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HOT VERSUS COLD PROCESING IN MORAL JUDGMENT AND THE ROLE OF COGNITIVE CAPACITY

by

SARAH CAVRAK

Under the Direction of Heather M. Kleider

ABSTRACT

In this study I first examined whether the cognitive processes (hot versus cold cognition) underlying judgments to traditional moral situations is universal to situations that are morally neutral, and whether individual differences in cognitive ability moderate these judgments. Second, I tested whether it was possible to modify the impact of hot versus cold processing systems on judgment deliberation by shifting the focus of attention during the decision-making process. I conclude that moral judgment is not simply the product of cognitive ability and is not sufficiently motivated by hot cognitive experiences alone. The role of cognitive abilities on moral valuation requires further examination.

INDEX WORDS: Cognition, Morality, Judgment, Executive functioning, Attention

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SARAH CAVRAK

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

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Sarah Elizabeth Cavrak

2010

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by

SARAH CAVRAK

Committee Chair: Heather Kleider

Committee: David Washburn
Marci Culley

Electronic Version Approved:

Office of Graduate Studies

College of Arts and Sciences

Georgia State University

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1 INTRODUCTION

Imagine that you are a construction worker, and that you and your crew are high on a scaffold working on a skyscraper. Suddenly, the scaffolding partially collapses. You and several others are hanging onto a dangling crossbar, but it cannot hold all of your weight. The worker next to you slips off the crossbar and grabs onto your one free arm. You realize that the entire structure is about to collapse, and the only way to avoid you and everyone else falling to your deaths is to repeatedly kick your co-worker in the stomach and chest until he lets go of your hand and falls to his certain death. This will remove just enough weight that the rest of you can make it to safety before the scaffold collapses. Is it appropriate for you to kill your co-worker in order to save yourself and the rest of the crew (Greene, Sommerville, Nystrom, Darley, and Cohen, 2007)?

Determining whether a situation is moral requires some knowledge of moral normativity, which is based on an awareness of acceptable socialized behavior (e.g., child development of morals, Kohlberg, 1969; moral foundations, Haidt & Joseph, 2004; religious beliefs, Wahrman, 1981). Further, assessing whether a behavior in a decidedly moral situation is deemed morally right from wrong is largely subjective (Lapsley & Hill, 2008). Graham, Haidt, and Nosek (2009) found that political affiliation predicted the relevance of moral intuition categories (e.g., harm, justice) when considering the moral valuation of a statement. In the construction worker example you are asked to consider killing someone (generally acknowledged as an immoral behavior) in order to save the lives of other people (a desirable outcome). How does one determine an appropriate course of this action?

Moral judgment theorists currently debate whether moral decisions are primarily the product of conscious thoughtful reasoning (Kohlberg, 1969), intuition (Haidt, 2001), or a combination of these (Pizarro & Bloom, 2003). Rationalist Models of moral decision-making describe a progression of judgment, such that a morally provocative situation directly leads to a controlled reasoning response, followed by a

decision or judgment about the situation (Williams, 1967). The model does not ignore the potential contribution of automatic emotional reactions, and allows for affect to influence judgment indirectly through reason, but not in all circumstances. In contrast, Haidt (2001) concluded that automatic emotion-based intuition guides moral considerations, such that any rationalization is made as a post hoc response. In doing so, he developed the Social Intuitionist Model (SIM), and stated that a situation requiring moral consideration will elicit an intuitive emotional response (e.g., disgust), which will lead to a judgment about the situation. A thoughtful and controlled reasoning process will then occur in order to justify the emotions that led to the judgment. Unlike in rationalist models, emotion is required for any moral judgment to occur.

The majority of studies aimed at distinguishing controlled from automatic cognition have focused on written scenarios containing a moral dilemma and a forced-choice decision for the participant to select and ultimately to justify. These dilemmas often put the participant in the position of deciding whether the actor (i.e., person performing the required action) should, in fact, harm or kill another person (i.e., victim) in order to spare the lives of at least one other person. Investigations into whether physical contact between actor and victim (personal actions) influence ratings of on acceptability for such an action find generally that. personal actions (e.g., shoving the victim onto a set of railroad tracks in order to save the lives of numerous other people), are rated as significantly less morally appropriate than situations where there is no physical contact (*impersonal* actions) but the outcome is the same (Cushman, Young, & Hauser, 2006; Moore, Clark, & Kane, 2008). Using fMRI technology, Green, Sommerville, Nystrom, Darley, and Cohen, (2001) found that personal moral dilemmas led to activation in the medial prefrontal cortex (a brain area associated with emotions), whereas impersonal dilemmas lead to brain activation in the dorsolateral pre-frontal cortex (an area associated with controlled processing (i.e., executive functioning)). Consequently, Greene and colleagues (2001) argued a dual-processing model to moral decisions, such that personal dilemmas lead to “hot”, cognition, and thus

emotion-based decisions, whereas impersonal dilemmas allow for “cold” cognitive processing leading to decisions that are logic-based. Regarding moral decision making, both hot and cold mechanisms...

Hot and cold reasoning systems (otherwise referred to as Systems 1 and 2, respectively) are active in judgments related to nonmoral decisions as well. Dual-process theories of general judgment and decision-making describe hot cognition as quick, implicit, and automatic (both in activation as well as processing). It functions from an associative-based network often relying on heuristics, and is involved in impression perception (Kahneman & Tversky, 2003). Cold cognition, on the other hand, is an intellectual and controlled process that requires explicit learning as well as a conscious processing system and functions from a rule-based structure (Posner & Snyder, 1975; Shiffrin & Schneider, 1977; Johnson-Laird, 1983; Evans, 1984, 1989; Pollock, 1991; Reber, 1993; Hammond, 1996; Sloman, 1996; Stanovich & West, 2000; Kahneman, 2003). Both systems have benefits and drawbacks contingent upon the circumstances requiring the decision. The hot system is cognitively efficient, necessarily requiring fewer processing resources than the intentional reasoning processes of the cold system which is resource demanding, and is advantageous when one is required to make split--second decisions (e.g., shoot a weapon or not; Payne, Jacoby, & Lambert, 2005), when performing multiple tasks, or when extended task performance requires both speed and precision (Kahneman, 2003).

Arguably both systems (hot and cold) are engaged ----The benefits inherent in hot system’s reflexive responding can become a detriment when speed and accuracy are at odds (cite). The errors of the hot system can be overcome with the conscious deliberation of the cold system, and because cold cognition is the more intentional of the two systems it is always involved in reasoned judgments (e.g., determining the probability of potential outcomes where some amount of risk is involved; Kahneman, 2003). Theoretically, this is because the rational cold system monitors the intuitive hot system. Any doubt or uncertainty one experiences over a situation is the result of the cold system, as this logic-based cold system monitors inconsistencies or conflicts that arise from thoughts about a particular situation.

For example, the hot system may immediately deem the construction worker situation as immoral because killing anyone, regardless of the reason, is wrong (the deontologic choice). The cold system, on the other hand, may acknowledge the intuitive/reflexive reaction of the hot system, but also be able to simultaneously conceive that the death of one person is more palatable than the deaths of many other people (including oneself). In this case, the cold system, in contrast to the hot system, may arguably determine that it is more appropriate to repeatedly kick one's co-worker from the scaffolding if it saves the lives of many other people (the utilitarian choice).

The extent to which one relies more heavily on a controlled or automatic processing system is a function of cognitive ability (Stanovich & West, 1998). If sufficient cognitive resources required to make a controlled, resource-dependant decision, indicative of the cold system, are unavailable then one will rely on the resource efficient hot system. Accessibility naturally decreases as interference from competing information sources or demands on attention increase, and there are differences in one's vulnerability to interference. Both vulnerability to interference and system availability are related to cognitive deficits based on internal factors, such as differences in age, arousal, and depression (Hasher & Zacks, 1988). System availability can also be affected by external factors otherwise referred to as "loads" such as time pressure, concurrent cognitive tasks, mood fluctuations, and time of day. These loads effectively reduce access to available cognitive processing resources. Availability determined by internal factors tends to be a greater predictor of task performance (e.g., decision-making) than availability determined by external factors (Kahneman, 2003).

Natural sources of cognitive ability, or Working Memory Capacity (WMC), are described as an interactive cognitive processing system where the interpretation and temporary storage of language, imagery, and episodic memories is required for various tasks (Atkinson & Shiffrin, 1971; Baddeley & Hitch, 1974). WMC can be measured using dual-processing tasks, and such measures correlate highly with fluid intelligence (Unsworth & Engle, 2007), language processing (Baddeley, 2003) and decision-making

ability (Hinson, Jameson, & Witney, 2003). The central executive component to working memory is a combination of storage and controlled attention (Engle, Tuholski, Laughlin, & Conway, 1999), and is needed when two goals are actively being maintained (Unsworth & Engle, 2007). Differences in WMC are not universally apparent across tasks, but have been shown to reveal themselves 1) when conscious effort is required to override a naturally intuitive response, and 2) when simultaneously maintaining and retrieving task-relevant information. This, in essence, is The Working Memory Problem (Unsworth & Engle, 2007).

Persons with lower WMC have low cognitive processing ability, relative to high WMC persons and thus generally make more judgment errors (MacDonald, Just, & Carpenter, 1992), are more susceptible to stereotype use (Schmader & Johns, 2003), and likely rely on the hot processing system during these tasks as it provides the quickest route to a decision. Persons with higher WMC have a cognitive advantage compared to their low capacity counterparts and have more control over when and how their cold system is utilized. Working Memory is positively associated with deductive reasoning (Bara, Bucciarelli, & Johnson-Laird, 1995), as well as making consistent judgements across a variety of challenging tasks. Moore, Clark, and Kane (2008) found that high WMC participants consistently found it morally appropriate to sacrifice one person to save several others regardless of the situation or the associated emotionality. Both the rationalist and the social intuitionist models of moral judgment include an emotional or affective component. Emotional responsiveness tends to surface with little or no intention on the part of the person experiencing the emotion, thereby making this a largely intuitive and automatic reaction, and these emotional reactions are strongly predicted by WMC. A recent study by Schmeichel, Volokhov, and Demaree (2008) found that persons with low (relative to high) WMC were less able to regulate their emotional experiences even when instructed to do so. Further, Kleider, Parrott, and King (2009) found that participants with lower WMC made more shoot/don't shoot errors when emotionally and physiologically aroused rather than when they were in a non-aroused state suggesting that for low

WMC persons, emotionality usurps cognitive resources required to make controlled decisions. Thus, if low WMC persons are more influenced by emotional reactions, and less ability to control the automaticity of these reactions, then High WMC persons, then emotions likely influence judgments during moral deliberation. Conversely, if high WMC persons have more capacity for controlled processing than low WMC persons, then even though they may experience the same emotional reaction as low WMC persons, intentional processing likely overrides these reactions leading to a logic-based rather than emotion-based decision. This is what Moore and colleagues (2008) argued when they asked persons of varying WMCs to make moral assessments. The authors found that, compared to low WMC participants, high WMC persons judged situations where the deaths described where both personal (i.e., harm/death caused to a person) and inevitable (i.e., death occurring regardless of participant's decision). In other words, low WMC persons were less likely to justify killing a person even if the death would occur regardless of their decision. This suggests that they used their automatic emotional responses (regarding the personal nature of the deaths) to guide their judgments. High WMC persons not only found these situations to be more appropriate relative to low WMC persons, but were consistent in the magnitude of their appropriateness ratings across similar categories of decisions (e.g., personal-inevitable). This suggests that high WMC persons used a controlled strategy with which to make their judgments rather than relying on an emotional reaction to inform their moral valuations. Moral or other types of decisions can be biased based on the inappropriate application of available heuristics (Kahneman & Ritov, 1994; Kahneman, et al., 1999). These heuristics or "rules of thumb" are cognitive short-cuts for previously experienced events or for information previously encountered. Using these short-cuts for mental efficiency is economical and allows for the re-appropriation of cognitions for other necessary tasks (Goldstein, 2005). Heuristic processing is used when hot cognitions are activated (Ask & Granhag, 2007). An example of a *moral* heuristic might be, "punish and do not reward betrayals of trust," (Lapsley & Hill, 2008). Beyond rule misapplication, other sources of bias or error in judgment can occur from lack of attention

and/or distraction (Stanovich & West, 2000). If someone makes an error, then first we must identify what the error is a lapse from. Clearly, there are no strict criteria that identify an erroneous decision because a mistake in judgment for one person may be a logical conclusion for another (Johnson-Laird, 1983). However, if moral judgment is a dual-process phenomenon, and internal factors predict the superiority of cognitive systems crucial in this decision process, then is it possible to activate the less dominant system? The motivation to attend to something beyond a natural emotional response or salient stimuli-specific features requires deliberate instruction. Getting people to think statistically (versus emotionally) and then apply statistical strategy to decision-making can occur as education level increases, and if training in statistical reasoning is acquired. (Nisbett, Krantz, Jepson, & Kunda, 1983; Fong, Krantz, & Nisbett, 1986; Kahneman, 2003).

If we can identify the likely default location of one's attention and strategy during decision-making, then it may be possible to shift one's attention to an alternative source so an alternative decision can be made. By examining the roles of the hot and cold cognitive systems in moral situations, as well as the individual differences therein, we can identify the cognitive underpinnings behind these judgments. In the current paper I will first address whether moral judgments differ from nonmoral judgments, and whether moral judgments are especially susceptible to variations in cognitive processing strategies (i.e., hot/cold systems) because of the emotional weight of the dilemmas. Second, I will also determine whether focusing on one's emotions will, activate the emotion-based processing system thereby making *any* judgment feel like a moral one, thus facilitating and emotion-based judgment. Dual-process reasoning may function differently when determining the appropriateness of moral versus nonmoral behavior. Conversely, all decisions may be swayed by activating emotional versus factual content suggesting that people have control over which cognitive system is engaged when making a decision.

1.1 Overview

If moral situations inevitably evoke an intuitive emotional response, then how are these decisions made with rational thought? I hypothesize that cold cognitive processing introduces doubt onto the emotion-based response of the hot cognitive system. Moore and colleagues (2008) showed that WMC impacted moral judgments, and that low WMC persons used their emotions during decision-making whereas high WMC persons reasoned thoughtfully during the judgment process. Considering the construction worker example one more time - If one chooses to kick the single co-worker off the building, then this is seen as the cold system rising above the emotional reaction of hot system (which may be otherwise incapacitating). If one does not choose to kick the single co-worker off the building, then is this an example of an inferior cold cognitive system? I hypothesize that we are more likely to see the former decision in persons with high WMC and the latter in person with low WMC. If this pattern is evident, then are we able to access (or activate) cold cognitive processing in the low WMC persons by giving them deliberate instruction to focus on the information necessary to make a logical decision? Are we also able to deactivate cold processing in high WMC persons by instructing them to focus only on affective information, thereby facilitating an emotion-based judgment consistent with hot cognitive processing?

In this study I had two questions of interest. First, I tested whether the cognitive mechanism underlying judgments to traditional moral situations is universal to situations that are morally neutral. If moral judgments evoke an emotional response (i.e., activating the hot system), then I expect low WMC persons to vary their judgments of moral acceptability between situations that are moral versus non-moral. Alternatively, high WMC persons, who rely on the cold system, should rate judgments equally acceptable across situations. Next, I wondered whether it was possible to modify the impact of hot versus cold processing systems on judgment deliberation. Here, I measured WMC, and then presented participants with a series of dilemmas (moral and nonmoral). I instructed participants to focus on the emo-

tional information in some scenarios, and the factual information in others. Participants determined the degree to which they found each scenario morally wrong.

1.2 Hypotheses & Predictions

I hypothesize that moral judgment is unique based on the emotional undercurrent present in each moral situation. I hypothesize that the emotionality imbedded in the moral dilemmas will be the salient motivation for low WMC persons when determining moral valuation and I predict that they will rate moral dilemmas significantly more morally wrong when compared to ratings of nonmoral dilemmas. Further, I hypothesize that the cognitive ability of the high WMC persons will diffuse the emotional heatedness among the moral dilemmas leaving these persons with cold and rational deliberations. I predict then that moral and nonmoral ratings among the high WMC persons will not differ.

Second, because previous research suggests that cognitive ability predicts how one approaches moral judgment I hypothesize that it is possible to shift these judgments based on deliberate instruction. Overall, I predict that persons with high WMC will find the moral situations to be less abhorrent than low WMC persons. Due to their cognitive strength and control, these participants will be able to direct their attention to emotional information when instructed, but this control will render their judgments of moral wrongness equivalent across instruction blocks. For low WMC persons, their lack of cognitive control will render them unable to shift their attention far enough away from their emotion-motivating intuitions and onto the content-based information when instructed to do so. Therefore, this lack of cognitive control will leave them susceptible to the effect of the instructional variations, resulting in moral judgment ratings that are significantly greater when told to focus on emotions, and significantly less wrong when told to focus on facts. I do not expect there to be any variations in judgments to nonmoral dilemmas as a function of instruction block and WMC.

2 METHOD

2.1 Participants

Participants included 174 Georgia State University undergraduate students recruited using the online participant pool, and were awarded course credit for completing the study. Five participants were removed from the dataset prior to analysis; three were removed for failing to complete one or all of the experiment tasks and two were removed for cheating on the OPSPAN task (i.e., writing down letters that needed to be remembered). A total of 169 students were included in the current analyses. The demographic distribution is as follows: 122 students self-reported as female, 47 self-reported as male; 78 identified African American, 39 White, 30 Asian, 11 Bi-racial, 5 Latino/a, and 6 reported they were of another race not listed on the demographic form. The majority of participants (79%) ranged in age from 18 to 21 years.

2.2 Procedure

When participants arrived for their designated session they were greeted by the experimenter and escorted back to the lab. Each participant was individually assigned to a personal computer separated from the other computers with a three-sided partition (designed to discourage distraction and maintain privacy). After reading and signing the informed consent document, participants provided demographic information, and then completed the OPSPAN task (see Materials). Finally, participants were presented with dilemma vignettes in three blocks. Each block contained four moral dilemmas and four nonmoral dilemmas. The first block was always the control condition whereby participants were not told to focus on any particular piece of information, but to simply read the information presented and consider the moral implications of their decision. Following each dilemma participants were asked to determine how morally wrong it would be to carry out the action suggested from the vignette.

The second and third blocks of dilemmas were the experimental instruction-focus blocks. Here participants were told to focus “only on the facts in each dilemma” (fact-focus block) or to focus “on how you would feel if you were truly faced with this situation” (emotion-focus block). Eight dilemmas were presented in each block, and the instruction-focus blocks were counterbalanced (i.e., half of the participants were randomly assigned to complete the fact-focus block followed by the emotion-focus block, and the other half completed the emotion-focus block first). Just as in the control-focus block, participants had to determine how morally wrong each suggested dilemma action would be. All dilemmas within each block were randomly presented. Once participants completed all three blocks they were debriefed and awarded course credit for their participation.

2.3 Materials

Operation Span Task (Unsworth, Heitz, Schrock, & Engle, 2005): The automated version of the Operation Span (OPSPAN) is a dual-processing task, wherein equation-letter combinations are shown to participants throughout each task trial. Here, participants are shown an equation (e.g., “ $9/3 + 5 = 8$ ”) and prompted to provide a true-false response. Once a response is given a single letter is then displayed on the computer screen for 800 ms. Participants are required to remember the letter presented after each equation, and then periodically prompted to recall these letters in the order they were shown. Letter-string recall varies randomly between 2 and 7 letters. On-screen feedback provides the total number of correctly recalled letters for each letter-string set. The alternating presentation of a mathematical equation and letter continues for 75 trials and varies in difficulty. The total OPSPAN score is calculated as the number of correctly recalled letter sequences across all trials. Higher scores reflect higher WMC. Measures of internal consistency, such as coefficient alphas and split-half correlations range from .7 - .9, and test-retest reliability has been shown across time with correlations between .7 and .8 reflecting this stability (Conway et al., 2005).

Dilemmas (Moore et al., 2008; Kortenkamp & Moore, 2001; Bohm & Pfister, 2005): Moral dilemmas (n=24) were adopted and modified from previous studies. Twelve dilemmas described a situation where the life of at least one person was in jeopardy, requiring the participant to decide how morally wrong it would be to kill one innocent person to save the lives of multiple other people. An example would include the classic Footbridge Problem where a trolley traveling down a stretch of tracks has lost its ability to brake and will hit five men working on the tracks if it is not stopped. The participant must decide how morally wrong it would be to shove one person onto the tracks in order to stop the trolley, ultimately killing that one person but saving the lives of the other five track workers. The remaining twelve dilemmas contained an environmental dilemma where either the environment or humans would benefit from the outcome, but not both. An example would include the classic Tragedy of the Commons where a rancher shares a common area of grazing land with nine other ranchers. There is an unwritten commitment among the ranchers not to overuse the common grazing land. The rancher comes across a special deal where he can purchase a number of additional cattle for a very low price. This would benefit him personally, but fall in direct opposition to the land agreement. The participant must decide how morally wrong it would be for the rancher to purchase the extra cattle. Moral wrongness was measured on a 1-6 Likert scale (1 = not morally wrong – 6 = very morally wrong).

3 RESULTS

3.1 Data Preparation

OPSPAN Scores: The distribution of OPSPAN scores was checked for normality both visually and statistically. The histogram appeared to represent a normal distribution of scores. Skewness and kurtosis values were acquired and then divided by their respective standard errors. Significant amounts of neither skewness nor kurtosis were observed within this distribution. Outliers were not observed here either. A tertiary split was next conducted across OPSPAN scores in order to separate participants into

one of three WMC categories; low (n=60), medium (n=51), high (n=58). Only participants that fell into the low and high WMC categories were used in the analyses that follow.

Moral Judgments: Average ratings of moral wrongness were calculated for each of the 24 dilemmas presented to participants. Dilemmas with an average rating ranging between 1 and 3 were coded 'nonmoral', and the dilemmas with an average rating between 4 and 6 were coded 'moral'. This coding scheme resulted in three moral and five nonmoral dilemmas within the control block; and four moral and four nonmoral dilemmas across both emotion and fact blocks. Next, eight values of "moral wrongness" were calculated for each participant. First, the average rating of "moral wrongness" for each dilemma type (moral, nonmoral) was calculated (n=2), followed by the average rating for each dilemma type within each block (control, emotion, fact; n=6).

3.2 Main Analyses

I first asked whether people would use the same criteria (i.e., cognitive mechanism) when making both moral and nonmoral decisions, and whether differences in cognitive functioning would matter across these types of dilemmas. To test this, I ran a 2 (WMC: low, high) x 2 (Dilemma: moral, nonmoral) mixed-model ANOVA on average ratings of moral wrongness for each dilemma type. The valuation of moral versus nonmoral dilemmas did not differ based on One's cognitive ability (low vs high WMC); however, there was a main effect of dilemma, such that moral dilemmas ($M=4.59$) were rated significantly more wrong than nonmoral dilemmas ($M=3.12$), $F(1,116)=268.96$, $\eta_p^2 = .70$, $p < .01$. With these data, and counter to the conclusions drawn by Moore and colleagues (2008), I conclude that WMC alone does not provide information regarding moral judgment motivation. Instead, judgment variations across WMC groups may only be evident when directly accessing the hypothesized judgment strategy (i.e., emotions for low WM persons and facts for high WM persons).

Second, I asked whether it was possible to shift judgments based on deliberate instructions (to focus on factual or emotional content). I ran a 2 (WMC: low, high) x 2 (Dilemma: moral, nonmoral) x 3

(Instruction: control, emotion, fact) mixed-model ANOVA on average ratings of moral wrongness for each dilemma type across each instruction block. Significant main effects of Dilemma Type and Instruction were observed, as was a two-way interaction between Dilemma Type and Instruction. A three-way interaction was also evident, $F(2,232)=3.53$, $\eta_p^2 = .03$, $p=.03$. See Table 1 for interaction means and standard deviations.

Table 1 - Means and standard deviations for the three-way interaction between WMC, Dilemma, and Instruction

WMC Group	Dilemma Type	Instruction - <i>M(SD)</i>		
		Control	Emotion	Fact
Low WMC	Moral	4.48(1.12)	4.94(1.08)	4.84(1.20)
	Nonmoral	3.68(1.02)	2.75(1.13)	3.14(1.20)
High WMC	Moral	4.45(1.38)	4.19(1.47)	4.64(1.35)
	Nonmoral	3.48(1.00)	2.62(1.01)	3.05(1.11)

The Effect of Low WMC: The interaction was first decomposed to look at the effect of WMC (low, high) on moral judgments. A 2x3 repeated measures ANOVA, of Dilemma Type x Instruction, was conducted for each WMC group independently. For the low WMC group, a main effect of Dilemma Type emerged along with a significant Dilemma Type by Instruction interaction, $F(2,118)=27.31$, $\eta_p^2 = .32$, $p<.01$, see Figure 1. The interaction was explored by conducting two one-way repeated measures ANOVAs to test the effect of instruction on each dilemma type individually. First, there was a significant main effect of Instruction on ratings of moral wrongness for moral dilemmas, $F(2,118)=5.87$, $\eta_p^2 = .09$, $p<.01$. Across pairwise comparisons, judgments in the control (no instruction focus) block were significantly lower than judgments in the emotion-focus block ($p<.01$), as well as judgments in the fact-focus block ($p=.01$). Judgments across the emotion-focus and fact-focus blocks were not significantly different from one another ($p=.47$). Second, the effect of Instruction was also significant for the nonmoral dilemmas, $F(2,118)=19.31$, $\eta_p^2 = .25$, $p<.01$. Ratings of moral wrongness in the control (no instruction) block were greatest and significantly different from ratings in the emotion block ($p<.01$), as well as the

fact block ($p=.01$). Ratings in the emotion and fact blocks were also significantly different from one another ($p=.01$).

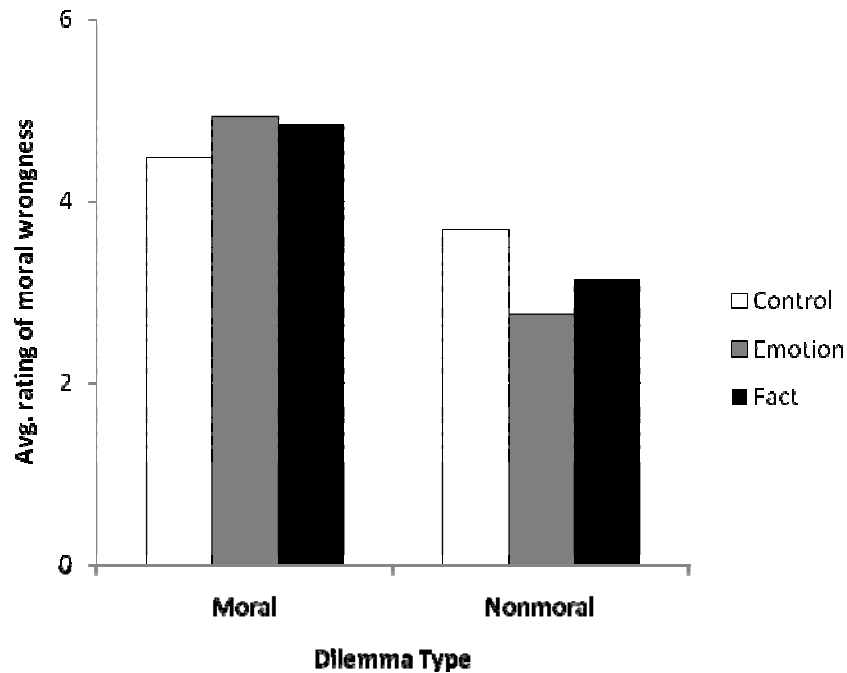


Figure 1 - Avg. rating of moral wrongness (by Dilemma Type and Instruction) for Low WMC persons

Next, the effect of Dilemma was tested on each of the instruction blocks by conducting three one-way repeated measures ANOVAs. The effect of Dilemma type within the control block was significant, $F(1,59)=31.14$, $\eta_p^2=.35$, $p<.01$. Moral dilemmas received significantly higher ratings of moral wrongness than nonmoral dilemmas. The effect of dilemma was also significant within the emotion block, $F(1,59)=172.49$, $\eta_p^2=.75$, $p<.01$. Moral dilemmas were rated as significantly more morally wrong than nonmoral dilemmas. Finally, the effect of dilemma within the fact block was tested, and found to be significant, $F(1,59)=109.01$, $\eta_p^2=.65$, $p<.01$. Again, moral dilemmas were rated as significantly more morally wrong than nonmoral dilemmas.

These data do not support my prediction. I expected to find significant differences in judgments to moral dilemmas across the emotion and fact blocks, such that ratings in the emotion block were sig-

nificantly greater than ratings in the fact block. Instead, moral dilemmas in the emotion and fact blocks are being rated significantly more morally wrong than when no instruction focus is given, and are not significantly different from one another. The instruction focus manipulation (regardless of the type) may be leading to a general salience of dilemma information, thus prohibiting low WMC persons from differentiating between emotion-based content from fact-based content. When trying to focus one's attention on specific pieces of information, all content evokes a visceral reaction, leading to increased valuations.

The Effect of High WMC: A two-way ANOVA, of Dilemma x Instruction, was conducted for the high WMC group next. Main effects of Dilemma and Instruction emerged along with a significant interaction, $F(2,114)=4.82$, $\eta_p^2=.08$, $p=.01$, see Figure 2. The interaction was explored by conducting two one-way repeated measures ANOVAs to test the effect of instruction on each dilemma type individually. There was a significant main effect of Instruction on ratings of moral wrongness for moral dilemmas, $F(2,114)=3.39$, $\eta_p^2=.06$, $p=.04$. Judgments in the emotion block were rated as significantly less morally wrong than judgments in the fact block ($p<.01$), but not significantly different than the control block ($p=.16$). Judgments made in the control block were not significantly different from judgments in the fact block ($p=.32$). The effect of Instruction was significant for the nonmoral dilemmas as well, $F(2,114)=15.37$, $\eta_p^2=.21$, $p<.01$. Ratings of moral wrongness in the emotion block were lowest and significantly different from ratings in the control ($p<.01$), and fact blocks ($p<.01$). Ratings in the control and fact blocks were also significantly different from one another ($p=.01$).

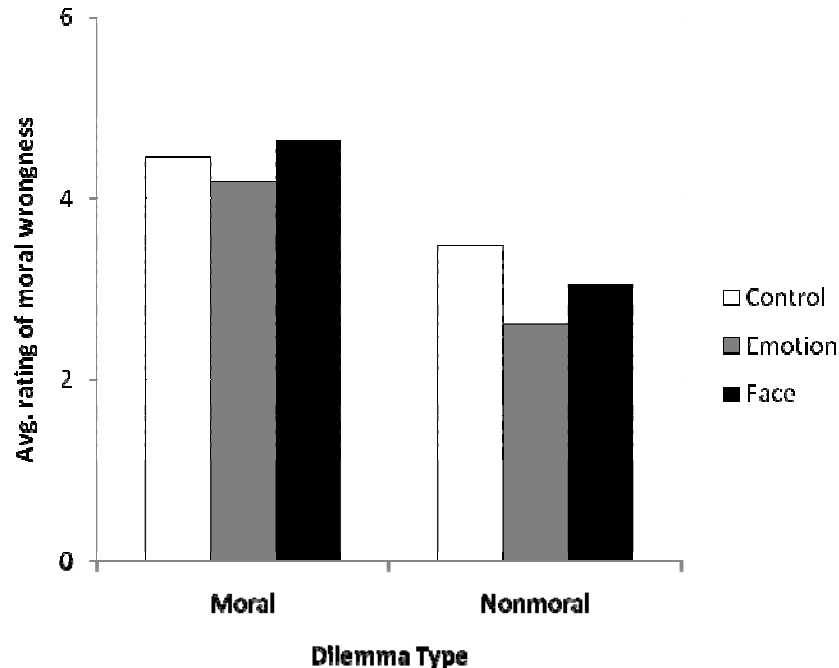


Figure 2 - Avg. rating of moral wrongness (by Dilemma Type and Instruction) for High WMC persons

Next, the effect of Dilemma was tested on each of the instruction blocks, by conducting three one-way repeated measures ANOVAs. First, the effect of Dilemma type within the control block was significant, $F(1,57)=25.03$, $\eta_p^2 = .31$, $p < .01$. Moral dilemmas received significantly higher ratings of moral wrongness than nonmoral dilemmas. The effect of dilemma was also significant within the emotion block, $F(1,57)=64.58$, $\eta_p^2 = .53$, $p < .01$. Moral dilemmas were rated as significantly more morally wrong than nonmoral dilemmas. Finally, the effect of dilemma within the fact block was tested, and found to be significant, $F(1,57)=73.00$, $\eta_p^2 = .56$, $p < .01$. Again, moral dilemmas were rated as significantly more morally wrong than nonmoral dilemmas.

These data are also inconsistent with my predictions. I expected high WMC persons to maintain such cognitive stability that no judgment differences would emerge regardless of the instruction focus manipulation. Instead, I found that ratings of moral wrongness significantly decreased when told to focus on emotions relative to when focusing on the fact-based content information. The emotion-focus instruction may have led to such a breach in judgment strategy that high WMC persons were left with

nothing to support ratings equivalent to when focusing on fact-based information (a cognitive strategy consistent with their natural response). Their tendency toward cold cognitive processes renders the emotion-focus instruction insufficient to prompt strong moral valuation.

The Effect of Moral Dilemmas: The interaction was next decomposed to look at the effect of dilemma type (moral, nonmoral) on moral judgments. A two-way mixed model ANOVA, of WMC x Instruction, was conducted for each dilemma type independently. For moral dilemmas, a significant main effect of Instruction emerged along with a significant interaction, $F(2,232)=5.64$, $\eta_p^2 = .05$, $p < .01$, see Figure 3. Given that the previous analyses already explored the effect of instruction on each WMC group, the current interaction was decomposed by testing the effect of WMC on each instruction type. An independent samples t-test was first conducted for low versus high WMC groups providing judgments in the control block. The effect of WMC was not significant ($p = .88$). A second independent samples t-test was analyzed, testing the effect of WMC on ratings within the emotion block. The effect was significant, $t(116)=3.16$, $p < .01$. When focusing on emotions, low WMC persons found moral dilemmas significantly more morally wrong than high WMC persons. A final independent samples t-test was conducted on ratings within the fact block. The effect of WMC was not significant ($p = .39$). When evaluating moral dilemmas, differences across judgments only emerge as a function of cognitive ability when told to focus on one's emotional response.

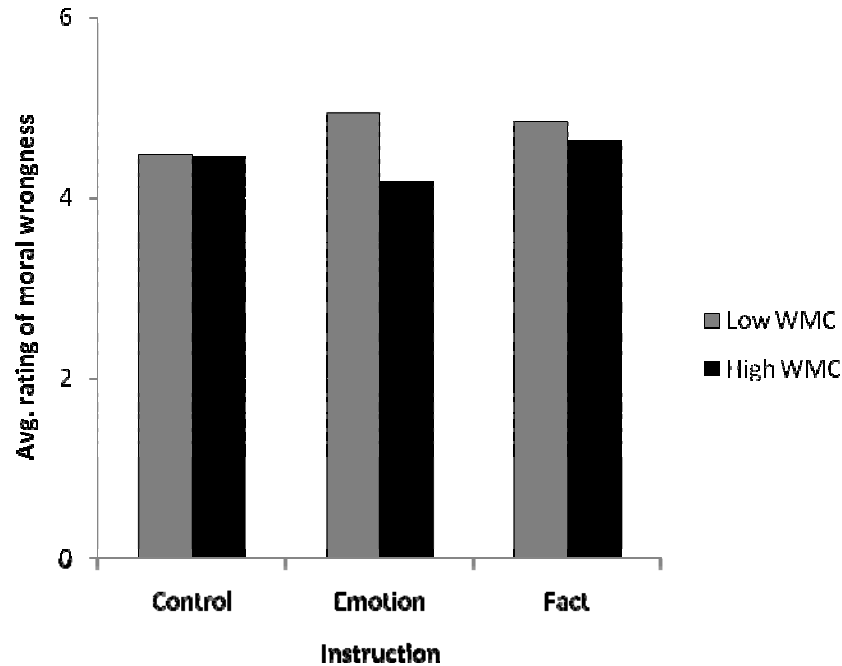


Figure 3 - Avg. rating of moral wrongness (by WMC and Instruction) for Moral Dilemmas

The Effect of Nonmoral Dilemmas: I next looked at the effect of nonmoral dilemmas on moral judgments. A two-way mixed model ANOVA, of WMC x Instruction, was conducted, and a significant main effect of Instruction emerged, $F(2,232)=34.43$, $\eta_p^2 = .23$, $p < .01$. Regardless of WMC group, all participants rated dilemmas in the control block ($M=3.59$) as most morally wrong. Judgments significantly decreased in strength in the fact block ($M=3.10$, $p < .01$), as well as in the emotion block ($M=2.68$, $p < .01$). Judgments in the fact and emotion blocks were significantly different from one another ($p < .01$). When considering situations with an absence of emotional content differences in WMC do not emerge.

The Effect of Instruction - Control: Finally, the effects of WMC group and Dilemma Type were tested on each level of Instruction individually. A 2x2 mixed-model ANOVA was first conducted on ratings of moral wrongness to dilemmas presented in the control block. A significant main effect of Dilemma Type was observed, $F(1,116)=54.41$, $\eta_p^2 = .32$, $p < .01$. All participants rated moral dilemmas ($M=4.47$) in the control block significantly more morally wrong than nonmoral dilemmas ($M=3.58$).

The Effect of Instruction - Emotion-focus: The same analysis was conducted on dilemmas presented in the emotion block. Main effects of WMC group and Dilemma Type were observed along with a significant interaction, $F(1,116)=5.64$, $\eta_p^2 = .05$, $p=.02$, see Figure 4. This interaction was decomposed by first examining the effect of dilemma type on each WMC group individually. A paired samples t-test comparison was run for the low WMC persons first, and emerged as significant, $t(59)=13.13$, $p<.01$. When focusing on emotions, low WMC participants rated moral dilemmas significantly more morally wrong than nonmoral dilemmas. The same t-test comparison was conducted on the ratings of high WMC persons, and also found to be significant, $t(57)=8.04$, $p<.01$. High WMC persons also found moral dilemmas significantly more morally wrong than nonmoral dilemmas. Independent t-tests were finally conducted comparing each WMC group across each dilemma type. Low WMC persons found moral dilemmas significantly more morally wrong than high WMC persons, $t(116)=3.16$, $p<.01$. There was no difference in moral valuations between WMC groups for the nonmoral dilemmas ($p=.50$).

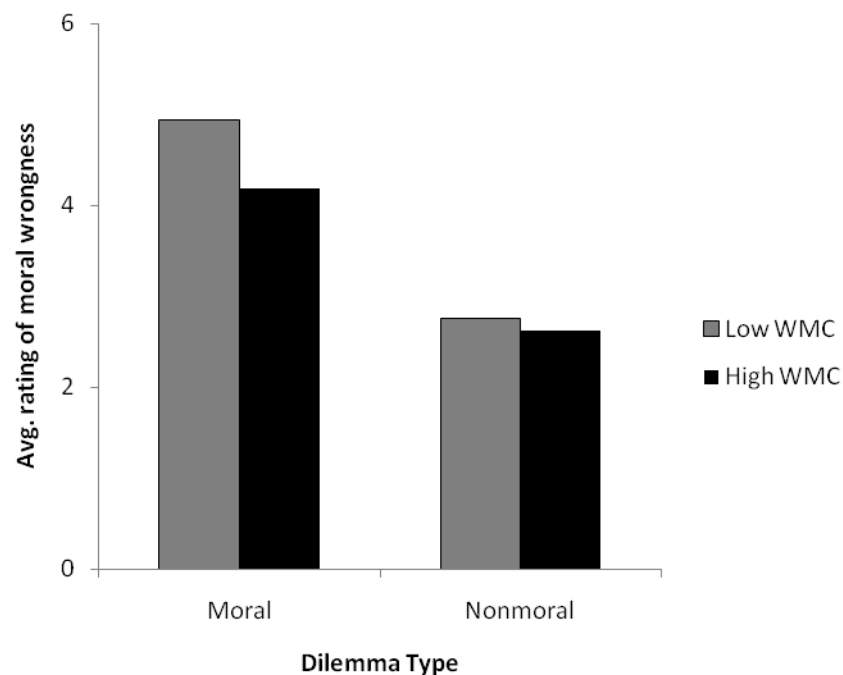


Figure 4 - Avg. rating of moral wrongness (by WMC and Dilemma Type) for judgments in the Emotion-focus block

The Effect of Instruction - Fact-focus: Finally, a 2x2 mixed-model ANOVA was conducted on ratings of moral wrongness to dilemmas presented in the fact block. A significant main effect of Dilemma Type was observed, $F(1,116)=177.85$, $\eta_p^2 = .61$, $p < .01$. All participants rated moral dilemmas ($M=4.74$) significantly more morally wrong than nonmoral dilemmas ($M=3.10$).

4 DISCUSSION

This study addressed two questions of interest. First, I tested whether the cognitive mechanism underlying judgments to traditionally moral situations was universal to situations that were morally neutral. I hypothesized that moral and nonmoral judgments would be subjected to different processing strategies because of the emotion uniquely tied to morality, and thus predicted that low WMC persons (who are presumed to be particularly susceptible to emotional information) would rate moral dilemmas significantly more morally wrong than nonmoral dilemmas. I further predicted that high WMC persons would be able to suppress the emotional undercurrent of the moral dilemmas and rate both moral and nonmoral dilemmas equally morally wrong. I did not find support for my hypothesis. All participants (regardless of WMC) found moral dilemmas more morally wrong than nonmoral dilemmas. Cognitive ability did not predict moral valuation, a finding that is in contrast to the data evidenced by Moore, Clark, and Kane (2008). These authors found significant differences in moral judgments when high compared to low WMC persons viewed personal-inevitable dilemmas. Although the current study also used these dilemmas, our participants also randomly viewed categorically nonmoral dilemmas. The participants in the Moore and colleagues' study did not view nonmoral dilemmas, but instead read moral dilemmas that systematically varied by content information (e.g., type of death, beneficiary of death). The difference in relative comparison between dilemmas may be one source for the disparate findings within the current study and previous research.

Second, I tested whether it was possible to modify the impact of hot versus cold processing systems on moral judgment deliberation. High WMC participants, who make logic-based decisions, should have been able to shift attention from the factual/content-based information to emotional information when instructed, as they have the capacity to simultaneously process more information than low WMC persons. However, this focus on emotional content should not affect their ratings of moral wrongness. For low WMC persons, shifting attention from emotion-based to fact-based content should have been difficult compared to high WMC persons as they have comparatively fewer resources to process content information. Their comparative lack of cognitive control should have left them susceptible to the effect of the instructional variations, resulting in moral judgment ratings that were significantly greater when told to focus on emotions, and significantly less wrong when told to focus on facts. I did not expect there to be any variations in judgments to nonmoral dilemmas as a function of instruction focus or WMC. In general, the instruction manipulation was successful and judgments varied across presentation blocks in both predictable and unpredictable ways. Judgments to nonmoral dilemmas were not impacted by cognitive ability as expected, but varied unexpectedly by instruction. For both high and low WMC persons, ratings of moral wrongness to nonmoral dilemmas were greatest when no instruction focus was given (control block). Ratings of moral wrongness decreased when told to focus on emotions, and increased when instructed to focus on fact-based information. This pattern was observed regardless of WMC. It is difficult to conclude more from this finding than the instruction was an effective means of shifting focus on dilemma content, but does not lend itself to deeper interpretation at this time.

Judgment to moral dilemmas also shifted based on the instruction manipulation, but in alternate patterns contingent upon cognitive ability. Counter to my prediction, judgments shifted for high WMC persons, such that moral valuations in the fact-focus block were greater than in the emotion-focus block. This effect arguably emerged because the cold cognitive preference of the high WMC persons

resulted in an inability to justify an equivalent rating of moral wrongness in the emotion block because the judgment criteria violated their logical processing strategy. Ratings dropped significantly when compared to decisions rendered when focusing on fact-based information (an instruction consistent with pre-established deliberation preference). Decisions shifted for low WMC persons as predicted, but in unexpected directions. When told to focus on *anything* specific (facts or emotions), ratings of moral wrongness increased relative to when no instruction focus was given (control block). I suggest this occurred because the attention-focus instruction led to a general information-salience-effect, such that any content was accompanied by a physiological cue which resulted in increased ratings of moral wrongness. Further, when observing the judgments between WMC groups, the only comparable difference occurred for moral dilemmas in the emotion-focus block. Thus, the one element incorporated into both Rationalist and Social Intuitionist models of moral judgment (i.e., hot cognition) is the only place where cognitive functioning impacted decision-making outcomes.

Prinz (2006) argued that the experience of emotion alone is both necessary and sufficient for moral valuation to occur. If this were accurate, then I would have found all participants (regardless of cognitive ability) rating judgments in the emotion-focus block more morally wrong than either of the other two blocks, but this pattern did not occur. Thus, emotion lends motivational support for moral valuations, but is not sufficient in-and-of itself to turn an otherwise nonmoral situation into a moral one; not even for persons whose primary source of motivation is their emotional reactions (i.e., low WMC persons). Lapsley and Hill (2008) argued that it is not the hot cognitive processing system at large which carries a role in the moral judgment process, but rather that its role is instead a function of the specific mechanism within the hot system that contributes to these decisions. This mechanism may be social intuitions, moral heuristics, or accessibility to cognitive resources. In the current study, I tested the role of reasoning capacity indexed by WMC) and found that judgments were not based on reflexive responding alone. If they were, then persons with low WMC (whose emotional intuitions are more readily ac-

cessible) would have found both moral and nonmoral dilemmas more morally egregious than persons with high WMC, but this is not the pattern that emerged.

If moral judgments rely in part on the accessibility of cognitive resources, then moral deliberation should be impacted by reducing available resources. Resource reduction can be accomplished by introducing external sources of interference (“loads”) such as time pressure, or concurrent cognitive tasks. These loads reduce access to available cognitive resources. Greene, Morelli, Lowenberg, Nyström, and Cohen (2008) found that cognitive load slowed reaction time during moral deliberation, and concluded that these loads decrease controlled judgments. It follows that external load, as well as internal WMC would interact to predict moral judgments. Thus, low WMC persons should be more susceptible to load than high WMC persons. I am currently collecting data where a cognitive load is induced during the judgment process, and occurs for half of the dilemmas presented in each block. Testing the role of heuristics would be a more challenging task to take on, as social intuitions and moral heuristics are, 1) highly correlated, and 2) below conscious awareness (Sunstein, 2005). The “rule” or deliberate instruction we gave participants across experimental blocks can certainly be viewed as decision-making strategies, but do not fit the heuristic criteria outlined by Lapsley and Hill (2008). Determining whether heuristics or intuitions are the prominent hot cognitive tool used across these judgments is moot as the primary goal of this study was not to tease apart these options. Instead it was to localize the application of hot versus cold processing systems for persons with varied cognitive processing tendencies. The emotion- versus fact-focus rules were intended to shift one’s attention toward the instructed information thereby altering decisions, and was successful at differentially affecting judgments; however, effectiveness of the strategy was contingent upon one’s cognitive ability.

In summary, I conclude that moral judgment is not simply the product of cognitive ability and is not sufficiently motivated by an emotional experience. Accessibility to cognitive resources and/or men-

tal rules (or short-cuts) seem the likeliest possibility for understanding the role of hot cognitive processing during moral deliberation.

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6 APPENDICES

Appendix A

Moral Dilemmas

Control Block

SPACE STATION

You are an engineer on the international space station, in orbit around the Earth. Suddenly, a fire breaks out in the cargo bay. The automatic fire safety system will open the outer door of the cargo bay, letting the oxygen out of the bay and thus putting out the fire. The automatic system only works when the inner portal to the rest of the station has been sealed. One member of the crew, a mechanic in the cargo bay, has put on half of his bulky space suit when the fire begins. He runs to the portal to climb through to safety, but the portal is too narrow to fit through while wearing a space suit. You realize that if he tries to climb through, he will get stuck and the fire will spread through the rest of the station because the safety system will not operate with the portal open. There is no time for him to take off the suit before the fire spreads. The only way you can prevent the spread of the fire, and save your life and the rest of the crew, is to push the mechanic back through the portal and into the cargo bay. This way, the safety system will seal the door and decompress the cargo bay, but it will also suck the mechanic into space and kill him. How morally wrong would it be for you to push the mechanic back through the portal, and into space, in order to save yourself and the rest of the crew?

HIV

You are a doctor. One of your patients, whom you have diagnosed as HIV positive, is about to receive a blood transfusion prior to being released from the hospital. While this will prolong his life, he will eventually die from the disease. He has told you, in the confidence of your doctor-patient relationship, that after he gets his transfusion, and his medicine from you, he intends to infect as many people as possible with HIV starting that evening. Because you are bound by doctor-patient confidentiality, there is no legal way to stop this man from carrying out his plan. Even if you warned the police, they would not be able

to arrest him, since his medical information is protected. It occurs to you that you could contaminate his medication by putting an untraceable poison in it that will kill him before he gets a chance to infect others. How morally wrong would it be for you to poison this man in order to prevent him from spreading HIV?

SHARK

You are part of a U.N. humanitarian team of SCUBA divers who are deactivating old World War II underwater anti-ship mines. One member of your diving team injures himself while trying to deactivate a mine. The blood in the water has attracted several sharks in the area. A feeding frenzy is about to ensue, with the sharks eating everything and everyone in sight. You have a spear-gun, but only one spear and there are many sharks. The bleeding diver is swimming toward the last protective shark cage and will reach it before you and the others. He will die from his injuries but will be saved from the sharks if he reaches the cage. The sharks, following the blood, are coming too close for you and the other divers to escape. You realize that if you shoot and kill the injured diver with your spear-gun before he reaches the cage, the sharks would stop to eat him while you and the others escaped to safety. How morally wrong would it be for you to kill this diver in order to save yourself and the rest of the group?

Fact Block

ROWBOAT

You are in a rowboat with a tour guide while sight-seeing on a lake in Alaska. You notice that three children have overturned their boat nearby. They are now in danger of quickly freezing to death in the icy water. You begin to row over to rescue them when you realize that your boat will not hold you, the tour guide, and the three children. Two of the children are closer to your boat than the third child. As you and the tour guide pull in the first two it is obvious that one of them is too heavy and if you keep him on board your boat will sink and all of the children will die. Neither you nor the guide can get out because you are rowing and the guide is performing CPR. The only way to save two children is to throw the large child off the boat and rescue the third one. How morally wrong would it be for you to throw one child off the boat to die in order to save the other two?

FUMES

You are an orderly in a hospital during the night shift. You notice that a chemical has just been spilled in a room containing six patients. This chemical is highly toxic and if left on the floor will rapidly evaporate creating a poisonous gas. This will inevitably kill all the patients in the room. This chemical cannot simply be mopped up, nor can it be soaked up with towels or sheets. However, because you have worked around this chemical before, you know that this chemical absorbs into human skin very rapidly. You could pull one of the patients out of bed onto the spill so that the chemical will completely soak into this person's skin instead of evaporating into the air in the room. This will quickly kill the one patient but save the other five patients from the gas. How morally wrong would it be for you to put this person onto the spilled chemical in order to save the other five patients?

TYCOON

You are an electrician who has been hired to fix an electrical problem in the home of a very wealthy steel tycoon who is terminally ill with a very slow-growing cancer. Recently it had been publicly an-

nounced that when this man eventually dies, his enormous personal fortune is to be given to the local children's hospital. You know that there are many children at this hospital who could be saved with this money, but who cannot wait much longer before they die. It occurs to you that while you're in the house, fixing the electrical problem, you could quietly slip into the tycoon's room while he is sleeping and suffocate him by covering his nose and mouth with your gloved hands. This would look exactly like he had died from a heart attack. Then his money would go to the children's hospital where it would save many lives. How morally wrong would it be for you to kill this man so that the children's hospital will get the money that it needs?

GATHERING FIREWOOD

The mountain forests are rapidly disappearing in a rural area because so much wood is needed by the village for cooking and heating. On the deforested slopes, the heavy rains wash away the soil, which young seedlings need to grow into mature trees. The government has established a preserve, or protected area, to help replenish the forest, which cannot currently support a diverse and healthy animal population. Past the forest preserve there is a designated firewood gathering area. The local residents, including you, have the daily job of walking up the steep mountain slopes toward the designated area to cut firewood for use in cooking and heating. The nature preserve is much closer than the firewood gathering area, and you contemplate cutting down a few protected trees even though you know it is against the law. How morally wrong would it be for you to cut down these trees?

Emotion Block

CLIFFHANGER

You are a construction worker. You and your crew are high on a scaffold, working on a skyscraper. Suddenly, the scaffolding partially collapses. You and several others are hanging on to a dangling crossbar, but it cannot hold all of your weight. The worker next to you slips off the crossbar and grabs a hold of your one free arm. However, you realize that the entire structure is about to give way. The only way to avoid you and everyone else falling to your deaths is to repeatedly kick your co-worker in the stomach and chest until he lets go of your hand and falls to his certain death. This will remove just enough weight that the rest of you can make it to safety before the scaffold collapses. How morally wrong would it be for you to kill your co-worker in order to save yourself and the rest of the crew?

BUS PLUNGE

You are the bus driver for a kindergarten field trip to the zoo. On the way, faulty tires cause the bus to overturn and plunge off of a bridge and into a roaring river. You and three of the children are still in the sinking bus, but the rest of the passengers have been swept away down the river to their deaths. You grab the two children nearest to you and begin to swim toward the exit door. The third remaining child grabs onto your leg. You realize that you are not strong enough to fight the current and swim with all three children holding on to you. The only way to reach the surface before you and the children drown is to shake the third child off of your leg. This will allow you to bring the two children to the surface with you, but the third child will drown. How morally wrong would it be for you to shake the child off your leg in order to save yourself and the two other children?

CRYING BABY

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 two rooms of the cellar of a large house. Outside you

hear the voices of soldiers who have come to search the house for valuables. Your baby, who is with you in the room, begins to cry loudly. You put your hand over 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, the baby and the others hiding in both rooms. To save yourself and the others you must keep your hand on his mouth and smother your baby to death. How morally wrong would it be for you to smother your baby in order to save yourself and the other townspeople?

GRAZING

You share a common area of grazing land with nine other ranchers. All the ranchers, including you, know that the common grazing land is the perfect size for the total amount of cattle that you all collectively own. If any of the ranchers buy extra cattle over-grazing would result, causing plant cover depletion, soil infertility and erosion, and the pollution of nearby waterways. The ranchers have an 'unwritten' commitment not to overuse the common grazing land. You come across a special deal where you can purchase a number of additional cattle for a very low price. This would cause your sales to go up and increase product distribution to your buyers, as well as to the individual consumer. How morally wrong would it be for you to purchase additional cattle?

Appendix B

Nonmoral Dilemmas

Control Block

EUTHANASIA

You are the leader of a small group of soldiers, and all of you are out of ammunition. You are on your way back from a completed mission deep in enemy territory when one of your men steps in a trap set by the enemy. His leg is badly injured and caught in the trap. You cannot free him from this trap without killing him. However, if you leave him behind, the enemy troops will find him and torture him to death. This soldier begs you not to leave him behind to be cruelly tortured to death. The enemy troops are closing in on your position. It is not safe for you or your men to remain with your trapped comrade any longer. In order to prevent this man's needless suffering at the hands of the enemy, you could kill him yourself by stabbing him in the heart. How morally wrong would it be for you to stab this man in the heart in order to prevent his needless suffering?

YELLOW PERCH IN LAKE MICHIGAN

In your community on Lake Michigan, commercial fishing of yellow perch is the major source of employment. You are a supervisor at the Department of Natural Resources where you monitor these perch. Through your position at the DNR, you have the power to issue citations and begin legal proceedings. Recent reports state that the current rate of fishing for yellow perch is not sustainable. If changes are not made to limit catches, the perch population will no longer be able to support commercial fishing. You discover the largest fishing distribution company in the area, Hastings & Brown, has engaged in overly aggressive fishing. Though they deplete over half of the perch population, they provide employment for hundreds of local residents. A citation from you could jeopardize local jobs, but proceeding with it could preserve the yellow perch. The CEO of Hastings & Brown has offered you a large sum of money to overlook the infraction. How morally wrong would it be to ignore this offer, and fine the fishing company?

ENVIRONMENTAL POLICY

You are a member of Congress. The legislature is deciding on a new policy concerning national forests in your state. A proposed bill outlines a plan to build a factory and research facility for scientists to develop potential cancer-fighting treatments. Currently, the projected location of this factory is within a national forest, a portion of which would need to be cleared if the factory were built. The clearance would displace a thriving owl population. How morally wrong would it be for you to veto this bill in order to preserve the owls and their habitat?

OVERPOPULATION

Human overpopulation is a major cause of animal species' extinction. Indonesia has relocated people from overcrowded islands like Java to forested areas, such as Borneo and western New Guinea. You have recently relocated to Borneo and find your fellow immigrants burning the forests (at the encouragement of the Indonesian government) in order to create farms and grazing land for livestock. In the process, they are driving endangered species, such as the Orangutan, toward extinction. You want to make a new home for yourself in this new community, including friendships and sustainable living opportunities. How morally wrong would it be for you to join your fellow immigrants in forest burning?

NUCLEAR WASTE

Ferry Creek Nuclear Plant has 1,550 metric tons of high-level radioactive waste in elevated cooling pools near the nuclear reactors. In the past, the accumulating waste has been moved into dry casks outside the plant as a quick, but temporary, solution. This decision has allowed the plant to remain in operation without interruption. However, if the casks were to break and a toxic spill to occur, the aftermath would

lead to a total decimation of the local plant and animal life, in addition to poisoning the ground water. A common practice in other countries reprocesses the waste, uses it again, and reduces the total amount of waste produced. This practice conserves uranium, but it is not firmly regulated in the United States and proceeding with it could attract the attention of federal authorities. You must guide the nuclear plant executives as to which option is the best solution for dealing with the overwhelming amount of accumulated waste. How morally wrong would it be for you to tell the executives to stick with their first plan of moving the casks, filled with waste, outside the plant?

Fact Block

ROOF

You are negotiating with an armed and disturbed man on the roof of a building. Down below there is a large crowd of people at the city's art and music festival. He has just stated that he is going to start shooting people in the crowd and then shoot himself and you are sure that you cannot talk him out of it. The people in the large crowd below do not realize that he is a threat and you have no way to warn them. From where he is standing, he could easily kill a dozen or more people before the crowd ran to safety, not counting those who would be trampled in the chaos. However, given your position, you could run over and shove him off the roof of the building before he starts shooting at people in the crowd. The lives of many others will be spared by this act. How morally wrong would it be for you to shove this man off the roof to save the lives of other people?

OIL

Following a recent earthquake, a large Danish research institute, RKT, has discovered natural oil resources in the North Sea located just underneath the ocean floor. The profit that the community could make from drilling these oil reserves could be re-invested in the fishing and tourism industries, thus improving the quality of life for many locals. As a representative of RKT, you possess reports indicating that drilling will definitely release oil into the sea and pollute the surrounding waters within a month. The consequences for the ecosystem would be devastating, and would lead to the deaths of many marine animals. How morally wrong would it be for you to share this information and stop the excavation of the discovered oil?

OLD GROWTH

Up until recently a large area of old growth forest has been set aside as parkland in a small town in British Columbia. Now the local lumber company Queensland Trees Inc., which owns the forest, is planning a clear-cut harvest of the old growth trees. It has been a low period for the town, and this new project means jobs and income for a number of years. You have lived in this town all your life. Most of your friends and previous co-workers are very excited about the new harvest and want to see the project happen. Both you and your spouse were recently laid off by Queensland, though you expect to be re-hired when this new harvest begins. However, you have learned that about 98% of old growth forests in North America have already been destroyed and that the unique old growth ecosystem is home to many rare species that cannot survive in other habitats. How morally wrong would it be for you to oppose the harvest?

KAOLIN CRISIS

For the past 150 years, Monroeville has been a factory town and has mined kaolin, a chalky white mineral. Miners dig huge holes in the land to acquire this substance because it is located many feet under-

ground. Recently the quality of the kaolin has decreased making it more expensive to mine and clean. Town elders wonder what new factory could provide the same jobs to the town, given the inevitable demise of the kaolin industry. Some townspeople have suggested that the land, previously excavated for the kaolin, should be filled and used to build a large agricultural industry for the community. Beginning to farm this land would not only allow employment to be maintained, but provide another food resource. Mining executives would prefer to repurpose the factory and equipment in order to mine gypsum, a less valuable mineral, so that the pre-existing jobs, equipment, and basic infrastructure can be maintained. Extraction of gypsum is similar to that of kaolin. You are a city council member and must vote on the best option for your town. How morally wrong would it be for you to vote to keep the factory open for mining purposes?

Emotion Block

ENEMY SPY

You are an officer in the military during a war. Your soldiers have found a high-ranking enemy spy trapped and injured inside of a partially collapsed building. You have been informed over the radio that a large group of enemy soldiers is planning a surprise attack on one of several nearby towns. These soldiers will kill all the civilians in the town if you and your soldiers do not stop them, but you do not know which town they plan to attack. You have questioned the trapped spy who is high ranking and surely knows these plans, but he has refused to tell you which town is the target of the impending enemy attack. He will die soon from his many injuries. You could begin to beat, burn, cut, and otherwise painfully torture him in order to force him to reveal this information. He would die from this painful torture, but you and your soldiers could then protect the town from the surprise attack, saving hundreds of innocent

lives. How morally wrong would it be for you to torture and kill this enemy spy in order to protect one of the nearby towns?

CAR OR TRAIN

You have plans to go to Six Flags this weekend, so you are considering how to get there. Public transportation costs \$2 each way, and it will take you close to 90 minutes to reach your destination. If you drive, it will take you half as much time to get there and back, increasing convenience and comfort, but will cost approximately \$10 in gas. Public transportation is operated primarily by electricity. Using it reduces the amount of greenhouse gases emitted by your trip, however the travel-time is less convenient. How morally wrong would it be for you to drive to Six Flags instead of taking public transportation?

GARBAGE

A region in the Midwest has a beautiful nature preserve which supports a diverse ecosystem of native plant and animal species. This region has a problem with proper disposal of residents' garbage because the landfill is almost filled to capacity. The waste management council has developed two equally effective proposals to deal with the waste overflow. Proposal 1 states a second landfill should be sited on the nature preserve, completely destroying its ecosystem. Proposal 2 outlines a new collection system that would force residents to separate their garbage into 7 categories: 6 for recycling and 1 for composting. Residents would be subject to substantial fines if they refused to abide by the recycling/composting regulations, as described in Proposal 2. You will participate in a local vote on this issue next week. How morally wrong would it be for you to vote for implementing the new collection system instead of building the new landfill?

LAKE FOR HOMES

Lake Wassily is a popular place for recreation and is considered the town "hotspot". Due to climate changes, the lake has stagnated attracting malaria-carrying mosquitoes to the area. Residents near the lake are at serious risk for contracting this disease, as one resident has already been infected. The CDC is advising the town to consult with the Environmental Protection Agency (EPA) regarding a new, effective, and environmentally safe way to eliminate the malaria-threat. This approach would put a financial strain on the city therefore the taxes of all city residents would need to be raised slightly. A large real estate agency has approached government officials and suggested they drain the lake to sell plots of land to individual homeowners. The malaria-threat would be neutralized, and the town would make (not spend) money. You currently live near the lake and would welcome the new homes in the area because they would increase the property value of your home. However, you would no longer enjoy the leisure and beauty of this lake if it were converted to a residential neighborhood. How morally wrong would it be for you to sign a petition to ask the town government to consult the EPA and preserve the lake?