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## **The Neuroscience of Morality and Consciousness: A Brief Introduction**

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The history of neuroethics is filled with dramatic stories. Brain injuries sustained by patients such as Phineas Gage (Damasio 1994), “Monsieur Leborgne”/“Patient Tan” (Damasio and Geschwind 1984), H.R. (Scoville and Milner 1957), and EVR (Eslinger and Damasio 1985) provided clues to the dynamic relationship between the structure of our minds and consciousness. Their stories evoked discussions of classic questions going back to Hippocrates about the nature of free will, the possibilities for personhood, and the origin of conscience. (Churchland 2007) When developments in neurotechnology enabled investigations of these issues to bypass the limits of individual cases, the conversation moved beyond the musings of philosophers and the speculations of scientists to interdisciplinary investigations into the neural mechanisms of morality and consciousness. Deemed “the neuroscience of ethics” (Roskies 2002), this set of questions has come to be known as the “first tradition” of neuroethics (Giordano and Benedikter 2011).

An example of one such interdisciplinary investigation involved a study by psychologists and philosophers utilizing functional magnetic resonance imaging (fMRI) to determine the neurobiology of moral judgment. Focusing on the ubiquitous “trolley” and “footbridge” dilemmas discussed in introductory philosophy classes, the researchers were able to determine which areas of the brain were active during the subjects’ assessment of the problems (Greene et al. 2001). In another study, researchers employed brain scans to track neural responses to moral issues (Moll et al. 2002). These studies, and others like them, challenge the concepts of consciousness and morality found in the works of theorists such as Plato, René Descartes, Sigmund Freud, Jean Piaget, and Lawrence Kohlberg, and present new ways to assess moral reasoning (Churchland 1988; Greene and Haidt 2002).

Researchers continue to broaden the scope of their questions to include topics such as the neuroimaging of personality (Canli and Amin 2002), the brain mapping of free will (Lau et al. 2004), and the interaction of brain chemicals and behavior (Zak 2012). As research becomes more expansive, so do the questions about its impact. Will the concept of moral responsibility be erased? Would discoveries about the neural basis of behavior lead to “mind control”? Could images of the brain generated by this research be subject to digital manipulation and thus undermine our freedom? The term “neuromorality” has been coined to reference both the research on the neural structure of morality and the questions generated by it (Roskies 2004). This empirical turn in consciousness studies provides a basis for us to revise our view(s) of what constitutes a “moral person” (Levy 2007).

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