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The moral pop-out effect: Enhanced perceptual awareness of morally relevant stimuli

Ana P. Gantman, Jay J. Van Bavel *

Psychology Department, New York University, 6 Washington Place, New York, NY 10003, USA

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ABSTRACT

People perceive religious and moral iconography in ambiguous objects, ranging from grilled cheese to bird feces. In the current research, we examined whether moral concerns can shape awareness of perceptually ambiguous stimuli. In three experiments, we presented masked moral and non-moral words around the threshold for conscious awareness as part of a lexical decision task. Participants correctly identified moral words more frequently than non-moral words—a phenomenon we term the *moral pop-out effect*. The moral pop-out effect was only evident when stimuli were presented at durations that made them perceptually ambiguous, but not when the stimuli were presented too quickly to perceive or slowly enough to easily perceive. The *moral pop-out effect* was not moderated by exposure to harm and cannot be explained by differences in arousal, valence, or extremity. Although most models of moral psychology assume the initial perception of moral stimuli, our research suggests that moral beliefs and values may shape perceptual awareness.

1. Introduction

In 2004, a woman from Florida sold a decade old, partially burnt, grilled cheese sandwich on eBay for $28,000 (Associated Press, 2004). The bidders clamored to pay over 14,000 times the value of the toast because an image of the Virgin Mary was perceived to be staring out from its charred center. Perceiving religious and moral iconography in natural phenomena, ranging from grilled cheese to bird feces, is surprisingly common (see http://jesusiseverywhere.net). In the current research, we examined whether moral concerns can shape the perception of ambiguous stimuli.

The vast majority of theories in moral psychology presume the perception of moral stimuli or "eliciting situations" (e.g., Haidt, 2001). In much of this research, participants are presented with vivid dilemmas and asked to render their moral judgment. Although moral perception is generally considered a necessary, pre-requisite for judgment and decision-making, there is good reason to believe that personal beliefs, moral identities, or moral motives may influence the basic awareness and interpretation of moral stimuli prior to action (see Aquino & Reed, 2002; Narvaez, Lapsley, Hagele, & Lasky, 2006). If so, these motives may literally lead people to see evidence of their moral values and beliefs in grilled cheese sandwiches or other perceptually ambiguous stimuli.

Research suggests that people have enhanced accessibility of highly valued or goal-relevant stimuli (Förster, Liberman, & Friedman, 2007), which may enhance perceptual awareness (Anderson, 2005; Anderson & Phelps, 2001; Bruner & Goodman, 1947; Vuilleumier, 2005). For example, food-related words are easier to recognize when one is hungry than when one is satiated (Radel & Clément-Guillotin, 2012; see also Balcetis, Dunning, & Granot, 2012). Given that morality satisfies multiple core motives, including the need for control (Kay, Gaucher, McGregor, & Nash, 2010), justice (Lerner & Miller, 1978), and to belong to and maintain social groups (Haidt & Graham, 2009), we hypothesized that perceptually ambiguous, moral stimuli

* Corresponding author. Tel.: +1 212 992 9627; fax: +1 212 995 4966.
E-mail address: jay.vanbavel@nyu.edu (J.J. Van Bavel).

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would be more likely to reach perceptual awareness than non-moral stimuli.

1.1. Present research

In three experiments, we examined whether perceptually ambiguous moral stimuli would be more likely to reach perceptual awareness than matched non-moral stimuli—a phenomenon we termed the *moral pop-out effect*. We hypothesized that morally relevant stimuli presented close to the threshold of perceptual awareness—a point at which they are perceptually ambiguous—would be recognized more often than non-moral stimuli. In order to do this, we presented words and non-words very briefly in a lexical decision task, and varied whether the words pertained to morality or not.

In Experiment 1, participants completed the lexical decision task with moral and non-moral words presented for 40 ms to ensure the words were close to the threshold of perceptual awareness (Gelskov & Kouider, 2010). In Experiment 2, we manipulated the presentation time of the stimuli to examine the entire time course during which morally relevant words "pop-out". We reasoned that words presented too quickly would fall below perceptual awareness and words presented too slowly would be perceived accurately, regardless of content. If moral concerns influence the awareness of perceptually ambiguous stimuli, then we should only find evidence of the *moral pop-out effect* for stimuli presented close to the threshold for perceptual awareness. In Experiment 3, we replicated the *moral pop-out effect* and investigated whether it might be strengthened after exposure to harm, a determinant of moral construal (Gray & Schein, 2012).

1.2. Experiment 1: The moral pop-out effect

In Experiment 1 we examined whether moral words would reach perceptual awareness (i.e., "pop-out") more frequently than non-moral words. We adapted a typical lexical decision task in which participants see a string of letters and indicate whether or not they comprise a word. Previous research has shown that faces presented for short durations (17 and 33 ms) are correctly identified at chance levels, whereas faces presented for longer durations (50 ms or longer) are correctly identified more frequently until they level off at nearly 100% accuracy (Gelskov & Kouider, 2010). We presented stimuli for 40 ms (an estimated threshold for perceptual awareness), to examine whether moral words had a lower threshold for perceptual awareness than non-moral words.

2. Methods

2.1. Participants

Twenty undergraduate students at New York University participated for partial course credit. One participant was excluded because the computer program crashed.[1]

2.2. Procedure

Participants were told that the experiment was about visual acuity. The concept of morality was never mentioned. Instructions for the lexical decision task were administered in DirectRT on a Dell Optiplex 760 with a 60 Hz refresh rate. Participants completed the study alone in a dimly lit room and sat approximately 16 in. from the monitor. Stimuli appeared in white letters on a black background, size 24 font in the center of the computer monitor. The experiment began with a brief tutorial with five trials of non-moral words and non-words (*apple*, *speilc*, *building*, *kroaf*, *parrot*) at decreasing stimulus durations (500, 300, 100, 80, and 60 ms) to allow participants to learn the task. On every trial, participants saw a fixation cross in the center of the screen for 100, 200 or 300 ms (randomized to prevent participants from feeling lulled by a repetitious rhythm). The fixation cross was followed by the stimulus word presented in the center of the screen for approximately 40 ms, and then a 200 ms backwards mask of ampersands that corresponded to the number of letters in the word (e.g., 'useful' was followed by '&&&&&&'). The screen was black until participants responded (see Fig. 1). There were 82 moral/non-moral words and 40 non-words presented in random order. All materials (including full moral and non-moral word lists) are available online at: https://osf.io/7fk9b/.

After the lexical decision task, participants completed a number of exploratory individual difference measures we thought might be associated with the *moral pop-out effect*. These were global belief in a just world (Lipkus, 1991), religiosity (Batson, 1976), the moral foundations questionnaire (Graham, Nosek, Haidt, Ravi, & Ditto, 2011), and revised disgust sensitivity (Olatunji et al., 2007). None of these individual difference measures were significantly correlated with the accurate recognition of moral vs. non-moral words in this or any subsequent experiment ($ps > .08$) and we do not discuss these measures further.[2]

Participants then completed a manipulation check intended to validate the distinction between moral and non-moral words. The experimenter explained to each participant that they were to rate whether the words were related to the domain of morality (and not whether the words were moral vs. immoral or whether they could imagine a moral situation involving the word). For example, "hero" and "devil" are both in the moral domain, but "pilot" should be considered non-moral. Participants then rated 82 randomly presented words (for a full word list, see https://osf.io/7fk9b/), 41 that we assumed were moral (e.g., *moral*, *virtue*, *steal*, *sin*, *should*) and 41 that were non-moral (e.g., *useful*, *virtual*, *steel*, *trick*, *could*) on a five-point scale (from 1 = "*not at all moral*" to 5 = "*very moral*"). Participants rated the moral words used in the lexical decision task as more morally relevant ($M = 3.84$, $SD = 0.50$) than non-moral words ($M = 2.03$, $SD = 0.49$), $t(18) = 16.36$, $p < .001$, $\eta^2 = .94$. Paired samples t-tests revealed no

[1] It was determined *a priori* to run this experiment until the end of the semester. This applies to all subsequent experiments reported here.

[2] We did detect, however, a marginally significant interaction between word type and the moral foundation of harm ($p < .08$), such that for those participants who reported that harm was relevant to their moral judgments, the moral pop-out effect was accentuated, $B = 0.32$, $SE = .17$, $p = .07$, $z = 1.83$, despite the lack of main effect, $B = -0.40$, $SE = .26$, $p = .31$, $z = 1.56$.