# Joshua Rottman: Summary of Research Accomplishments and Plans for Future Work

*Note: Undergraduate coauthors who I mentored are designated with asterisks (\*).*

## Central Research Focus: The Cognitive Science of Moral Boundaries

The gamut of moral disagreement is vast. Hijabs, vaccines, and abortions are variously condoned and condemned. Homeless buskers encounter a mixture of contempt and compassion. Legal battles rage about whether to protect or exploit marine life in the high seas. What explains this moral variegation, and how can we productively overcome moral discord? My interdisciplinary research integrates social, developmental, cognitive, cross-cultural, and philosophical methodologies to investigate diversity and malleability in the endowment and withholding of moral value. It is driven by four associated questions:

(1) How extensive and variable are the contours of the moral domain?

(2) How and why do disgust and dirtiness reduce the scope of moral treatment?

(3) How do people allocate moral value to outgroup members, animals, and ecosystems?

(4) What leads children and adults to acquire new moral beliefs or to change existing moral beliefs?

## Characterizing the Breadth and Heterogeneity of the Moral Domain

Descriptively, how do people separate "moral" issues from other kinds of normative content? There have been no broadly satisfactory answers to this question. To Occam's chagrin, attempts to parsimoniously delineate the moral domain have been thwarted by evidence that evaluations of moral wrongness stem from a complex plurality of distinct appraisals (Piazza, Sousa, **Rottman**, & Syropoulos\*, 2019, *Social Psychological and Personality Science*). The moral domain not only consists of actions that elicit concerns about welfare or about justice, but also incorporates actions that elicit concerns about purity. For example, while homicide is considered immoral because of its harmfulness, suicide is frequently judged to be immoral due to beliefs that it taints a person's soul (**Rottman**, Kelemen, & Young, 2014a, *Cognition*; **Rottman**, Kelemen, & Young, 2014b, *Cognition*; **Rottman** & Kelemen, 2014, *Behavioral and Brain Sciences*). Moral evaluations of harmful and impure acts are differentiated not only in terms of their content, but also by recruiting distinct signature forms of cognitive processing. I have recently found that people evaluate harm and impurity in qualitatively different ways, such that the magnitude and frequency of outcomes substantially moderate moral judgments of harm-related transgressions but not moral judgments of purity-related transgressions (**Rottman** & Young, 2019, *Psychological Science*). Thus, the "moral domain" may be most accurately characterized as a loose composite of distinct subdomains.

Circumscribing the moral domain is also elusive because the scope of morality is impacted by cultural factors such as religious affiliation. While adherents of non-proselytizing religions (e.g., Judaism) conceptualize the moral domain as being primarily constrained to harmful and unjust actions, adherents of proselytizing religions (e.g., Islam) consider a larger set of actions, including their own religious norms, to belong within the moral domain (Levine, **Rottman**, Davis, O'Neill, Stich, & Machery, in press, *Social Cognition*). Thus, seeking a universally applicable definition of morality is likely to be a fruitless pursuit.

***Future research***: While my previous research focused on investigating the motley range of *actions* that are considered moral, I have begun to investigate how *people* are variously categorized as belonging to moral kinds. I have found initial evidence of extreme stringency in conceptualizations of moral categories like "Loyal Person" (**Rottman**, Bellersen\*, Foster-Hanson, & Kroll, in preparation). I additionally plan to explore whether moral disagreements are best predicted by variation in moral values (e.g., valuing harm vs. purity) or variation in beliefs about the properties of entities (e.g., whether trees have intrinsic worth).

**Disgust and Uncleanliness Typically Shrink the Boundaries of Moral Concern**

Given that upholding purity is amongst the heterogeneous set of values that some consider to be "moral", how do concerns about purity, as well as related beliefs and emotions, influence the treatment of entities and objects? In some cases, valuing purity can broaden the scope of moral concern. For example, when appeals to harm and injustice fail to spur motivations to protect the natural world, galvanizing purity-based intuitions about the desecration of landscapes could do the trick (**Rottman**, 2014, *Frontiers in Psychology*; **Rottman**, Kelemen, & Young, 2015, *Philosophy Compass*). However, purity-based moral concerns more often have the effect of reducing the scope of moral concern, in part because they are frequently predicated upon the emotion of disgust, which leads to aversion and evasion.

Disgust is generally posited to have evolved as a mechanism for avoiding disease-ridden substances (for a review of theory and research on disgust, see **Rottman**, DeJesus, & Greenebaum*, 2019, *Handbook of Emotional Development*). However, I have argued that disgust is a more complex and enigmatic emotion than this conventional characterization suggests. I have recently found that disgust elicitors are not always likely signals of pathogens. For instance, children frequently consider fresh vegetables to be disgusting (DeJesus, Gerdin, Venkatesh, & **Rottman**, in preparation). Additionally, political liberals react to political conservatives with disgust (Landy, **Rottman**, Batres, & Leimgruber, under revision, *Journal of Experimental Social Psychology*). On the whole, the research literature betrays inconsistent evidence for associations between disgust and disease, while containing several indications that people react to healthy outgroup members or people with poor moral character as if they were contagious. Building upon these empirical data, I have formulated a novel theory of the functional properties of disgust. I argue that there are convincing reasons to believe that disgust may have evolved in large part because it adaptively regulates social interactions, rather than existing primarily because it regulates bodily contact with pathogens and parasites (**Rottman**, DeJesus, & Gerdin, 2018, *The Moral Psychology of Disgust*; also see **Rottman**, 2014, *Evolutionary Psychology*; **Rottman** & Young, 2014, *Emotion Review*).

The role that disgust plays in policing social boundaries is evidenced by the extreme disregard that is often directed toward people who elicit this emotion. Given common associations between dirt, disgust, and disdain, I have examined whether people who are physically unclean are treated with decreased moral regard, such that they are distrusted and negatively evaluated. In a large-scale project that spanned multiple years of data collection with participants who were individually tested in my lab at F&M and in India, I found that children and adults have marked tendencies to preferentially trust, favor, and ascribe a range of positive traits to clean (as compared to dirty) individuals, especially when these people are of a similar age (**Rottman**, Johnston, Bierhoff*, Pelletier*, Grigoreva*, & Benitez*, 2020, *Journal of Experimental Child Psychology*). A follow-up study measured children's prejudicial biases toward novel foreigners who were metaphorically depicted as being dirty and disgusting, and the results indicated that biases against people who are figuratively "dirty" are weaker than biases against people who are physically filthy (Grigoreva* & **Rottman**, in preparation). This research thus suggests that there may be a protracted developmental trajectory for biases involving metaphorical applications of embodied concepts (Gerdin, Venkatesh, **Rottman**, & DeJesus, provisionally accepted, *Behavioral and Brain Sciences*).

***Future research***: I plan to continue searching for boundary conditions that establish when and why disgust and dirtiness tend to reduce moral treatment. For example, do children derogate people who are physically dirty even when this dirtiness is the result of productive labor (e.g., garbage collection or farming)? In addition to conducting more basic research on the effects of experiencing disgust toward marginalized people, I intend to eventually design and test methods for overcoming these unsavory consequences. I am also interested in studying interventions for attenuating disgust toward eating insects, as a means to help increase the prevalence of consuming this highly sustainable protein source.

**Demarcating the Boundaries of Moral Regard: Who and What is Ascribed Moral Worth?**

Just as myriad actions are subsumed within the moral domain, people ascribe moral value to a wide range of entities and objects, and numerous considerations influence whether someone or something is deemed worthy of being protected from harm and treated fairly. Moral regard is prominently aligned with the attribution of rational and affective psychological capacities, but possessing a mind is not the only determinant of an entity's moral worth. For example, people and animals are considered to have greater moral standing when they possess musical abilities (Agrawal, **Rottman**, & Schachner, in preparation). Attributions of moral worth also vary depending on whether a focus is placed on the recipient or the benefactor of moral value. People tend to attribute moral rights to other humans more strongly than they attribute themselves with the moral obligations to protect these individuals, but this asymmetry is reduced for non-human targets (Crimston & **Rottman**, under revision, *Group Processes & Intergroup Relations*).

The metaphor of a "moral circle" is frequently used to describe the boundary that divides entities deemed to be deserving of moral consideration from entities that are deemed unworthy of moral consideration. This circle of moral concern is typically depicted by a set of concentric rings that indicate a tendency for outward expansion (across multiple timescales) toward entities that are increasingly dissimilar to the self, thus progressively incorporating kin, strangers in one's community, members of other communities, other mammals, and so forth in a predictable fashion. While this elegant schema has been a productive way to measure aggregate levels of moral concern, it is not well-equipped to account for certain fine-grained distinctions in how people ascribe moral worth — including cases of people who ascribe moral worth to entities on more "distant" rings of the moral circle at the expense of entities situated on "closer" rings. To address this limitation, I measured attributions of moral worth in a more granular fashion, comparing people's value for human outgroups to their value for nature. I found that a substantial number of people value animals and ecosystems more than members of stigmatized and marginalized groups, which is predicted by increased tendencies to anthropomorphize animals and to dehumanize humans (**Rottman**, Crimston, & Syropoulos*, under revision, *Cognitive Science*). This finding has implications for effective donation behaviors; people who value humanitarianism over environmentalism are more likely to favor giving to charitable causes that benefit distant humans (Law, **Rottman**, & Gaesser, in preparation).

*Future research*: This strand of research, which I have developed entirely since coming to F&M, is the one that is currently most exciting to me. Thus, I plan to focus most heavily on this line of work in the upcoming years, and I aspire to eventually write a book on ascriptions of moral worth. I will soon begin investigating why some people value natural entities more than cultural artifacts while other people value cultural artifacts more than natural entities. At a broader level, I am also interested in conducting research to better understand why people believe tradeoffs to exist between valuing different ontological kinds. I have recently found evidence that many people conceptualize morality as a limited resource and that this mindset is associated with reduced levels of overall moral concern (**Rottman**, in preparation). In the near future, I aim to further unpack this finding with additional empirical studies and a substantial theoretical review article. Furthermore, although I have so far approached this strand of my research program by studying adults living in the United States, I plan to follow up on much of this research with cross-cultural investigations and studies of the development of these phenomena during childhood.

**Reshaping Moral Boundaries: Moralization and Value Change**

My ultimate goal in conducting basic research on moral boundaries is to inform practical solutions for expanding moral concern in ways that will improve the state of the world. Of course, this is feasible only insofar as moral values can be altered. Common sense tells us that morality is diverse in part because it

is pliable. Adults perceive children to be especially morally malleable, leading them to favor reprimanding children more frequently than fellow adults for identical moral transgressions (White, Schaller, Abraham*, & **Rottman**, in preparation). However, although children are often deluged with moralistic rebukes and storybooks that are designed to instill positive moral beliefs, developmental psychologists have historically ignored the effects of these socialization attempts and have instead focused their attention on autonomous moral reasoning (see **Rottman**, 2019, *Behavioral and Brain Sciences*; **Rottman** & Young, 2015, *The Moral Brain*). Thus, despite recent work demonstrating that learning from verbal assertions ("testimony") is a major source of conceptual development and knowledge acquisition in early childhood, much is unknown about the efficacy of testimony and other forms of social communication for influencing children's moral development. I have attempted to address this imbalance in the research literature by investigating the relevance of social communication for the acquisition and modification of moral beliefs.

My dissertation work established that children can rapidly acquire moral beliefs about novel, harmless actions upon exposure to a diverse array of morally relevant testimony (**Rottman** & Kelemen, 2012, *Cognition*; **Rottman**, Young, & Kelemen, 2017, *Emotion*). More recently, I have investigated whether testimony can similarly influence children's evaluations of novel social groups, thus contributing to an understanding of the roots of prejudice. The findings of this research showed that negatively valenced testimony can lead children to form negative evaluations of members of a fictional group, particularly when it is provided directly rather than overheard (Lane, Conder, & **Rottman**, 2020, *Child Development*).

Do different forms of social communication exert varying impacts on children's moral beliefs? To address this question, I studied how storybooks and testimony influence children's inclinations toward equality-based versus merit-based fairness. Across three experiments (the most ambitious and informative of which was designed and conducted wholly at F&M), I found that allegorical storybooks involving animal protagonists were ineffective in changing children's distributive justice preferences, while direct testimony was highly effective. However, when storybooks and testimony were closely matched and designed to facilitate transfer, such that each addressed a human situation resembling the distribution task, both were equally impactful and exerted effects that lasted for several weeks (**Rottman**, Zizik*, Minard*, Young, Blake, & Kelemen, provisionally accepted, *Cognition*). Contrary to my dissertation research, which indicated that appealing to principles produces stronger moralization than appealing to emotions, these studies did not uncover any differences in the relative efficacy of reasoned and emotional appeals.

I have also explored the effectiveness of different kinds of appeals in impacting adults' moral convictions. In one paper, emotional personal anecdotes were somewhat more effective than frames describing statistical trends in shifting people's beliefs about culture-war issues like fracking and transgender bathroom rights (Ciuk & **Rottman**, in press, *Political Communication*). In other research, I found evidence that "memes" designed to induce analogical reasoning about morally relevant similarities between dogs and pigs increased adults' moral valuation of pigs and led them to express stronger intentions toward vegetarianism, regardless of whether these memes contained disturbing or cute images (Horne, **Rottman**, & Lawrence*, under review, *Cognition*). However, effects were fragile in both of these papers, indicating that adults' moral convictions are much more difficult to alter than children's moral convictions.

***Future research***: As I continue to uncover new findings about the nature and development of moral thought, I plan to spend increasing amounts of energy turning these insights into interventions. I have collected pilot data demonstrating the effectiveness of an intervention designed to facilitate adults' open-minded consideration of disputed moral viewpoints by encouraging humility and elevating compassionate feelings toward dissimilar others (**Rottman**, Lynch*, Nadelhoffer, & Sinnott-Armstrong, n.d.), and I have begun applying for grants to replicate this on a larger scale. In addition, I hope to test the efficacy of interventions for reducing waste and fostering moral concerns about the effects of climate change.

## Additional Research

### Accounting for the Intuitive Allure of Teleological Explanations

My early work as a graduate student indicated that people have a robust tendency to favor purpose-based explanations over mechanistic explanations. Experimentally inhibiting reflective reasoning causes an increase in endorsements of false teleological statements, even among professional scientists (Kelemen, **Rottman**, & Seston, 2013, *Journal of Experimental Psychology: General*). This bias is likely connected to a default tendency to interpret actions as being performed intentionally (Rosset & **Rottman**, 2014, *Journal of Cognition and Culture*) and to a broader tendency toward "intuitive theism" (**Rottman** & Kelemen, 2012, *Science and the World's Religions*). I have also found evidence that a latent bias to favor teleological explanations is generalizable; it can be detected in China, despite its disparate theological traditions (**Rottman**, Zhu, Wang, Schillaci, Clark, & Kelemen, 2017, *Religion, Brain & Behavior*).

### Nurturing Strong Undergraduate Research

I am proud to have mentored many students in publishing research. To date, 37 undergraduates have worked in my lab. They have come from diverse backgrounds (19% Black or Latinx; 22% international; 81% women), two have earned the highest student award conferred by F&M (the Williamson Medal), and several have gone on to top Ph.D. programs in experimental psychology (e.g., NYU, UMass Amherst, Cornell). In addition to the 11 students who have earned co-authorship on papers described above, six students have conducted independent work that has been published or is being prepared for publication. One paper found that assessments of deserved punishment for harmful and impure acts are not affected by perpetrators' genetic or environmental backgrounds (Lynch*, Lane, Berryessa, & **Rottman**, 2019, *PLOS One*). Another student uncovered cross-cultural differences in beliefs about weapons, with guns and knives being considered less dangerous by Americans than by Western Europeans (Syropoulos*, Rivera-Rodriguez, Gómez, Baka, Cros, Martel, & **Rottman**, in press, *Peace and Conflict: Journal of Peace Psychology*), and he is finalizing another manuscript that presents a scale measuring personal feelings of safety (Syropoulos*, Leidner, Mercado, Li, Cros, Gómez, Baka, Checkroun, & **Rottman**, in preparation). Other senior theses that are *en route* to publication include investigations of children's attributions of free will to humans and robots (Flanagan*, **Rottman**, & Howard, under revision, *Cognitive Science*), adults' beliefs about the relevance of socioeconomic status for moral responsibilities to engage in sustainable behaviors (Lerner* & **Rottman**, in preparation), adults' moral judgments of the sexual assault of sex robots (Grigoreva* & **Rottman**, in preparation), and associations between friendship networks and patterns of gossip (Yucel, Sjobeck, Glass*, & **Rottman**, under revision, *Human Nature*).

## Summary

Since my arrival at Franklin & Marshall College in July 2015, I have established a fertile research program with the objective of describing and explaining the cartography and gerrymandering of various moral boundaries. I have heavily involved undergraduate researchers as collaborators. My rate of publication has substantially increased over the course of the past five years, and I expect that my productivity will continue to develop apace. In my future work, I plan to expand each of my four related strands of research, with a primary focus on studying attributions of moral worth. I will also increasingly test interventions for producing moral change. Finally, I look forward to advancing a new theoretical framework that aims to account for the broad range of novel findings that my research has unearthed.