



The rise of moral cognition



Joshua D. Greene

Dept. of Psychology, Harvard University, United States

ARTICLE INFO

Article history:

Available online 12 December 2014

Keywords:

Morality
Moral judgment
Moral cognition

ABSTRACT

The field of moral cognition has grown rapidly in recent years thanks in no small part to *Cognition*. Consistent with its interdisciplinary tradition, *Cognition* encouraged the growth of this field by supporting empirical research conducted by philosophers as well as research native to neighboring fields such as social psychology, evolutionary game theory, and behavioral economics. This research has been exceptionally diverse both in its content and methodology. I argue that this is because morality is unified at the functional level, but not at the cognitive level, much as vehicles are unified by shared function rather than shared mechanics. Research in moral cognition, then, has progressed by explaining the phenomena that we identify as “moral” (for high-level functional reasons) in terms of diverse cognitive components that are not specific to morality. In light of this, research on moral cognition may continue to flourish, not as the identification and characterization of distinctive moral processes, but as a testing ground for theories of high-level, integrative cognitive function.

© 2014 Elsevier B.V. All rights reserved.

Cohen Priva and Austerweil (2015) analyzed thirty-four years of *Cognition* titles and abstracts to spot trends in the evolution of this journal and the fields it represents. They identified the rise of moral cognition as the most dramatic development in recent years, if not in the history of the journal. (Other shifts have been larger, but not nearly so fast.) Through the 1980s and 1990s the topic of moral psychology barely registered in these pages. Then, in the mid 2000s the field exploded, yielding an eight-fold increase in the prominence of morality-related words. More than a growth spurt, the field has busted Hulk-like out of its jeans and sneakers.

Many journals have encouraged the growth of moral cognition, but few, if any, have supported this no-longer-nascent field like *Cognition*. For this, the field owes Gerry Altman and Steven Sloman, *Cognition's* outgoing and incoming Editors-in-Chief respectively, a great debt. At a time when many journals gave new-wave moral cognition only funny looks, *Cognition* took this unconventional work

seriously and, by maintaining its high standards throughout, shined a spotlight on the best of what this new field has to offer. Everyone applauds interdisciplinary research in theory, but in practice work that attempts to cross traditional boundaries is frequently detained at the border. *Cognition*, however, is truly and essentially interdisciplinary. In particular, *Cognition* has for more than a decade provided an outlet for empirical research conducted by philosophers (Knobe & Nichols, 2008, 2013; Nichols, 2002), foreshadowing, and perhaps a precipitating, a massive shift in the philosophy of mind (Knobe, 2015). Second, *Cognition* has long been amenable to a puzzles-and-paradoxes approach to psychological science, which welcomes real-world applications but also welcomes the exploration of interesting problems for its own sake, knowing that basic science pays off in the end. This playful open-mindedness was congenial to philosophers and philosophically minded psychologists seeking insight into the problems of free will and moral responsibility (Woolfolk et al., 2006; Gerstenberg & Lagnado, 2010; Nahmias, Shepard, & Reuter, 2014; Young & Phillips, 2011), moral dilemmas (Bartels, 2008; Bartels & Pizarro, 2011; Duke & Bègue,

E-mail address: jgreene@wjh.harvard.edu

2015; Greene, Morelli, Lowenberg, Nystrom, & Cohen, 2008; Greene et al., 2009; Nichols & Mallon, 2006; Pastötter, Gleixner, Neuhauser, & Bäuml, 2013; Piazza, Sousa, & Holbrook, 2013; Strohminger, Lewis, & Meyer, 2011; Suter & Hertwig, 2011; Trémolière, Neys, & Bonnefon, 2012; Uhlmann, Zhu, & Tannenbaum, 2013; Wiech et al., 2013; Wiegmann & Waldmann, 2014), “moral luck” (Cushman, 2008; Gummerum & Chu, 2014; Hamlin, 2013; Young & Saxe, 2011), meta-ethics (Goodwin & Darley, 2008; Nichols & Folds-Bennett, 2003), the Knobe effect (Cushman, Knobe, & Sinnott-Armstrong, 2008; Uttich & Lombrozo, 2010), and the nature of the moral self (Bartels, Kvaran, & Nichols, 2013; Strohminger & Nichols, 2014).

While much of the recent work in moral cognition has been inspired by philosophy, it has also drawn heavily from fields not traditionally represented in *Cognition*. The work of social psychologists Haidt et al. (1993) and Haidt (2001, 2012) and Rozin, Lowery, Imada, and Haidt (1999) inspired a wave of research examining, among other things, the relative influences of concerns for harm and fairness on the one hand, and concerns for purity, authority, and in-group favoritism on the other (Gray, 2014; Rottman & Kelemen, 2012; Rottman, Kelemen, & Young, 2014; Schmidt, Rakoczy, & Tomasello, 2012; Young & Saxe, 2011). Another major cluster of recent moral cognition research uses economic games to illuminate the psychology of pro-social behavior, including both cooperation and the punishment of anti-social behavior (Blake & McAuliffe, 2011; Civai, Corradi-Dell’Acqua, Gamer, & Rumiati, 2010; Descioli & Kurzban, 2009; Gummerum & Chu, 2014; McAuliffe, Jordan, & Warneken, 2015; Meristo & Surian, 2013; Mills & Keil, 2008; Olson & Spelke, 2008; Pietraszewski & German, 2013; Schmidt et al., 2012; Warneken, 2013). Finally, much recent research in moral cognition uses developmental methods, including the cognitive methods (looking time, etc.) long championed by *Cognition* (Cushman et al., 2013; Hamlin, 2013; Meristo & Surian, 2013) as well as methods native to the longstanding tradition of moral development (Blair, 1995; Nichols, 2002; Nichols & Folds-Bennett, 2003; Royzman, Leeman, & Baron, 2009; Sousa, Holbrook, & Piazza, 2009; Stich, Fessler, & Kelly, 2009), especially in combination with child-appropriate versions of economic games (Friedman & Neary, 2008; Gummerum & Chu, 2014; McAuliffe et al., 2015; Olson & Spelke, 2008; Rossano, Rakoczy, & Tomasello, 2011; Schmidt et al., 2012; Sheskin, Bloom, & Wynn, 2014).

This gives a sense for how the field has grown and the directions it’s taken. Where is it going? I believe that moral cognition is not a natural kind at the cognitive level. By way of analogy, consider the concept VEHICLE. At a mechanical level, vehicles are extremely variable and not at all distinct from other things. A motorcycle, for example, has more in common with a lawn mower than a with a sailboat, and a sailboat has more in common with a kite than with a motor cycle. One might conclude from this that the concept VEHICLE is therefore meaningless, but that would be mistaken. Vehicles are bound together, not at the mechanical level, but at the functional level. I believe that the same is true of morality. So far as we can tell,

the field of moral cognition does not study a distinctive set of cognitive processes (Greene, 2014). (But see Mikhail, 2011.) Instead, it studies a set of psychological phenomena bound together by a common function. As I (Greene, 2013) and others (Frank, 1988; Gintis, 2005; Haidt, 2012) have argued, the core function of morality is to promote and sustain cooperation. This conclusion follows from a great deal of research indicating that moral thoughts and feelings are ideally suited to promoting cooperation. They do this primarily by applying psychological carrots and sticks to ourselves and to others. Guilt, for example, is a psychological stick that motivates oneself to be cooperative, while gratitude is a psychological carrot that motivates others. Love and contempt are among the inhabitants of the remaining two cells.

These feelings and the cognitive processes that trigger them perform a common function in different ways. So far, however, the cognitive mechanisms behind these thoughts and feelings show no sign of being distinctively moral. This suggests that what we call “moral cognition,” is just the brain’s general-purpose cognitive machinery—machinery designed to learn from experience (Cushman, 2013), represent value and motivate its pursuit (Cushman, 2013; Shenhav & Greene, 2010), represent mental states and traits (Young, Cushman, Hauser, & Saxe, 2007), imagine distal events (Amit & Greene, 2012; Caruso & Gino, 2011), reason (Paxton, Ungar, & Greene, 2012), and resist impulses (Greene et al., 2008; Suter & Hertwig, 2011)—applied to problems that we, for high-level functional reasons, identify as “moral.” If all of this is correct, it explains why the field of moral cognition has been so varied and why that is unlikely to change. We are explaining moral thinking in terms of its more basic cognitive components, which are not specific to morality and which have typically been characterized in greater detail by researchers in other fields.

I’ve said that morality is fragmented at the cognitive level but unified at the functional level by its relation to cooperation. These two claims are logically independent. For example, morality might be fragmented at the cognitive level, but unified at a higher level in some other way. And, as noted above, there is evidence independent of claims about cooperation indicating that moral cognition draws on diverse domain-general cognitive machinery, not only peripherally—you need your visual cortex to read about a moral dilemma—but centrally, in the core processes of moral evaluation. Of course, moral cognition’s reliance on various domain-general cognitive processes does not imply that it relies on no distinctive moral processing. Supporting that claim would require an exhaustive search of the moral mind.

We may yet discover cognitive mechanisms that are distinctively moral, in which case the field of moral cognition will, I presume, focus on characterizing these mechanisms and explaining how they interact with the rest of brain. But what happens if, as I predict, we find no such mechanisms? It’s possible that the study of moral cognition will simply fractionate into a number of separate problems, none of which belongs to moral cognition, resulting in the dissolution of the field. An alternative possibility, which I favor, is that moral cognition will continue to flourish, not

as the study of a single cognitive organ (Hauser, 2006), and not only as the study of loosely related problems, but as a testing ground for more general questions about the nature of high-level cognition, questions about how the brain's disparate cognitive components are integrated to produce (mal)adaptive behavior. The field of computer science, for example, benefitted greatly from decades of attention to chess, not because chess involves a distinctive kind of processing, but precisely because it does not. And if you think that decomposing chess into a set of cognitive operations is challenging, try decomposing our thinking about abortion or the Israeli–Palestinian conflict.

Because moral cognition covers so much psychological and neural territory, the cognitive science of morality will likely teach us lessons that we could not learn simply from studying in isolation things such as reinforcement learning (Cushman, 2013), theory of mind (Young et al., 2007), visual imagery (Amit & Greene, 2012; Caruso & Gino, 2011), and cognitive control (Greene et al., 2008; Paxton, Ungar, & Greene, 2012; Suter & Hertwig, 2011). The last decade of research has taught us, first, that the problems of moral cognition are sufficiently well-defined that they are amenable to the tools of cognitive science and, second, that they are not so well defined that we can predict with great confidence what we are going to learn from studying them.

References

- Amit, E., & Greene, J. D. (2012). You see, the ends don't justify the means: visual imagery and moral judgment. *Psychological Science*, 23(8), 861–868.
- Bartels, D. M. (2008). Principled moral sentiment and the flexibility of moral judgment and decision making. *Cognition*, 108(2), 381–417.
- Bartels, D. M., Kvaran, T., & Nichols, S. (2013). Selfless giving. *Cognition*, 129(2), 392–403.
- Bartels, D. M., & Pizarro, D. A. (2011). The mismeasure of morals: Antisocial personality traits predict utilitarian responses to moral dilemmas. *Cognition*, 121(1), 154–161.
- Blair, R. J. R. (1995). A cognitive developmental approach to morality: Investigating the psychopath. *Cognition*, 57(1), 1–29.
- Blake, P. R., & McAuliffe, K. (2011). "I had so much it didn't seem fair": Eight-year-olds reject two forms of inequity. *Cognition*, 120(2), 215–224.
- Caruso, E. M., & Gino, F. (2011). Blind ethics: Closing one's eyes polarizes moral judgments and discourages dishonest behavior. *Cognition*, 118(2), 280–285.
- Civai, C., Corradi-Dell'Acqua, C., Gamer, M., & Rumiati, R. I. (2010). Are irrational reactions to unfairness truly emotionally-driven? Dissociated behavioural and emotional responses in the Ultimatum Game task. *Cognition*, 114(1), 89–95.
- Cohen Priva, U., & Austerweil, J. L. (2015). Analyzing the history of Cognition using topic models. *Cognition*, 135, 4–9.
- Cushman, F. (2008). Crime and punishment: Distinguishing the roles of causal and intentional analyses in moral judgment. *Cognition*, 108(2), 353–380.
- Cushman, F. (2013). Action, outcome, and value: A dual-system framework for morality. *Personality and Social Psychology Review*, 17(3), 273–292.
- Cushman, F., Knobe, J., & Sinnott-Armstrong, W. (2008). Moral appraisals affect doing/allowing judgments. *Cognition*, 108(1), 281–289.
- Cushman, F., Sheketoff, R., Wharton, S., & Carey, S. (2013). The development of intent-based moral judgment. *Cognition*, 127(1), 6–21.
- DeScioli, P., & Kurzban, R. (2009). Mysteries of morality. *Cognition*, 112(2), 281–299.
- Duke, A. A., & Bègue, L. (2015). The drunk utilitarian: Blood alcohol concentration predicts utilitarian responses in moral dilemmas. *Cognition*, 134, 121–127.
- Frank, R. H. (1988). *Passions within reason: The strategic role of the emotions*. WW Norton & Co.
- Friedman, O., & Neary, K. R. (2008). Determining who owns what: Do children infer ownership from first possession? *Cognition*, 107(3), 829–849.
- Gerstenberg, T., & Lagnado, D. A. (2010). Spreading the blame: The allocation of responsibility amongst multiple agents. *Cognition*, 115(1), 166–171.
- Gintis, H. (Ed.). (2005). *Moral sentiments and material interests: The foundations of cooperation in economic life*. MIT Press.
- Goodwin, G. P., & Darley, J. M. (2008). The psychology of meta-ethics: Exploring objectivism. *Cognition*, 106(3), 1339–1366.
- Gray, K. (2014). Harm concerns predict moral judgments of suicide: Comment on Rottman, Kelemen and Young (2014). *Cognition*, 133(1), 329–331.
- Greene, J. (2013). *Moral tribes: Emotion, reason, and the gap between us and them*. Penguin.
- Greene, J. D., Cushman, F. A., Stewart, L. E., Lowenberg, K., Nystrom, L. E., & Cohen, J. D. (2009). Pushing moral buttons: The interaction between personal force and intention in moral judgment. *Cognition*, 111(3), 364–371.
- Greene, J. D. (2014). The cognitive neuroscience of moral judgment and decision-making. In M. S. Gazzaniga (Ed.), *The cognitive neurosciences V*. Cambridge, MA: MIT Press.
- Greene, J. D., Morelli, S. A., Lowenberg, K., Nystrom, L. E., & Cohen, J. D. (2008). Cognitive load selectively interferes with utilitarian moral judgment. *Cognition*, 107(3), 1144–1154.
- Gummerum, M., & Chu, M. T. (2014). Outcomes and intentions in children's, adolescents', and adults' second- and third-party punishment behavior. *Cognition*, 133(1), 97–103.
- Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review*, 108(4), 814.
- Haidt, J. (2012). *The Righteous Mind: Why good people are divided by religion and politics*. New York: Pantheon.
- Haidt, J., Koller, S. H., & Dias, M. G. (1993). Affect, culture, and morality, or is it wrong to eat your dog? *Journal of Personality and Social Psychology*, 65(4), 613.
- Hamlin, J. K. (2013). Failed attempts to help and harm: Intention versus outcome in preverbal infants' social evaluations. *Cognition*, 128(3), 451–474.
- Hauser, M. D. (2006). The liver and the moral organ. *Social Cognitive and Affective Neuroscience*, 1(3), 214–220.
- Knobe, J., & Nichols, S. (Eds.). (2008). *Experimental philosophy*. Oxford University Press.
- Knobe, J., & Nichols, S. (Eds.). (2013). *Experimental philosophy*. Oxford University Press (Vol. 2).
- Knobe, J. (2015). Philosophers are doing something different now: Quantitative data. *Cognition*, 135, 36–38.
- McAuliffe, K., Jordan, J. J., & Warneken, F. (2015). Costly third-party punishment in young children. *Cognition*, 134, 1–10.
- Meristo, M., & Surian, L. (2013). Do infants detect indirect reciprocity? *Cognition*, 129(1), 102–113.
- Mikhail, J. (2011). *Elements of moral cognition: Rawls' linguistic analogy and the cognitive science of moral and legal judgment*. Cambridge University Press.
- Mills, C. M., & Keil, F. C. (2008). Children's developing notions of (im) partiality. *Cognition*, 107(2), 528–551.
- Nahmias, E., Shepard, J., & Reuter, S. (2014). It's OK if 'my brain made me do it': People's intuitions about free will and neuroscientific prediction. *Cognition*, 133(2), 502–516.
- Nichols, S. (2002). Norms with feeling: Towards a psychological account of moral judgment. *Cognition*, 84(2), 221–236.
- Nichols, S., & Folds-Bennett, T. (2003). Are children moral objectivists? Children's judgments about moral and response-dependent properties. *Cognition*, 90(2), B23–B32.
- Nichols, S., & Mallon, R. (2006). Moral dilemmas and moral rules. *Cognition*, 100(3), 530–542.
- Olson, K. R., & Spelke, E. S. (2008). Foundations of cooperation in young children. *Cognition*, 108(1), 222–231.
- Pastötter, B., Gleixner, S., Neuhauser, T., & Bäuml, K. H. T. (2013). To push or not to push? Affective influences on moral judgment depend on decision frame. *Cognition*, 126(3), 373–377.
- Paxton, J. M., Ungar, L., & Greene, J. D. (2012). Reflection and reasoning in moral judgment. *Cognitive Science*, 36(1), 163–177.
- Piazza, J., Sousa, P., & Holbrook, C. (2013). Authority dependence and judgments of utilitarian harm. *Cognition*, 128(3), 261–270.
- Pietraszewski, D., & German, T. C. (2013). Coalitional psychology on the playground: Reasoning about indirect social consequences in preschoolers and adults. *Cognition*, 126(3), 352–363.

- Rossano, F., Rakoczy, H., & Tomasello, M. (2011). Young children's understanding of violations of property rights. *Cognition*, *121*(2), 219–227.
- Rottman, J., & Kelemen, D. (2012). Aliens behaving badly: Children's acquisition of novel purity-based morals. *Cognition*, *124*(3), 356–360.
- Rottman, J., Kelemen, D., & Young, L. (2014). Tainting the soul: Purity concerns predict moral judgments of suicide. *Cognition*, *130*(2), 217–226.
- Royzman, E. B., Leeman, R. F., & Baron, J. (2009). Unsentimental ethics: Towards a content-specific account of the moral–conventional distinction. *Cognition*, *112*(1), 159–174.
- Rozin, P., Lowery, L., Imada, S., & Haidt, J. (1999). The CAD triad hypothesis: A mapping between three moral emotions (contempt, anger, disgust) and three moral codes (community, autonomy, divinity). *Journal of Personality and Social Psychology*, *76*(4), 574.
- Schmidt, M. F., Rakoczy, H., & Tomasello, M. (2012). Young children enforce social norms selectively depending on the violator's group affiliation. *Cognition*, *124*(3), 325–333.
- Shenhav, A., & Greene, J. D. (2010). Moral judgments recruit domain-general valuation mechanisms to integrate representations of probability and magnitude. *Neuron*, *67*(4), 667–677.
- Sheskin, M., Bloom, P., & Wynn, K. (2014). Anti-equality: Social comparison in young children. *Cognition*, *130*(2), 152–156.
- Sousa, P., Holbrook, C., & Piazza, J. (2009). The morality of harm. *Cognition*, *113*(1), 80–92.
- Stich, S., Fessler, D. M., & Kelly, D. (2009). On the morality of harm: A response to Sousa, Holbrook and Piazza. *Cognition*, *113*(1), 93–97.
- Strohmingner, N., Lewis, R. L., & Meyer, D. E. (2011). Divergent effects of different positive emotions on moral judgment. *Cognition*, *119*(2), 295–300.
- Strohmingner, N., & Nichols, S. (2014). The essential moral self. *Cognition*, *131*(1), 159–171.
- Suter, R. S., & Hertwig, R. (2011). Time and moral judgment. *Cognition*, *119*(3), 454–458.
- Trémolière, B., Neys, W. D., & Bonnefon, J. F. (2012). Mortality salience and morality: Thinking about death makes people less utilitarian. *Cognition*, *124*(3), 379–384.
- Uhlmann, E. L., Zhu, L. L., & Tannenbaum, D. (2013). When it takes a bad person to do the right thing. *Cognition*, *126*(2), 326–334.
- Uttich, K., & Lombrozo, T. (2010). Norms inform mental state ascriptions: A rational explanation for the side-effect effect. *Cognition*, *116*(1), 87–100.
- Warneken, F. (2013). Young children proactively remedy unnoticed accidents. *Cognition*, *126*(1), 101–108.
- Wiech, K., Kahane, G., Shackel, N., Farias, M., Savulescu, J., & Tracey, I. (2013). Cold or calculating? Reduced activity in the subgenual cingulate cortex reflects decreased emotional aversion to harming in counterintuitive utilitarian judgment. *Cognition*, *126*(3), 364–372.
- Wiegmann, A., & Waldmann, M. R. (2014). Transfer effects between moral dilemmas: A causal model theory. *Cognition*, *131*(1), 28–43.
- Woolfolk, R. L., Doris, J. M., & Darley, J. M. (2006). Identification, situational constraint, and social cognition: Studies in the attribution of moral responsibility. *Cognition*, *100*(2), 283–301.
- Young, L., Cushman, F., Hauser, M., & Saxe, R. (2007). The neural basis of the interaction between theory of mind and moral judgment. *Proceedings of the National Academy of Sciences of the United States of America*, *104*(20), 8235–8240.
- Young, L., & Phillips, J. (2011). The paradox of moral focus. *Cognition*, *119*(2), 166–178.
- Young, L., & Saxe, R. (2011). When ignorance is no excuse: Different roles for intent across moral domains. *Cognition*, *120*(2), 202–214.