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Causes and cures II: The biology of violence

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ABSTRACT

The past 2 years have been a landmark moment for violence prevention, with the publication of *The Global Status Report on Violence Prevention 2014*, a historic resolution on violence by the 67th World Health Assembly, and the release of multiple documents on violence by international and United Nations entities, with a corresponding building of momentum in scholarship. Most notably, in September 2015, the United Nations General Assembly adopted the *2030 Agenda for Sustainable Development*, addressing the need for violence prevention at an unprecedented scale. In this context, more than ever, violence studies have become a field of its own right. Still, a systematic approach to the topic is lacking, and no textbook yet synthesizes the knowledge of multiple disciplines toward a cogent understanding. This article is the second of a series that will cover an outline for summarizing the major bio-psycho-social and structural–environmental perspectives on violence. It discusses the major assumptions that have held back advances in a biological understanding of human violence, such as reductionism. It reviews biologically useful distinctions between aggression and violence, as well as the relationship between mental illness and violence. Recent advances in the neurosciences, such as neuroplasticity and epigenetics, show that the biological cannot be separated from the psychological, social, and environmental, such that a merging of the fields is necessary for an understanding of a phenomenon as complex as human violence.

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We are living through a landmark moment for violence prevention. The past 2 years, especially, have seen an outpouring of documents reflecting a growing focus on the problem of violence and multilateral collaborations to solve it. In December 2014, for example, the World Health Organization, the United Nations Office on Drugs and Crime, and the United Nations Development Programme (World Health Organization, United Nations Office on Drugs and Crime & United Nations Development Program, 2014) joined forces to launch *The Global Status Report on Violence Prevention 2014*, detailing the efforts of 133 countries to address interpersonal violence. It is the first major report on violence since the *World Report on Violence and Health* (Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002), an influential document that consolidated all the existing science on violence for the first time. In the same year, the 67th World Health Assembly (World Health Assembly, 2014) adopted a historic resolution addressing violence, bringing particularly to focus women, children, and other vulnerable members of the populations subject to systematic structural and institutional violence. Furthermore, *Global Study on Homicide 2013*: *Trends, Contexts, Data* (United Nations Office on Drugs and Crime, 2014), *Hidden in Plain Sight*: *A Statistical Analysis of Violence against Children* (United Nations Children's Fund [UNICEF], 2014a), *Ending Violence against Children*: *Six Strategies for Action* (United Nations Children's Fund, 2014b), *Preventing Suicide*: *A Global Imperative* (World Health Organization, 2014), and *Preventing Youth Violence*: *Taking Action and Generating Evidence* (World Health Organization, 2015), all appeared within a 2-year time span, highlighting the major types of violence.

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Most notably, on September 25, 2015, the United Nations General Assembly adopted the *2030 Agenda for Sustainable Development* (United Nations [UN], 2015), addressing the need for violence prevention at an unprecedented scale and recognizing the interdependence between sustained peace and sustainable development. In this context, more than ever, violence studies have become a field of its own right, worthy of a course at the university level, so that the complexities and commonalities of the different forms of violence can be addressed. It is timely, given the numerous curricula and degree programs that are forming around violence studies. It is necessary, as the study of violence is still locked in silos, mostly hidden away as subsections of other disciplines. As of now, no systematic way of approaching these issues has been established, and few guidelines exist for designing a comprehensive course. No textbook yet adequately synthesizes the research results of multiple disciplines in an academically rigorous, practically guided manner. Instruction on violence continues to be largely piecemeal, focusing on specific problem areas and encouraging "niche-based" research as well as study. Meanwhile, we are in need of a cogent understanding that is more than the sum of its parts.

Over the next several issues, *Aggression and Violent Behavior* has graciously offered to publish a lecture series that has been implemented through the Global Health Studies Program at Yale College in a course entitled, "Violence: Causes and Cures." While it does not purport to be the definitive sequence for reviewing all the major bio-psycho-socio-political and structural–environmental perspectives on violence, it is an attempt to present them in a coherent manner. This article consists of the second of this fifteen article series.

1. Introduction

> Every living organism is essentially an open system. (Ludwig von Bertalanffy, *General System Theory*, (1968)

Biological contributors are important in violence since any human behavior will entail a physical component to it, particularly of the brain. Exploring the biology of violence, therefore, is an essential aspect of *how to think about violence* through a bio-psycho-socio-environmental paradigm (Lee, 2015). Discussing "the biology of violence," however, carries a rocky history and must be done responsibly. Indeed, bringing in biology has often become a *source* of violence: in justifying colonial conquests, extermination of races, discrimination of the morphologically different, and more recently of relocating social problems to the individual (thus "blaming the victim"). On the other hand, the concept of an ungovernable biological drive—an inevitable consequence of evolutionary, genetic, or biochemical forces—can seem to exonerate responsibility and to be reassuring for some. The purpose of this article is to show that both these perspectives arise from a flawed concept of biology; a more updated scientific approach would be to place biology within a holistic, interdisciplinary perspective that includes environmental, psychological, and social contexts. In other words, before there is any discussion of a biology of violence, there needs to be an accurate concept of biology itself.

Traditionally, the seeming simplification of human behavior that biology offered was very tempting, leading phrenologists to look for the right bump on the skull (behind the ear, as it had been determined at one time) or modern neuroscientists to explore localized lesions (experimenting in turn with the parietal, temporal, and prefrontal lobes of the brain). The implication has been that some evolutionary, genetic, neurobiological, neuroendocrine, or morphological process will ultimately explain violent behavior, reducing its complexity. The underlying assumption is that we can "explain" phenomena by reducing behavior to biology, biology to physics, and physics to the movements of elementary particles. We now know that this premise is flawed: not only are elementary particles impossible to find, even if they were, they seem to *increase* in complexity rather than decrease. Still, this theory has so captured our imagination, it continues to predominate discourse on how the brain apparently determines our moral, ethical, and even political decisions: we see this tendency in the increasing use of neuroimaging studies in courtrooms to "explain" aberrant behavior and to decide criminal responsibility and sentencing policy. While technological advances for viewing the neurological contributions to cognition and behavior have been impressive, nowhere does the fallacy of this very idea become as clear as in violence—where every attempt to use biology to give asingular explanation has failed. The new biology, on the other hand, moves away from categorization, differentiation, and reductionism toward integration, synchronization, and harmonization with psycho-social-environmental processes, which we will discuss after a review of history.

2. The tempting idea

Heavy reliance on pure biology to explain violence began in the nineteenth century, when criminologist Cesare Lombroso of Italy developed a theory of *atavism* in his *L'Uomo delinquente* (*Criminal Man*) (1876). He asserted that criminality was a genetic throwback to primitive states, and that this "criminal type" of person was recognizable through their large jaws or cheekbones, sloping foreheads, long arms, and flat feet. This was a time when "physiognomy" was in fashion, interpreting a person's character, personality, and even presence of disease from outer appearances, especially from the shape of the skull. Lombroso's work was highly and justifiably criticized (Wolfgang, 1955), but his compelling formulations have impacted criminological theory and studies of crime to this day. Forty years later, physician Charles Goring (1913) of England compared convicts to noncriminal citizens and found that criminals were shorter and weighed less; however, Goring had not taken into account the differences in environment, which invalidated his conclusions. In the U.S., sociologist Richard Dugdale's (1877) genealogical study of families with histories of criminal involvement, mental health problems, and poverty, and then eugenicist Henry Goddard's (1912) investigation of genealogical "feeblemindedness" suggested a hereditary component to crime. Then in the 1930s, physical anthropologist Ernest Hooten (1939) suggested that biological inferiority was the cause of crime; criminal individuals would have physical characteristics such as low foreheads, long necks, and crooked jaws. This was also the time when Nazi ideology claimed the superiority of the Aryan race, based on appearances. Like Goring's research, Hooten's work was criticized for methodological flaws. In the 1940s and 1950s, criminologists Glueck and Glueck (1950)were the first to perform studies of chronic juvenile offenders and claimed that potential deviants could be identified as young as 6 years old—but the approach suffered because of the subjective and thus unreliable assessments. Eventually, the heavy reliance on a biological perspective alone became untenable, pushing the practice toward *pseudoscience* rather than science to maintain ideology, which paved the way for social theories becoming extremely popular in the 1960s, swinging the pendulum to the other extreme.

Then the improvement of instruments renewed hopes for again finding a purely biological basis for criminal violence. A popular theory was that those who resorted to criminal behavior were less intelligent than other individuals, and this generated research that compared standardized IQ test scores (Hirschi & Hindelang, 1977). However, because these tests were not considered valid across racial and class lines, the results could not be conclusive. Studies of chromosome abnormalities looked at the "XYY" syndrome's relationship to violent crime, postulating that the Y, or the designated "male" chromosome, must be responsible for violent behavior, given the higher prevalence of violence among males across cultures and time (and therefore two Y chromosomes should yield more "Y characteristics"). The results were not definitive, however, as no difference in levels of violence emerged between the XY and the XYY chromosome bearers (Schiavi,