



## FlashReport

## “Black and White” thinking: Visual contrast polarizes moral judgment

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## HIGHLIGHTS

- ▶ Black and white visual patterns activate a dichotomous construct of right vs. wrong.
- ▶ Visual contrast primes a specific mindset that leads to polarized moral judgments.
- ▶ Non-affective, perceptual experiences can shape moral judgment.

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## ABSTRACT

Recent research has emphasized the role of intuitive processes in morality by documenting the link between affect and moral judgment. The present research tested whether incidental visual cues without any affective connotation can similarly shape moral judgment by priming a certain mindset. In two experiments we showed that exposure to an incidental black and white visual contrast leads people to think in a “black and white” manner, as indicated by more extreme moral judgments. Participants who were primed with a black and white checkered background while considering a moral dilemma (Experiment 1) or a series of social issues (Experiment 2) gave ratings that were significantly further from the response scale’s mid-point, relative to participants in control conditions without such priming. These findings suggest that in addition to affective cues and gut feelings, non-affective cues relating to processing style can influence moral judgments.

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## Introduction

The factors behind people’s ability to tell right from wrong have been the topic of intensive scientific investigation. Whereas early approaches such as Kohlberg’s work on the development of moral reasoning assumed that rational thinking is the sole determinant of people’s moral decisions (e.g., Kohlberg, Levine, & Hewer, 1983), more recent efforts have focused on non-rational processes as primary factors for moral considerations. In particular, Haidt (2001) proposed the *Social Intuitionist Model*, based on which automatic intuitive processes influence people’s moral judgment outside of conscious awareness. According to this model, people form moral judgments based on gut feelings and it is only subsequently that they generate reasons to justify these judgments.

Research on such intuitive factors that shape moral judgment has largely focused on the role of affect. Indeed, a growing body of research suggests that experimental manipulations of physical disgust influence people’s judgments of moral disgust (e.g., Eskine, Kaciniak, & Prinz, 2011; Schnall, Haidt, Clore, & Jordan, 2008; Wheatley & Haidt, 2005). For example, participants exposed to a foul, disgusting smell considered

moral transgressions such as lying or stealing as more wrong than participants who are not exposed to such a smell (Schnall, Benton, & Harvey, 2008). Further, morally objectionable behaviors elicit a facial disgust response that is identical to the one exhibited when being confronted with physically disgusting stimuli, including a bitter tasting drink, or photos of mutilated bodies (Cannon, Schnall, & White, 2011; Chapman, Kim, Susskind, & Anderson, 2009), and there is some evidence suggesting that similar brain structures are involved in the experience of both physical disgust and moral condemnation (e.g., Moll et al., 2005).

Thus, accumulating evidence indicates that incidental feelings of disgust can change moral judgments. However, the more general claim of the social intuitionist model, that various kinds of automatically processed cues can influence moral judgment, has not been examined. The present research explored such a link by presenting participants with visual cues that involved a potential moral connotation in the absence of any affective valence.

Previous work has established that people associate certain colors with notions of morality. In professional sports, players wearing black uniforms are perceived as more aggressive and they are sanctioned more often in the form of penalties, compared to players who wear uniforms in other colors (Gilovich & Frank, 1988). Further, Sherman and Clore (2009) demonstrated that the color white is associated with positive moral value, whereas the color black is associated with negative

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moral value. In a Stroop task participants were faster to name the color of morality-related words printed in white font, but they were faster to name the color of immorality-related words printed in black font. This research demonstrated an inherent association of color and moral meaning. What has not been established, however, is whether other aspects of color might literally “color” moral judgments, but through a different mechanism, namely by priming a specific mindset, rather than by providing an association.

One such mindset involves the contrast of black and white, which is commonly depicted in visual images (e.g., the Yin–Yang symbol) and verbal metaphors (e.g., “black and white” thinking) to represent distinctions of good and bad and other conceptual dichotomies. We hypothesized that the incidental exposure to a black and white visual contrast should prime a specific mindset, namely “black and white” thinking, and therefore lead to more polarized moral judgments, relative to a neutral visual background.

## Experiment 1

Participants were asked to respond to the classic moral dilemma developed by Kohlberg et al. (1983). It describes the situation of a man called Heinz whose wife is dying of cancer. Because the pharmacist who sells the life-saving drug charges more than Heinz can afford, the latter decides to steal the drug. Thus, the scenario can either be considered as Heinz following a praiseworthy moral imperative, namely saving a life, or as him committing a crime, namely stealing precious goods from another person.

Because previous research has established that a specific mindset can be primed by providing participants with concepts related to a given processing style (e.g., Gollwitzer, Heckhausen, & Steller, 1990; for a review, see Bargh & Chartrand, 2000), we activated a metaphor associated with taking an extreme point of view, namely “black and white” thinking. For participants in the experimental condition the Heinz dilemma was presented on a black and white checkered background, whereas for participants in the control condition it was presented on a uniformly gray background. To control for the potential confound of visual contrast irrespective of moral connotation, a second control group received the dilemma on a blue and yellow checkered background. We hypothesized that participants primed with a black and white mindset should adopt a more binary way of thinking when asked to indicate how right or wrong the behavior of the protagonist was; in other words, they were expected to exhibit more extreme judgments to either side of the response scale, relative to participants in the control conditions.

## Method

### Participants

One hundred-eleven visitors to a psychology-research website (mean age = 28.15 years,  $SD = 12.11$ , 67 female) volunteered for a study on decision making.

### Materials and procedure

Participants were presented with the Heinz dilemma and rated their approval or disapproval of him stealing the drug on a scale from 1 (= right) to 7 (= wrong). Only this one item was presented to participants; no other dependent variables were included. Participants were randomly assigned to one of the three conditions, and saw the stimuli as depicted in Fig. 1.

### Results and discussion

To assess judgment polarization, we computed a deviation score corresponding to each rating's absolute distance from the scale's midpoint “4”. Results revealed that mean deviation scores differed significantly among conditions,  $F(2, 108) = 4.24$ ,  $p = .02$ ,  $\eta_p^2 = .07$ . Planned comparisons showed that, as expected, participants in the black and

white condition ( $M = 1.73$ ,  $SD = .87$ ) gave ratings that were significantly further from the scale's midpoint, compared to participants in the gray condition ( $M = 1.22$ ,  $SD = 1.00$ ),  $F(1, 108) = 5.38$ ,  $p = .02$ , or the blue and yellow condition ( $M = 1.14$ ,  $SD = .98$ ),  $F(1, 108) = 7.22$ ,  $p = .008$ . Further, there was no difference between the gray and the blue and yellow condition,  $F(1, 108) = 0.13$ ,  $p = .71$ .

As expected, although conditions differed in how polarized their moral judgments were, conditions did not differ in overall judgment severity (black and white condition:  $M = 3.51$ ,  $SD = 1.90$ ; gray condition:  $M = 3.54$ ,  $SD = 1.52$ ; blue and yellow condition,  $M = 3.24$ ,  $SD = 1.30$ ),  $F(2, 108) = 0.40$ ,  $p = .67$ . In other words, the judgment polarization in the black and white condition was bidirectional, which left the overall mean rating unaffected. To conclude, the findings from Experiment 1 indicate that priming participants with a visual contrast relating to judgment extremity led to more extreme judgments, relative to the two control conditions.

## Experiment 2

Previous research has shown that abstract social issues in the absence of any detailed description of a specific conflict or dilemma can be considered moral issues (Zhong, Strejcek, & Sivanathan, 2010). To replicate and extend the findings from Experiment 1 to other moral concerns, in this experiment we asked participants to respond to a series of social issues while being exposed to a black and white, or a neutral gray background. As in Experiment 1, we predicted that being primed with the visual contrast of black and white should lead to more extreme judgments than receiving no such priming.

## Method

### Participants

One hundred-thirty individuals (mean age = 28.42,  $SD = 11.36$ , 73 female) participated in a survey on social issues in exchange for 15 cents as payment. Participants were recruited through Amazon's Mechanical Turk, an online marketplace where people complete cognitive tasks. Recent research (Buhrmester, Kwang, & Gosling, 2011) has shown that this method of conducting online experiments provides high quality data that are at least as reliable as those obtained through more traditional data-collection methods.

### Materials and procedure

Participants rated the morality of six social issues (pornography, adultery, using drugs, littering, smoking and use of profane language) as used by Zhong et al. (2010) on a scale from  $-5$  (= very immoral) to  $+5$  (= very moral). Only these six items were presented to participants; no other dependent variables were included. The social issues were presented one at a time, in a random order, and half the participants viewed them displayed against a black and white checkered background, whereas the other half viewed them against a uniform gray background.

### Results and discussion

Consistent with the results of Experiment 1, the mean deviation of judgments from the scale's midpoint was greater in the black and white condition ( $M = 2.50$ ,  $SD = .96$ ) than in the gray condition ( $M = 2.05$ ,  $SD = .91$ ),  $F(1, 128) = 7.35$ ,  $p = .008$ ,  $\eta_p^2 = .05$ . When analyzed individually, all six items showed this same general pattern (Fig. 2). Significant main effects for priming condition were obtained for *smoking*,  $F(1, 128) = 5.69$ ,  $p = .02$ ,  $\eta_p^2 = .04$ , *using drugs*,  $F(1, 128) = 4.31$ ,  $p = .04$ ,  $\eta_p^2 = .03$ , and *adultery*,  $F(1, 128) = 8.34$ ,  $p = .005$ ,  $\eta_p^2 = .06$ .

Mean severity ratings did not differ between conditions (black and white condition:  $M = -1.79$ ,  $SD = 1.57$ ; gray condition:  $M = -1.53$ ,  $SD = 1.32$ ),  $F(1, 128) = 1.05$ ,  $p = .31$ . Unlike in Experiment 1 that used a moral dilemma designed to elicit both right and wrong responses,

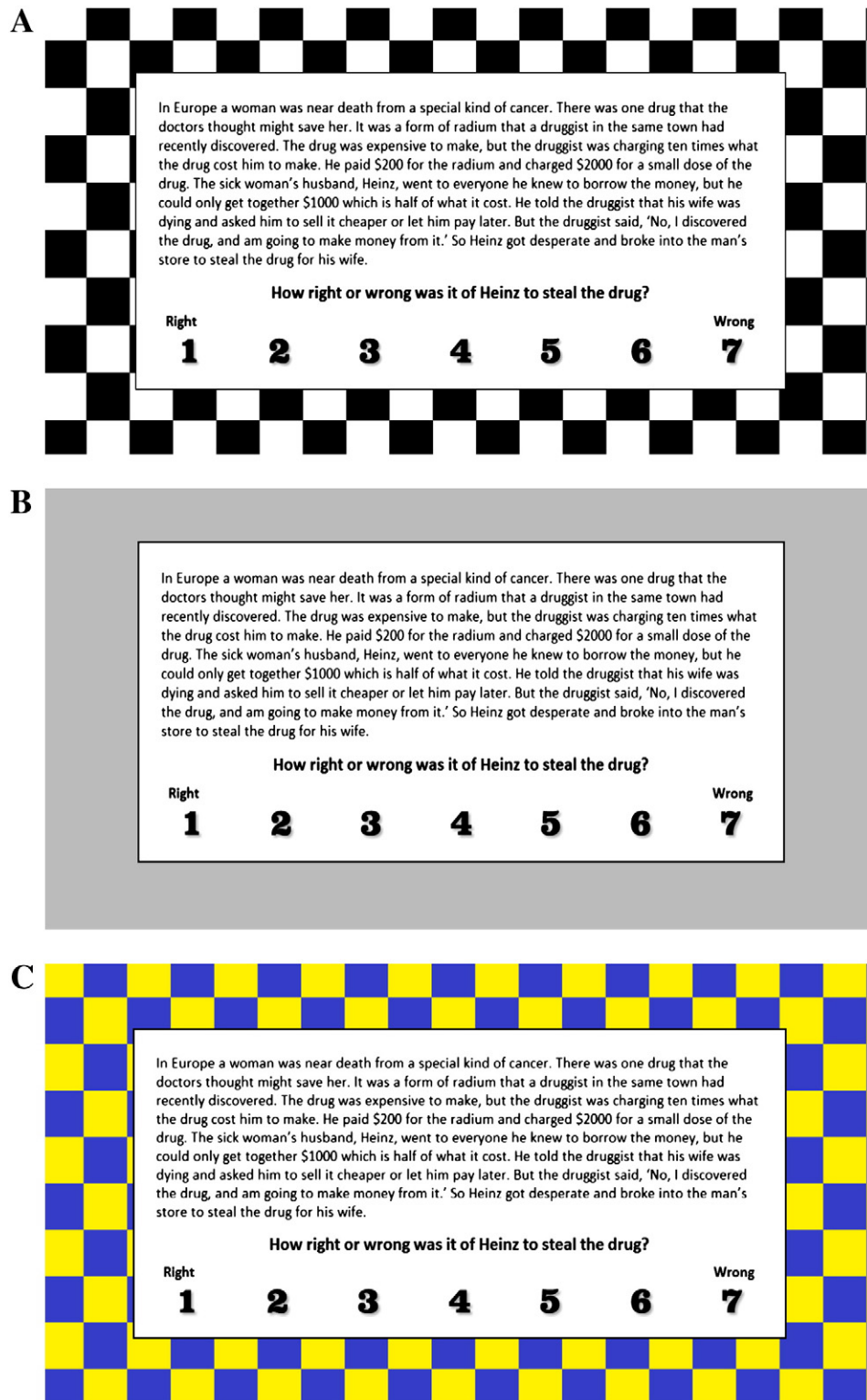


Fig. 1. Priming manipulations used in Experiment 1: (A) black and white, (B) gray, and (C) blue and yellow.

the items in Experiment 2 were mostly on the wrong side of morality, designed to elicit negative responses. One might therefore expect a difference in mean severity ratings. However, a sizeable number of participants gave positive and/or zero responses to one or more of the six items. We identified 39 participants who gave at least one positively

biased rating. Although when comparing them there was no significant effect of condition,  $F(1, 37) = .39, p = .54$ , means were in the predicted direction (black and white condition:  $M = 2.53, SD = 1.07$ ; gray condition:  $M = 2.32, SD = .96$ ) and there was a small effect size ( $\eta_p^2 = .01$ ), revealing a small trend for positive scores to be polarized in the black

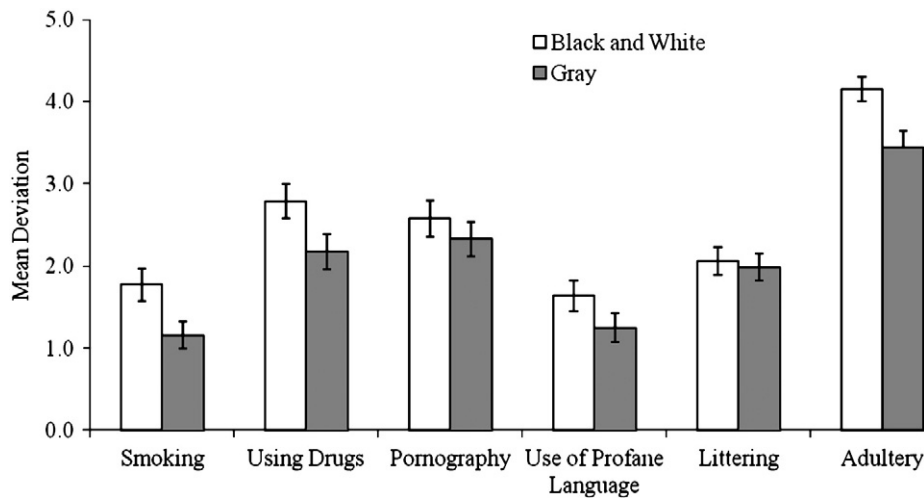


Fig. 2. Mean deviation of participants' judgments from the scale's midpoint (Experiment 2). Error bars represent standard error.

and white condition. As expected, the analogous analysis for negative scores yielded a significant effect of condition (black and white condition:  $M = -3.05$ ,  $SD = .94$ ; gray condition:  $M = -2.66$ ,  $SD = .86$ ),  $F(1, 128) = 6.1$ ,  $p = .02$ ,  $\eta_p^2 = .05$ . Further, the frequency of zeros for any of the six items was lower in the black and white condition (67 zeros) than the gray condition (88 zeros). Indeed, an analysis conducted on mean zero responses for each participant revealed a marginally significant effect of condition (black and white condition:  $M = 1.02$ ,  $SD = 1.02$ ; gray condition:  $M = 1.38$ ,  $SD = 1.23$ ),  $F(1, 128) = 3.33$ ,  $p = .07$ ,  $\eta_p^2 = .03$ , supporting our initial hypothesis that participants in the gray condition would score more toward the midpoint of the response scale compared to participants in the black and white condition.

## General discussion

Two experiments provided converging evidence that incidental visual experiences relating to color contrast can influence moral judgment. Priming participants with a black and white background while considering a moral dilemma (Experiment 1) or a series of social issues (Experiment 2) resulted in them making judgments in a “black and white” and therefore extreme manner, by selecting response options closer toward the scale's end points.

These findings demonstrate a further connection between perceptions of color and notions of morality (Gilovich & Frank, 1988; Sherman & Clore, 2009). People not only hold strong associations between certain colors and notions of morality but they also use a given kind of mindset implied in perceptual cues when they form a moral judgment. Thus, our findings advance existing theoretical approaches of morality by showing that not only affect (e.g., Chapman et al., 2009; Schnall, Haidt, Clore & Jordan, 2008) but also perceptual experiences shape automatic intuitions that influence moral judgments. These findings are thus in line with Haidt's (2001) social intuitionist model, and its key contention that various kinds of intuitive influences – whether affective or not – can have an influence on judgments of morality independently of deliberate reasoning.

An early study tested priming effects on moral reasoning (La Rue & Olejnik, 1980) by inducing either a relatively basic reasoning style relating to concrete operations (cf. Piaget, 1928), or a more advanced reasoning style relating to formal operations. When indicating their reasons of agreement with a decision in a moral dilemma, participants who had first engaged in formal operations requiring propositional thought listed more items showed more “advanced” reasoning consistent with a higher stage of moral thought according to Kohlberg (1976) than participants who had only engaged in concrete operations. This finding was interpreted to demonstrate that appropriate instruction can lead to a

sophisticated moral reasoning style that was previously only latent, but not expressed. In other words, participants were able to stretch their moral reasoning abilities and make more advanced responses and draw upon information relevant to the specific moral dilemma. In contrast, in our studies the priming involved presenting incidental perceptual cues that were entirely irrelevant to the moral judgment situation.

The reported findings support approaches of embodied cognition that propose a central role of metaphor and language in cognitive representations (Lakoff & Johnson, 1980; for a review, see Landau, Meier, & Keefer, 2010). Indeed, evidence has been accumulating that physical experiences such as cleanliness (Helzer & Pizarro, 2011; Schnall, Benton, & Harvey, 2008; Zhong & Liljenquist, 2006), warmth (Ijzerman & Semin, 2009; Williams & Bargh, 2008) and weight (Jostmann, Lakens, & Schubert, 2009) are closely linked to specific abstract concepts. However, whereas such associations might be direct and based on the content of bodily experience, our findings involve idiomized linguistic expressions that most speakers of English would be familiar with, but which do not necessarily reflect a clear physical basis.

Our results indicate that the effect of the black and white metaphor was not driven solely by contrast because there was no comparable effect for the blue and yellow contrast condition. Instead, there appears to be a specific metaphoric connotation of black vs. white that relates to judgment extremity. One remaining question therefore is whether such metaphoric links might be specific to morality, or extend to other judgment contexts as well. On the one hand, the distinction between light and dark is so fundamental that most languages include different words for black and white even if they have no other color words (Berlin & Kay, 1969). This would suggest that the metaphor has wide applicability to a range of concepts (e.g., esthetic judgments), and might possibly constitute a “basic” metaphor (Schnall, in press). On the other hand, it is conceivable that our findings are specific to morality because they relate to one of the presumed moral foundations (Graham, Haidt, & Nosek, 2009), namely purity. Indeed, compared to people low in disgust sensitivity, people high in disgust sensitivity not only hold more conservative attitudes toward moral issues (Inbar, Pizarro, Iyer, & Haidt, 2012), they are also better at visually detecting slight deviations from white that might be indicative of contamination (Sherman, Haidt, & Clore, in press). Thus, it is conceivable that a black and white visual contrast is especially salient in moral contexts.

The fact that subtle presentations of idiomized metaphors can change which actions people consider right or wrong could have important practical and applied implications. Indeed, there is a growing recognition that embodied physical experiences and resulting cognitive processes might be intimately tied to abstract thinking and decision



making in legal situations (e.g., Benforado, 2010; Spellman & Schnall, 2009). The observed association between perceptual experiences and notions of morality might, for example, be particularly problematic in contexts that involve judgments of others' guilt, or innocence: Subtle perceptual stimuli in the courtroom context (e.g. the color of floor tiling) might unconsciously influence legal actors, leading to biased judgments and decisions when objectivity is of utmost concern. The knowledge about the existence of such factors might constitute the first step toward guarding against their potential influence.

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