Biological Determinism, Free Will and Moral Responsibility: Insights from Genetics and Neuroscience, by Chris Willmott. Dordrecht: Springer, 2016. 84 pp.

This book in the Springer series on ethics provides a very accessible explanation of the need to reconsider notions of free will and moral responsibility in an age of scientific breakthroughs in genomics and brain science. The analysis addresses moral accountability in light of the influence of genetics and brain neurochemistry on human behavior. To discuss this new terrain in ethics discourse there needs to be overlapping analyses to enlighten the influence of biological determinism. Specifically, this endeavor combines philosophical considerations of free will and determinacy with approaches to legislation in a new field of neurolaw that engages genetics and neuroscience in criminal proceedings and trials.

The study presents a philosophical and legal foundation to set the stage for exploring the relevance of recent scientific breakthroughs regarding the human mind. It provides an insightful philosophical account of the apparent standoff between free will and the evidence of determinism. One extreme of the debate is libertarianism: upholding free will and denying that free will is compatible with determinism. Another extreme is hard determinism, which presents the most daunting challenge to the free will of individuals as being legally and morally accountable for behavior—in this perspective, either determinism or free will can be construed as being real, but each excludes the other. In particular, there is a form of hard determinism called biological determinism that is directly relevant to the discussion in the book. The crucial point that the author highlights regarding legal responsibility is that data from genetics and neuroscience suggest an influence on human responses that is demonstratively outside of conscious control. In this emerging scientific landscape there is an increasing awareness of the need to overhaul law on criminal responsibility and liability in the English-speaking world. This is especially the case with regard to a modern understanding of sanity in mental health and disorders. On this new terrain, the study astutely highlights the distinction between a focus on the mental component in a crime (mens rea) and the application of DNA and forensic evidence about the crime (actus reus). To pursue this focus regarding mental disorders further, the author presents a valuable account of the three legal (not medical) approaches that are typically relevant: insanity, diminished responsibility, and automatism. Insanity can pertain either at the time when the crime was committed or at the time of trial. Diminished responsibility (applicable in cases of murder) recognizes that the defendant has a substantially impaired ability to understand the crime, make a rational judgment, or exercise self-control. Automatism (which justifies acquittal) refers to an involuntary movement by an individual arising from a lack of control, such as that caused by a brain tumor. In the general context of these standard approaches, the author judiciously connects this philosophical and legal foundation of his analysis to

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the related scientific and ethical debates that follow—criminal responsibility and moral liability will have to explore and integrate the increasingly reliable evidence of biological factors in criminal behavior.

The author is a scientist, and his expertise enables him to provide a remarkably lucid account of the relevance of science for the debate on free will and determinism. Scientific breakthroughs in genetics and neuroscience are indispensable for understanding the underlying biology of behavior, especially with regard to methodologies for imaging the brain (e.g., electroencephalography, positron emission tomography, and functional magnetic resonance imaging). In addition to neuroarchitecture and brain imaging techniques, science is able to increasingly clarify the influence of specific genes on human behavior in the sense of behavior stemming from our genetic makeup, including the impact of epigenetics (environmental influences on gene expression). Furthermore, significant achievements have been made regarding the impact of brain injury (such as trauma, tumors, or atrophy like Alzheimer's or Parkinson's disease) on brain structure and behavior, including antisocial behavior, sexual disinhibition, increased aggression, and criminal behavior. In this fascinating realm of new science, we should be able to better understand the impact of genetic or neurological abnormalities on the behavior of defendants. This is very important for understanding the role of neuroscientific and genetic evidence in criminal trials. The author perceptively notes that it would not be surprising to expect an impact of behavioral genetics and brain physiology on criminal cases, including a trial's outcome or sentence. Yet, somewhat surprisingly, so far there have been relatively few examples (the majority of which took place in the United States) where genetic or brain imaging evidence had a significant impact on criminal proceedings. To understand this, it is necessary to grasp the stages in criminal proceedings, not only when this evidence is admissible but also what standards are expected for scientific evidence and the role of expert witnesses. In particular, it is important to comprehend the distinction between genetic evidence being admissible for consideration by a court and a willingness to be persuaded by it in the determination of legal decisions. Generally, there has been a growing willingness to accept genetic evidence, especially in the sentencing phase. A particular issue that may increasingly influence the outcome of cases and the development of law concerns the insights of brain physiology with regard to the culpability of minors. That is, scientific evidence about the immaturity of the brain stands against establishing a relatively young age for criminal responsibility. This represents an obvious area in which modern science can noticeably impact legal developments.

It will be fascinating to see whether emerging neuroscientific evidence will have a significant impact on courts in an ongoing and consistent manner across jurisdictions. Whatever transpires, the author is appropriately emphatic about establishing the underlying validity of the methods of behavioral genetics and brain imaging: the validity and reliability of this emerging scientific data is robust. However, he carefully notes that it does not necessarily follow that using evidence in criminal cases has been justified. Indeed, it is the case that the accomplishments in genetics and neuroscience regarding behavior have significant philosophical and legal implications, not least for the long-standing debate on free will and moral responsibility. But to confirm a correlation between brain structure and a particular behavior does not inherently indicate a causation, far less a compulsion. That is, the correlation

does not preclude the role of free will and moral responsibility. Also, the notion that genes alone are responsible for behavior has been systematically undermined by recent scientific discoveries. The need for genetic and environmental interactions can help to explain why there has been little success in linking specific genes to particular conditions such as diseases or behavioral patterns. In other words, a role for genes in behavior, including brain imaging that endorses connections between neuroarchitecture and behaviors, does not forgo the place of free will and moral responsibility in human behavior. Here the prudence of the argument is manifest. That is, confirming scientific methodologies needs to be accompanied by advising judiciaries to be cautious about expanding the use of neurobiological evidence. Genetics and brain imaging data have been cited in criminal cases—but according to the author, this has occurred in an uncoordinated manner, with serious concerns being raised about the appropriateness of the evidence. A great deal more knowledge is needed regarding the interaction of genetics, neurobiology, and environmental influences to endorse their use in criminal cases. Hence, there is a consensus among experts that the current use of neuroscientific data to determine criminal responsibility is premature. Although the fundamental science is sound, the application of this science to criminal justice is not yet appropriate, with a possible exception being the impact of scientific research on the adolescent brain. Recognizing the influence of genetics and neurobiology on human behavior is balanced with arguing against a model of biological determinism that undermines moral responsibility where free will is downplayed. Nonetheless, it seems inevitable that neuroscientific and behavioral genetic evidence will increasingly influence criminal law. In the future these scientific techniques and their data could become integral to some criminal proceedings, such as proceedings in which biological information may have a mitigating influence during the sentencing phases of trials.

The book's analysis presents an impressive prudential approach, balancing the reliability of scientific achievement with caution about its applicability to criminal courts. The author's outstanding knowledge of science and law provides an excellent primer to professionals who are fascinated by and struggle with these recurring dilemmas between free will and determinism. Especially helpful are the many legal cases peppered throughout the book to illustrate and analyze the critical points under discussion, referring to law in both England and the United States. Ethical, legal, and scientific scholars, from novices to experts, will find this short book to be an extraordinary resource for engaging moral responsibility in the age of genetics and neuroscience.

——Gerard Magill