



# The Visual Guide to Morality: Vision as an Integrative Analogy for Moral Experience, Variability and Mechanism

Chelsea Schein, Neil Hester and Kurt Gray\*

University of North Carolina at Chapel Hill

---

## Abstract

Analogies help organize, communicate and reveal scientific phenomena. Vision may be the best analogy for understanding moral judgment. Although moral psychology has long noted similarities between seeing and judging, we systematically review the “morality is like vision” analogy through three elements: experience, variability and mechanism. Both vision and morality are experienced as automatic, durable and objective. However, despite feelings of objectivity, both vision and morality show substantial variability across biology, culture and situation. The paradox of objective experience and cultural subjectivity is best understood through constructionism, as both vision and morality involve the flexible combination of more basic ingredients. Specifically, both vision and morality involve a mechanism that demonstrates Gestalt, combination and coherence. The “morality is like vision” analogy not only provides intuitive organization and compelling communication for moral psychology but also speaks to debates in the field, such as intuition versus reason, pluralism versus universalism and modularity versus constructionism.

---

“I know it when I see it.” – Supreme Court Justice Potter Stewart (*on identifying pornography; Jacobellis v. Ohio*, 1964)

Conversations about morality often reference vision, with laypersons and Supreme Court Justices alike “seeing” an action’s wickedness or righteousness. Similarities between morality and vision were first noted by Hume (1777) – who likened moral judgment to aesthetic judgments – and have been echoed by more contemporary scholars, who suggest that moral judgment is more about “seeing-that” than “reasoning-why” (Haidt, 2001; Wilson, 1997). Despite the general acknowledgement that morality is often experienced like vision, we suggest that this analogy is underappreciated and under-explored. Vision captures not only the experience of making moral judgments but also the variability and mechanism of these judgments. We suggest that vision provides an intuitive way to summarize and communicate moral psychology research and also offers perspectives on current debates in the field.

Analogies have long played a central role in the development of scientific theory and its dissemination (Glucksberg & Keysar, 1990). In psychology, prominent analogies include Wundt’s comparison of psychology to chemistry (Blumenthal, 1975) and Freud’s model of the unconscious as an iceberg. Within moral psychology, the mind has been analogized as a camera with easy automatic settings (i.e., emotion) and more difficult manual settings (i.e., cognition; Greene, Morelli, Lowenberg, Nystrom, & Cohen, 2008; Greene, 2014), and to an elephant (i.e., emotion) with a rider (i.e., cognition; Haidt, 2012) who erroneously believes herself to be in control.

While these analogies are intuitive, they apply to any dual-process account of judgment – whether moral or not – and capture only one aspect of moral judgment. We suggest that the

“morality is like vision” analogy is an improvement because it is both more comprehensive and more specific. It captures multiple elements of moral judgment and also applies more to moral judgment than to non-moral judgments. Admittedly, non-moral judgments do occasionally involve some likeness to vision (Kahneman & Tversky, 1977), but – as we will see – the sheer number and depth of similarities make the “morality is like vision” analogy particularly apt. We also acknowledge that morality is not literally the same as vision (but see Gantman & Van Bavel, 2015 for their connection), but there are remarkable resemblances between them.

In this paper, we review three broad elements of the “morality is like vision” analogy. In each case, we use visual images to illustrate similarities between moral judgment and visual perception. The first analogical element is *experience*, in which both vision and morality are experienced as automatic, durable and objective. This experience speaks to the very genesis of moral psychology and debates about intuition versus reason. The second analogical element is *variability*, in which both vision and morality vary across people – whether due to biology or culture – and across situations. This variability speaks to ongoing debates in moral psychology about pluralism versus universalism. The third analogical element is *mechanism*, in which both vision and morality are constructed from the interplay of lower-level inputs and higher-level meaning-making. This mechanism speaks to current debates in moral psychology about constructionism versus modularity.

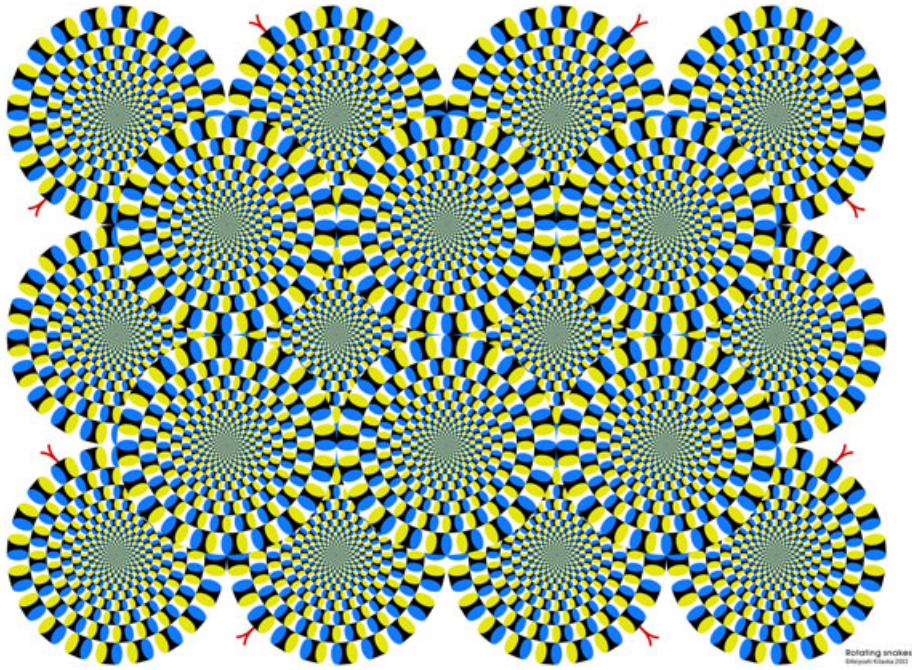
## Experience

Whether people are literally seeing or seeing immorality, their perceptions are *automatic, durable* and feel *objective*. They arise quickly, are not easily dispelled and feel like features of the external world – more so than non-moral judgments (Goodwin & Darley, 2008; Van Bavel, Packer, Haas, & Cunningham, 2012). Although these features of moral judgment have all been accepted by modern moral psychology, this was not always the case. Historically, scholars believed that moral judgment was a product of calculated reasoning that captured universal moral truth (Kohlberg, 1969). The “morality is like vision” analogy reinforces this progression of thought in moral psychology, and visual images provide a visceral way to understand moral experience.

### *Automatic*

In the Rotating Snakes image (Figure 1), the snakes seem to move without conscious consideration or effortful reasoning. Because of its evolutionary importance, the visual system has evolved to process the world automatically – often without the input of explicit thought (Fodor, 1985). Indeed, most species with vision lack the very capacity for explicit thought. Even in humans, our basic perceptions of the world occur rapidly, and there are many times when deliberative reasoning cannot interfere with vision (Gregory, 2015).

Only 20 years ago, claims of automaticity in moral judgment would have been met with suspicion. Moral judgment was long thought to be the province of conscious deliberation (Kohlberg, 1969). However, abundant evidence suggests that moral judgments occur automatically and rapidly (Haidt, 2001; Van Berkum, Holleman, Nieuwland, Otten, & Murre, 2009). When people are told about a case of murder or incest, extensive pondering is unnecessary in order to condemn it. Instead, morally relevant information (e.g., harm) is quickly and unconsciously processed – sometimes within milliseconds (Decety & Cacioppo, 2012; Gray, Schein, & Ward, 2014) – to yield moral judgments (Haidt, 2001; Gigerenzer, 2008; Sunstein, 2005; Sinnott-Armstrong, 2008). Of course, reasoning can still exert an effect on moral judgment (Paxton, Ungar, & Greene, 2012; Pizarro & Bloom, 2003), but typically serves to reinforce prior

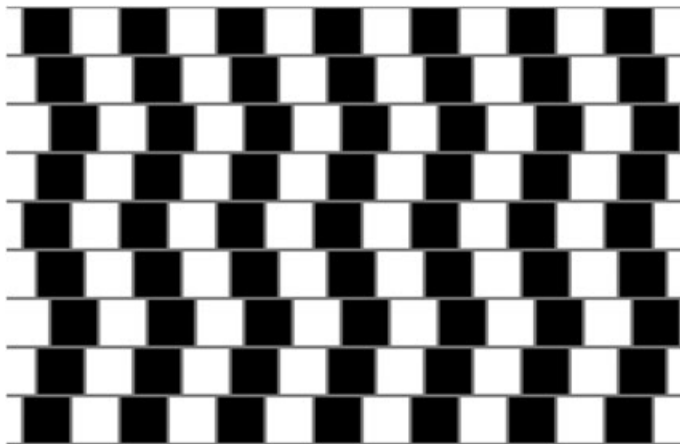


**Figure 1** Rotating snakes (Kitaoka, 2003).

intuitions (Haidt, 2001; Kruglanski & Gigerenzer, 2011; except perhaps within moral dilemmas, Greene, Sommerville, Nystrom, Darley, & Cohen, 2001).

### *Durable*

Vision is durable. In the Café Wall (Figure 2), you cannot help but see the grout lines as sloping, even if you “know” that they are parallel, and even if you try to reason otherwise. This is because vision involves robust inputs from low-level features and the rapid application of



**Figure 2** Café Walls (Gregory & Heard, 1979).

unconscious perceptual rules, which prevent the interference of conscious control. In the case of the Café Walls, the displaced alternate tiles causes brightness contrasts, which automatically lead to the appearance of wedges – and even if you know the explanation behind this illusion, it still persists (Gregory & Heard, 1979).

Morality is also durable, as moral judgments persist even in the face of contradictory evidence and social pressure (Ditto & Liu, 2011; Liu & Ditto, 2013; Skitka, Bauman, & Sargis, 2005). Like the Café Wall, even if you “know” that an immoral deed should be permissible, automatic processing compels you to see it as wrong. In one famous case, participants who received clear evidence that an instance of incest was harmless maintained their moral condemnation of the act (Haidt, 2001), likely because they persisted in viewing it as harmful (Jacobson, 2012; Royzman, Kim, & Leeman, 2015). Like morality, harm is perceived automatically and durably (Decety & Cacioppo, 2012; Gray et al., 2014), which means that people cannot help but see typically harmful deeds as immoral (even when they are argued to be harmless; Gray et al., 2014).

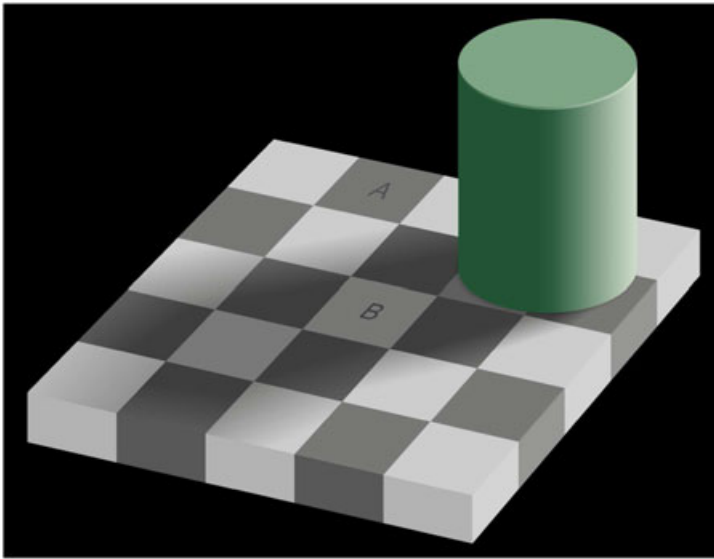
One may think that morality should be less durable than vision, as morality involves lower-level inputs that are less robust than in vision. However, this is offset by the emotional nature of moral judgments (Cameron, Lindquist, & Gray, 2015; Greene et al., 2001; Moll et al., 2002; Valdesolo & DeSteno, 2006). Moral judgments are inherently affective (Hume, 1777; Greene, 2013; Haidt, 2012), and affect occurs rapidly and is largely immune to deliberative conscious reasoning (Zajonc, 1980; Haidt, 2001). Consider the feelings that arise at the idea of an anesthetized tarantula – guaranteed safe! – being placed on your face. Even if you “know” your safety is guaranteed, it is hard to dispel your negative feelings (Gendler, 2008). Likewise, even if you know that a baby is fake (i.e., a doll), smacking its head against a table still feels wrong (Cushman, Gray, Gaffey, & Mendes, 2012). This durability of moral beliefs stands in contrast to historical views that moral judgment reflects reasoning. Instead, research reveals that moral judgment is often *resistant* to reason (Haidt, 2001; but see Paxton et al., 2012), a point emphasized by the “morality is like vision” analogy.

### *Objective*

When we see the world, it seems like we perceive it exactly as it is. When a lemon looks yellow, we think that it *is* yellow (Crane & French, 2015). When we look at the Checker Shadow image (Figure 3), we think that Box A seems darker than Box B because it *is* darker. But it isn’t – the shades of gray in Box A and Box B are identical. Though the reasons for this illusion are well-known (i.e., the principle of light constancy; Adelson, 2000), it nevertheless illustrates that people believe that their visual experiences are objective. This sense of objectivity has long roots, as ancient Greek philosophers also believed that the eyes directly perceived the external world (e.g. Democritus ca. 400 BCE; Euclid ca. 300 BCE; as cited by Wade, 2000).

Most people also strongly believe that their moral judgments reflect an objective moral reality (Goodwin & Darley, 2010; Skitka, Washburn, & Carsel, 2015). Of course, people are naïve realists in many domains of judgment (Ross & Ward, 1997), but this is especially prevalent in morality (Asch, 1952). People believe that moral judgments are more like facts than preferences (Goodwin & Darley, 2010), implying that they are universal and authority-independent (Shweder, Mahapatra, & Miller, 1987; Turiel, Killen, & Helwig, 1987; Skitka et al., 2015). This sense of objectivity can generate feelings of moral conviction that motivate people to act on behalf of their moral beliefs (Skitka & Bauman, 2008; Skitka et al., 2015; Young & Durwin, 2013).

Historically, many philosophers also believed that moral judgments (mostly their own) captured moral truth (moral realism; Sayre-McCord, 2015). Unfortunately, the existence of moral disagreement suggests these judgments are not objective (Joyce, 2015) – or at least that feelings of moral objectivity on their own are not a reliable guide to truth (Mackie, 1990). The



**Figure 3** Checker shadow illusion (Adelson, 1995).

disconnection between conviction (or confidence) and accuracy is evident in many domains of judgment (e.g., probability estimation; Tversky & Kahneman, 1974). However, the lack of clear accuracy criteria in morality exacerbates this problem within morality.

Challenges to the objectivity of vision – in the form of visual illusions – helped to spur on the modern field of vision science (Gregory, 2015; Wade, 2000), and the same is true of moral psychology. Research using moral dilemmas (i.e., moral “illusions”) helped reveal that moral judgments are not as objective or straightforward as they often seem (Greene et al., 2001) and shifted the focus of moral psychology from armchair philosophy to empiricism (Appiah, 2008). Challenges to both visual and moral objectivity were also motivated by a better understanding of the substantial variability within these domains. This variability is the second element captured by the “morality is like vision” analogy.

### Variability

Our moral judgments often feel universal, applying to all people and situations. In the Judeo-Christian tradition, ten judgments are so immutable as to be “written in stone,” and across religions and cultures, certain moral rules are indelibly recorded in holy books and books of law. Consider killing: taking another’s life always seems wrong. However, a closer examination raises doubts. What about when people are threatened (self-defense), or when the victim wants to die (euthanasia), or when someone has committed an irredeemable act (capital punishment)? Many people who endorse these forms of killing consider themselves moral, sometimes *because* of such endorsed killing.

There are not only some situations in which killing is kosher but also entire cultures who view certain types of killing as acceptable (e.g., patricide; Asch, 1952). For example, according to Greek myths, Spartans viewed the killing of weak or deformed infants as a moral imperative (Moseley, 1985), and even Americans view mass killing as heroic if done in the theater of war. These examples suggest that, despite our experience of universality, moral judgment is variable – and certainly seems to involve more *consequential* variability than non-moral judgment (Shweder & Haidt, 1994). Because of its roots in philosophy (e.g., Kohlberg, 1969; in Kant, 1780), moral psychology



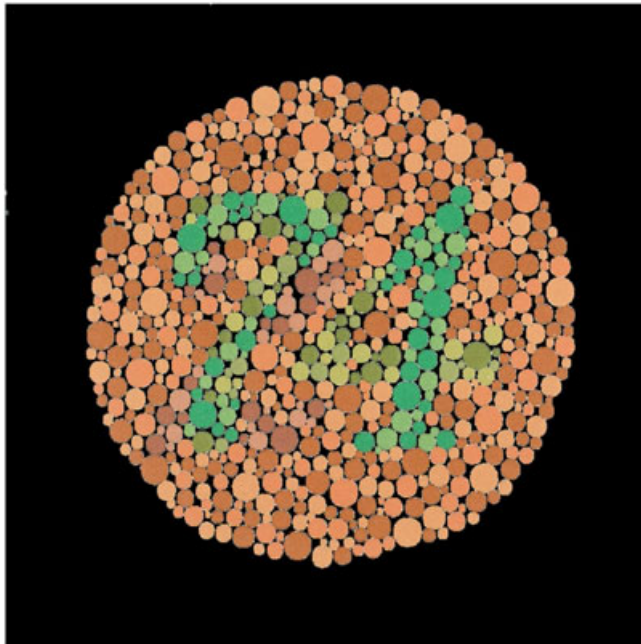
has often viewed this variability as superficial (Asch, 1952; Turiel et al., 1987). However, the “morality is like vision” analogy suggests that moral differences run deep.

Vision was also once thought to be universal, but scientists have demonstrated differences in visual perception. Although scholars have historically ignored variability (e.g., color-blindness was not discovered until the last years of the 18th century; Gregory, 2015), the field now accepts that vision is sensitive to the contexts of *biology*, *culture* and the *situation* (Segall, Campbell, & Herskovits, 1963; Stoerig, 1996; Gregory, 2015). People with different brains, upbringings and environments actually *see* the world differently; and along with others (Shweder & Haidt, 1994), we suggest that people with different backgrounds also see morality differently. However, we further suggest that these fundamental differences co-exist with one deep similarity – that all people use underlying criteria of intention and suffering (and their causal combination) to make moral judgments. Differences in morality therefore arise through the fundamental variability of perceptions of intention and suffering (Schein & Gray, 2015).

### *Biology*

Eye pigmentation deficits mean that close to 10% of males struggle to distinguish red from green (Gregory, 2015), and so cannot see the number “74” in Figure 4. Imagine trying to explain to one of these men what red looks like; chances are that you would have limited success because the qualia of perception depend upon first-hand feelings (Nagel, 1974), which arise in part from basic biological capacities (Stoerig, 1996). The same appears to be true in moral judgment.

It is estimated that around .6% of the US population (Lenzenweger, Lane, Loranger, & Kessler, 2007) and more than 35% of the US prison population (Black, Gunter, Loveless, Allen, & Sieleni, 2010) are psychopaths (or more accurately, have antisocial personality disorder). Psychopathy is a personality disorder that prevents people from intuitively understanding morality (Anderson, Barrash, Bechara, & Tranel, 2006; Barrash, Tranel, & Anderson, 2000; Blair, 2007),



**Figure 4** A red–green color blindness test item, in color and grayscale (Ishihara, 1972).

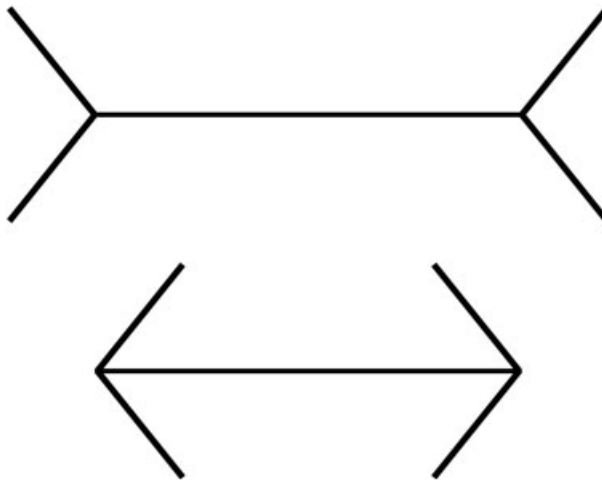
because they fail to react emotionally when others suffer (Blair, 2005; Mahmut, Homewood, & Stevenson, 2008; Marsh & Blair, 2008; Young, Koenigs, Kruepke, & Newman, 2012). Those with psychopathy are not only more willing to harm others (Bartels & Pizarro, 2011; Glenn, Iyer, Graham, Koleva, & Haidt, 2009; Gray, Jenkins, Heberlein, & Wegner, 2011; Hare, 1998) but also have difficulty even recognizing facial distress cues (Marsh et al., 2008; 2011), further explaining their aberrant moral judgments.

Psychopathy is not the only disorder linked to aberrant moral judgment. Autism is a congenital inability to understand the minds of others – not in terms of suffering but in terms of intention (Baron-Cohen, Leslie, & Frith, 1985; Gray et al., 2011; Lombardo, Chakrabarti, Bullmore, & Baron-Cohen, 2011; Senju, Southgate, White, & Frith, 2009). Accordingly, autism is associated with abnormal judgments of accidental versus intentional wrongs (Moran et al., 2011).

Both those with psychopathy and autism recognize the theoretical importance of morality and its precursors (i.e., intention and suffering; Cima, Tonnaer, & Hauser, 2010; Leslie, Mallon, & DiCorcia, 2006) – just as those with colorblindness acknowledge the theoretical importance of red and green. However, like colorblind individuals faced with red and green, psychopaths and autistic individuals lack intuitive experience when faced with suffering and intention: “they know the words, but not the music” (Blair et al., 2006; Grant, Boucher, Riggs, & Grayson, 2005; Johns & Quay, 1962). This dissociation not only emphasizes the intuitive nature of morality but also highlights how first-hand experience – what one can actually see – drives morality.

### *Cultural*

The top line of the Müller-Lyer illusion (Figure 5) looks longer than the bottom to Westerners, but not to Congolese hunter-gatherers (Segall et al., 1963). The difference arises in part because outward and inward angles are cues to depth in developed environments (e.g., urban areas with rectangular houses), but not in less developed environments (e.g., rural areas with rounded huts; Ahluwalia, 1978; Pedersen & Wheeler, 1983; Rivers, 1905; Segall et al., 1963). This illusion illustrates that visual perception is shaped not only by innate biological capacities but also by the environment. The visual scenes people see every day – especially during development (Hubel &



**Figure 5** The Müller-Lyer illusion (Müller-Lyer, 1889).

Wiesel, 1970) – dictate the very features that people can see. Likewise, people’s moral environment – their culture – dictates the features of the moral world that they can see.

The field of moral psychology once downplayed cultural differences in morality (Kohlberg, 1969), but anthropological accounts revealed undeniable pluralism (Shweder et al., 1987). For example, Oriya Brahmans, a high Hindu caste, morally condemn acts largely seen as benign in the United States, such as the eldest son eating chicken after his father dies (Shweder et al., 1987). Not only do these Brahmans see immorality behind these actions but they also report doing so because of perceived harm: eating chicken interferes with processing the father’s “death pollution,” condemning his soul to eternal perdition (Shweder, 2012).

It can be difficult for Westerners to appreciate these judgments (Henrich, Heine, & Norenzayan, 2010), but similar moral gaps occur even within America, as liberals and conservatives disagree about the importance of chastity (Haidt, 2012) and social order (Janoff-Bulman & Carnes, 2013). Consider the case of gay marriage: whereas liberals see as an expression of love, some conservatives see moral turpitude and irreparable harm to society (Crawford, Inbar, & Maloney, 2014; Schein, Ritter, & Gray, forthcoming).

Even in variability, however, there can be unity, as morality in every culture serves a similar purpose: to mitigate internal and external cultural threats. At the minimum, all cultures must suppress selfish individual impulses for the common good (within-group cooperation; Axelrod & Hamilton, 1981; Ridley, 1998), while guarding against intergroup threats of annihilation or subjugation by other cultures (intergroup competition; Bowles, 2006), as well as environmental threats like disease, food poisoning, famine and natural disasters (Chapman & Anderson, 2013).

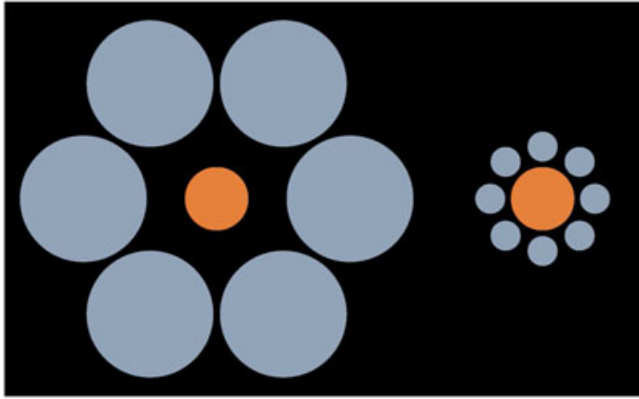
As cultures experience different levels and specific sources of threat, they have evolved specific moral prohibitions. Cultures that face starvation moralize equality in resource distribution (e.g., hunter-gatherers; Woodburn, 1982) and cultures that face high pathogen infection risk (e.g., high prevalence of sexually transmitted infections) have more restrictive sexual mores (Harrington & Gelfand, 2014; van Leeuwen, Park, Koenig, & Graham, 2012). Though this variation was once neglected, recent work in moral psychology has focused upon it, offering a variety of moral taxonomies (Rai & Fiske, 2011), including moral foundations theory (Graham et al., 2013) and the model of moral motives (Janoff-Bulman & Carnes, 2013).

Importantly, these culture-specific experiences of threat influence individuals’ moral intuitions by shaping their perceptions of harm (Schein & Gray, 2015). These perceived threats often reflect actual threats, but need not, which leaves room for even more moral variation. For example, rural Americans are more likely to die from drunk drivers than from Muslim jihadists, but many *perceive* the latter as more dangerous and therefore also more immoral. Just as with vision, two people can look at the exact same thing and see its morality differently. And just as with the Muller-Lyer illusion, even knowing the “rational facts” often fail to dispel its lasting power.

### *Situations*

The two interior circles in Figure 6 are identical in size but look different because our visual system automatically uses surrounding cues when forming perceptions. The impact of context in vision is pervasive, occurring largely outside of our awareness, and the same is true in moral judgment. For example, changing the temporal order of two moral scenarios can substantially change how people judge them (Laham, Alter, & Goodwin, 2009), even when those people are philosophers (Schwitzgebel & Cushman, 2012). Although sensitivity to these cues leads to “faulty” perceptions in vision (Luckiesh, 1922) and morality (i.e., judgments that are normatively incorrect; Kumar & Campbell, 2012), there is no doubt that the situation matters.





**Figure 6** Ebbinghaus illusion (Ebbinghaus, 1902).

Framing effects offer one clear example of the situation's influence on moral judgments. Participants judge selfish behaviors to be more permissible in an economic game labeled the "wall street game" than in the same game labeled the "community game" (Lieberman, Samuels, & Ross, 2004), and civilian casualties seem less offensive when they are "collateral damage" rather than "the murder of children" (Conway-Lanz, 2006). Political groups jockey for the moral high-ground by framing the same issue with positive terms such as "pro-life" and "pro-choice" (Ball-Rokeach, Power, Guthrie, & Waring, 1990; Rohlinger, 2002). As with vision, these frames work at such a deep level that we feel their impact even if we consciously recognize that someone is trying to "spin" this issue.

Moral perceptions also change based on temporary mood. Incidental inductions of disgust from dirty desks or fart spray have been associated with harsher moral judgments (Schnall, Haidt, Clore, & Jordan, 2008; Van Dillen, van der Wal, & van den Bos, 2012; but see Landy & Goodwin, 2015), likely because of the negative affect (Valdesolo & DeSteno, 2006) and perceived harm (Gray & Schein, forthcoming; Schein et al., forthcoming) inherent in disgust. Whereas moral psychologists once asked *if* emotions play a role in moral cognitions, they now ask *how* emotions play a role. Some have hypothesized special effects of specific emotions (Rozin, Lowery, Imada, & Haidt, 1999), but more recent work reveals more global linkages (Cameron et al., 2015).

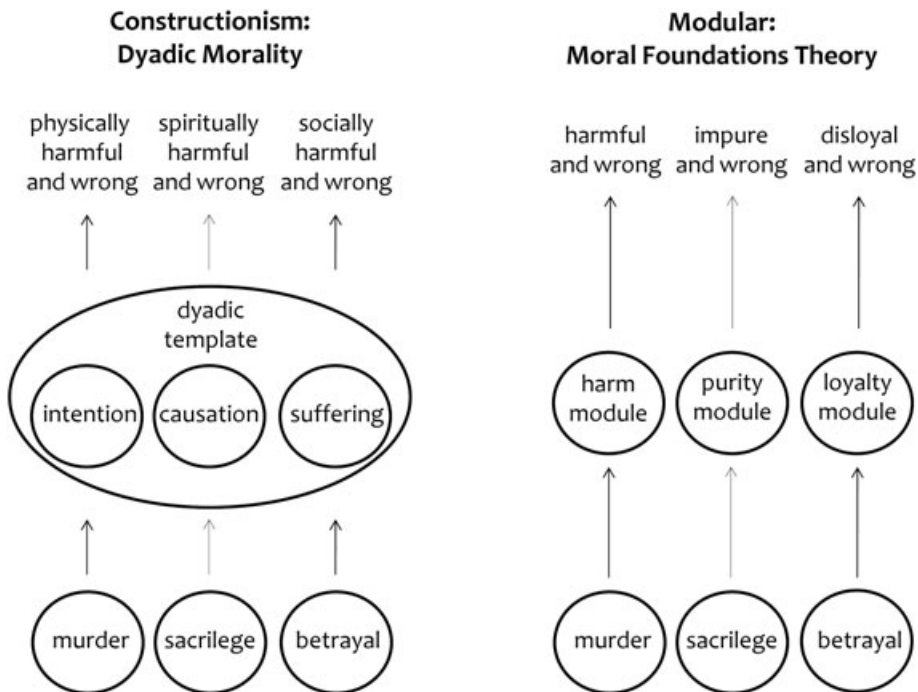
Situational variability is perhaps best illustrated by work on moral dilemmas. These scenarios ask if killing one person to save five people is permissible and elicit vastly different intuitions depending upon how the one person is killed. It is more morally permissible to harm to someone using indirect rather than direct contact (Cushman, Young, & Hauser, 2006; Greene et al., 2009), by inaction rather than action (Cushman et al., 2006; DeScioli, Christner, & Kurzban, 2011; Spranca, Minsk, & Baron, 1991), unintentionally rather than intentionally (Cushman et al., 2006; Gray & Wegner, 2008; Gray, Young, & Waytz, 2012) and with a slow rather than a quick decision (Critcher, Inbar, & Pizarro, 2012; Tetlock, Kristel, Elson, Green, & Lerner, 2000).

Even for cases that seem cut-and-dry, research reveals substantial variability in morality and vision due to different biological factors, cultures or situations. In both cases, this variability can seem paradoxical because it conflicts with our sense that what we see is objective. This paradox is resolved by the fact that our perceptions are not direct readouts of the visual and moral world, but instead constructed from the interplay of domain-general inputs and dynamic conceptualization (Van Bavel, FeldmanHall, & Mende-Siedlecki, 2015). Instead of direct reflections of truth, these perceptions arise from the mechanism of psychological construction.

## Mechanism

It's clear that moral judgments vary and yet feel objective, but how exactly are moral judgments *made*? In contrast to experience and variability, questions of moral mechanism are more opaque – and are therefore more debated. In moral psychology (as in emotion; Barrett, 2013), there are two broad positions about the nature of cognition – modularity and constructionism. Modularity suggests that moral judgment involves a number of innate and fundamentally distinct mechanisms, each of which map directly onto a subset moral judgments in a one-to-one fashion (Graham et al., 2013). For example, the modular theory of moral foundations theory suggests the existence of a moral “purity” module, uniquely sensitive to violations of sex and religion as inputs, which in turn directly outputs an isomorphic moral experience of purity.

Constructionism suggests that moral judgment involves only one mechanism, but this mechanism is dynamic and integrative, combining a common set of basic ingredients into an emergent whole (Cameron et al., 2015; Lindquist, 2013). Although these basic ingredients (i.e., perceived intention, causation and suffering) can be somewhat modular (Hamlin, Wynn, & Bloom, 2007; Leslie & Keeble, 1987; Woodward, 1998), there is not a one-to-one map between these low-level inputs and ultimate moral judgment. Instead, constructionism suggests a few-to-many relationship, in which these few basic ingredients are combined differently – based on context – into descriptively diverse forms. For example, the theory of dyadic morality suggests that the elements of harm can combine to yield moral variability that spans physical harm to sexual sin (Schein & Gray, 2015; see Figure 7).



**Figure 7** Two different models of moral cognition. In constructionist Dyadic Morality, acts are compared to a dyadic template. More harmful acts (i.e., more intention, causation and suffering) generate more robust moral judgment; however, context and culture can change understandings of what can suffer, how acts can be caused and who can intend. In modular Moral Foundations Theory, an act activates a specific moral module, which leads directly to a corresponding moral judgment.



**Figure 8** This image is a collection of black blobs, but we see a panda.

The “morality is like vision” analogy helps to resolve the modularity versus constructionism debates. Like moral psychology, vision once solely emphasized modularity (Wade, 2000), but now embraces the construction of visual experience (Gregory, 1997). Nonetheless, these models still provides a place for some kind of modularity, as lower-level inputs provide the innate ingredients out of which the whole emerges (Gregory, 2015). We explore this synthesis through the lens of *Gestalt*, *combination* and *coherence* (Koffka, 1935; Wagemans et al., 2012).<sup>1</sup>

### *Gestalt*

When broken down into its basic parts, a visual image is merely a collection of features: color, curves, depth, motion, orientation and edges (Treisman & Gelade, 1980). Each of these low-level elements is detected by dedicated cells whose inputs and outputs are fixed (Gregory, 2015). However, despite the modularity of these very basic elements, there is an intermediate mechanism of visual cognition that combines these elements to give rise to an emergent whole. This whole is more than the sum of its parts (Koffka, 1935) and has been called the Gestalt, the German word for “shape or form.” The visual Gestalt means that, when we look at the image in Figure 8, we do not see the separate inputs but instead a single form – a panda. A Gestalt exists also in moral judgment, with lower-level inputs combined into a coherent whole.

Moral psychology has identified many determinants of moral judgment, including intention and outcome (Cushman, 2008; Knobe, 2003), causation (Alicke, 1992, 2000), skill (Malle, 2006), affect (Greene, 2007) and norms (Nichols, 2002; Royzman, Leeman, & Baron, 2009; Monroe, Guglielmo, & Malle, 2012). Each of these inputs could be considered modular (at least by some; Sperber, 2004), or at least innate (Govrin, 2014). An appreciation of intention emerges

<sup>1</sup>Other models of feature integration could also be fruitfully applied (e.g., Treisman & Gelade, 1980).

early in life (Hamlin & Wynn, 2011), as does one of causation (Leslie & Keeble, 1987) and suffering (i.e., empathy; Vaish, Carpenter, & Tomasello, 2009).

However, these elements are not perceived in isolation, but instead as an overarching moral whole. Consider your judgment of “child abuse.” Although there are many factors involved in this act – an intention to injure, the outcome of suffering, clear causation between abuser and abusee, the ability of the abuser to perpetrate harm, negative feelings and the violation of a norm – all these cluster together into a coherent moral judgment. This is the principle of *emergence*, in which both visual and moral perceptions seem to be more than the sum of their parts. An example of such an emergent whole in physical science is the property of “wetness” that emerges from the combination of hydrogen and oxygen (neither of which are wet). In moral cognition, we suggest that this emergent whole of “wrongness” stems from the *dyad*.

Dyadic morality suggests that people have a cognitive moral template involving the combination of two perceived minds, an intentional agent causing harm to a suffering patient (Gray, Waytz, & Young, 2012). This template has the components of intention, causation and suffering, but these components combine to give an emergent sense of harm – a specific morally relevant kind of harm – that seems as coherent as the panda in Figure 8. Dyadic morality thus suggests that the process of moral judgment involves evaluating whether an act matches a Gestalt of dyadic harm. This harm is most canonically direct physical harm, but culture and context facilitate more diverse forms – or combinations – of harm that give rise to moral variability.

### *Combination*

Visual cognition is specialized at the lower-level, but not the higher-level. There is not a specific visual module for every type of visual experience – for trees, and cats, and stars, and houses, and oceans. Even when studies initially find relative specialization (e.g., faces; Kanwisher, McDermott, & Chun, 1997), subsequent research reveals more domain-general processes (Gauthier, Skudlarski, Gore, & Anderson, 2000).<sup>2</sup> Instead, visual experience emerges from the *combination* of a small number of lower-level elements. One might argue that emergence is a necessary process: there are literally millions of visual scenes, and the mind cannot come innately prepared for each. Instead, constructionism suggests that the mind uses conceptual knowledge to transform specific combinations into visual content. Consider the Dalmatian in Figure 9. Like the panda in Figure 8, this image consists only of black and white blobs, but a rich (and very different) perception arises from their combination.

In morality, rich diversity can arise with only a small combination of features. Dyadic morality suggests that different ways of causing suffering (emotional, physical and economic) to different patients (e.g., children, the self and society) can give rise to different experiences of immorality, such as child abuse, drug addiction and tax fraud. As an analogy for the generative power of constructionism, consider origami. A single sheet of origami can be folded into many shapes – a box, a swan or even a Triceratops – but all are ultimately constructed from various combinations of paper folds. With moral judgments, various combinations of harm can give rise to diverse “shapes” of morality.

The constructionism of dyadic morality means that the various taxonomies of cultural variability we mentioned (e.g., Graham et al., 2013) can all be fundamentally understood as forms of harm depending on who is suffering, and how exactly they are being harmed (Schein & Gray, 2015). Dyadic morality also facilitates biological variability through people’s innate (in) sensitivity to intention (autism; Moran et al., 2011) or suffering (psychopathy; Cima et al.,

<sup>2</sup>The Fusiform Face Area (FFA) was once thought to specially recognize faces (Kanwisher, McDermott, & Chun, 1997), but research has revealed that it might just process expert things. In car experts, it also lights up (Gauthier, Skudlarski, Gore, & Anderson, 2000).



**Figure 9** Camouflaged Dalmatian. Photographer: Ronald C James (as appeared in Gregory, 2015).

2010) and situational variability through the relative salience of intention, causation and suffering in acts (as revealed by moral dilemmas; Cushman et al., 2006; Thomson, 1976).

Also supporting the constructed combinations of dyadic morality is work showing that processes of moral judgment are not consistent with theories that posit a number of discrete modules (Haidt & Joseph, 2007). Although different moral concerns (e.g., harm vs. purity) may seem intuitively different, they are not empirically distinct. Harm and purity are correlated at extremely high levels ( $r = .87$ ; Gray & Keeney, 2015b), and – strikingly – “harm violations” such as murder as seen to be *more* “impure” than “impurity violations” such as bestiality (Gray & Keeney, 2015b).

Evidence against different moral “modules” is also revealed by the lack of specificity in cognitive operations and links to emotions. Ostensible cognitive differences between harm and purity scenarios stem not from moral content – i.e., harm versus purity (Clifford, Iyengar, Cabeza, & Sinnott-Armstrong, 2015; Young & Saxe, 2011) – but instead of confounds: purity scenarios such as bestiality are weirder and less severe than murder scenarios such as murder (Gray & Keeney, 2015a, 2015b). Specific links between moral content and emotions – i.e., disgust and purity – are also not distinct (Cameron et al., 2015), but are instead rooted in perceived harm, consistent with dyadic morality (Gray & Schein, forthcoming; Schein et al., forthcoming). The argument for modular morality also fails to capture another important feature of our moral world – moral coherence.

### *Coherence*

Visual experience depends on inputs from low-level features such as the color and layout of blobs, but it is also shaped by conceptualization. Once you know that Figure 9 is a Dalmatian, not only can you not help but see the Dalmatian but your visual system also transforms other

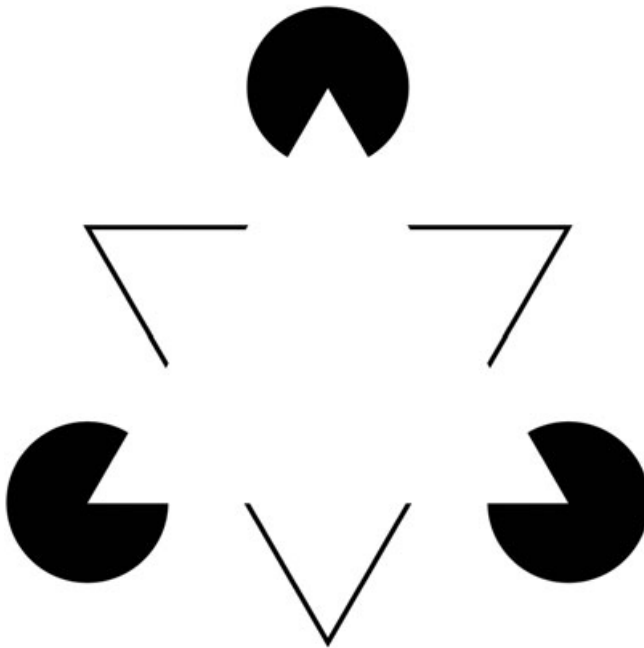


elements to be consistent with your understanding. Suddenly, the image has depth, and you might even see a shadow. In other words, vision involves coherence in which conceptual knowledge shapes our processing of lower-level inputs. Sometimes, this coherence process even leads to the perception of fictional objects such as the white triangle in Figure 10.

Moral judgments also demonstrate coherence, in which lower-level features are shaped by our top-down understanding (Clark, Chen, & Ditto, 2015; DeScioli, Gilbert, & Kurzban, 2012; Gray et al., 2014). Specifically, once a moral judgment is formed, feedback processes cause coherence within all elements of a dyadic template, a process we have labeled *dyadic completion* (Gray, 2012; Gray et al., 2014). In other words, if we believe that an act is wrong, we will then perceive intention, causation and suffering within that act. Dyadic completion is facilitated by the ambiguous nature of each of these elements. Intention and suffering involve perceiving other minds, which are ultimately inaccessible (Waytz, Gray, Epley, & Wegner, 2010), and causation can only be inferred from the coincidence of actions (Hume, 1740).

There are three kinds of dyadic completion. In *agentic dyadic completion*, people perceive an intentional agent when suffering victims are present, blaming supernatural beings (Gall, 2004; Gray & Wegner, 2010), animals (Oldridge, 2004) and other people (Knobe, 2003). In *causal dyadic completion*, people perceive a causal link between the mere intention to harm someone and their suffering (e.g., through witchcraft; Pronin, Wegner, McCarthy, & Rodriguez, 2006) and overestimate the causal role played by immoral agents in negative outcomes (Alicke, 2000). Finally, in *patientic dyadic completion*, people automatically perceive victims in immorality, even if they are ostensibly harmless – such as when religious blasphemy and sexual deviance are seen to result in suffering children (DeScioli et al., 2012; Gray et al., 2014; Schein, Goranson, & Gray, 2015).

Ultimately, this combination of bottom-up inputs and top-down inferences creates a feedback loop in which things seem harmful, then wrong, then even more harmful, then even more wrong (Figure 11). For example, a slight inclination to view pornography as harmful, can—over



**Figure 10** Kanizsa Triangle (Kanizsa, 1975).

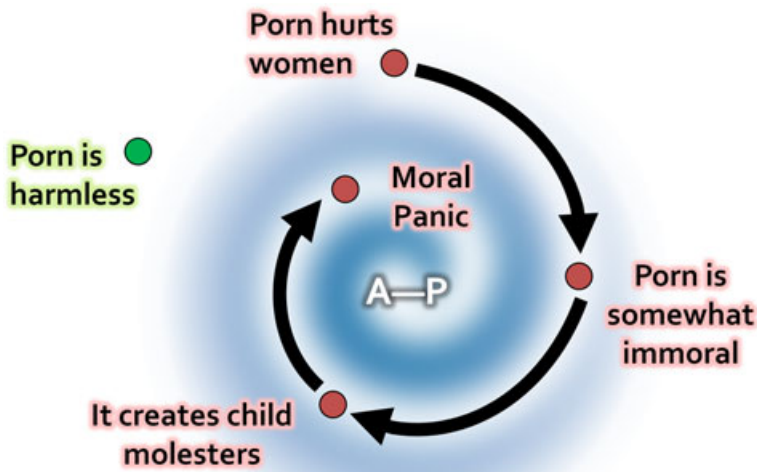
time—initiate a feedback cycle that leads to moral panic (Haslam, 2016; Schein & Gray, 2016). This feedback loop can thus exacerbate small moral differences, leading to fundamentally different perceptions. As with vision, what we see initially may be mostly automatic, but subsequent cognition can shape our perceptions (Barrett & Bar, 2009).

## General Discussion

Morality has been likened to many things, but we suggest that the best analogy is to vision. As many have suggested (Greene, 2013; Haidt, 2001), the “morality is like vision” analogy helps capture the experience of moral judgments as *automatic*. But it does even more. It also captures the experience of moral judgments as *durable* and *objective*. Beyond experience, morality is like vision because both show variability across *biology*, *culture* and the *situation*. Overlaps between seeing and judging also occur for mechanism, in terms of *Gestalt*, *combination* and *coherence*.

Although both morality and vision involve a vivid first-hand experience, we recognize that people do not literally “see” moral judgments and that any analogy has limitations. However, the sheer overlap between morality and vision make it an especially comprehensive analogy. The “morality is like vision” analogy is also relatively specific, applying more clearly and comprehensively to moral judgments than to general decision-making. Compared with non-moral judgments (e.g., probability judgment; Tversky & Kahneman, 1974), morality is more durable and objective-seeming, demonstrates more meaningful variability and involves a greater role for construction. Rational arguments about morality (but not probability judgment) are unconvincing, variability in morality (but not probability judgments) persists despite formal education and morality (but not probability judgments) involves emotion, which is itself constructed.

Finally, this analogy also has lessons for the field, as vision has already settled many of the issues that moral psychological currently debates, such as intuition versus reason, pluralism versus universalism and modularity versus construction. In short, both vision and morality are generally intuitive and durable (Haidt, 2001; Sunstein, 2005), while allowing some limited role for



**Figure 11** The Dyadic Loop. The dyadic moral template (A-P) exerts a gravitational force (Schein & Gray, 2014), pulling acts toward it with reciprocal perceptions of harm and immorality. Over time, this can lead to substantially different moral perceptions of issues (e.g., pornography).

reasoning. Both vision and morality show variability (Segall et al., 1963; Shweder, 2012), but such variability is predictable given the nature of the environment and potential threats. Both vision and morality are also constructed, such that low-level ingredients combine to yield an emergent whole that varies by context and expectation. These low-level inputs may be modular, but the actual mechanisms of moral and visual perception are flexible and take on different shapes within different contexts.

Perhaps the most important lesson offered by the “morality is like vision” analogy is for understanding moral conflict. The reason that people in moral debates see their opponents as monsters – rather than as simply mistaken – is because the *experience* of moral judgments automatically produces strong feelings of objectivity. But, morality is not objective, and *variability* in moral judgments – especially across culture – makes moral conflicts inevitable. The potential solution lies in the *mechanism* of morality, in which diverse moral positions can be understood as varieties of perceived harm. If we can reveal to people that their moral opponents have the same moral sense, but simply see it from a different perspective, we might be able to increase moral tolerance. In other words, understanding how morality is like vision might – to draw on the analogy one last time – help people finally see eye-to-eye.

### Note

\* Correspondence: University of North Carolina at Chapel Hill, Chapel Hill, NC, USA. Email: kurtjgray@gmail.com

## References

- Adelson, E. H. (2000). Lightness perception and lightness illusions. In M. Gazzaniga, *The New Cognitive Neurosciences* 2nd ed., Vol. **339**, (pp. 339–351). Cambridge, MA: MIT Press.
- Ahluwalia, A. (1978). An intra-cultural investigation of susceptibility to “perspective” and “non-perspective” spatial illusions. *British Journal of Psychology*, **69**(2), 233–241.
- Alicke, M. D. (1992). Culpable causation. *Journal of Personality and Social Psychology*, **63**(3), 368–378.
- Alicke, M. D. (2000). Culpable control and the psychology of blame. *Psychological Bulletin*, **126**(4), 556–574.
- Anderson, S. W., Barrash, J., Bechara, A., & Tranel, D. (2006). Impairments of emotion and real-world complex behavior following childhood- or adult-onset damage to ventromedial prefrontal cortex. *Journal of the International Neuropsychological Society*, **12**(02), 224–235.
- Appiah, A. (2008). *Experiments in Ethics*. Cambridge, Mass.: Harvard University Press.
- Asch, S. E. (1952). *Social Psychology* (1st ed.). Englewood Cliffs, N.J.: Prentice-Hall.
- Axelrod, R., & Hamilton, W. D. (1981). The evolution of cooperation. *Science*, **211**(4489), 1390–1396.
- Ball-Rokeach, S. J., Power, G. J., Guthrie, K. K., & Waring, H. R. (1990). Value-framing abortion in the United States: An application of media system dependency theory. *International Journal of Public Opinion Research*, **2**(3), 249–273.
- Baron-Cohen, S., Leslie, A. M., & Frith, U. (1985). Does the autistic child have a “theory of mind”? *Cognition*, **21**(1), 37–46.
- Barrash, J., Tranel, D., & Anderson, S. W. (2000). Acquired personality disturbances associated with bilateral damage to the ventromedial prefrontal region. *Developmental Neuropsychology*, **18**(3), 355–381.
- Barrett, L. F. (2013). Psychological Construction: The Darwinian approach to the science of emotion. *Emotion Review*, **5**(4), 379–389.
- Barrett, L. F., & Bar, M. (2009). See it with feeling: Affective predictions during object perception. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, **364**(1521), 1325–1334.
- Bartels, D. M., & Pizarro, D. A. (2011). The mismeasurement of morals: Antisocial personality traits predict utilitarian responses to moral dilemmas. *Cognition*, **121**, 154–161.
- Black, D. W., Gunter, T., Loveless, P., Allen, J., & Sieleni, B. (2010). Antisocial personality disorder in incarcerated offenders: Psychiatric comorbidity and quality of life. *Annals of Clinical Psychiatry*, **22**(2), 113–20.
- Blair, K. S., Richell, R. A., Mitchell, D. G. V., Leonard, A., Morton, J., & Blair, R. J. R. (2006). They know the words, but not the music: Affective and semantic priming in individuals with psychopathy. *Biological Psychology*, **73**(2), 114–123.
- Blair, R. J. R. (2005). Responding to the emotions of others: Dissociating forms of empathy through the study of typical and psychiatric populations. *Consciousness and Cognition*, **14**(4), 698–718.

- Blair, R. J. R. (2007). The amygdala and ventromedial prefrontal cortex in morality and psychopathy. *Trends in Cognitive Sciences*, **11**(9), 387–392.
- Blumenthal, A. L. (1975). A reappraisal of Wilhelm Wundt. *American Psychologist*, **30**(11), 1081–1088.
- Bowles, S. (2006). Group competition, reproductive leveling, and the evolution of human altruism. *Science*, **314**(5805), 1569–1572.
- Cameron, C. D., Lindquist, K. A., & Gray, K. (2015). A constructionist review of morality and emotions: No evidence for specific links between moral content and discrete emotions. *Personality and Social Psychology Review*. doi: 10.1177/1088868314566683
- Chapman, H. A., & Anderson, A. K. (2013). Things rank and gross in nature: A review and synthesis of moral disgust. *Psychological Bulletin*, **139**(2), 300–327.
- Cima, M., Tonnaer, F., & Hauser, M. D. (2010). Psychopaths know right from wrong but don't care. *Social Cognitive and Affective Neuroscience*, **5**(1), 59–67.
- Clark, C. J., Chen, E. E., & Ditto, P. H. (2015). Moral coherence processes: Constructing culpability and consequences. *Current Opinion in Psychology*, **6**, 123–128.
- Clifford, S., Iyengar, V., Cabeza, R., & Sinnott-Armstrong, W. (2015). Moral foundations vignettes: A standardized stimulus database of scenarios based on moral foundations theory. *Behavior Research Methods*, **47**(4), 1–21. doi: 10.3758/s13428-014-0551-2
- Conway-Lanz, S. (2006). *Collateral Damage: Americans, Noncombatant Immunity, and Atrocity after World War II*. New York: Routledge.
- Crane, T., & French, C. (2015). The problem of perception. In E. N. Zalta, *The Stanford Encyclopedia of Philosophy* (Winter 2015). Retrieved December 27, 2015, from <http://plato.stanford.edu/archives/win2015/entries/perception-problem/>
- Crawford, J. T., Inbar, Y., & Maloney, V. (2014). Disgust sensitivity selectively predicts attitudes toward groups that threaten (or uphold) traditional sexual morality. *Personality and Individual Differences*, **70**, 218–223.
- Critcher, C. R., Inbar, Y., & Pizarro, D. A. (2012). How quick decisions illuminate moral character. *Social Psychological and Personality Science*, **4**(3), 308–315.
- Cushman, F. (2008). Crime and punishment: Distinguishing the roles of causal and intentional analyses in moral judgment. *Cognition*, **108**(2), 353–380.
- Cushman, F., Gray, K., Gaffey, A., & Mendes, W. B. (2012). Simulating murder: The aversion to harmful action. *Emotion*, **12**(1), 2–7.
- Cushman, F., Young, L., & Hauser, M. (2006). The role of conscious reasoning and intuition in moral judgment: Testing three principles of harm. *Psychological Science*, **17**(12), 1082–1089.
- Decety, J., & Cacioppo, S. (2012). The speed of morality: A high-density electrical neuroimaging study. *Journal of Neurophysiology*, **108**(11), 3068–3072.
- DeScioli, P., Christner, J., & Kurzban, R. (2011). The omission strategy. *Psychological Science*, **22**(4), 442–446.
- DeScioli, P., Gilbert, S., & Kurzban, R. (2012). Indelible victims and persistent punishers in moral cognition. *Psychological Inquiry*, **23**(2), 143–149.
- Ditto, P. H., & Liu, B. (2011). Deontological dissonance and the consequentialist crutch. In M. Mikulincer & P. R. Shaver (Eds.), *The social psychology of morality: Exploring the causes of good and evil* (pp. 51–70). Washington, DC: American Psychological Association.
- Ebbinghaus, H. (1902). *Grundzüge der psychologie* (Vol. 1). Leipzig: Verlag von Veit & Comp. Retrieved January 12, 2016.
- Fodor, J. A. (1985). Precis of the modularity of mind. *Behavioral and Brain Sciences*, **8**(01), 1–5.
- Gall, T. L. (2004). Relationship with God and the quality of life of prostate cancer survivors. *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care & Rehabilitation*, **13**(8), 1357–1368.
- Gantman, A. P., & Van Bavel, J. J. (2015). Moral perception. *Trends in Cognitive Sciences*, **19**(11), 631–633.
- Gauthier, I., Skudlarski, P., Gore, J. C., & Anderson, A. W. (2000). Expertise for cars and birds recruits brain areas involved in face recognition. *Nature Neuroscience*, **3**(2), 191–197.
- Gendler, T. S. (2008). Alief and belief. *Journal of Philosophy*, **105**(10), 634–663.
- Gigerenzer, G. (2008). Moral intuition = fast and frugal heuristics? In *Moral Psychology, Vol 2: The Cognitive Science of Morality: Intuition and Diversity* (pp. 1–26). Cambridge, MA, US: MIT Press.
- Glenn, A. L., Iyer, R., Graham, J., Koleva, S., & Haidt, J. (2009). Are all types of morality compromised in psychopathy? *Journal of Personality Disorders*, **23**(4), 384–398.
- Glucksberg, S., & Keysar, B. (1990). Understanding metaphorical comparisons: Beyond similarity. *Psychological Review*, **97**(1), 3.
- Goodwin, G. P., & Darley, J. M. (2008). The psychology of meta-ethics: Exploring objectivism. *Cognition*, **106**(3), 1339–1366.
- Goodwin, G. P., & Darley, J. M. (2010). The perceived objectivity of ethical beliefs: Psychological findings and implications for public policy. *Review of Philosophy and Psychology*, **1**(2), 161–188.

- Govrin, A. (2014). The ABC of moral development: An attachment approach to moral judgment. *Frontiers in Psychology*, *5*. <http://doi.org/10.3389/fpsyg.2014.00006>
- Graham, J., Haidt, J., Koleva, S., Motyl, M., Iyer, R., Wojcik, S., & Ditto, P. (2013). Moral foundations theory: The pragmatic validity of moral pluralism. *Advances in Experimental Social Psychology*, *47*, 55–130.
- Grant, C. M., Boucher, J., Riggs, K. J., & Grayson, A. (2005). Moral understanding in children with autism. *Autism*, *9*(3), 317–331.
- Gray, K. (2012). The power of good intentions: Perceived benevolence soothes pain, increases pleasure, and improves taste. *Social Psychological and Personality Science*, *3*, 639–645.
- Gray, K., Jenkins, A. C., Heberlein, A. S., & Wegner, D. M. (2011). Distortions of mind perception in psychopathology. *Proceedings of the National Academy of Sciences*, *108*(2), 477–479.
- Gray, K., & Keeney, J. E. (2015a). Disconfirming moral foundations theory on its own terms: Reply to Graham (2015). *Social Psychological and Personality Science* November 2015, *6*(8), 874–877.
- Gray, K., & Keeney, J. E. (2015b). *Impure, or Just Weird?* Scenario sampling bias raises questions about the foundation of moral cognition. *Social Psychological and Personality Science* 2015, *6*(8), 859–868.
- Gray, K., & Schein, C. (forthcoming). No absolutism here: Harm predicts moral judgment 30× better than disgust – Commentary on Scott, Inbar & Rozin (2015). *Perspectives on Psychological Science*.
- Gray, K., Schein, C., & Ward, A. F. (2014). The myth of harmless wrongs in moral cognition: Automatic dyadic completion from sin to suffering. *Journal of Experimental Psychology: General*, *143*(4), 1600–1615.
- Gray, K., Waytz, A., & Young, L. (2012). The moral dyad: A fundamental template unifying moral judgment. *Psychological Inquiry*, *23*, 206–215.
- Gray, K., & Wegner, D. M. (2008). The sting of intentional pain. *Psychological Science*, *19*(12), 1260–1262.
- Gray, K., & Wegner, D. M. (2010). Blaming God for our pain: Human suffering and the divine mind. *Personality and Social Psychology Review*, *14*(1), 7–16.
- Gray, K., Young, L., & Waytz, A. (2012). Mind perception is the essence of morality. *Psychological Inquiry*, *23*, 101–124.
- Greene, J. D. (2007). The secret joke of Kant's soul. In W. Sinnott-Armstrong, *Moral Psychology, Vol. 3: The Neuroscience of Morality: Emotion, Disease, and Development*, (pp. 35–80). Cambridge, MA: MIT Press.
- Greene, J. D. (2013). *Moral Tribes: Emotion, Reason, and the Gap between Us and Them*. New York, NY: Penguin.
- Greene, J. D., Cushman, F., 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., 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.
- Greene, J. D., Sommerville, R. B., Nystrom, L. E., Darley, J. M., & Cohen, J. D. (2001). An fMRI investigation of emotional engagement in moral judgment. *Science*, *293*(5537), 2105–2108.
- Gregory, R. L. (1997). Knowledge in perception and illusion. *Philosophical Transactions of the Royal Society, B: Biological Sciences*, *352*(1358), 1121–1127.
- Gregory, R. L. (2015). *Eye and Brain: The Psychology of Seeing*. Princeton, NJ: Princeton University Press.
- Gregory, R. L., & Heard, P. (1979). Border locking and the Café Wall illusion. *Perception*, *8*(4), 365–380.
- Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review*, *108*(4), 814–834.
- Haidt, J. (2012). *The Righteous Mind: Why Good People are Divided by Politics and Religion*. New York, NY: Pantheon Books.
- Haidt, J., & Joseph, C. (2007). The moral mind: How five sets of innate intuitions guide the development of many culture-specific virtues, and perhaps even modules. *The Innate Mind*, *3*, 367–392.
- Hamlin, J. K., & Wynn, K. (2011). Young infants prefer prosocial to antisocial others. *Cognitive Development*, *26*(1), 30–39.
- Hamlin, J. K., Wynn, K., & Bloom, P. (2007). Social evaluation by preverbal infants. *Nature*, *450*(7169), 557–559.
- Hare, R. D. (1998). *Without Conscience: The Disturbing World of the Psychopaths Among Us*. New York: Guilford Press.
- Harrington, J. R., & Gelfand, M. J. (2014). Tightness–looseness across the 50 united states. *Proceedings of the National Academy of Sciences*, *111*(22), 7990–7995.
- Haslam, N. (2016). Concept creep: Psychology's expanding concepts of harm and pathology. *Psychological Inquiry*, *27*(1), 1–17.
- Henrich, J., Heine, S., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences*, *33*(2–3), 61–83.
- Hubel, D. H., & Wiesel, T. N. (1970). The period of susceptibility to the physiological effects of unilateral eye closure in kittens. *The Journal of Physiology*, *206*(2), 419–436.
- Hume, D. (1740). *A Treatise of Human Nature*. New York, NY: Dover.
- Hume, D. (1777). *An Enquiry Concerning the Principles of Morals*. La Salle, IL: Open Court.
- Ishihara, S. (1972). *Tests for Colour-Blindness*. Tokyo, Japan: Kanehara Shuppan Co., Ltd.
- Jacobellis v. Ohio. (1964) (Vol. **378**). Supreme Court.
- Jacobson, D. (2012). Moral dumbfounding and moral stupefaction. *Oxford Studies in Normative Ethics*, *2*, 289–316.



- Janoff-Bulman, R., & Carnes, N. C. (2013). Surveying the moral landscape moral motives and group-based moralities. *Personality and Social Psychology Review*, *17*(3), 219–236.
- Johns, J. H., & Quay, H. C. (1962). The effect of social reward on verbal conditioning in psychopathic and neurotic military offenders. *Journal of Consulting Psychology*, *26*(3), 217–220.
- Joyce, R. (2015). Moral anti-realism. In E. N. Zalta, *The Stanford Encyclopedia of Philosophy* (Fall 2015). Retrieved January 10, 2016, from <http://plato.stanford.edu/archives/fall2015/entries/moral-anti-realism/>
- Kahneman, D., & Tversky, A. (1977). *Intuitive Prediction: Biases and Corrective Procedures*. DTIC Document. Retrieved July 11, 2014, from <http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA047747>
- Kanizsa, G. (1975). Amodal completion and phenomenal shrinkage of surfaces in the visual field. *Italian Journal of Psychology*, *2*, 187–95.
- Kant, I. (1780). *The Metaphysical Elements of Ethics*. (T. K. Abbott, Trans.). Fairford, UK: Echo Library.
- Kanwisher, N., McDermott, J., & Chun, M. M. (1997). The fusiform face area: A module in human extrastriate cortex specialized for face perception. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience*, *17*(11), 4302–4311.
- Kitaoka, A. (2003). *Rotating snakes: A bitmap figure*. Retrieved November 11, 2014, from <http://www.ritsumei.ac.jp/akitaoka/index-e.html>
- Knobe, J. (2003). Intentional action and side effects in ordinary language. *Analysis*, *63*, 190–193.
- Koffka, K. (1935). *Principles of Gestalt Psychology*. New York: Harcourt, Brace, & World.
- Kohlberg, L. (1969). Stage and sequence: The cognitive-developmental approach to socialization. In T. Mischel, *Cognitive Development and Epistemology* (pp. 151–235). New York, NY: Academic Press.
- Kruglanski, A. W., & Gigerenzer, G. (2011). Intuitive and deliberate judgments are based on common principles. *Psychological Review*, *118*(1), 97–109.
- Kumar, V., & Campbell, R. (2012). On the normative significance of experimental moral psychology. *Philosophical Psychology*, *25*(3), 1–20.
- Laham, S. M., Alter, A. L., & Goodwin, G. P. (2009). Easy on the mind, easy on the wrongdoer: Discrepantly fluent violations are deemed less morally wrong. *Cognition*, *112*(3), 462–466.
- Landy, J. F., & Goodwin, G. P. (2015). Does incidental disgust amplify moral judgment? A meta-analytic review of experimental evidence. *Perspectives on Psychological Science*, *10*(4), 518–536.
- Lenzenweger, M. F., Lane, M. C., Loranger, A. W., & Kessler, R. C. (2007). DSM-IV personality disorders in the National Comorbidity Survey Replication. *Biological Psychiatry*, *62*(6), 553–564.
- Leslie, A. M., & Keeble, S. (1987). Do six-month-old infants perceive causality? *Cognition*, *25*(3), 265–288.
- Leslie, A. M., Mallon, R., & DiCorcia, J. A. (2006). Transgressors, victims, and cry babies: Is basic moral judgment spared in autism? *Social Neuroscience*, *1*(3–4), 270–283.
- Lieberman, V., Samuels, S. M., & Ross, L. (2004). The name of the game: Predictive power of reputations versus situational labels in determining prisoner's dilemma game moves. *Personality and Social Psychology Bulletin*, *30*(9), 1175–1185.
- Lindquist, K. A. (2013). Emotions emerge from more basic psychological ingredients: A modern psychological constructionist model. *Emotion Review*, *5*(4), 356–368.
- Liu, B., & Ditto, P. H. (2013). What dilemma? Moral evaluation shapes factual belief. *Social Psychological and Personality Science*, *4*(3), 316–323.
- Lombardo, M. V., Chakrabarti, B., Bullmore, E. T., & Baron-Cohen, S. (2011). Specialization of right temporo-parietal junction for mentalizing and its relation to social impairments in autism. *NeuroImage*, *56*(3), 1832–1838.
- Luckiesh, M. (1922). *Visual Illusions: Their Causes, Characteristics and Applications*. New York: D. Van Nostrand Company. Retrieved January 12, 2016.
- Mackie, J. L. (1990). *Ethics: Inventing Right and Wrong*. Penguin: UK.
- Mahmut, M. K., Homewood, J., & Stevenson, R. J. (2008). The characteristics of non-criminals with high psychopathy traits: Are they similar to criminal psychopaths? *Journal of Research in Personality*, *42*(3), 679–692.
- Malle, B. F. (2006). Intentionality, morality, and their relationship in human judgment. *Journal of Cognition and Culture*, *6*(1–2), 87–112.
- Marsh, A. A., & Blair, R. J. R. (2008). Deficits in facial affect recognition among antisocial populations: A meta-analysis. *Neuroscience & Biobehavioral Reviews*, *32*(3), 454–465.
- Marsh, A. A., Finger, E. C., Schechter, J. C., Jurkowitz, I. T. N., Reid, M. E., & Blair, R. J. R. (2011). Adolescents with psychopathic traits report reductions in physiological responses to fear: Emotion and psychopathic traits. *Journal of Child Psychology and Psychiatry*, *52*(8), 834–841.
- Marsh, A., Finger, E., Mitchell, D., Reid, M., Sims, C., Kosson, D., ... Blair, R. (2008). Reduced amygdala response to fearful expressions in children and adolescents with callous-unemotional traits and disruptive behavior disorders. *American Journal of Psychiatry*, *165*(6), 712–720.
- Moll, J., de Oliveira-Souza, R., Eslinger, P. J., Bramati, I. E., Mourão-Miranda, J., Andreiuolo, P. A., & Pessoa, L. (2002). The neural correlates of moral sensitivity: A functional magnetic resonance imaging investigation of basic and moral emotions. *The Journal of Neuroscience*, *22*(7), 2730–2736.

- Monroe, A. E., Guglielmo, S., & Malle, B. F. (2012). Morality goes beyond mind perception. *Psychological Inquiry*, **23**(2), 179–184.
- Moran, J. M., Young, L., Saxe, R., Lee, S. M., O’Young, D., Mavros, P. L., & Gabrieli, J. D. (2011). Impaired theory of mind for moral judgment in high-functioning autism. *Proceedings of the National Academy of Sciences*, **108**(7), 2688–2692.
- Moseley, K. L. (1985). *History of Infanticide in Western Society*, Issues in Law & Medicine, 1986 Mar; **1**(5), 345–361.
- Müller-Lyer, F. C. (1889). Optische urteilstäuschungen. *Archiv Für Anatomie Und Physiologie, Physiologische Abteilung*, **2**(Supplement), 263–270.
- Nagel, T. (1974). What is it like to be a bat? *The Philosophical Review*, **83**(4), 435–450.
- Nichols, S. (2002). Norms with feeling: Towards a psychological account of moral judgment. *Cognition*, **84**(2), 221–236.
- Oldridge, D. J. (2004). *Strange histories: The trial of the pig, the walking dead, and other matters of fact from the medieval and renaissance worlds*. New York: Routledge.
- Paxton, J. M., Ungar, L., & Greene, J. D. (2012). Reflection and reasoning in moral judgment. *Cognitive Science*, **36**(1), 163–177.
- Pedersen, D. M., & Wheeler, J. (1983). The Müller-Lyer illusion among Navajos. *The Journal of Social Psychology*, **121**(1), 3–6.
- Pizarro, D. A., & Bloom, P. (2003). The intelligence of the moral intuitions: A comment on Haidt (2001). *Psychological Review*, **110**(1), 193–196.
- Pronin, E., Wegner, D. M., McCarthy, K., & Rodriguez, S. (2006). Everyday magical powers: The role of apparent mental causation in the overestimation of personal influence. *Journal of Personality and Social Psychology*, **91**(2), 218–231.
- Rai, T. S., & Fiske, A. P. (2011). Moral psychology is relationship regulation: Moral motives for unity, hierarchy, equality, and proportionality. *Psychological Review*, **118**(1), 57–75.
- Ridley, M. (1998). *The Origins of Virtue: Human Instincts and the Evolution of Cooperation* (1st ed.). London, UK: Penguin.
- Rivers, W. H. R. (1905). Observations on the senses of the Todas. *British Journal of Psychology*, **1**, 321–396.
- Rohlinger, D. A. (2002). Framing the abortion debate: Organizational resources, media strategies, and movement-countermovement dynamics. *The Sociological Quarterly*, **43**(4), 479–507.
- Ross, L., & Ward, L. (1997). Naive realism in everyday life: Implications for social conflict and misunderstanding. In T. Brown, E. Reed, & E. Turiel (Eds.), *Values and knowledge*, (pp. 103–135). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.
- Royzman, E., Kim, K., & Leeman, R. F. (2015). The curious tale of Julie and Mark: Unraveling the moral dumbfounding effect. *Judgment and Decision Making*, **10**(4), 296–313.
- Royzman, E., 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), 574–586.
- Sayre-McCord, G. (2015). Moral realism. In E. N. Zalta, *The Stanford Encyclopedia of Philosophy* (Spring 2015). Retrieved January 10, 2016, from <http://plato.stanford.edu/archives/spr2015/entries/moral-realism/>
- Schein, C., Goranson, A., & Gray, K. (2015). The uncensored truth about morality. *The Psychologist*, **28**(12), 982–985.
- Schein, C., & Gray, K. (forthcoming). Moralization and harmification: The dyadic loop explains how the innocuous becomes harmful and wrong. *Psychological Inquiry*. (2016) **27**(1), 62–65.
- Schein, C., & Gray, K. (2014). The prototype model of blame: Freeing moral cognition from linearity and little boxes. *Psychological Inquiry*, **25**(2), 236–240.
- Schein, C., & Gray, K. (2015). The unifying moral dyad: Liberals and conservatives share the same harm-based moral template. *Personality and Social Psychology Bulletin*, **41**(8), 1147–1163.
- Schein, C., Ritter, R., & Gray, K. (forthcoming). Harm mediates the disgust-immorality link. *Emotion*.
- Schnall, S., Haidt, J., Clore, G. L., & Jordan, A. H. (2008). Disgust as embodied moral judgment. *Personality and Social Psychology Bulletin*, **34**(8), 1096–1109.
- Schwitzgebel, E., & Cushman, F. (2012). Expertise in moral reasoning? Order effects on moral judgment in professional philosophers and non-philosophers. *Mind & Language*, **27**(2), 135–153.
- Segall, M. H., Campbell, D. T., & Herskovits, M. J. (1963). Cultural differences in the perception of geometrical illusions. *Science*, **139**, 769–771.
- Senju, A., Southgate, V., White, S., & Frith, U. (2009). Mindblind eyes: An absence of spontaneous theory of mind in Asperger syndrome. *Science*, **325**(5942), 883–885.
- Shweder, R. A. (2012). Relativism and universalism. In D. Fassin, *A Companion to Moral Anthropology* (pp. 85–102). Hoboken, NJ: John Wiley & Sons, Ltd.
- Shweder, R. A., & Haidt, J. (1994). The future of moral psychology: Truth, intuition, and the pluralist way. In *Reaching Out: Caring, Altruism, and Prosocial Behavior* (pp. 336–341). New York, NY, US: Garland Publishing.

- Shweder, R. A., Mahapatra, M., & Miller, J. (1987). Culture and moral development. In J. Kagan & S. Lamb (Eds.), *The Emergence of Morality in Young Children* (pp. 1–83). Chicago, IL: University of Chicago Press.
- Sinnott-Armstrong, W. (2008). Framing moral intuitions. In W. Sinnott-Armstrong (Ed.), *Moral Psychology, Vol 2: The Cognitive Science of Morality: Intuition and Diversity* (pp. 47–76). Cambridge, MA: MIT Press.
- Skitka, L. J., & Bauman, C. W. (2008). Moral conviction and political engagement. *Political Psychology, 29*(1), 29–54.
- Skitka, L. J., Bauman, C. W., & Sargis, E. G. (2005). Moral conviction: Another contributor to attitude strength or something more? *Journal of Personality and Social Psychology, 88*(6), 895–917.
- Skitka, L. J., Washburn, A. N., & Carsel, T. S. (2015). The psychological foundations and consequences of moral conviction. *Current Opinion in Psychology, 6*, 41–44.
- Sperber, D. (2004). Modularity and relevance: How can a massively modular mind be flexible and context-sensitive? *The Innate Mind: Structure and Content*. Retrieved January 9, 2015.
- Spranca, M., Minsk, E., & Baron, J. (1991). Omission and commission in judgment and choice. *Journal of Experimental Social Psychology, 27*(1), 76–105.
- Stoerig, P. (1996). Varieties of vision: From blind responses to conscious recognition. *Trends in Neurosciences, 19*(9), 401–406.
- Sunstein, C. R. (2005). Moral heuristics. *The Behavioral and Brain Sciences, 28*(4), 531–542; discussion 542–573.
- Tetlock, P. E., Kristel, O. V., Elson, S. B., Green, M. C., & Lerner, J. S. (2000). The psychology of the unthinkable: Taboo trade-offs, forbidden base rates, and heretical counterfactuals. *Journal of Personality and Social Psychology, 78*(5), 853–870.
- Thomson, J. J. (1976). Killing, letting die, and the trolley problem. *The Monist, 59*(2), 204–217.
- Treisman, A. M., & Gelade, G. (1980). A feature-integration theory of attention. *Cognitive Psychology, 12*(1), 97–136.
- Turiel, E., Killen, M., & Helwig, C. C. (1987). Morality: Its structure, functions, and vagaries. In J. Kagan & S. Lamb (Eds.), *The emergence of morality in young children* (pp. 155–243). Chicago and London: University of Chicago Press.
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science, 185*(4157), 1124–1131.
- Vaish, A., Carpenter, M., & Tomasello, M. (2009). Sympathy through affective perspective taking and its relation to prosocial behavior in toddlers. *Developmental Psychology, 45*(2), 534–543.
- Valdesolo, P., & DeSteno, D. (2006). Manipulations of emotional context shape moral judgment. *Psychological Science, 17*(6), 476–477.
- Van Bavel, J. J., FeldmanHall, O., & Mende-Siedlecki, P. (2015). The neuroscience of moral cognition: From dual processes to dynamic systems. *Current Opinion in Psychology, 6*, 167–172.
- Van Bavel, J. J., Packer, D. J., Haas, I. J., & Cunningham, W. A. (2012). The importance of moral construal: Moral versus non-moral construal elicits faster, more extreme, universal evaluations of the same actions. *PLoS ONE, 7*(11), e48693.
- Van Berkum, J. J. A., Holleman, B., Nieuwland, M., Otten, M., & Murre, J. (2009). Right or wrong? The brain's fast response to morally objectionable statements. *Psychological Science, 20*(9), 1092–1099.
- Van Dillen, L. F., van der Wal, R. C., & van den Bos, K. (2012). On the role of attention and emotion in morality: attentional control modulates unrelated disgust in moral judgments. *Personality and Social Psychology Bulletin, 38*(9), 1222–1231.
- van Leeuwen, F., Park, J. H., Koenig, B. L., & Graham, J. (2012). Regional variation in pathogen prevalence predicts endorsement of group-focused moral concerns. *Evolution and Human Behavior, 33*(5), 429–437.
- Wade, N. J. (2000). *A Natural History of Vision*. Cambridge, MA: MIT Press.
- Wagemans, J., Elder, J. H., Kubovy, M., Palmer, S. E., Peterson, M. A., Singh, M., & von der Heydt, R. (2012). A century of Gestalt psychology in visual perception I. Perceptual grouping and figure-ground organization. *Psychological Bulletin, 138*(6), 1172–1217.
- Waytz, A., Gray, K., Epley, N., & Wegner, D. M. (2010). Causes and consequences of mind perception. *Trends in Cognitive Sciences, 14*, 383–388.
- Wilson, J. Q. (1997). *The Moral Sense*. New York, NY: Simon and Schuster.
- Woodburn, J. (1982). Egalitarian societies. *Man, 17*(3), 431–451.
- Woodward, A. L. (1998). Infants selectively encode the goal object of an actor's reach. *Cognition, 69*(1), 1–34.
- Young, L., & Durwin, A. J. (2013). Moral realism as moral motivation: The impact of meta-ethics on everyday decision-making. *Journal of Experimental Social Psychology, 49*(2), 302–306.
- Young, L., Koenigs, M., Kruepke, M., & Newman, J. P. (2012). Psychopathy increases perceived moral permissibility of accidents. *Journal of Abnormal Psychology, 121*(3), 659–667.
- Young, L., & Saxe, R. (2011). When ignorance is no excuse: Different roles for intent across moral domains. *Cognition, 120*(2), 202–214.
- Zajonc, R. B. (1980). Feeling and thinking: Preferences need no inferences. *American Psychologist, 35*(2), 151.