

Moral Judgments and Visual Attention: An Eye-Tracking Investigation

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Abstract

When making moral judgments people often make snap decisions and then highlight information that confirms that preliminary judgment, a phenomenon referred to as “motivated moral reasoning.” The current study uses eye-tracking technology to examine whether people are also “motivated moral *perceivers*” – that is, whether people disproportionately attend to visual information that is consistent with their moral judgments when evaluating morally challenging situations. To examine this tendency, participants were presented with a set of classic dilemmas in which an individual or group must die in order for another individual or group to live. Participants were then presented with visual images of the parties involved in the dilemmas. I predicted that people would avoid looking at the individual or group they decided to sacrifice, focusing instead on the individual or group they decided to save. My results confirmed that people selectively attended less to the image of the individual or group they had decided to kill or let die.

Moral norms, what people consider to be “right” and “wrong,” are the foundations for values and ethics in every culture. Moral judgments, therefore, are people’s decisions about the rightness or wrongness of an action based on social values (Ditto, Pizarro, & Tannenbaum 2009; Haidt 2001). People often feel that an action must be either right or wrong; there is no relativism, so they search for rationality to justify judgments. These judgments influence acceptance, punishment, or

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other repercussions of a person's behavior based upon how their actions are evaluated in a moral context. The study of how humans form these moral judgments and explain their conclusions is thus integral to understanding how moral reasoning can be influenced.

Haidt (2001) uses a lawyer vs. judge analogy to explain different moral reasoning processes that result in moral judgments. The judge uses bottom-up processing to think rationally and to sift through information to seek the truth and find justice (Haidt; Ditto et al. 2009). By contrast, the lawyer utilizes top-down processing to look for information to confirm the conclusion, plea or accusation, of the client. Ditto et al. also calls this lawyerly thinking "motivated moral reasoning," describing a phenomenon in which one's judgment is motivated by a desire to reach a particular moral conclusion. Previous research shows that in the process of moral reasoning most people prefer to think they are judges (and, indeed, researchers themselves have classically viewed people as judges – e.g. Kohlberg 1969; Piaget 1932). However, they are actually more similar to lawyers who make initial intuitive judgments and when faced with social pressure to justify them, turn to moral reasoning to explain the decision *post hoc* (Haidt; Ditto et al.). In both processes, moral reasoning is a conscious search for evidence to support a moral judgment (Haidt).

Moral reasoning is a phenomenon of "confirmation bias," which refers to the process of unintentionally gathering and using information that selectively confirms a previously held belief (Nickerson 1998). The difference between the traditional understandings of moral reasoning and confirmation bias is intentionality. As explained by the judge/lawyer analogy, the "lawyer" is fully aware of the conclusion he or she intends to validate and his or her moral reasoning is motivated to confirm it. Confirmation bias is an automatic process of unconscious case-building to support a predetermined conclusion wherein humans trick themselves into thinking they are judges even though they are thinking like biased lawyers (Nickerson). People use confirmation bias in many decision making processes in life, not only moral judgments. Scientists, judges (ironically), doctors, and politicians have all been shown to be susceptible to gathering and manipulating facts to confirm a held belief (Nickerson). While traditionally moral judgments were thought to follow a process of reasoning using confirming evidence,

newer research shows judgments happen before reasoning.

Recently, Haidt (2001) challenged the traditional supposition that moral decisions were reached through a process of reasoning that concluded with a judgment founded upon that reasoning, that moral reasoning involved a conscious process of thinking about linking facts together systematically and logically to reach an informed (and impartial) decision. Haidt postulated instead a model in which moral decisions are generated via intuition – an unconscious, implicit process that occurs without careful consideration and is influenced by innate individual and cultural biases. People employ their intuitions much like an attitude or heuristic, a general “rule of thumb” for solving a problem, in order to make quick, visceral decisions about moral situations. The “social intuition” model states that when confronted with a moral dilemma people make intuitive judgments first, only afterward supplying a reasoning created *post hoc* to provide justification for the decision (Haidt). They first use perception to “see the truth” and then seek the facts to justify that perceived truth. People often falter in this process when attempting to produce a justification that explains their judgment, a phenomenon Haidt calls “moral dumbfounding” (Haidt).

While research has illuminated the degree to which cognitive processes are biased by rapidly forming, intuitive moral judgments, less is known about the biasing of incoming information at the level of visual perception. When visually processing incoming information, viewers often visually attend to information that confirms previous decisions, evidence of confirmation bias. When people are asked to make a preliminary decision and then are presented with options to select to learn more information that either reinforces or counters the choice they have made, they will choose to read confirming information (Jonas et al. 2001). People change the way they search a visual field based on what they want to confirm; that is, they use confirmation bias to skew perception to be consistent with a previous decision. Confirmation bias can also be thought of as a failure to search for negative evidence (Goldstone 1993). According to Goldstone, there is a bias towards attending to objects mentioned in instructions and away from those not mentioned. Motivated moral reasoning (a conscious process) is often susceptible to bias and can be considered a subset of confirmation bias. We know control of truth seeking happens at

the level of cognition, but research is lacking on how people regulate incoming visual information that is consistent with their preformed moral judgments.

In a related field of study, differences in visual attention have been studied in conjunction with personality. Luo and Isaacowitz (2007) studied dispositional optimism (the belief that good future outcomes will occur across domains) and attention to negative or positive information regarding skin cancer. Using an eye-tracking device, the researchers measured whether participants looked at positive, neutral, or negative text and images of skin cancer and correlated the results with reported measures of optimism. Those who were low in dispositional optimism or high in health-related optimism looked more at negative or neutral information, whereas those who were more optimistic looked more at positive and less at negative stimuli. This study showed that people regulate incoming information consistently with their pre-established dispositions, a function of confirmation bias driven by personality. While this study did not examine moral reasoning, it is an important indication that people control visual input consistent with their sense of relevance and their dispositional outlook.

Beyond the area of research on temperament, scholars have studied visual attention to images in the context of avoiding anxiety producing situations. Eye-tracking technology provides an interesting tool for the examination of visual attention in anxiety provoking scenarios. Mühlberger, Wieser, and Pauli (2008) used an eye-tracking device to track looking patterns at emotional faces or neutral objects in the presence or absence of an emotion induced condition, public speaking. Participants were either told that they would be giving a presentation after the experiment or were told nothing. All participants looked at a series of paired happy face/angry face, happy face/neutral object, and angry face/neutral object images and eye-tracking was used to record gaze. When in the fear (of public speaking) condition, participants initially avoided the faces and then looked more at the happy than angry faces when each was paired with neutral objects. From this study the authors conclude that social anxiety induced avoidance of faces regardless of expression and that faces were more meaningful for anxious people. The Mühlberger et al. study used eye-tracking to assess gaze allocation in socially arousing situations, but in the absence

of moral judgment.

In addition to confirmation bias, disposition, and social anxiety, visual attention has also been used in the study of social dominance (Maner, DeWall, & Gailliot 2008). All people visually attend more to images of men and women displaying gender-specific forms of social dominance. This selective attention, like confirmation bias, happens unwittingly and confirms social cues. Evolution theories maintain that selective attention in threatening situations is adaptive to human functioning.

Maner et al. urged that more research on the automatic processes of perception needs to be performed to better understand higher level cognitive processes such as moral judgments. The current study answers this call by seeking to demonstrate the importance of perception to executive reasoning. This study uses eye-tracking technology to explore the relationship between people's moral judgments about morally challenging situations and their visual attention to related images. People are motivated moral reasoners subject to confirmation bias and moral dumbfounding, but do they skew the justifications they develop at the deeper perceptual level? Are people motivated moral perceivers? Eye-tracking has been utilized by researchers in many types of assessment including optimism (Luo & Isaacowitz 2007), social anxiety (Mühlerberger et al. 2008), and social dominance (Maner et al. 2008), but this is the first to explore the relationship between moral decision making and gaze patterns. I am interested in the degree to which people control incoming sensory information in order to conform to a moral judgment. People are generally motivated to keep their initial judgment consistent and therefore seek confirming information, perhaps through visual means. Given what we know about motivated moral reasoning, we should expect people to attend to visual stimuli that is consistent with their moral judgment and avoid stimuli that is inconsistent.

Method

Participants

Participants included 266 College of Charleston students (219 females; 232 Caucasian, 18 African American, 8 Asian American, 6 Hispanic, 2 other) taking Introductory Psychology classes and

participated for research credit.

Materials

Eye-tracking testing occurred in an approximately 8 by 15 foot room with a desk against one wall. The participants sat at the desk with a computer monitor that showed the images. The eye-tracking device was positioned on the desk below the screen. We used an ERICA eye-tracking device (Eye Response Technologies 2004) which recorded gaze fixation points defined as: .05 seconds (minimum) time for fixation, a diameter of 40 pixels, and 10 (minimum) points within a fixation. The experimenter sat at one end of the desk with a laptop computer that controlled the images on the monitor and calibrated the ERICA eye-tracker.

Stimuli.

Text explaining the scenarios were presented for 25 seconds followed by a ten second exposure to the image slides. A three second buffer slide containing a dark screen with centered red dot was presented between each slide to reorient the participants' eyes to the center of the screen. In both studies we considered the first recorded fixation point on the images to be a centered focus point carried over from the buffer slide. Therefore, we discounted the first fixation point and counted the second recorded fixation point to be the first true glance at the images. In the first condition, participants read either the Trolley scenario or the Footbridge scenario (see Appendix).

After reading one of the scenarios, a split screen was presented with an image of an overweight man on one side and a picture of five workmen on the other side, images were counterbalanced between participants. In the final condition, all participants read the Baby/Villager scenario (see Appendix) and were then exposed to an image of a baby on one side of the monitor screen and an image of people hiding in a cave on the other side.

Procedure

The eye-tracking task was part of a larger study and was the second task participants engaged in immediately after filling out informed consent and completing a sorting task. Participants were in the laboratory for a total of 50-60 minutes with roughly five to ten

minutes spent on the eye-tracking task.

During the moral judgments phase of the study, participants were shown into the room with the eye-tracking device. They were told to sit close to the desk in a comfortable position where they could hold their head still during the tracking. The eye-tracker was then focused on the glint in the participants' right eyes followed by a preliminary calibration of the device. The participants were told they would see a set of stories with dilemmas to consider and they could give their responses to the stories at the end.

After participants viewed either the Trolley or the Footbridge case and the Baby/Villager case, the experimenter left the room and the participants filled out a questionnaire with ratings on Likert scales on which 1 was strongly negative and 7 was strongly affirmative. The Trolley case questions were: "Would you flip the switch to save the five people?" and "Should you flip the switch to save the five people?" while the Footbridge asked: "Would you push the man off the bridge to save the five people?" and "Should you push the man off the bridge to save the five people?" The Baby/Villager questionnaire asked: "Would you smother your baby to save the other villagers?" and "Should you smother your baby to save the other villagers?" After the moral judgments phase, participants were shown to the next room to finish the larger study.

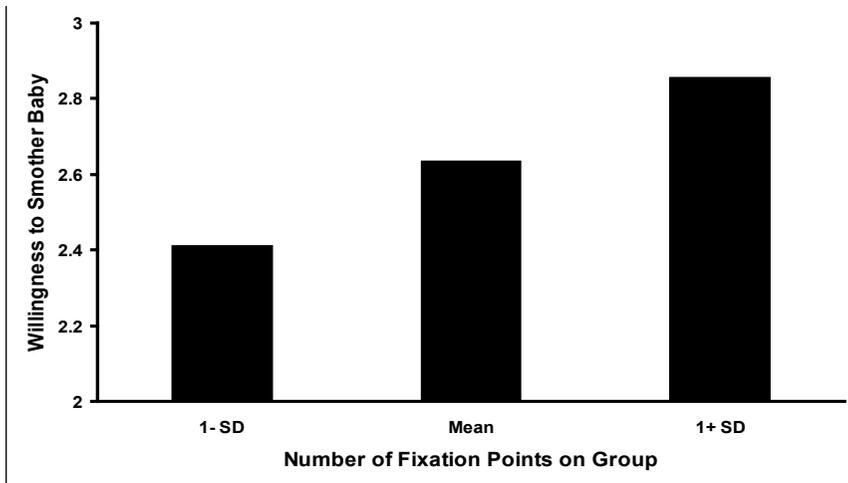
Results

The most significant findings between recorded gaze patterns and questionnaire answers were in response to questions that asked, "would you...". This phrase implies a moral action whereas "should" implies a moral evaluation. In light of this distinction, it is not surprising that judgments related to participants' projected actions were more strongly correlated with their behavioral visual perception. The study thus focuses results of willingness to kill on answers to the "would" questions instead of the "should" questions.

The "would" questions, those that measure willingness to kill, produced the most variance. For the Baby/Villager scenario, we regressed the number of times people fixated on the group onto their willingness to smother the baby and found it to be predictive of willingness to smother the baby, both alone ($B = .052, p = .047$) and when controlling for the total number of switches between images (B

= .060, $p = .027$). The more frequently participants looked at the group the more willing they were to smother the baby (Figure 1).

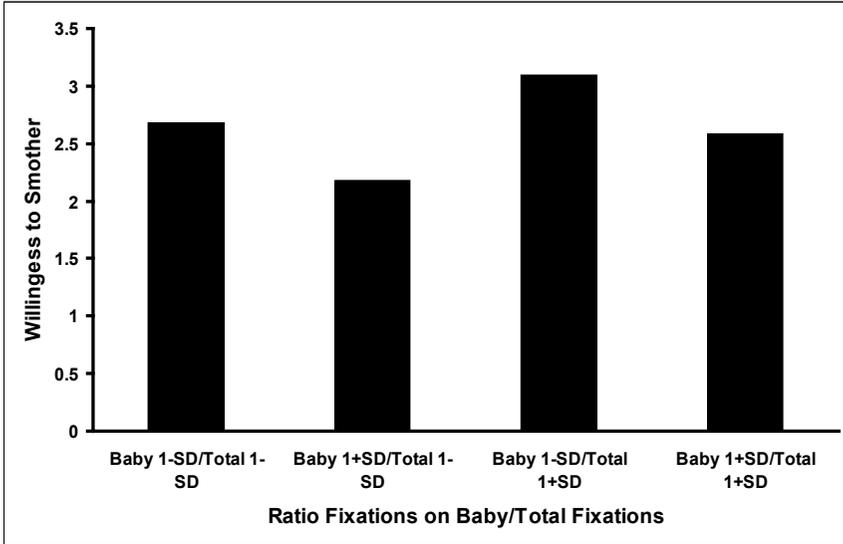
Figure 1. Relationship between willingness to smother the baby and number of fixations on group image.



We also regressed the number of times people fixated on the baby onto their willingness to smother the baby and found it to be predictive of their willingness to smother the baby, though only when controlling for the total number of fixations ($B = -.067$, $p = .048$). The less frequently people looked at the baby, relative to their total fixations, the more willing they were to smother the baby (Figure 2). Additionally, the time spent looking at the baby was predictive of willingness to smother ($B = -.160$, $p = .041$): the less time people spent looking at the baby, the more willing they were to smother the baby.

Using an ANOVA to examine the role of gender, we found a significant difference between males and females in their willingness to smother the baby. Specifically, males were more willing to smother the baby ($M = 3.450$, $SE = .253$) than females ($M = 2.451$, $SD = .121$), $F(1, 213) = 12.683$, $p < .001$, $\eta^2 = .056$. Nonetheless, regression analyses revealed that time spent looking at the baby ($B = -.147$, $p = .054$) and the number of fixations on the group ($B = .051$, $p = .048$) remained

Figure 2. Relationship between willingness to smother the baby and number of fixations on the baby controlling for the total number of fixations.

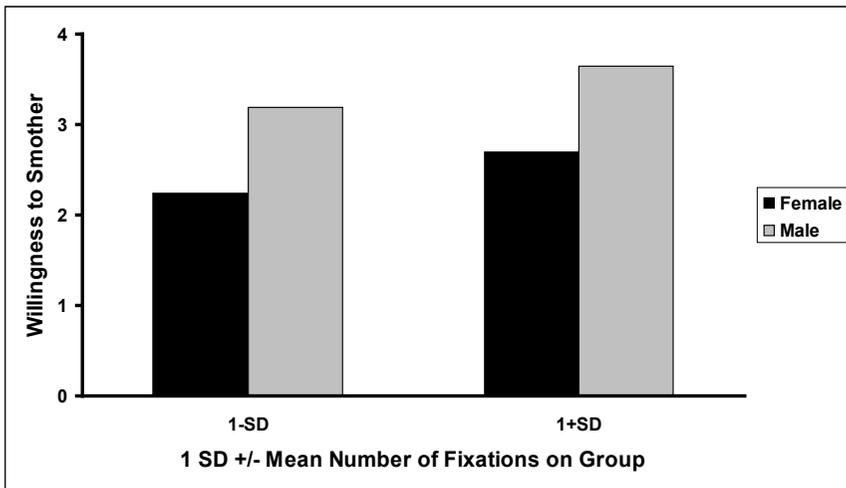


predictive of willingness to smother even after controlling for gender (Figures 3 and 4).

Using an ANOVA to explore the Trolley and Footbridge cases we discovered similar findings for both scenarios. A between-subjects ANOVA revealed that, overall, participants were more willing to kill the individual in the Trolley case ($M = 5.44$, $SE = .178$) than in the Footbridge case ($M = 4.13$, $SE = .29$), $F(1, 204) = 14.848$, $p < .001$, $\eta^2 = .068$, a finding consistent with prior literature. There was a significant main effect of first look on the group or individual ($F(1, 204) = 32.713$, $p < .001$, $\eta^2 = .065$) and interaction between first look and Trolley or Footbridge case ($F(1, 204) = 22.982$, $p = .002$, $\eta^2 = .047$). In other words, participants whose first glance was at the group were more willing to kill the individual (Trolley: $M = 5.66$, $SE = .20$; Footbridge: $M = 3.78$, $SE = .268$) than if the first glance was at the individual (Trolley: $M = 5.11$, $SE = .162$; Footbridge: $M = 2.96$, $SE = .204$) in both scenarios, thereby saving the group (Figure 5). The

Trolley and Footbridge studies differed from the Baby/Villager case in that gender was not a significant predictor of willingness to kill the individual ($F(1, 218) = 2.711, p = .101, \eta^2 = .012$). The variables of interest were not predicted by responses to the *should* questions on the questionnaire.

Figure 3. Gender differences in relationship between willingness to smother the baby and number of fixations on the group.



Discussion

Our study confirmed the prediction that people avoid looking at information that is inconsistent with their intuitively formed moral judgment. Participants who were more willing to smother the baby looked at the baby less and people who were more willing to pull the switch or push the man off the footbridge looked at the individual less. Visual attention towards the saved individuals in the scenario indicates that participants used sensory control over incoming information in a way that was consistent with their moral judgments. Gaze allocation could be explained in terms of moral anxiety avoidance or cognitive dissonance: either avoidance of the sacrificed individual or seeking the group that will be saved. People may have avoided looking at the individual because they experienced moral anxiety as a result of

having already made the decision to kill him or her. Averting gaze from the anxiety inducing individual reduced the uncomfortable feelings; looking to those saved brought feelings of comfort. Where the participants looked may be explained as an attempt to reduce the level of cognitive dissonance between their morals and their choice. People do not like to be in the discomfoting position of being immoral, thus gaze control helps to form consistency between beliefs and actions.

“Consequentialism,” a theory that defines morally correct behavior as action that brings the greatest gain to the greatest number of people, even at the expense of a few, helps to explain moral reasoning (Lanteri, Chelini, & Rizzello 2008). Consequentialism may explain why the participants in our study looked more at the group, seeking confirmation that saving the group would be the morally correct choice and reducing anxiety over choosing to kill the individual.

Figure 4. Gender differences in willingness to smother the baby comparing number of fixations on the baby with the total number of fixations.

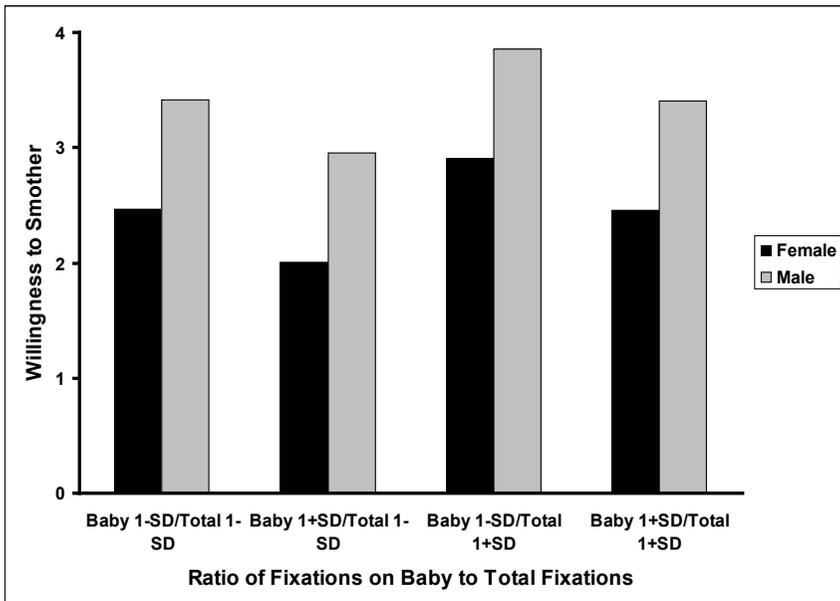
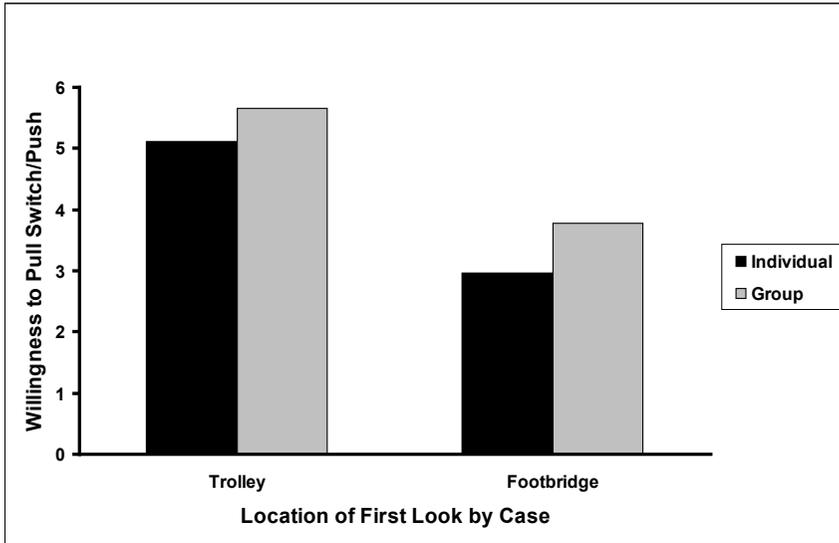


Figure 5. Gender differences in the Trolley/ Footbridge cases relationship between willingness to pull the switch/push the man and location of first look.



In the Baby/Villager case, we found a gender difference in willingness to smother the baby, with males being more willing than females. This discrepancy may be because females are biologically more emotionally geared than men towards protecting babies from harm. Consistent with this theory, there was not a significant gender difference in willingness to kill the individual in the Trolley and Footbridge studies in which the individual was an overweight man. The discrepancy between cases indicates that the gender difference was possibly the result of perceived vulnerability of the individual in each case.

Also consistent with the literature, this study suggests that people not only use motivated moral reasoning to aid in their moral judgments, but also use motivated moral perceiving as a function of confirmation bias. Of course, this study assumes that after reading the case, participants immediately made judgments (Haidt). It is possible that people made their judgments while they were looking at the images (since, in our study it was not possible to identify when

during the experiment the moral judgment occurred in relation to the presentation of images). Our study first presented textual description of the scenario and then showed images representing the characters, but different methodological manipulations could pinpoint precisely when the judgment occurred (i.e. before, during, or after seeing the images). Here, the eye-tracker was crucial because there were no other manipulations of presentation to decipher which characteristic of the individual or the group was most important in willingness to kill. What we did discover was the bi-directional relationship between people's moral judgments and their visual attention.

One limitation of this study was that the participants were not asked to justify their moral reasoning, merely to indicate if they *should* or *would* kill the individual. Future studies could use a more thorough investigation of reactions to the scenarios to determine cognitive thought processes. Also, manipulations of race, age, weight, and gender of the subjects in each case could show interesting effects on willingness to kill the individual. To our knowledge, this was the first study on how participants seek visual confirmation of moral judgments and we do not know if altering the images would produce different results. Visual attention is only one factor in adaptive cognitive judgments (Maner et al. 2008), but this study takes a first step in predicting the regulation of incoming sensory perceptions to confirm moral judgments.

This study pushes the debate into the real world of moral reasoning and suggests that there is more involved than impartial application of moral principals. Confirmation bias is a common presence both at the level of judgment and of perception. The power of visual perception to influence moral judgment might explain why throughout history political groups have used distorted images as propaganda against enemies. Perceived dehumanization makes acts of war, genocide, and patriotism less cognitively dissonant with our normal moral prohibitions against killing other humans. Furthermore, when confirmation bias is used to search for discrediting information, political images and symbols may reinforce judgments about the morality of killing the enemy (Nickerson 1998). Propaganda is one example of the implications from this study, but the results could be applied to many situations in which visual attention is manipulated in the presence of moral judgments. The moral of the story is that

we do indeed engage in motivated reasoning – but only with those perceptions we are biased to see.

Appendix

Vignette for the Trolley case:

A trolley is running out of control down a track. In its path are five people working on the trolley track and they are wearing head gear designed to block out noise, so they won't hear the trolley coming in time to move out of the way. Fortunately, you can flip a switch, which will lead the trolley down a side track to safety. Unfortunately, there is a very large man working on that side track. He is listening to music on his iPod and won't hear the trolley coming in time to move out of the way. So if you pull the switch, you will move the trolley to the side track, killing him, but saving the five workers.

Vignette for the Footbridge case:

A trolley is running out of control down a track. In its path are five people working on the trolley track and they are wearing head gear designed to block out noise, so they won't hear the trolley coming in time to move out of the way. Fortunately, you are on a footbridge under which the train will pass, and you can stop it by blocking the tracks in front of it. As it happens, there is a very large man listening to music on his iPod standing next to you on the bridge and if you push him off the bridge and onto the track, you will stop the trolley, killing him, but saving the five workers.

Vignette for the Baby/Villager case:

Enemy soldiers have taken over your village. They have orders to kill all remaining civilians. You and some of your townspeople have sought refuge in the cellar of a large house. Outside, you hear the voices of soldiers who have come to search the house for valuables. Your baby begins to cry loudly. You cover his mouth to block the sound. If you remove your hand from his mouth, his crying will summon the attention of the soldiers who will kill you, your child, and the others hiding out in the cellar. To save yourself and the others, you must smother your child to death.

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