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Some of the earliest criminological theories equated crime to the biological makeup of humans. Because some of the earlier biological studies either overstated the causal nature of biological variables or were completely disproved due to methodological shortcomings or antiquated statistical techniques, a majority of criminologists today dismiss the biological research on criminality without a second thought. James Q. Wilson and Richard J. Herrnstein suggest that many criminologists are not attuned to biological and psychological concepts involved with the causes of criminality due to their sociological training; “physical correlates of crime are often dismissed by most criminologists, for whom these are at best historical stages in the development of their subject” (p. 72). Because of this lack of understanding of the biological approach or the inherent bias of most sociological theories of criminality, the debate of whether or not criminals are characterized by a certain type of body-build has long been debated in the field of criminology. Hans Eysenck and Gisli Gudjonsson argued that the study of physique is a complex subject, due primarily to many different typologies and methods of measurement.

In the 1940s, William H. Sheldon attempted to study the relationship between human physique and criminality. Sheldon graduated from the University of Chicago with a Ph.D. in psychology in 1926 and with an M.D. in 1933. He held positions as a professor at the University of Oregon Medical School, where he was also the director of the constitution clinic, and the director of the Biological Humanics Foundation in Cambridge, Massachusetts. His work led him to the belief that the psychological foundation of humans was predominantly supported by biological underpinnings.

In this search to link physique and behavior, Sheldon developed the idea of the somatotype; this is a personal score that is determined by different measurements taken from a human body. Sheldon posited three types of extreme somatotype: mesomorphs who are athletically built, endomorphs who are overweight, and ectomorphs who are underweight. Sheldon suggested that these somatotypes corresponded directly to psychological states. That is, mesomorphs are active, dynamic, assertive, and aggressive; endomorphs are relaxed, comfortable, and extroverted; and ectomorphs are introverted, thoughtful, inhibited, and sensitive.

Here, Sheldon's body of work and the research linking somatotypes to criminality is examined. First, Sheldon's classification system and the research that resulted from initial studies on somatotypes are explored. Second, somatotypic classification methods produced to advance the work of Sheldon are discussed. Finally, the decline of somatotyping as both a function of measurement constraints and theoretical shortcomings is reviewed.

William Sheldon and Somatotypes

Dating back to the times of Cesare Lombroso, there have been numerous attempts to study the links between physique and criminality that have yielded different methods of measuring physique. Some of these measurements have been simplistic while others have been complex. For instance, Earnest Hooton separated height and weight into a 3 × 3 matrix, or nine subgroups, to see if there was a relationship between physique and crime; height was identified as short, medium, and tall, and weight was identified as slender, medium, and heavy. This example outlines a simple method of determining physique.

A more complex method of determining physique can be found in the work of Ernst Kretschmer. [p. 835 ↓] While a host of physique studies were completed in Europe in the 1800s, one of the preeminent studies of physique was completed by Kretschmer. Originally published in 1931, Kretschmer's study, *Physique and Character*, comprised 400 patients of every age and occupation in a hospital in an effort to link physique and character. Kretschmer's key contribution to physical determination was the three types of physique he established: the asthenic, athletic, and pyknic forms. A person could contain characteristics from each of Kretschmer's types, making for a blended physical type. According to Kretschmer, the extreme asthenic type of physique has a "deficiency in thickness combined with an average unlesened length" (p. 22); this type is characterized as weak and frail. The extreme athletic type of physique is "recognized by the strong development of the skeleton, the musculature and also the skin" (p. 25). The extreme pyknic type of physique "is characterized by the pronounced peripheral development of the body cavities, and a tendency to a distribution of fat about the trunk, with a more graceful construction of the motor apparatus" (p. 30).

Drawing directly from the work of Kretschmer, Sheldon outlined the study of physique and the measurement of somatotypes in *The Varieties of Human Physique*. His theory was founded on the assumption that it is possible to determine physical differences among human beings. Sheldon focused on three extreme physical types, adapted from embryology, which correspond approximately to Kretschmer's physical typology: endomorphs (pycknic), mesomorphs (athletic), and ectomorphs (asthenic). These three types were selected because they illustrated the most extreme cases of physique. Sheldon and colleagues defined endomorphy as the "relative predominance of soft roundness throughout the various regions of the body" (1940, p. 5). Mesomorphy means the "relative predominance of muscle, bone, and connective tissue" (p. 5). Ectomorphy means the "relative predominance of linearity and fragility" (p. 5); Sheldon noted that this form had the largest brain and central nervous system.

To refine his measurement, Sheldon examined 400 male undergraduate students at the University of Chicago. In an effort of standardization, subjects were photographed naked from three angles: a front view, a side view, and a back view. The subject stood on a pedestal a certain distance away from the camera. From the 400 subjects, 4,000 photographs were amassed and examined. From these photographs, 17 measurements (dependent on the height to convert into ratio form) were taken from a body. From this, a three-number scale was derived to conclude a person's somatotype. The first number in the score reflects the amount of endomorphy in an individual, the second number represents the amount of mesomorphy in an individual, and the third number represents the amount of ectomorphy present in an individual. Thus, an extreme endomorph would receive a score of 7-1-1, an extreme mesomorph would receive a score of 1-7-1, and an extreme ectomorph would receive a score of 1-1-7. There are potentially 343 different identifiable somatotypes when using Sheldon's classification procedure.

In 1949, Sheldon put his method of somatotyping to the test in studying crime for the first time. Sheldon followed the lives of a sample of 200 young men from the Hayden Goodwill Inn. Because it was a social service agency, the sample consisted of youth with antisocial personalities as well as delinquent histories. This gave Sheldon's study a comparison group of noncriminals on which to base his results. Although Sheldon examined many different sociological variables as well as biological variables, Sheldon's chief finding among the criminal sample, in terms of somatotypes, was that mesomorphy was the most common somatotype. In essence, Sheldon concluded that

delinquents were more inclined to being mesomorphically built. With the exception of a 30-year follow-up study, this would also mark the last time that Sheldon's method of somatotyping would be used in the study of the link between physique and crime.

In the 30-year follow up of Sheldon's research, Emil Hartl et al. reexamined the 200 men whose biographies were presented by Sheldon in 1949. Hartl et al.'s major finding was that future adult criminals differed from noncriminal subjects in the sample in terms of mesomorphy. As in Sheldon's original study, criminals were more likely to have a mesomorphic build. In their discriminant function analysis on all of the data, Hartl et al. found mesomorphy to be the strongest discriminating variable. When conducting a multiple regression on criminal behavior, however, Hartl et al. indicated that none of the variables relating to morphology, [p. 836 ↓] mesomorphy, endomorphy, or ectomorphy were statistically significant. In other words, the somatotype did a poor job in predicting future criminality.

Extended Somatotype Classifications

Sheldon's somatotyping approach was inevitably eclipsed by the work of Richard Parnell in 1958. Parnell's method of somatotyping was considered to be more objective than Sheldon's. This method of somatotyping emphasized the phenotype, not the somatotype. The phenotype is the body as it appears at a particular point in time (Parnell, 1958, p. 4). Because of this, Parnell indicated that his method for somatotyping was not a good variable for prediction purposes. Unlike Sheldon, Parnell labeled his physical types on the chart as Fat, Muscularity, and Linearity, which correspond to the endomorph, mesomorph, and ectomorph, respectively.

Inspired by the somatotyping work of Sheldon and Parnell, Sheldon and Eleanor Glueck conducted an analysis on the relationship between physique and crime. The Gluecks (1951) compared the physiques between a sample of delinquents and a sample of nondelinquents. The Gluecks relied on a physical anthropologist to measure the somatotypes of their subjects. It was Parnell's method of somatotyping that was used to study the physique of individuals in the Gluecks' sample; the Gluecks merely interpreted the results. The Gluecks concluded that mesomorphy was more predominant among

the delinquents, while the control group of nondelinquents contained no predominance of any single somatotype.

The Gluecks (1956) examined this data source further by examining the physique of criminals in relation to other sociological variables and traits they had found. The Gluecks looked at the relationship between physique and several categories of variables that included neurological traits, intelligence, character, family, environment, and personality. While some of the variables in each category were found to be correlated with the different body types, the Gluecks concluded that there is no combination of physical traits and sociological traits that could predict delinquency in an individual. This is true even for the mesomorphs, who comprised the majority of the criminal sample.

Besides the Gluecks' study, two other studies utilized Parnell's somatotyping procedure. Juan

Cortes and Florence Gatti examined the relationship between a person's physique and the need for achievement, or motivation. They examined 100 delinquent youths and a comparison group of 100 nondelinquents in a high school. In both groups, a significant and positive relationship was found between mesomorphy and motivation; they also found that a significant, but negative, relationship existed between ectomorphy and motivation. Cortes and Gatti concluded that a relationship existed between mesomorphs and the desire to achieve (p. 412).

Boyd McCandless, W. Scott Persons, and Albert Roberts examined perceived criminal opportunity and body build among delinquent youth. McCandless et al. examined 500 adjudicated delinquent youth by both somatotyping the youth and administering a questionnaire to measure opportunity. McCandless et al. hypothesized that mesomorphs would be more likely to have committed more delinquent acts than either ectomorphs or endomorphs. However, their regression analysis lent no credence to this. Race was the only variable to have a significant relationship with perceived criminal opportunity.

After the McCandless et al. study in 1972, research utilizing somatotypes was discontinued predicated on many of the issues discussed in the next section. It was not

until 2008 that a new method of somatotyping emerged. In an effort to utilize a newer, more refined method of somatotyping, Sean Maddan, Jeffery Walker, and J. Mitchell Miller utilized the body mass index (BMI) as a measure of an individual's somatotype.

The body mass index, often referred to as the Quetelet Index, utilizes a person's height and weight to gauge the total body fat in adults. It is an indicator of optimal weight for health and different from lean mass or percent body fat calculations because it only considers height and weight (National Heart, Lung, and Blood Institute, 1998). This measure correlates primarily to body fat and can be used on either males or females. The BMI is a "heterogeneous phenotype" (Feitosa et al., 2002, p. 72) or how the person's physique is at a given point in time. In this sense it is a measure of somatotyping more similar to Parsons's method, which was based on physical phenotype as well.

A person's BMI is calculated by dividing weight (in kilograms) by height (in meters) squared. The [p. 837 ↓] BMI equation relies heavily on the subject's height. The relationship between the physique and height of an individual was mentioned frequently in the literature. Even Sheldon foreshadowed the importance of height and weight in measuring somatotypes noting that with height-weight norms, it will be possible to create a scale of height-weight measures for each different somatotype. BMI values can range from one and up, making it a continuous, interval level variable. According to the BMI, a person who is an endomorph receives a BMI score of 26 and above, a person who is a mesomorph will receive a BMI score of between 19 and 25, and a person who is an ectomorph will receive a score of less than 19.

To test the reliability of the BMI measure, Maddan and colleagues took Sheldon's original sample data from *Varieties of Delinquent Youth* and compared the results of his somatotyping technique with the same sample using the BMI scale to determine the individual's somatotype. The bivariate correlation analyses that were completed to measure the relationship between the two types of somatotype measures showed a strong relationship between Sheldon's method of somatotyping and the BMI measure. These analyses indicate that the BMI is a reliable measure of somatotyping.

The most important finding of the Maddan et al. research was that somatotypes still accounted for some of the variation in violent and nonviolent prison sentences in a

sample of male prisoners (N = 5,000) taken in Arkansas from 1975 to 2000. While the somatotype showed effects, the impact was minor across the somatotype measures. The logistic regression analysis illustrated that the somatotypes had a statistically significant effect, albeit weak, and added to the overall model. More importantly, the direction of the effects was in line with previous research on physique and criminality. Mesomorphic offenders were more likely to be in prison for a violent offense than their endomorphic counterparts. The direction was the same for ectomorphs, but this variable failed to gain statistical significance.

Issues with Somatotype Studies

The biological approach to studying criminality has been much maligned. These studies have suffered from methodological issues, ranging from measurement to sampling, and conceptual issues, ranging from untestability to logic. One of the key problems with biological studies has been with regards to the types of variables included in analyses. Most of the biological research, not including the work in this area today, has focused primarily on strictly biological variables. The other major problem for biological studies has been with regards to control groups. Most of the biological research has focused only on a single group, which has greatly decreased the worth of much of the biological research. Somatotyping has its own set of problems and shortcomings.

There are several limitations to the research on delinquency and somatotypes. First, Sheldon's method of somatotyping was very time consuming and expensive. It took 3 to 4 months to compare the data gathered from the three different pictures of each subject. This time did not include the time it would take to analyze the data with other data in the study, in the case of criminology, delinquency, social, and other structural variables. Second, and due to the time period in criminological development, little data were collected on females. Third, the study on the link between crime and biology, in general, and somatotyping, specifically, is that the results are either mixed or weak.

The final, and maybe most important, limitation of the somatotyping research before 2008, was the technique that had to be used to measure somatotypes. Sheldon's procedure (and reformulations of his method) required not only that subjects be naked, but also that several pictures were taken of the naked subjects. Today, a researcher

would have difficulty finding subjects and securing approval by an institutional review board to conduct the study.

Conclusion

Adrian Raine asserted that “no factor linked to crime should be viewed in the anachronistic terms of genetics versus environment” (p. 204). To do this is both divisive and overly simplistic. Criminologists should move toward an integration of genetic and social factors for crime in an effort to examine how these two factors relate to one another. This entry has focused on a biological approach that has largely fallen to the wayside of criminological history: somatotypes.

[p. 838 ↓]

While several studies have been conducted on somatotyping and criminality over the last 50 years, overall interest in the subject has waned. This is due primarily to the stigma that has been associated with conducting research on the link between biological causes of crime in the past, the methodological shortcomings of some of the work in this area, and some of the causation overstatements made in relation to findings. Even though this is the case, it is hard to discard some of the findings from the somatotype literature in spite of some of the methodological shortcomings. Research has consistently shown that mesomorphic physiques are more associated with criminal groups than with noncriminal control groups. This makes it difficult to simply dismiss the relevance of somatotypes as correlates to criminal behavior.

Physique is not the cause of crime. This much is known from all of the studies related to somatotyping. However, the majority of criminal subjects represented in research do have a mesomorphic body type. The remaining challenge for criminologists is to determine what it is about mesomorphy that is related to criminality and why this is so.

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See also

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