The Biology of Morality: Human Development and Moral Neuroscience

Melanie Killen^a Judith Smetana^b

^aUniversity of Maryland, College Park, Md., and ^bUniversity of Rochester,
Rochester, N.Y., USA

Morality has been defined as prescriptive norms regarding how individuals ought to treat one another [Kant, 1785/1959]. The formulation of the categorical imperative – act in such a way that you would will your act to be universal – has led developmental psychologists to study the emergence, origins, structure, and sequence of children's understanding of norms regarding justice, fairness, and equality [Piaget, 1932], and how children reason when making moral decisions [Colby & Kohlberg, 1987]. Research over the past 30 years from what has come to be known as the Social Domain Model has focused on rigorously defining morality. Psychological criteria, drawn from moral philosophy and refined and validated through empirical research, have been used to determine whether individuals view events, acts, or decisions involving morality as distinct from other types of social considerations, including conventional, prudential, or pragmatic concerns [Killen & Smetana, 2006; Nucci, 2001; Smetana, 2006; Turiel, 1998].

Recently, the field of neuroscience has expanded beyond psychological phenomena – such as memory, perception, and information processing – to take on the challenge of studying morality. Neuroscientists seek to determine the parts of the brain that are activated when individuals solve moral dilemmas. Whether a 'moral organ' exists in the brain is hotly debated [Greene, Sommerville, Nystrom, Darley, & Cohen, 2001; Hauser, 2006]; either way, our understanding of the biological basis of morality has changed dramatically in the past 7–8 years with the use of fMRI techniques along with other psychophysiological measurements. We view this attention to morality as exciting, intriguing, and full of possibilities, but also somewhat perplexing.

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Melanie Killen, Department of Human Development
3304 Benjamin Building, University of Maryland
College Park, MD 20742-1131 (USA)
Tel. +1 301 405 3176, Fax +1 301 405 2891
E-Mail mkillen@umd.edu

It is perplexing because the way that morality has been defined, operationalized, and measured in most moral neuroscience experiments is wildly discrepant from the extensive developmental and psychological research on how individuals use moral criteria, evaluate morally charged issues, and make moral judgments. In most moral neuroscience studies, for example, morality is not explicitly defined; it is taken for granted in the nature of the task. Participants may be asked to make altruistic judgments, judgments about character, or respond to extreme, forced-choice decisions about inflicting death on others as an unwilling observer of a tragic situation (e.g., the famous ‘trolley car dilemmas’) [Greene et al., 2001]. These experimental situations are deemed ‘moral’, although definitional criteria typically are not used, and moral reasoning is rarely assessed. It is not enough to know that an act is judged as good or bad; the ‘moral’ litmus test lies with the *reasons* why it is viewed as good or bad, right or wrong.

We have learned from the past 30 years of moral developmental research that moral decisions are rarely simple and that children, adolescents, and adults weigh and coordinate moral and nonmoral features of situations when making judgments. Our methods, including systematic counterprobe techniques as well as classification assessments, have allowed us to empirically categorize these features and understand children’s reasoning. Most of the stimulus tasks used in moral neuroscience research involve the use of complex, multifaceted dilemmas, making it even more important to determine how participants evaluate, categorize, reason about, and interpret each aspect of the dilemma and experimental situation.

A few exceptions have emerged [Blair, 1995; Eisenberger, Lieberman, & Williams, 2003; Leslie, Mallon, & DiCorcia, 2006] and have demonstrated that the types of distinctions demonstrated in moral developmental research also hold promise for understanding brain activity, psychopathy, and cognitive deficits. These findings provide hope that an integration of morality and neuroscience will enable research scientists to preserve the human development story of morality. We believe that this involves judgment, decision making, and choices about everyday exchanges, interactions, and events, along with unfolding the biological bases of both straightforward and complex social decisions and evaluations. There is little question that the biology of morality is a fascinating and important quest. If we sacrifice the integrity of the phenomenon, however, we will take two steps backwards to move one step forward.

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