MITCH HARDEN

Chimps Don't Read Kant

It was in *Soul Made Flesh: The Discovery of the Brain–and How it Changed the World* by Carl Zimmer that I was first introduced to the work of Dr. Joshua Greene. In the final chapter of the book Zimmer begins to look at the implications of a sub-branch of evolutionary psychology that has been dubbed by some as neuroethics. Actually, this emerging line of research has not yet cemented a name for itself at this time, and some refer to it as moral neuroscience. The main thrust of this field, or at least Greene's role in researching ethics, may have been inspired by chimpanzees. The fact that chimpanzees make ethical choices seems to show that there is a biological basis for our ethics that isn't entirely dependent on our conscious reasoning–or as Zimmer put it, "Chimps may be smart, but they don't read Kant" (2004).

Dr. Greene's Academic Background

Joshua Greene began his academic career at the University of Pennsylvania in 1992 with the intention of studying business. However, he became involved with a psychological research project run by Jonathon Baron studying the valuation of environmental goods (Baron & Greene, 1996). Greene also enrolled in a seminar-style introductory psychology class taught by Paul Rozin, which left a lasting impression.

After his freshman year Greene transferred to Harvard and became a philosophy major. He spent his summers researching under Amartya Sen and later Derek Parfit, who advised Greene on his undergraduate thesis, a philosophical exploration of psychological biases in moral judgment.

Greene pursued his graduate work in Princeton's philosophy department in 1997. It was at this time that he reconnected with Jonathon Baron to collaborate long-distance on the nature of utilitarianism and declining marginal utility (Greene & Baron, 2001). He finished his graduate work the following year and began work on his doctoral dissertation. Greene split the next three years between cognitive neuroscience and his dissertation, "The Terrible, Horrible, No Good, Very Bad, Truth About Morality and What To Do About It" (Greene, 2002). He currently continues his research at the Center for the Study of Brain, Mind, and Behavior Neuroscience of Cognitive Control Laboratory at Princeton.

Dr. Greene's Research

Greene's research interests were sparked while he was at Harvard studying philosophy. In philosophy, morality breaks down into two primary camps, each of which follows one of two greatly influential philosophers: Immanual Kant or John Stuart Mill. Kant believed that it was wrong to use another human being as a means to any end no matter how desirable. Mill, on the contrary, argued that morality should always do the greatest good for the most people. In a 2004 interview with Carl Zimmer, Greene remarked, "Kant puts what's right before what's good, Mill puts what's good before what's right."

In practice the average person is caught somewhere in between these two philosophies, embracing neither the Kantian ethic nor the Utilitarian ethic completely. Greene observed this most completely through the "trolley problem":

> A runaway trolley is hurtling down the tracks toward five people who will be killed if it proceeds on its present course. You can save these five people by diverting the trolley onto a different set of tracks, one that has only one person on it, but if

> you do this that person will be killed. Is it morally permissible to turn the trolley and thus prevent five deaths at the cost of one? Most people say yes. Now consider a slightly different dilemma. Once again, the trolley is headed for five people. You are on a footbridge over the tracks next to a large man. The only way to save the five people is to push this man off the bridge and into the path of the trolley. Is that morally permissible? Most people say no (Greene, Sommerville, Nystrom, Darley, & Cohen, 2001).

It is Greene's hypothesis that this disparity can be attributed to the structures of the brain used during moral-personal decision-making structures that appear to be different than those we use for moral-impersonal decision-making. The first case in the trolley problem is an example of a moral-impersonal choice, while the second case is a moral-personal choice. To test the theory Greene asked volunteers sixty questions containing a mix of moral-personal, moral-impersonal, and non-moral questions while observing their brain activity with a functional MRI (fMRI). Greene discovered that during moral-personal questioning areas of the brain associated with emotion were more active. In particular these emotional and social cognition areas include the medial frontal gyrus, the posterior cingulated gyrus, the left angular gyrus, and the right angular gyrus. During moral-impersonal questioning areas associated with working memory proved to be more active, such as the middle frontal gyrus, the left parietal lobe, and the right parietal lobe (Greene et al, 2001).

The second part of the study dealt with the reaction times of the subjects as they responded to these moral dilemmas. Greene hypothesized that there would be a greater disparity in reaction times between "appropriate" and "inappropriate" responses to moral-personal questions than would be seen during moral-impersonal questioning, and experimental data shows that this is in fact the case. When deeming a moral-personal action "appropriate" (It's okay to push the portly fellow off the footbridge) it took a significantly longer time to respond. This leads Greene to believe that overcoming the personal aspects of a moral-personal dilemma requires significant cognitive effort (Greene, et. al., 2001).

From these results Greene also hypothesizes that morality is not an objective mind-independent truth, but rather a function of the structure of our brain (Greene, 2003). Just as we can instantly recognize another human as male or female without having to compute all the features of them that indicate gender, so too do we make moral decisions without computing the "good" and "evil" of each situation. He hypothesized that when there is a significant conflict between the moral-personal, and moral-impersonal additional areas within the brain, specifically the anterior cingulated cortex (ACC) and the dorsolateral prefrontal cortex (DLPFC), would show increased activity (Greene, Nystrom, Engell, Darley, Cohen, 2004). Greene notes that these are the same structures that were found to be active during in detecting and resolving the cognitive conflict of the common psychological phenomenon, the Stroop effect.

To expand upon this, Greene ran another experiment that involved a moral dilemma that showed no consensus in judgment amongst participants. Here he found that there was a direct positive correlation between activity in the DLPFC and a utilitarian outcome of moral judgment (Greene, et. al., 2004). Greene also found that the reaction time data support the fact that moral judgments are contemplative, since participants took between ten and twenty seconds even though they were not required to justify their answers at any point.

Philosophical Conflict

It is a common approach to assume that all people know the difference between right and wrong, and if all persons just did what they knew was right, the world would be a better place. Although after looking at Greene's findings we find cannot merely do what we think is best, because what we think is best is being shaped by our moral-personal weighted biology (Greene, 2002). Greene's findings may help to explain why the conflict between rationalists like Immanuel Kant and utilitarian like John Stuart Mill has persisted for the last two centuries of moral thought.

> We propose that the tension between the utilitarian and deontological perspectives in moral philosophy reflects a more fundamental tension arising from the structure of the human brain. The social-emotional responses that we've inherited from our primate ancestors (due, presumably, to some adaptive advantage they conferred), shaped and refined by culture bound experience, undergird the absolute prohibitions that are central to deontology. In contrast, the "moral calculus" that defines utilitarianism is made possible by more recently evolved structures (Greene, et. al., 2004)

Moral Neuroscience and the Law

Legal reforms may also arise from Greene's research; in fact, Greene himself has explored this issue in a recently published paper. While the law claims to have no need to distinguish between determinism and libertarianism (the belief in free will), in practice it carries a strong libertarian bias. Current legal systems are also largely retributivist in nature with the aim to dole out punishment to those that are deserving of it based on their actions. In most cases the disparity between what people feel is wrong and what the law considers wrong is relatively small. However, the research of Greene could increase this margin, as it will help to refute people's common-sense conception of free will and the requisite punishment that is earned through "wrong" actions. Through this new understanding of moral-personal decision making structures in the brain, we can differentiate between the crime of passion and the fundamentally different decision making process that leads to a similar pre-meditated crime. This change could lead to an abandonment of the retributivist system for such crimes and prompt a move toward a system that promotes future welfare (Greene & Cohen, 2004)

Conclusion

While Joshua Greene is only just beginning his career, he has managed to raise new questions about the nature of morality in a way previously unexplored. While it is too soon to know the outcome of his

research, there can be no doubt as to the value of the questions he raises. His contributions to the emerging field of evolutionary psychology, as well as philosophy, and cognitive science seem likely to yield a variety of testable theories.

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