and Ball, 1995).

5. James Q. Wilson is a political scientist and the late Richard J. Herrnstein's background was in psychology.

6. Edited readers or anthologies (e.g., Sheley, 1995) and short, specialized books intended to supplement other course readings (e.g., Akers, 1997) were excluded from the study. The list of textbooks examined was taken from Wright (1994a) and Wright and Rogers (1996).

7. Because textbooks varied considerably in print size (and, thus, in the number of words that appeared on a page), percentage of space devoted to biological arguments (rather than the total pages devoted to these arguments) was emphasized as the chief means for measuring and comparing the quantity of coverage in the textbooks (see Table 1).

8. For these comparisons, thirty-three of the thirty-five recent textbooks were classified by theoretical orientation; the textbook that did not take a position on the empirical evidence supporting nature explanations and the textbook that did not discuss these arguments were excluded. Altogether, the authors of fourteen textbooks specifically embraced sociological orientations; seven of these books endorsed critical sociological perspectives (including conflict and peace-making approaches). The other nineteen textbooks mostly embraced interdisciplinary approaches to the study of crime (ten books), although a number of miscellaneous perspectives were represented: psychological (three books), economic/rational choice (two books), biological (one book), no discernible orientation (one book), legalistic (one book), and public policy (one book). For more information about the theoretical orientations of particular criminology textbooks, see Wright (1990, 1994b) and Wright and Rogers (1996).

9. Only two of the earlier textbooks (Hartung, 1965; Quinney, 1970) linked biological arguments to sexism, racism, and fascism. (This difference between the older and the newer books was statistically significant: chi-square = 13.13, $df = 1$, $p < .001$.) It appears that textbook authors in the 1960s—before the emergence of critical and feminist perspectives—were less likely to impute a political slant to biological explanations of crime. Interestingly, though, among the newer textbooks, those that embraced critical perspectives were no more likely than other books to associate biological perspectives with sexism, racism, and fascism (chi-square = 0.49, $df = 1$, $p > .05$).

10. To their credit, two textbook authors (Jeffery, 1990; Schmallegger, 1996) disputed this logic; for example, Schmallegger (1996:165, 190) claimed that this is a "narrow-minded criticism" that promotes "head-in-the-sand science."

11. It was not counted as a mistake if textbook authors claimed there was little or no empirical support for nature explanations of crime.

12. For some speculations about how specific developments in biotechnology may impact on the future of crime and justice, see Stephens (1990, 1992).

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APPENDIX: CRIMINOLOGY TEXTBOOKS EXAMINED IN THIS STUDY, 1961–1970

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