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MOVEMENT IN FREE WILL BELIEF MEDIATES THE EFFECTS OF MANIPULATING FREE
WILL ON ONTOLOGICAL BUT NOT UTILITARIAN MORAL DECISIONS

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by

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Abstract:

Research indicates that undermining people's belief in free will to create a more deterministic view leads to less moral action (e.g. less helping, cheating, and stealing). Two experiments investigated four possible mechanisms of this effect: Free will belief (this refers to the degree to which a person feels he or she is in full conscious control of their every thought and action), rational thought (a mode of processing that is deliberate and rational), experiential thought (a mode of processing that is automatic and largely emotion-based), and locus of control (which refers to the degree that one feels he or she is in control of their actions – internal locus – or that his or her actions are primarily controlled by external forces – external locus). These mechanisms were chosen to (a) test the possibility that the free will manipulations used in the past might be confounded with concepts related to rational and experiential thought, which have been related to moral decisions in other paradigms; and (b) to test the idea posed by other authors that reduction in free will belief leads to less moral behavior because feelings of control have been undermined. Additionally, this work sought to extend these findings to utilitarian moral dilemmas – an unexplored domain in the context of free will research.

To manipulate free will belief, participants saw 15 sentences to prime either free will or deterministic beliefs. To assess mechanisms, participants rated their free will belief, rational-experiential thought, and locus of control. Then, participants completed two measures of morality: helping intentions and approval of utilitarian actions. In Experiment 1, corroborating past work, undermining free will belief reduced helping behavior. Additionally, self-reported free will belief tended to mediate this effect, but not rational thought, experiential thought, or locus of control. Extending this work, in Study 2, priming determinism led to greater approval of utilitarian decisions relative to free will, but free will belief did *not* significantly mediate this effect. Furthermore, neither rational or experiential thought, nor locus of control were supported as mediators. These results indicate that deterministic beliefs promote utilitarian action, and that these effects are not due to differences in self-reported rational or experiential thought, or locus of control. Additionally, this work suggests that undermining free will belief may not always result in less moral outcomes, as utilitarian decisions involve a degree of moral ambiguity and require that one prioritize either individual morality or the well-being of a group.

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MOVEMENT IN FREE WILL BELIEF MEDIATES THE EFFECTS OF MANIPULATING FREE WILL ON ONTOLOGICAL BUT NOT UTILITARIAN MORAL DECISIONS

Undermining free will undermines morality – when and how?

Many people believe that they possess free will, in that they believe they are in complete, conscious control of their thoughts, feelings, and actions. Recently, however, researchers have begun to question whether people actually have free will, and some have published findings that point to the contrary. In light of this controversy, psychologists have been very interested in understanding how belief in free will influences decision making and action. The research conducted up to this point indicates that when people question their beliefs in free will and hold more deterministic beliefs, they end up making less compassionate and less moral decisions (Viney, Waldman & Barchilon, 1982; Vohs and Schooler, 2008; Baumeister, Masicampo & DeWall, 2009). These findings have led researchers, like Vohs and Schooler (2008) and Baumeister et al.(2009), to caution against publishing research that indicates that free will is an illusion or an epiphenomenon (Wegner, 2004), because the realization that free will is an illusion may have detrimental effects on society by promoting less moral decisions. However, this warning may be premature.

Before we take seriously such warnings, the mechanisms and boundary conditions of this effect should be made clear; as yet, they are not. First, the manipulations of free will used by Baumeister et al. (2009) and Vohs and Schooler (2008) might be problematic in that, instead of manipulating free will beliefs, they may be manipulating the extent to which people use experiential and cognitive thought processes. Specifically, manipulations designed to promote free will belief may be activating experiential thought – a mode of thought which operates using affective processes and experience-based knowledge – whereas manipulations designed to *undermine* free will belief may be activating cognitive thought – a mode of thought that is

intentional, operates analytically, and is detached from emotion (Cognitive Experiential Self Theory (CEST); e.g. Epstein, 1985). This confound is problematic because research indicates that experiential and cognitive modes of thought both alter moral decision making, with these thought differences promoting moral decisions in ways that appear similar to how free will beliefs operate. If this is the case, then the free will manipulations may be having their effects because they differentially activate experiential and cognitive thinking, not because they alter beliefs in free will. Thus, free will belief, cognitive thought, and experiential thought should be examined as mechanisms in order to determine whether the primes are influencing moral decisions as a result of influencing one or more of these constructs.

Additionally, Vohs and Schooler (2008) and Baumeister et al. (2009) suggest that a sense of control is being undermined when free will is undermined, and that this contributes to a shirking of responsibility and indulgence in one's selfish impulses; however, this mechanism was not tested in their studies. Thus, I also examine whether control operates as a mechanism. In testing these various mechanisms, I can establish what features of the complex primes for free will and determinism drive the effects found by past work and also allow for more specific predictions about the effects of free will beliefs on decisions.

Finally, in addition to investigating mechanisms, this work will begin to establish boundary conditions of the effects of free will belief. Does undermining free will belief always lead to less prosocial and less moral behavior? Thus far, Baumeister et al. (2009) and Vohs and Schooler (2008) examined effects on cheating, stealing, helping, and aggression. There are unambiguous rules regarding all of these behaviors: people should not cheat, steal, or aggress, and people *should* be helpful. Do the effects also extend to moral decisions that are ambiguous and have conflicting rules? To answer this question, this work will examine whether the effects

of undermining free will extend to moral situations that are ambiguous and associated with different modes of thought: utilitarian dilemmas. These are dilemmas that present two choices (e.g. (1) smother ones crying child to prevent oneself and family from being discovered and killed by soldiers, or (2) do not smother ones child, but be discovered and killed by the soldiers) both of which can be construed as moral, depending on whether a person prioritizes saving more people or prioritizes not taking actions that are immoral.

Figure 1 displays a model with the four possible mechanisms that this work investigates: free will belief, experiential thought, cognitive thought, and locus of control. Two pathways – mediated by free will belief and locus of control – are suggested by the works of Vohs and Schooler (2008) and Baumeister et al. (2009), who argue that undermining free will belief and therefore a sense of causal agency and responsibility, leads to less moral outcomes. My work will examine the validity of these mechanisms and also test cognitive and experiential thought, shown as two other pathways.

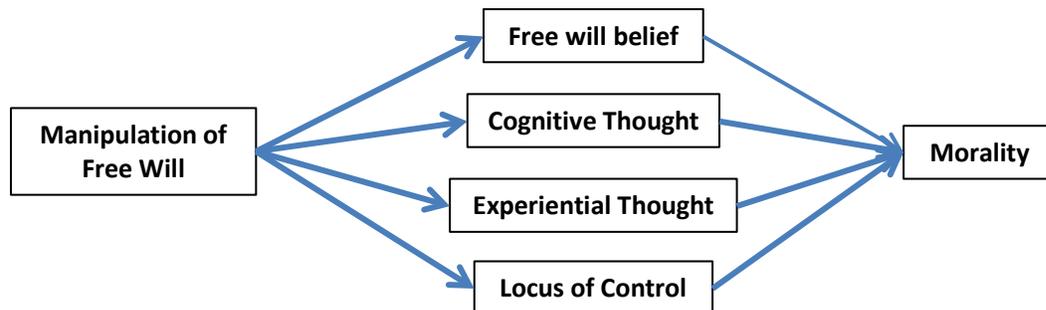


Figure 1. Conceptual mediational pathways.

Next, I will discuss Vohs and Schooler's (2008) and Baumeister et al.'s (2009) research linking free will beliefs to moral behavior and address how their effects may be confounded with experiential and cognitive systems of thought, leaving the role of free will belief in moral

behavior unclear. I will then discuss the research linking cognitive and experiential thinking styles to moral behavior. Lastly, I describe two experiments designed to test multiple mediational pathways – displayed in Figure 1 – to determine if the mechanism behind the findings of Vohs and Schooler (2008) and Baumeister et al. (2009) is free will belief, cognitive thought, experiential thought, and/or locus of control. Additionally, Experiment 2 will introduce an ambiguous moral outcome, in contrast to the unambiguous outcomes used by Vohs and Schooler (2008) and Baumeister et al. (2009), to determine the manner in which the effects extend to this kind of moral situation. In examining the proposed mechanisms and outcomes, I hope to contribute new knowledge and clarity regarding the different roles of free will belief and cognitive-experiential thought in moral decisions.

Free Will, Determinism, and Moral Behavior

Free will refers to the idea that the “will” causes actions free from external factors; a person chooses what they do and is therefore always responsible for his or her actions. If people are responsible for their actions, then as long as a feeling of causation and responsibility remain, people who believe in free will should be less tempted to act in a morally reprehensible manner. In contrast to free will belief, there is deterministic belief. Determinism maintains that all actions flow from prior events, including biological predisposition and environmental pressures, with “will” ultimately having nothing to do with action. The idea that the will is illusory and plays no real role in determining action might lessen one’s sense of moral obligation – if a person does not cause their actions willfully, they cannot be linked to them or held responsible for them. Vohs and Schooler (2008) and Baumeister et al. (2009) use this logic to examine the hypothesis that decreasing belief in free will would encourage less moral action. Because these two studies are the basis for my proposal, I describe them in depth below, and then discuss how the

manipulations they employ may be activating other concepts besides belief or disbelief in free will.

Vohs and Schooler (2008). Vohs and Schooler (2008) argue that moral decisions are much more likely when people believe that they have control over their actions. For example, they cite research by Mueller and Dweck (1998) which indicates that a perceived lack of control leads people to exert less effort, presumably because that perception leads to a reduced sense of agency or causal effectiveness. Similarly, Vohs and Schooler (2008) argue that reducing belief in free will – a concept that provides a sense of control and agency – might lead to less moral behavior. They predicted that creating the belief that human actions flow from predetermined causes (determinism) would undermine people’s sense of being a causal agent and not necessarily *lead*, but *allow* participants to act in immoral ways.

In Study 1, Vohs and Schooler (2008) differentially activated belief in free will by asking participants to read one of two passages from The Astonishing Hypothesis (Francis Crick, 1994). The passage used to create a deterministic mindset argued “that rational, high-minded people – including most scientists – now recognize that actual free will is an illusion” (pg.50). The control passage was about consciousness. Participants in the determinism condition were more likely to cheat relative to the control condition by *not* preventing the answers to math problems from displaying, even though they knew how to prevent it and were asked to do so.

In Study 2, there were three conditions: Free will, determinism, and a control condition. To manipulate these beliefs, participants read 15 statements advocating for either free will, determinism, or they read 15 benign facts (the control condition; see Appendix A for the statements). Each statement was printed on a separate page and studied for one minute. When a tone sounded, participants proceeded to the next statement. In this study, participants in the

determinism condition were more likely to act immorally by overpaying themselves relative to those in free will and control conditions.

To confirm that belief in free will had been reduced by the determinism condition, in both studies participants completed a 16-item version of the Free Will and Determinism scale (FAD; Paulhus & Margesson, 1994). The manipulations were successful in that they altered responses to this scale. However, the researchers never examined if the FAD mediated the effect of the free will manipulations on these moral outcomes. This is an important step, for it may be that the free will manipulations are manipulating multiple constructs (as I will argue later) and FAD does not mediate the effect.

Baumeister, Masicampo & DeWall (2009). Baumeister et al. (2009) expanded on the research of Vohs and Schooler (2008) by looking at different pro-social actions: Helping behavior and aggression. They proposed that the belief in free will encourages people to be thoughtful and to expend energy controlling their default, automatic, and selfish impulses, leading to pro-social behavior. The researchers predicted that undermining this belief would prime a person with the sense that, because they do not control their actions, they do not need to bother exerting the energy necessary to control these automatic, selfish impulses. Thus, by activating determinism, the researchers may be prompting a selfish way of thinking which may be encouraging participants to consider whether acting in a moral way is useful or meaningful to them personally. This consideration may lead participants to decide that, for example, helping strangers and paying attention to peoples' taste preferences is not worth their time and effort.

The authors tested these predictions in three studies. In the first study, the authors use Vohs and Schooler's (2008) statements to create free will, determinism, and control conditions. The moral outcome, helping, was measured by exposing participants to six scenarios (e.g. letting

a classmate borrow a phone) and by asking them to indicate how likely they would be to help in each case. They found that participants in the determinism condition reported being less likely to help on average than those in the free will and control conditions. Furthermore, the free will and control conditions did not differ, confirming the authors' hypothesis that most people already believe in free will, so the free will condition simply serves to endorse an already-held belief.

In Study 2, chronic belief in free will was measured using the Free will and Determinism scale (FAD; Paulhus & Margesson, 1994). Helping was then measured by the number of hours participants volunteered to help a student in need. Those with lower free will belief offered fewer hours than those with higher free will belief.

In Study 3, free will belief was manipulated once again, using the same method as Study 1, though without the control condition. The moral outcome was operationalized as the amount of hot sauce participants added to a serving of nachos that would ostensibly be offered to an unknown person. Again, those in the determinism condition behaved in accordance with predictions, adding significantly more hot sauce to the nachos relative to those in the free will condition. Using the logic of Baumeister et al. (2009), perhaps those in the determinism condition decided it was not worth the time and effort to take care when adding the hot sauce, while those in the free will condition were more attentive to how others would experience the hot sauce.

Based on these studies, the authors concluded that undermining free will belief is detrimental, for it produces less moral action. Lastly, I would like to reiterate that the effects (less moral decisions) in both Vohs and Schooler (2008) and Baumeister et al. (2009) seem to be caused by a reduction of moral behavior in the determinism condition rather than an increase in morality in the free will condition. For this reason, Baumeister et al. (2009) warns colleagues

against publishing studies indicating the nonexistence or illusory status of free will, as this information could have a similar undermining effect and lead to less moral behavior.

As in the Vohs and Schooler (2008) study, Baumeister et al. (2009) never examined whether free will beliefs actually mediated the effects of their manipulation on the moral outcomes. Furthermore, in both of these papers, the authors argue that these effects are due to deterministic beliefs undermining a person's sense of self control; however, control is never assessed as a mediator either. Thus, the mechanisms that underlie these effects have not been clearly established. Furthermore, the free will manipulations employed by Vohs and Schooler (2008) and Baumeister et al. (2009) may actually be manipulating cognitive-experiential modes of thinking, which could also be responsible for the effect. Next, I elaborate on this idea that the primes are confounded with cognitive and experiential modes of thinking.

Confounds with Cognitive-Experiential Modes of Thinking

Epstein's Cognitive Experiential Self Theory (CEST; e.g. Epstein, 1985; Epstein, 1990; Kirkpatrick & Epstein 1992) argues that humans have two primary modes of thinking: One, the experiential mode, is automatic, affect-laden, and experience-based. The other, the cognitive mode, is intentional, analytic, and detached from emotion. These two systems have profound effects on peoples' thoughts and actions. For example, the experiential mode leads individuals to make inferences using heuristics and emotions, while the cognitive mode leads individuals to make inferences based on logic and reason (Kirkpatrick & Epstein, 1992). The cognitive and experiential modes of thought also affect moral decisions, which I will discuss in the next section of this proposal. But, I first return to discussing the confounded status of the manipulations.

Recall that in Vohs and Schooler (2008) and Baumeister et al. (2009), beliefs in free will and determinism were manipulated by having participants read and think about 15 sentences.

These sentences, however, appear to activate not only different beliefs about free will, but perhaps differences in activation of modes of thought as well, with the free will manipulation activating the experiential mode and the determinism manipulation activating the cognitive mode.

First, the sentences of the determinism condition promote the idea that people are logical, unemotional entities – an apt description of not only determinism but also the rational, logical cognitive mode of thought. The determinism sentences a) suggest a view of the self that is mechanistic (e.g. “biological computers,” “complex machine,” “every action...caused by a specific pattern of neural firings”); b) never refer to “feeling” words, and c) advocate for the belief that science is how we go about understanding human nature. The free will items instead a) explicitly emphasizes *not* being a machine and being more than just a physical creature (e.g. “I am more than a robot,” “mental experience cannot be completely reduced to physical causes,” “by exerting my will, I overcome the physical factors...”); b) refer explicitly to feelings (e.g. “feelings of regret,” “personal pride in good decisions”), which are a crucial component of the experiential mode of thinking, and c) reject or diminish the role of science in lieu of personal experience (e.g. “...no matter what a few scientists claim,” “...many things science cannot explain,” “...even if science cannot explain it). The two manipulations thus create opposing views about the use of logic and reason (cognitive mode) and emotion and personal experience (experiential mode).

Additionally, there are no references to the self in the items of the determinism condition; instead, they reference people or humans generally; whereas in the free will condition, almost every item contains a reference to the self – the words “I” or “me” are present in 10 out of 15 phrases. Drawing attention to the self could prime those in the free will condition with

thoughts of personal experiences (an aspect of experiential thought), whereas those in the determinism condition are not at all primed with references to the self, but rather humanity as an abstract concept (focusing on abstract concepts is an aspect of cognitive thought).

Lastly, even the scholarly writing-style of the determinism condition – in stark contrast to the casual tones of the free will condition – might contribute to activating a rational, logical (cognitive) mode of thought. In fact, the Crick essay used by Vohs and Schooler (2008) to undermine free will belief has similar issues – the authors even describe it as “rational and high minded.”

These sentence-primers, although they might be manipulating belief in free will, may also be differentially priming opposing modes of thinking as they are conceptualized by Epstein’s cognitive-experiential self theory. There are even similarities between the free will and determinism manipulations and the manipulations commonly used to prime cognitive and experiential thought: In both Kirkpatrick and Epstein (1992) and Greenberg et al. (1997) cognitive and experiential thought were manipulated by asking people to respond to two open-ended questions by either a) using their first thoughts and their “gut” or b) answering as logically and analytically as possible. In the sentence primers used by Vohs and Schooler (2008) and Baumeister et al. (2009), the overtones are similar. In the determinism condition, participants are encouraged to think logically, rationally, and are dissuaded from use of emotion specifically by the image of people as biological robots and endorsements of science and logic. In the free will condition, participants are encouraged to reference their feelings and experiences for knowledge, specifically by the direct references to emotion and rejection of science for something more experiential.

If it is the case that Vohs and Schooler (2008) and Baumeister et al. (2009) are manipulating cognitive-experiential thought, then their work may simply be another instantiation of the differential effects of these two modes of thought. The importance of determining whether this free will research is actually about free will belief is in discovering if this is a unique effect or just more of the same; that is, more research on CEST.

In the next section, I discuss how cognitive and experiential thought are differentially implicated in morality research, in order to demonstrate that activating them may explain the effects found by Vohs and Schooler (2008) and Baumeister et al. (2009).

Cognitive-Experiential Thought and Morality

Researchers have been very interested in how experiential/rational modes of thinking alter moral judgments. Much of this work has focused on *utilitarian* moral decisions. Generally in research on utilitarian decision making, participants decide whether to cause or allow a negative consequence to befall one person (e.g. death), in order to spare multiple others from the same fate. A classic example of this is trade-off is the trolley dilemma. In the trolley dilemma, a person is standing on a bridge next to a very large man and sees that a trolley is headed for a group of workers on the tracks. If one pushes the man onto to the tracks, one can stop the trolley and save the workers, but it will result in the death of the large man. The dependent variable is almost always whether the participant decides to act in a utilitarian manner (to prioritize the welfare of the group over the individual, and kill one person to save the multiple workers) or a nonutilitarian manner (*not* prioritizing the group and doing nothing, allowing the group of workers to die). The decision is designed to be morally ambiguous because both acting and not acting involve an immoral component, but each decision reveals something about what the

participant is prioritizing (acting immorally or considering the outcome) and also which mode of thought might be active – which I will explain next.

Emotional and rational thought are differentially activated concurrently with nonutilitarian and utilitarian decisions. Specifically, Greene, Sommerville, Nystrom, Darley and Cohen (2001) found that there are major differences in activation of emotion networks when participants are making decisions in the context of dilemmas that are highly emotional. For example, in a similar trolley dilemma, most participants judged it permissible to sacrifice a person to save others when the sacrificing would happen via pulling a lever (diverting the trolley onto a track with a single person on it), but it was considered much less permissible if the sacrificing occurred via physically assaulting someone (pushing the large man off of the bridge). The first example is a “moral-impersonal.” The latter “moral-personal” scenario resulted in significantly more activation in the emotional network when nonutilitarian judgments were made (choosing to not push the large man). The author’s argue that it is the *method of action* which is being morally evaluated. It is not immoral to pull a lever; it *is* immoral to push someone off of a bridge, and when emotions are linked to refusing to act in this immoral way.

This finding suggests, first, that the emotion network is strongly linked to immoral actions; specifically, the emotional network is more strongly implicated in considering the *means* to an end. Secondly, while the end result is the same (killing one to save others), participants are often unable to explain why one scenario is less permissible than the other, leading the authors to reiterate that the nonutilitarian response to the more “personal” scenarios are emotional and intuitive (“knee-jerk”), bypassing any cognitive mode of thinking and therefore defying articulation. This suggests that emotional modes of thought are linked with avoiding immoral

action, regardless of the outcome. Research in this paradigm also reveals that the rational mode is linked with a different decision.

For instance, Koenig et al. (2007) found that persons with damage to the prefrontal cortex – an area related to emotional processing of information – were more likely to make utilitarian decisions in moral-personal scenarios relative to their healthy peers. That is, when the area of the brain that facilitates emotional processing is damaged, people are less likely to experience problems with actively killing one person, in order to save others. This work indicates that emotional processing plays a role in moral regulation, for this kind of processing makes one less likely to act immorally (e.g. kill someone) in situations that elicit emotions, but also that an unemotional mode – a rational mode – might be linked with making the decision that considers the benefits of the outcome – saving more people.

Other work using this paradigm also supports the idea that a rational mode might be associated with utilitarian decisions in moral-personal dilemmas. Greene, Morelli, Lowenberg, Nystrom, and Cohen (2008) had participants read moral dilemmas similar in structure to the trolley dilemmas. In this study, text outlining the dilemma was streaming across a screen. In one condition, participants also saw numbers streaming below the text, to which they were instructed to attend and press a button every time they saw the number five – this was the load condition. Under the load condition, reaction times were slower for utilitarian judgments, yet load did not influence the reaction times when non-utilitarian judgments were made. The slower reaction times for utilitarian decisions under cognitive load suggest that the utilitarian decisions are the product of a deliberate, rational (cognitive) thought process. Conversely, by their invulnerability to cognitive load, the nonutilitarian decisions appear to be the result of an automatic or experiential mode of thought.

In sum, this literature suggests that different modes of thought play different roles in determining an appropriate course of action – the experiential mode seems to consider the utilitarian action, on the whole, to be less acceptable because it involves an immoral act (like murder); the opposing mode of thought, the cognitive mode, might judge the utilitarian action to be moral because the end result involves saving more people, despite requiring a blatantly immoral action to achieve this end.

How CEST May Influence the Moral Situations Used in the Free Will Research

If cognitive and experiential modes of thought are linked with different moral decisions (such as utilitarian and nonutilitarian), then it is possible that these modes of thought may influence the types of moral outcomes used by Vohs and Schooler (2008) and Baumeister et al. (2009), providing an alternative explanation for their findings. In the studies of these authors, respondents in the free will condition acted more morally than those in the determinism condition, in that they were more likely to help and less likely to cheat, steal, and aggress. This may happen because the free will condition is activating an experiential focus. Respondents are relying on their experiential cues (focusing on the emotional response to each immoral choice) and are avoiding choices that involve engaging in an immoral action that may make them feel guilty or ashamed. Indeed, Baumeister et al. (2009) even argue that people in the free will condition focus on the nature of their actions more than those in the determinism condition.

Conversely, the determinism condition resulted in less moral outcomes, and this may result if people are using a more cognitive mode of thought. The cognitive mode involves processing situations using logic; a person primed to use logic may be evaluating situations not as moral issues, but rather as issues of practicality. What is counted as cheating (Vohs & Schooler, 2008) may be seen as justifiable because as long as s/he *tries* to get the answer, letting

the answer reveal itself is a nonissue. Taking more money than one earned could be rationalized as being paid fairly for one's time. The fact that those in the determinism condition were less likely to help someone in the Baumeister et al. (2009) scenarios and were adding more hot sauce to food could be viewed as not wasting time on relatively trivial issues of strangers. Thus, the determinism results could stem from the cognitive mode of thought. I am not arguing that one mode facilitates better behavior, rather, that what constitutes a better outcome may depend on how the situation is being evaluated, which I will discuss next.

How Free Will Belief may Influence Utilitarian Dilemmas

Thus far, the types of moral outcomes used by Vohs and Schooler (2008) and Baumeister et al. (2009) have been those that are unambiguous; it is clear which action is moral and which is not. Researchers have not yet examined how free will belief might influence choices made in response to ambiguous moral situations, such as utilitarian dilemmas. Baumeister et al. (2009) and Vohs and Schooler (2008) argue that free will belief provides people with a sense that they are thoughtful, causal agents and responsible for their actions. In contrast, they argue that determinism lessens this sense of moral responsibility and thoughtfulness.

This logic, when applied to utilitarian dilemmas, produces an interesting contradiction. Recall that judgments in utilitarian dilemmas appear to be influenced primarily by the extent to which people have moral concerns about the *actions taken* to achieve the outcome, with emotional thought being linked with rejecting the utilitarian action and rational thought linked with accepting the utilitarian action (Greene et al., 2008). In the trolley scenario, for example, the action that must be taken to bring about a beneficial ending (saving 5 people) is morally questionable (pushing a person off a bridge); people in an emotional mode of thought hesitate to take the action, but a rational mode is associated with taking the action – pushing the man off of

the bridge. If Baumeister et al. (2009) are correct in suggesting that free will promotes thoughtfulness and feelings of responsibility, then Baumeister et al. (2009) would predict that those in the free will condition would be less likely to approve of a utilitarian decision, and determinism more so. This is because determinism may undermine concern over the moral responsibility, and lead the person to engage in the immoral action that brings about a prosocial end.

If, on the other hand, the free will and determinism primes activate experiential and cognitive thought, respectively, then the same result is expected. That is, if the free will primes lead to experiential thought – which is emotional and automatic – then those primed with free will should approve less of utilitarian actions. If the determinism primes activate cognitive thought – which is rational and deliberate – then those primed with determinism should approve more of utilitarian decisions. Both sets of predictions for utilitarian decisions thus provides the possible boundary condition of this effect, for if determinism leads to more utilitarian decisions (choosing to act immorally to save more people), then arguably, this is a situation in which determinism, not free will, leads to the more pro-social, moral, decision.

Summary and Goals

In the past three sections, I have discussed how the manipulations of Vohs and Schooler (2008) and Baumeister et al. (2009) may be influencing cognitive-experiential thought in addition to free will belief, such that cognitive-experiential thought may explain the findings found by these researchers. I have also discussed how cognitive and experiential thought are differentially linked to moral outcomes, such that the experiential mode leads people to focus on emotional cues and avoid being responsible for immoral actions, and the cognitive mode leads people to make decisions that, considering the necessary actions, have the best overall outcomes.

Lastly, I have discussed how applying the logic of Vohs and Schooler (2008) and Baumeister et al. (2009) to utilitarian moral scenarios suggests that in ambiguous moral situations, free will belief may not result in the outcome that benefits the most people.

In light of what I have discussed, the most important goals of this research are to test the underlying mechanisms of the effects of priming free will and determinism, and examine a possible boundary condition. This includes examining the role that cognitive-experiential thought may play in moral decision-making, as well as the roles of free will, determinism, and locus of control, for these mechanisms were proposed, but untested by Vohs and Schooler (2008) and Baumeister et al. (2009), and, lastly, examining utilitarian dilemmas. Specifically, this research investigates: 1) whether a confound exists in the sentence primes used by Vohs and Schooler (2008) and Baumeister et al. (2009) to activate determinism, such that they also activate the experiential or cognitive mode of thought; 2) whether free will belief and feelings of control – mediators suggested but untested by Vohs and Schooler (2008) and Baumeister et al. (2009) are operating; and 3) whether effects of the free will and determinism primes extend to utilitarian dilemmas.

Another possible outcome of this investigation is that both free will belief and cognitive-experiential thought underlie moral outcomes. If this is the case, then one conclusion may be that both constructs are being manipulated by the primes, but each has unique effects. For example, free will belief and determinism may lead to differences in felt responsibility and accountability, whereas priming cognitive or experiential thought differentially influence valuing personal experience. If this is the case, then this dual mediation effect would indicate that manipulations of free will belief and determinism are not pure; instead, the manipulations have elements of both free will belief and determinism and cognitive-experiential thought, and that both contribute to

the relationship between the manipulation and moral outcomes. If free will belief and determinism are unique constructs, then researchers need to devise manipulations that clearly alter *them* and not confound them with cognitive-experiential thought. However, it may also be that these two concepts are linked and manipulations designed to alter one alter the other. In which case, researchers may want to focus on whether differential mechanisms underlie the process, such as accountability and experiential reactions to the means involved in acting. The proposed research will be the first step in investigating these explanations. A pilot and two experiments were run to examine my hypotheses, described below.

Hypotheses and Overview of the Experiments

Participants will be exposed to free will and determinism sentences, as in Baumeister et al. (2009) and Vohs and Schooler (2008). I expect that,

1) The free will manipulation is activating experiential thought and the determinism condition is activating cognitive thought.

Next, I examined the relative contributions of free will vs. cognitive and experiential thought on moral behavior. I hypothesize that,

2) If free will belief is the primary mediator between the manipulation and moral behavior, then higher scores on free will belief should predict more helping (Experiment 1) and less utilitarian decisions (Experiment 2), even when controlling for cognitive and experiential thought;

3) Alternatively, if experiential thought is the primary mediator between the primes and moral behavior, then higher scores on experiential thought (lower on cognitive thought) will predict more helping (Experiment 1) and less utilitarian decisions (Experiment 2) when controlling for level of free will belief.

4) If both are playing a role, then higher scores on free will and higher scores on experiential thought will predict more helping (Experiment 1) and less utilitarian decisions (Experiment 2).

5) Lastly, if control and free will belief are influenced by the primes in the way Vohs and Schooler (2008) and Baumeister et al. (2009) suggest, the control and free will belief should mediate the relationship between the primes and the outcomes (helping and utilitarian decisions). Figure 1, shown previously, illustrates these predicted relationships.

First, a pilot study was conducted to a) determine which method of presenting the sentences was most effective at manipulating free will belief, and b) provide support for the causal link between the manipulation and proposed mediators (cognitive and experiential thought and free will belief). Following the pilot, two experiments examined the relative contribution of free will belief and cognitive-experiential thought to making moral decisions, which I have operationally defined as helping and utilitarian decisions. Experiment 1 was intended to replicate Baumeister et al. (2009, Study 1) in which free will belief was manipulated by using a sentence priming task and then helping behavior and free will belief were assessed.¹ In addition, the Faith in Intuition and Need for Cognition scales of the Rational-Experiential Inventory (REI-10; Epstein, Pacini, Heier & Denes-Raj 1996) were included to determine the extent to which the manipulations activate cognitive-experiential thought, and allow me to compare the relative contribution of free will belief and experiential thought on the decision to help. Experiment 2 built on Experiment 1 by examining utilitarian dilemmas. This allowed me a chance to replicate the findings of Experiment 1 and also to examine a moral outcome that has not been examined in the context of free will: utilitarian dilemmas.

¹ Baumeister et al., (2009) found no differences between the control and free will conditions in level of free will belief, nor were there differences between these conditions on the moral outcomes, therefore, we will not include a control condition.

Pilot Experiment

The purpose of the pilot was to establish a causal link between the manipulation – exposure to the free will or determinism sentences – and the proposed mediators: free will belief and cognitive and experiential thought. This step is important because in the later experiments, I intended to place the dependent variables immediately after the manipulation and then assess the mediating variables in order to ensure that the effect of the manipulation did not dissipate before the dependent variables were assessed, and also account for the possibility that by measuring the mediators I might be changing the very factors that I am interested in assessing.

The second goal of the pilot was to determine which method of manipulating free will belief is most effective. The two manipulation methods tested were (a) a Velten procedure, in which instructions to participants about internalizing the sentences facilitate altering participant beliefs, and (b) a Velten procedure combined with an induced-agreement procedure, in which participants are led to voluntarily indicate agreement with the presented statements. These two procedures were tested to determine which one would be both effective at priming the concept of free will, but not overly obvious such that it would produce null or contrast effects (Martin, 1986).

Methods

Twenty-nine undergraduates (20 women) from the psychology subject pool completed this study for credit.

The design was a 2 (Belief: Free Will, Determinism) by 2 (Method: Velten with Induced Agreement, Velten Only) experiment, which was completed on computers. Participants were randomly assigned to one of these four conditions. In the Velten condition, the participants saw the following instructions:

“We'd like you to imagine how you'd be if you held certain beliefs. To do this, you will read a set of belief-statements to yourself. You will have several moments to consider each of the statements as they appear one by one on the screen. As you look at each statement, focus your observation only on that one. Your success at coming to experience this belief will largely depend on your willingness to accept and respond to the idea in each statement. Allow each statement to act upon you. Attempt to respond to the belief suggested by each statement. Then try to think of yourself as one who holds that belief. If it is natural for you to do so, try to visualize a scene in which you may have had such a belief.”

After seeing these instructions, a sample sentence appeared: “A statement will appear at the top of your screen exactly where these instructions are. You'll have several moments to contemplate the sentence according to the instructions.”

In the induced-agreement condition, participants saw the same Velten instructions, but in addition, beneath each sentence as it was displayed was a 5-point Likert item asking how much they agreed with the statement (1=Strongly Disagree, 2=Slightly Agree, 3 = Somewhat Agree, 4 = Moderately Agree, and 5 = Strongly Agree). This item was constructed in such a way such that it induces agreement by having more agreement options than disagreement options (Rattan, Savani, & Naidu, in press).

After being exposed to one of these two instructions, respondents were randomly assigned to be in either the free will or determinism condition. In the free will condition, participants were shown 15 sentences supporting a belief in free will, one at a time, for 30 seconds each. Similarly for the determinism condition, participants read 15 sentences supporting

a belief in determinism. The sentences were taken from Vohs and Schooler (2008) (see appendix A for sentences).

Participants then completed the Rational-Experiential Self Inventory (REI-10; Epstein, Pacini, Heier & Denes-Raj 1996, see appendix C for items), used to measure cognitive and experiential thought. This scale has five items from the Need for Cognition Scale, $\alpha = .89$ (NFC; Cacioppo & Petty, 1982), which measures cognitive processing (e.g. “I would prefer complex to simple problems.”). It also includes five items from the Faith in Intuition Scale, $\alpha = .74$ (FI; Epstein et al. 1996), which measures the affective, heuristic processing that is characteristic of experiential processing (e.g. “I trust my initial feelings about people.”). These two subscales will reveal what aspects of cognitive and experiential thought are being activated by the primes.

To assess whether belief in free will was being manipulated, respondents completed the Free Will and Determinism Scale (FAD-Plus; Paulhus & Carey 2011, see appendix B). In this pilot experiment, I used the scientific determinism (six items, $\alpha = .87$) and free will subscales (7 items, $\alpha = .81$). I expected the free will condition to result in higher scores on the free will subscale and lower scores on the scientific determinism subscale relative to the determinism condition.

Lastly, participants responded to the Cognitive Response Test (CRT; Shane, 2005; Toplak, West & Stanovich, 2011; Kahneman & Frederick, 2007; see Appendix E), another measure of activation of experiential or cognitive thought. It consists of three brain-teaser questions. Each can be answered in a way that suggests one is using heuristic, intuitive processing, or systematic, logical processing. Experiential responses were coded as 1, cognitive responses as -1, and other answers as zero, thus, when summed this provides an indicator of

experiential thought, with higher values indicating greater experiential thought. Table 1 displays all variable correlations; this can be found after the appendices.

Results

A series of 2 (Belief: Free will vs. Determinism Prime) x 2 (Method: Velten only or Velten Plus Induced Agreement) were conducted on the scientific determinism and free will subscales of the Free will and Determinism Scale (FAD-Plus), as well as the Rational-Experiential Inventory (REI), and Cognitive Response Test (CRT) scores. In terms of the scientific determinism subscale of the FAD-Plus, the belief priming manipulation was successful. People who had determinism primed reported higher levels of scientific determinism ($M = 3.00, SD = .65$) than those who had free will primed ($M = 2.43, SD = .82$); main effect of belief, $F(1, 25) = 4.27, p = .05$. There was also a marginally significant effect of method, $F(1, 25) = 3.46, p = .08$, such that the Velten-only condition ($M = 2.94, SD = .75$) scored higher on scientific determinism than the Velten-with-induced-agreement condition ($M = 2.42, SD = .75$). There was no significant interaction.

In terms of the free will subscale of the FAD-Plus, there were no main effects of belief or method, but there was a significant belief x method interaction, $F(3, 25) = 6.18, p = .02$, such that when exposed to the Velten-only procedure, those in the free will condition ($M = 4.05, SD = .55$) scored significantly higher on the free will subscale than those in the determinism condition ($M = 3.12, SD = .54, p = .01$). However, when exposed to the Velten-with-induced-agreement procedure, there was no significant difference between the free will ($M = 3.79, SD = .80$) and determinism conditions ($M = 4.07, SD = .52, p = .42$).

To test whether cognitive and experiential thought were influenced by the manipulation, the Need for Cognition (NFC) and Faith in Intuition (FI) subscales were examined in a 2-way

ANOVA. Consistent with the hypothesis that priming free will activated experiential thought, analyses on the FI scale revealed that the free will condition scored higher on FI ($M = 3.69$, $SD = .62$) than the determinism condition ($M = 3.19$, $SD = .69$, main effect of belief, $F_{belief}(3, 25) = 4.07$, $p = .05$). Analysis of the NFC scale revealed no significant effects, $F_{method}(3, 25) = .55$, $p = .46$, $F_{belief}(3, 25) = 1.22$, $p = .28$, $F_{belief \times method}(3, 25) = .35$, $p = .56$.

I also analyzed the CRT, but found no significant effects, $F_{method}(3,25) = .28$, $p = .60$, $F_{belief}(3, 25) = .05$, $p = .83$, $F_{belief \times method}(3, 25) = .05$, $p = .83$.

Discussion

Based on these results, it was determined that the Velten-only procedure was most appropriate to use, because this manipulation resulted in the predicted effect on free will belief as measured by both the scientific determinism and free will subscales of the FAD-Plus, replicating past research. Additionally, because the pilot demonstrated that scores on both subscales are moved in the expected directions in response to the manipulation, in the following experiments an aggregate of the free will and scientific determinism subscales (13 items, $\alpha = .87$) will be used to assess movement of free will belief.

My conclusion from analyzing the measures of cognitive and experiential thought is that, consistent with my predictions, there appears to be an effect of the manipulations on rational-experiential thought as measured by the Faith in Intuition scale of the REI-10, such that free will belief is activating more experiential thought. However, this success is qualified by a lack of effects on the Need for Cognition subscale and the Cognitive Response Test (CRT). However, the sample size for this pilot was small, and the CRT contains only three items with a small range of responses – more power may be needed in order to detect an effect.

Therefore, in order to fully test my hypotheses regarding the relationship between free will belief, experiential thought, and the moral outcome variables, I retain the REI and CRT for the following experiments. The subscales of the REI – the Faith in Intuition and Need for Cognition scales – are orthogonal (Pacini & Epstein, 1999), therefore it is possible that the manipulations of free will may affect one scale, but not the other. Furthermore, because emotional and rational thought are differentially implicated in moral decisions, whether cognitive-experiential thought has predictive power for outcomes like helping is an important question.

Another goal of Experiment 1 was to test the possible mediator of control suggested, but untested, by the past work by Vohs and Schooler (2008) and Baumeister et al. (2009). Recall that their logic stipulates that the negative moral outcomes found from undermining free will result from undermining the sense of control and agency that one feels by having free will. To address this, participants completed a measure of locus of control.

Experiment 1

Method

Fifty-six participants (nine men) completed the study for credit. The procedures are similar to the pilot. Immediately following the Velten manipulation of free will and determinism, participants completed the helping measure used in Baumeister et al. (2009). The measure contains a set of six short scenarios, in response to which participants are asked how likely they are to help (e.g. a classmate asking to borrow a cellphone; see Appendix G; $\alpha = .62$).

As in the pilot, participants completed the Rational-Experiential Self Inventory (NFC scale, 5 items, $\alpha = .84$; FI scale, 5 items, $\alpha = .76$) and the Free Will and Determinism Scale (FAD-Plus). I created an aggregate measure of free will belief using the scientific determinism

subscale ($\alpha = .77$) and free will subscale ($\alpha = .76$). To do this, I reverse-coded the scientific determinism items and aggregated them with the free will items, thus higher values indicate greater free will belief and less deterministic belief ($\alpha = .80$).

After completing these measures, participants completed the Cognitive Response Test and the measure of locus of control. This measure (See Appendix F, Rotter, 1966; $\Omega = .83^2$) contained 13 items, with two possible responses per item. These were coded such that 1 was assigned to the response indicating a more external locus of control and 0 to responses indicating a more internal locus, thus higher scores indicate a more external locus. Table 2 displays all variable correlations; this can be found after the appendices.

Results

Importantly, while the Cognitive Response Test (CRT) was proposed as a convergent measure for cognitive experiential thought, it is not correlated with the Need for Cognition and Faith in Intuition subscales of the Rational-Experiential Inventory, $r(54) = 0.13$, ns, $r(54) = .21$, ns. For this reason, we include the CRT in the mediation analysis as a distinct measure of cognitive thought alongside the faith in intuition, need for cognition, and free will scales.

The hypotheses are that the free will condition should score (a) higher on the Free Will and Determinism Scale (FAD-Plus), relative to the determinism condition and (b) score lower on the Need for Cognition and higher on Faith in Intuition scale of the Rational Experiential Inventory; (c) if free will belief is the primary mediator between the manipulation and moral behavior, then higher scores on free will belief (that is, higher scores on the FAD-Plus) should predict more helping even when controlling for cognitive-experiential thought (that is, controlling for Need for Cognition and Faith in Intuition scores); (d) Alternatively, if experiential thought is the primary mediator between the primes and moral behavior, then experiential

² An ordinal reliability coefficient, omega, was calculated (Gadernann, Guhn, & Zumbo, 2012).

thought (that is, higher scores on Faith in Intuition) will predict more helping even when controlling for level of free will belief, and rational thought (higher scores on Need for Cognition) will predict less helping even when controlling for free will belief; (e) if both cognitive experiential thought and free will belief are playing a role, then higher scores on free will and higher scores on experiential thought will predict more helping; (f) lastly, if locus of control is the primary mediator, then higher scores on the locus of control measure should predict more helping.

First, the Cognitive Response Test (CRT) was not correlated at all with the Need for Cognition (NFC) and Faith in Intuition (FI) scales, $r(51) = .03$, ns, and $r(51) = -.16$, ns, respectively, suggesting that the CRT is measuring mode of thought very differently from the NFC and FI scales. This could be because the CRT is an implicit measure. Therefore, the CRT was included alongside the NFC and FI scales as a unique predictor of mode of thought. To test the above hypotheses, I used Hayes' (Hayes, 2012) process procedure for mediations, model 4. The confidence interval was estimated using 5000 bootstrapping resamples, and I used mean-centered predictors and the procedure that created heteroskedasticity-consistent SEs. Free will belief was dummy coded such that free will = 1 and determinism = 0. I tested the five mediators, FAD-Plus, NFC, FI, CRT, and locus of control (LOC) simultaneously, which tests each mediator as a predictor of the outcome while controlling for the other mediators. This analysis supported the hypothesis that exposure to the free will sentences will led to greater free will belief (FAD-Plus), $b = .34$, $se = .13$, $t(54) = 2.56$, $p = .01$. Counter to the hypothesis concerning CEST, exposure to the free will sentences did not predict rational thought (NFC), $b = .35$, $SE = .23$, $t(54) = 1.54$, $p = .13$, and also did not predict experiential thought (FI), $b = -.19$, $SE = .19$, $t(54) = -1.02$, $p = .31$. Also, exposure to the free will sentences did not predict scores on the CRT – a

measure of cognitive-experiential thought, but unrelated to NFC and FI, $b = .41$, $SE = .42$, $t(54) = 1.0$, $p = .32$. These three null predictions indicate that the primes are not influencing mode of thought. Finally, the primes did not predict LOC, $b = .33$, $SE = .56$, $t(54) = .59$, $p = .56$

The total effect was significant, effect = .77, boot se = .34, $t(51) = 2.27$, $p = .03$, 95% CI [.09, 1.45], indicating that those in the free will condition, consistent with past work, were more likely to help than those in the determinism condition. Furthermore, free will belief (FAD-plus) mediated this relationship, effect = .25, boot se = .16, 95% CI [.02, .67]. However, rational thought (NFC), experiential thought (FI), and control (LOC) did not predict helping, NFC: $b = .15$, $se = 0.25$, $t(51) = .59$, $p = .56$; FI: $b = .06$, $se = .37$, $t(51) = .16$, $p = .88$; CRT: $b = -.13$, $se = 0.13$, $t(51) = -1.0$, $p = .32$; LOC: $b = -.04$, $se = 0.15$, $t(51) = -.27$, $p = .79$, and therefore did not operate as mediators (all effects < .06, all 95% CIs include 0). This finding contradicts Vohs and Schooler (2008) and Baumeister et al.'s (2009) idea that the reason undermining free will belief results in less moral behavior is because a sense of control, and therefore responsibility, is also being undermined. Also, the total indirect effect was not significant, effect = .22, boot se = .22, 95% CI [-.16, .72]. These analyses are represented in Figure 3.

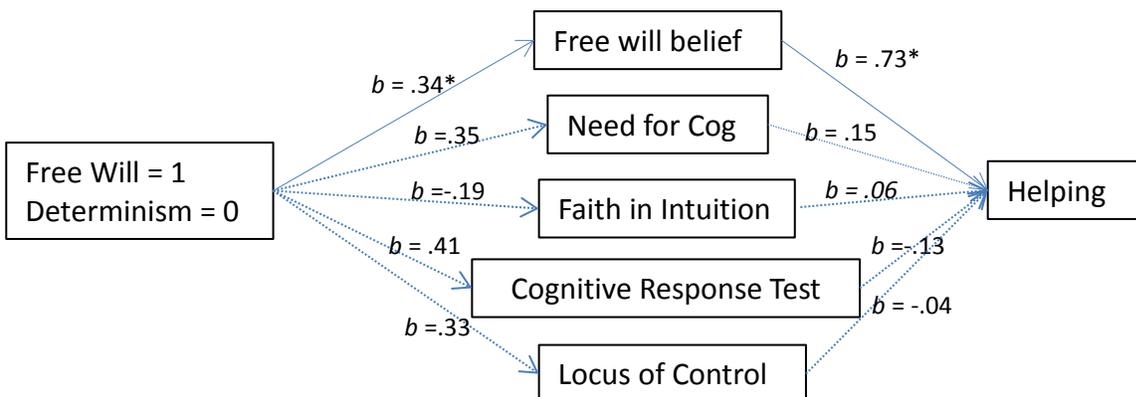


Figure 2. The mediating effects of free will belief (FAD-Plus), need for cognition (NFC), faith in intuition (FI), cognitive response test scores (CRT), and locus of control (LOC) on helping. Only

free will belief mediates; no other relationships are significant. Significant coefficients are denoted by an *.

Discussion

This experiment replicated Baumeister et al. (2009), in that activating free will led to greater helping intentions relative to activating determinism. In addition, free will belief mediated this effect. In contrast to the prediction that activating free will also increases experiential thought and activating determinism increases cognitive thought, there was no effect on Faith in Intuition (FI), Need for Cognition (NFC) or the Cognitive Response Test (CRT). Experiment 2 builds upon this work, by addressing two issues.

First, a limitation in experiment 1 is that the sample was only 16% men. There is no reason to expect differences by gender, but in Experiment 2, I recruited men and women in approximately equal number in order to examine gender more closely.

Second, in the pilot, experiential thought (FI) was higher for the free will condition, with no effects of the free will and determinism primes on rational thought (NFC). In experiment 1, there were no effects of the primes on experiential or cognitive thought. Also, cognitive and experiential thought did not predict helping (and for these two reasons, could not mediate). While there is no research on morality which tests these modes of thought as mediators for outcomes like helping intentions, the work on utilitarian decisions suggests that more emotional thought would lead to greater consideration of morality (and therefore more helping), but I did not find this effect. It is possible that intention to help in these hypothetical scenarios is not influenced by cognitive and experiential thought. Another possibility is that the 5-item NFC and 5-item FI scales are not sufficient to adequately assess cognitive-experiential thought. In experiment 2, a longer version of the two scales (the 31-item Rational-Experiential Inventory; Epstein, Pacini, Denes-Raj, & Heier, 1996) is used to account for this possibility – perhaps more dimensions of

thoughtfulness and emotion must be assessed to link the primes to cognitive and experiential thought and these to helping, or, in the case of Experiment 2, utilitarian dilemmas.

Experiment 2 examines whether and how the effects of free will belief and cognitive-experiential thought extend to utilitarian situations. Research on utilitarian decision indicates that these decisions differ depending on whether rational or emotive aspects of the moral outcome are being considered; rational thought is associated with more utilitarian decisions, experiential thought is not.

Experiment 2

This experiment intended to (1) replicate the effect of activating free will belief and determinism on cognitive and experiential thought; (2) investigate whether cognitive and experiential processing mediates the relationship between manipulating free will belief and moral outcomes using a more reliable index of cognitive-experiential thought; (3) extend the effects of manipulating free will to utilitarian moral decisions; (4) address the gender inequity by recruiting equal numbers of men and women.

Method

Sixty-one participants (33 women) from the psychology subject pool completed this study for credit. Following the same procedure used in Experiment 1, participants were randomly assigned to either the free will or determinism condition. Next, participants responded to a series of scenarios taken from the Greene et al. (2001) battery of utilitarian moral dilemmas. These dilemmas are similar to the trolley dilemma, in which a person must decide whether to let a runaway trolley kill five workers on the tracks or divert the trolley onto another track on which only a single worker stands. In all of the scenarios, the participants could prevent negative consequences from befalling multiple people by instigating a negative consequence for one

person. Each dilemma asked if it were appropriate to act in the situation described; participants responded on a Likert scale ranging from 1 = “Definitely not appropriate” to 5 = “Definitely appropriate.” The proffered action is always the utilitarian option, the one that uses an immoral means to bring about an arguably moral end. I used eight scenarios (see Appendix H), which were chosen for their variability in both situation and severity, (i.e. some actions involve stealing, others, murder).

After responding to the utilitarian scenarios, participants completed a Rational-Experiential Inventory (REI-31), a longer version with 31 items (NFC, 19 items $\alpha = .86$ FI, 12 items $\alpha = .76$; see Appendix D), and, as in Experiment 1, the Free Will and Determinism Scale (FAD-Plus; scientific determinism subscale $\alpha = .71$; free will subscale $\alpha = .70$; free will aggregate $\alpha = .67$) and Cognitive Response Test^{3 4}.

Locus of control was not included in this study, given that it had no effects in Experiment 1. Table 3 displays a correlation table of all variable-correlations – this can be found after the appendices.

Results

As in Experiment 1, I tested my hypotheses with mediational analyses. I used mean-centered versions of free will belief (FAD-Plus), need for cognition (NFC), faith in intuition (FI), and cognitive response test scores (CRT). The confidence interval was estimated using 5000 bootstrapping resamples. The analyses revealed that, as in Experiment 1, exposure to the free will sentences led to increased free will belief, $b = .22$, $se = .11$, $t(59) = 2.0$, $p = .05$. Also, as in

³ Participants also completed another item assessing agreement with the sentences as an additional manipulation check that is phrased with reference to the Velten instructions: “Thinking back to the sentences you read, how successful were you at experiencing the beliefs as your own?” and “Thinking back to the sentences you read, how much did you agree with the beliefs?” Response options ranged from 1 “not at all successful” to 9 “very successful,” and 1 “not at all” to 9 “very much so,” respectively.

⁴ While the CRT revealed nothing in the prior two experiments, it is included for the sake of thoroughness and to verify the null effect with a second sample of arguably adequate size with equal numbers of males and females.

Experiment 1, the primes did not influence rational thought (NFC), $b = -.15$, $se = .14$, $t(59) = -1.09$, $p = .28$. Nor was there an effect of the primes on experiential thought (FI), $b = -.21$, $se = .14$, $t(59) = -1.5$, $p = .13$, nor on the CRT, $b = -.50$, $se = 0.52$, $t(59) = -.98$, $p = .33$. This corroborates the conclusion that the free will and determinism primes are not influencing modes of thought.

Additionally, consistent with predictions, the free will belief prime was significantly predictive of less approval of utilitarian decisions relative to the determinism prime. This is evident in the total effect: effect = $-.45$, boot $SE = .20$, $t(59) = -2.32$, $p = .02$, and also the direct effect, $b = -.45$, $se = .21$, $t(55) = -2.18$, $p = .03$, and suggests that determinism primes lead to more approval of utilitarian decisions. Unlike Experiment 1, however, in which free will belief mediated the effect of the primes on helping, it did not mediate with approval of utilitarian decisions, effect = $-.04$, boot $se = .05$, 95%CI $[-.19, .03]$. Indeed, none of the measured variables mediated this relationship; all 95% CIs include 0. These analyses are depicted in Figure 2.

In sum, the primes were effective as before, and supported the prediction that free will would lead to less approval of utilitarian decisions; however, no mediation occurred.

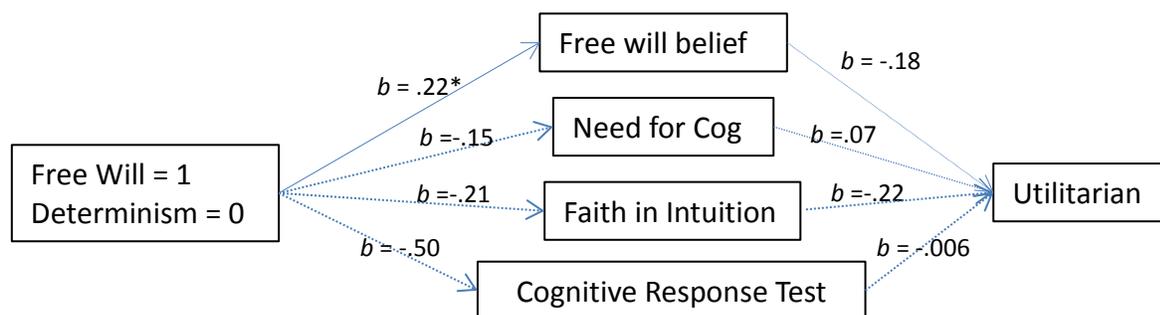


Figure 2. The mediating effects of free will belief (FAD-Plus), need for cognition (NFC), faith in intuition (FI), and cognitive response test scores (CRT) on approval of utilitarian decisions. Determinism primes lead to more approval of utilitarian decisions (total and direct effect), but no other relationships are significant. Total effect: effect = $-.45$, boot $se = .20$, $t(59) = -2.32$, $p = .02$.

Direct effect: effect = $-.45$, boot se = $.20$, $t(55) = -2.19$, $p = .03$. Indirect effects: all 95% CIs include 0. Significant coefficients are denoted with an *.

General Discussion

This project examined whether past manipulations of free will belief were confounded with primes of rational and experiential thought, and sought to establish possible mediational mechanisms between manipulations of free will belief and morality. These mechanisms included rational and experiential thought, free will belief, and locus of control. Additionally, this project attempted to extend these effects and past work by examining utilitarian moral dilemmas.

The data replicated past work which found that undermining free will belief led to less helping: in Experiment 1, people were less likely to help others when they were in the determinism than the free will condition. In addition, free will belief (as measured by the FAD-Plus scale) tended to mediate the results. However, control, a mediator suggested, but untested, by past work was not influenced by the manipulations and had no relationship with helping intentions. This suggests that undermining free will belief may have no effect on perceptions of control as past research suggests in explanation of their findings.

Experiment 2 extended this work by showing that determinism led to greater approval of utilitarian moral decisions than did free will. This suggests that believing in determinism does not always lead to less prosocial behavior. However, unlike Experiment 1, self-reports of free will belief did not mediate this effect. In fact, none of the measures collected operated as significant mediators.

This lack of mediation could stem from the fact that utilitarian decisions differ from the types of moral decisions that have been used in past work, and thus there may be other, unmeasured, factors that underlie this finding. For example, one possible alternative is that the free will primes produce more self-awareness than the determinism primes. References to the

self are common in the free will sentences, whereas they are absent completely from the determinism sentences. Research indicates that as self-awareness increases, so too does a person's focus on her or his own internal moral standards (Baumeister, 1998, pg. 686). This may result in less approval of utilitarian actions, for these actions require that one engage in an immoral action (like murder) to bring about a positive outcome for more people. In addition, exposure to the determinism sentences may be leading to a greater focus on humans in general and thus *less* self-awareness. This focus on others rather than the self could then result in participants considering the welfare of people in general, leading to greater approval of utilitarian decisions, which involve putting the group before the individual. Less self-awareness could also result in less helping, for the same reason – that reducing self-awareness reduces adherence to moral standards.

Additionally, investigating meaningfulness might be fruitful, as Vohs and Schooler (2008) and Baumeister et al. (2009) suggest that undermining free will leads to a sense that one's actions are meaningless. If people feel their actions are meaningless, they may not care enough to help people. They may also have fewer qualms with utilitarian decisions. In fact, it may be meaning instead of control that is primarily being affected by the manipulations. A sense of meaninglessness, similar to feeling a lack of control, could lead to the impression that one's actions do not matter, making the feeling of personal responsibility pointless as well.

Rational-Experiential Thought

Contrary to my predictions that the free will primes activated cognitive-experiential thought, the free will primes did not influence cognitive-experiential thought in any consistent way. The pilot linked free will belief with higher faith in intuition scores, while Experiment 1 linked free will belief with higher need for cognition scores, and in Experiment 2 there was no

relationship at all between free will belief and either of these measures of cognitive-experiential thought. Additionally, I found no evidence that cognitive or experiential thought was linked to helping or utilitarian decisions. It is possible that the aspects of the free will and determinism primes that appear to refer to rational and experiential thought may do so only conceptually, and not be related in the mind in such a way that the primes would operate as I have hypothesized. That is, referencing feelings in the context of free will may not lead one to think experientially and referencing science in the context of determinism may not lead one to think rationally, as I argued. Instead, these concepts, being in the context of free-will and determinism, may be bound up together and compartmentalized collectively as a schema of free will, and so do not, as individual ideas, lend themselves to activating different modes of thought.

Alternatively, the effects of the primes on any mediating constructs may be unconscious. If this is the case, self-report measures would not capture the activation of other modes of thought or changes in feelings of control that may be caused by the primes. In this case, I would still expect to see – and did see – movement on the free will and determinism scale (FAD-Plus), because the ideas in those items were explicitly and consciously processed while being exposed to the free will and determinism primes.

Another issue is that, while research on utilitarianism suggests that cognitive-experiential thought might have a role to play in moral outcomes, this work did not find any relationship between our measures of cognitive-experiential thought and the moral outcomes. Past work has shown that certain decisions tend to occur in tandem with activation of emotional and unemotional systems in the brain; specifically, utilitarian decisions appear to be the product of a more deliberate, rational thought process, while deontological or non-utilitarian decisions appear to be the product of a more automatic, emotional system. However, this was based on analysis of

active brain regions, and perhaps our self-report measures of rational-experiential thought cannot tap into these processes, which may happen well outside awareness.

Relations to Past Work

Regarding the past work on undermining free will belief, these experiments suggest that the effects found by Vohs and Schooler (2008) and Baumeister et al. (2009) are due to the undermining of free will belief, as confirmed by replicating the effect on helping and demonstrating that free will belief mediated the effect. However, it is still unclear what features of the primes are driving the effects. The fact remains that the primes are complicated and refer to many different ideas. It could be that there is something specific to helping, and perhaps the other unambiguous prosocial outcomes, that is relevant to free will belief, but not to ambiguous outcomes like utilitarian scenarios. Other elements of the primes may function in that case. The fact that determinism led to greater utilitarian decisions suggests a more rational thought process is operating; so, despite the lack of corroborating mediators of cognitive-experiential thought, there is still a possibility that the primes are also unconsciously activating different modes of thought as I propose. And, as mentioned, unconscious effects of the primes are also potentially operating. Future research can use outcomes similar to the utilitarian dilemmas (in that the decisions made reveal which mode of thought may be operating) to examine this possibility.. Additionally, experiments linking different modes of thought with manipulations from the CEST paradigm should be linked with these moral outcomes to demonstrate the expected pattern – that explicitly activating rational thought leads to less helping and more utilitarian decisions, while emotional thought leads to more helping and less utilitarian decisions.

An important issue that Baumeister et al (2009) raise in response to their findings is that undermining free will belief may be harmful, because it results in less moral behavior. This work

qualifies that statement slightly, because Experiment 2 demonstrated that those who read statements supporting free will were less approving of utilitarian decisions, and sometimes utilitarian decisions are desirable. For example, while sacrificing a person is generally insupportable, there are situations in which some consider it necessary, such as in negotiations with terrorists who have a hostage and make demands that would put multiple others in danger. This situation and others described in the utilitarian scenarios may seem outlandish or rare, but they are more likely to face an individual who is in a decision-making position with regard to the well-being of a large group, e.g. presidents, generals, doctors, plant-managers, etc. What is important to note about the effect of Experiment 2, however, is that while those in the determinism condition were more approving of utilitarian decisions, this effect was not mediated by free will belief. Therefore, manipulations of free will in general (i.e. manipulations *other* than that used in this study) may not influence approval of utilitarian decisions in this way. There is likely some element of this specific manipulation that influenced this outcome, and it may be, to a sufficient degree, unrelated to free will or determinism. Future work could test other manipulations of free will that are “purer” than those used in this research.

Finally, it is possible that there was not enough power in Experiment 2 to detect an effect. While the samples in both experiments were similar, the mediating effect between the primes and approval of utilitarian decisions may be smaller than that mediating the effect on helping.

Conclusion

This work demonstrates that determinism may sometimes lead to the better moral decision. In contrast with conclusions of much of the past work using this paradigm that claim undermining free will leads to ubiquitously less moral behavior, the effect depends on the situation. Additionally, it is clear that the mechanisms of these effects deserve more attention.

While variation in free will belief tended to explain the effect on helping, it is still unclear what *about* free will belief is leading to these effects. Furthermore, free will and determinism primes had an effect on utilitarian decisions, but free will beliefs did not mediate the effect; this suggests that something else might be operating apart from free will belief, or that more power is needed to detect this effect. One explanation of past researchers for the effects of free will belief – control-- was tested here and not supported, nor were my hypotheses regarding cognitive-experiential thought; however, there are other possibilities in self-awareness and meaningfulness that may reveal why priming and undermining free will belief influences moral judgments. It is also possible that self-report mediators will reveal nothing, as the primes influence constructs outside of awareness, and future work should examine outcomes that reveal processes instead of mediators.

In sum, it is clear that believing in free will is generally a positive thing; it increases moral behavior in situations that have clear norms for what is good behavior. Yet, moral situations are often complex and ambiguous, and may require prioritizing one norm or rule over another; elements of deterministic belief facilitate approaching this kind of decision in a rational way, which may, actually, be preferable.

References

- Baumeister, R.F. (1998). The self. In D.T. Gilbert, S.T. Fiske, & G. Lindzey (Eds.), *Handbook of social psychology* (4th ed.; pp. 680-740). New York: McGraw-Hill.
- Baumeister, R. F., Masicampo, E. J., & DeWall, C. N. (2009, February). Prosocial benefits of feeling free: Disbelief in free will increases aggression and reduces helpfulness. *Personality and Social Psychology Bulletin*, *35*(2), 260-268. doi: 10.1177/0146167208327217
- Cacioppo, J. T., & Petty, R. E. (1982). The need for cognition. *Journal of Personality and Social Psychology*, *42*(1), 116-131. doi:http://dx.doi.org/10.1037/0022-3514.42.1.116
- Crick, F. H. C. (1994). *The astonishing hypothesis: The scientific search for the soul*. Charles Scribner'S Sons, New York, NY. Retrieved from <http://search.proquest.com/docview/618553126?accountid=13158>
- Epstein, S. (1985, October). The implications of cognitive-experiential self-theory for research in social psychology and personality. *Journal for the Theory of Social Behaviour*, *15*(3), 283-310. doi: 10.1111/j.1468-5914.1985.tb00057.x
- Epstein, S. (1990). Cognitive-experiential Self-theory. In L. Pervin (Ed.), *Handbook of personality theory and research: Theory and research* (pp. 165-192). NY: Guilford Publications, Inc. doi: 1990-98135-007
- Epstein, S., Lipson, A., Holstein, C., & Huh, E. (1992). Irrational reactions to negative outcomes: Evidence for two conceptual systems. *Journal of Personality and Social Psychology*, *62*(2), 328-339. doi: 10.1037/0022-3514.62.2.328
- Epstein, S., Pacini, R., Denes-Raj, V., & Heier, H. (1996). Individual differences in intuitive-experiential and analytical-rational thinking styles. *Journal of Personality and Social Psychology*, *71*(2), 390-405. doi: 10.1037/0022-3514.71.2.390
- Gadermann, Guhn, & Zumbo (2012). Estimating ordinal reliability for Likert-type and ordinal item response data: A conceptual, empirical, and practical guide. *Practical Assessment, Research, & Evaluation*, *17*.
- Greene, J. D., Sommerville, R. B., Nystrom, L. E., Darley, J. M., & Cohen, J. D. (2001, September 14). An fMRI investigation of emotional engagement in moral judgment. *Science*, *293*(5537), 2105-2108. doi: 10.1126/science.1062872
- Greene, J. D., Morelli, S. A., Lowenberg, K., Nystrom, L. E., & Cohen, J. D. (2008). Cognitive load selectively interferes with utilitarian moral judgment. *Cognition*, *107*(3), 1144-1154. doi: 10.1016/j.cognition.2007.11.004

- Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling [White paper]. Retrieved from <http://www.afhayes.com/>
- Kahneman, D., & Frederick, S. (2007). Frames and brains: Elicitation and control of response tendencies. *Trends in Cognitive Sciences*, 11(2), 45-46. doi:<http://dx.doi.org/10.1016/j.tics.2006.11.007>
- Kirkpatrick, L. A., & Epstein, S. (1992). Cognitive-experiential self-theory and subjective probability: Further evidence for two conceptual systems. *Journal of Personality and Social Psychology*, 63(4), 534-544. doi: 10.1037/0022-3514.63.4.534
- Koenig, M (2007). "Damage to the pre frontal increases utilitarian moral judgments". *Nature* (London) (0028-0836), 446, p. 908.
- Koven, N. S. (2011). Specificity of meta-emotion effects on moral decision-making. *Emotion*, 11(5), 1255-1261. doi: 10.1037/a0025616
- Martin, L. L. (1986). Set/reset: Use and disuse of concepts in impression formation. *Journal of Personality and Social Psychology*, 51(3), 493-504. doi:10.1037/0022-3514.51.3.493
- Wegner, D. M. (2004). Précis of the illusion of conscious will. *Behavioral and Brain Sciences*, 27(5), 649-659. Retrieved from <http://search.proquest.com/docview/620720018?accountid=13158>
- Pacini, R., & Epstein, S. (1999). The relation of rational and experiential information processing styles to personality, basic beliefs, and the ratio-bias phenomenon. *Journal of Personality and Social Psychology*, 76(6), 972-987. doi: 10.1037/0022-3514.76.6.972
- Paulhus, D. L., & Margesson, A. (1994). *Free will and Determinism (FAD) Scale*. Unpublished manuscript, University of British Columbia, Vancouver, Canada.
- Paulhus, D. L., & Carey, J. M. (2011). The FAD-Plus: Measuring lay beliefs regarding free will and related constructs. *Journal of Personality Assessment*, 93(1), 96-104. doi: 10.1080/00223891.2010.528483
- Rattan, A. Savani, K. Naidu, N. V. R. Dweck, C. S. (2012). Can everyone become highly intelligent? Cultural differences in and societal consequences of beliefs about the universal potential for intelligence. *Journal of Personality and Social Psychology*, 103(5), 787-803. doi:10.1037/a0029263.
- Shane, F. (2005). Cognitive reflection and decision making. *The Journal of Economic Perspectives*, 19(4), 25. Retrieved from <http://search.proquest.com/docview/212071747?accountid=13158>

- Simon, L., Greenberg, J., Harmon-Jones, E., Solomon, S., Pyszczynski, T., Arndt, J., & Abend, T. (1997). Terror management and cognitive-experiential self-theory: Evidence that terror management occurs in the experiential system. *Journal of Personality and Social Psychology*, 72(5), 1132-1146. doi: 10.1037/0022-3514.72.5.1132
- Toplak, M. E., West, R. F., & Stanovich, K. E. (2011). The cognitive reflection test as a predictor of performance on heuristics-and-biases tasks. *Memory & Cognition*, 39(7), 1275-1289. Retrieved from <http://search.proquest.com/docview/920257715?accountid=13158>
- Viney, W., Waldman, D. A., & Barchilon, J. (1982, November 11). Attitudes toward punishment in relation to beliefs in free will and determinism. *Human Relations*, 35(11), 939-950. doi: 10.1177/001872678203501101
- Vohs, K. D., & Schooler, J. W. (2008). The value of believing in free will: Encouraging a belief in determinism increases cheating. *Psychological Science*, 19(1), 49-54. doi: 10.1111/j.1467-9280.2008.02045.x
- Wegner, D. M. (2004). Précis of the illusion of conscious will. *Behavioral and Brain Sciences*, 27(5), 649-659. Retrieved from <http://search.proquest.com/docview/620720018?accountid=13158>

Appendix A

Determinism and Free Will Primes (Vohs and Schooler, 2008)

You will be shown a set of 15 statements, one at a time. Please read and reflect on each statement carefully. You will have one minute to reflect on each statement before the computer advances to the next statement.

Deterministic Statements

1. Ultimately, we are biological computers - designed by evolution, built through genetics, and programmed by the environment.
2. The brain is a complex machine capable of carrying out extremely sophisticated behaviors.
3. Science has demonstrated that free will is an illusion.
4. It is likely that scientists will eventually understand how the feeling of personal experience results from neurons firing in the brain.
5. Everything a person does is a direct consequence of their environment and genetic makeup.
6. Once scientists understand enough about the physical principles underlying behavior, they should be able to precisely predict a person's future actions based solely on that person's genetics and prior experiences.
7. Our actions are determined by what we have experienced in the past combined with the specific genetic predispositions that we have.
8. Like everything else in the universe, all human actions follow from prior events and ultimately can be understood in terms of the movement of molecules.
9. A belief in free will contradicts the known fact that the universe is governed by lawful principles of science.
10. Our mental activities are exclusively the product of physical processes.
11. Every action that a person takes is caused by a specific pattern of neural firings in the brain.
12. All behavior is determined by brain activity, which in turn is determined by a combination of environmental and genetic factors.
13. People often claim that they have free will, but all they really have is the experience of making choices.
14. Just as science has shown that physical movement is merely forces of gravity combined with muscular force, scientists are now realizing that personal thoughts, feelings, and beliefs are similarly controlled by basic physical processes.

15. Even if some behaviors are not actually pre-determined, this does not mean there is free will, as random actions are no more under our control than are those caused by prior events.

Free Will Statements

1. I demonstrate my free will everyday when I make decisions.
2. I am able to override the genetic and environmental factors that sometimes influence my behavior.
3. I have feelings of regret when I make bad decisions because I know that ultimately I am responsible for my actions.
4. I take personal pride in good decisions I have made in the past because I know that, at the time, I had the freedom to and could have made a bad decision.
5. Avoiding temptation requires that I exert my free will.
6. Ultimately people cannot blame their own actions on anything other than themselves.
7. I have free will to control my actions and, ultimately, to control my destiny in life.
8. I am more than a robot that has been programmed by genetics and the environment, no matter what a few scientists claim.
9. People are responsible for their behaviors because they have free will to control their actions.
10. Our actions and thoughts are not simply the result of prior experiences.
11. By exerting their free will, people can and do overcome the negative effects of a dysfunctional environment.
12. It has been shown that mental experience cannot be completely reduced to physical causes.
13. There are many things that science still cannot explain, so it does not trouble me that science cannot offer an explanation for free will.
14. Given that I have had personal experiences that science cannot explain, I also know that I have free will even if science cannot explain it.
15. By exerting my will, I overcome the physical factors that influence my behavior and experience true freedom.

Appendix C

Rational-Experiential Inventory - 10 item
(REI-10; Epstein Pacini Denes-Raj & Heier, 1996)

Please respond to the following items using the scale provided:

1	2	3	4	5
Completely false				Completely true

NFC:

Right now I don't want to have to do a lot of thinking.

Right now I want to avoid situations that require thinking in depth about something.

Right now I would prefer to do something that challenges my thinking abilities rather than something that requires little thought.

Right now I would prefer complex to simple problems.

Right now thinking hard and for a long time about something would give me little satisfaction.

FI:

Right now I trust my initial feelings about people.

Right now I believe in trusting my hunches.

Right now I would say that my initial impressions of people are almost always right.

Right now I think that when it comes to trusting people I can usually rely on my "gut feelings."

Right now I feel I could tell whether a person is right or wrong even if I can't explain how I would know.

Appendix D

Rational Experiential Inventory – 31 Item (REI-31; Epstein, Pacini, Denes-Raj, & Heier, 1996)

Need for cognition subscale

1. I would rather do something that requires little thought than something that is sure to challenge my thinking abilities. (R)
2. I don't like to have the responsibility of handling a situation that requires a lot of thinking. (R)
3. I would prefer complex to simple problems.
4. I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something. (R)
5. I find little satisfaction in deliberating hard and for long hours. (R)
6. Thinking is not my idea of fun. (R)
7. The notion of thinking abstractly is not appealing to me. (R)
8. I prefer my life to be filled with puzzles that I must solve.
9. Simply knowing the answer rather than understanding the reasons for the answer to a problem is fine with me. (R)
10. I don't reason well under pressure. (R)
11. The idea of relying on thought to make my way to the top does not appeal to me. (R)
12. I prefer to talk about international problems rather than to gossip or talk about celebrities.
13. Learning new ways to think doesn't excite me very much. (R)
14. I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.
15. I generally prefer to accept things as they are rather than to question them. (R)
16. It is enough for me that something gets the job done, I don't care how or why it works. (R)
17. I tend to set goals that can be accomplished only by expending considerable mental effort.
18. I have difficulty thinking in new and unfamiliar situations. (R)
19. I feel relief rather than satisfaction after completing a task that required a lot of mental effort. (R)

Faith in Intuition subscale

20. My initial impressions of people are almost always right.
21. I trust my initial feelings about people.
22. When it comes to trusting people, I can usually rely on my "gut feelings."
23. I believe in trusting my hunches.
24. I can usually feel when a person is right or wrong even if I can't explain how I know.
25. I am a very intuitive person.
26. I can typically sense right away when a person is lying.
27. I am quick to form impressions about people.
28. I believe I can judge character pretty well from a person's appearance.
29. I often have clear visual images of things.
30. I have a very good sense of rhythm.
31. I am good at visualizing things.

Appendix E

The Cognitive Reflection [Response] Test (CRT)

- 1) A bat and a ball cost \$1.10 in total. The bat costs \$1.00 more than the ball. How much does the ball cost? ____cents.
- 2) If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? ____ minutes
- 3) In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch of lily pads to cover the entire lake, how long would it take for the patch to cover half of the lake? ____days.

- 1: Intuitive answer: 10 cents. Correct answer: 5 cents
- 2: Intuitive answer: 100 minutes Correct answer: 5 minutes
- 3: Intuitive answer: 24 days Correct answer: 47 days

Appendix F

Locus of Control (Rotter, 1966)

Score one point for response 'a' to questions: 1, 3, 4, 5, 10, 11, 12, and 13.

Score one point for response 'b' to questions: 2, 6, 7, 8, and 9.

Please choose one choice (a or b) for each number:

1. a. Children get into trouble because their parents punish them too much.
1. b. The trouble with most children nowadays is that their parents are too easy with them.
2. a. Many of the unhappy things in people's lives are partly due to bad luck.
2. b. People's misfortunes result from the mistakes they make.
3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.
3. b. There will always be wars, no matter how hard people try to prevent them.
4. a. In the long run people get the respect they deserve in this world.
4. b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.
5. a. The idea that teachers are unfair to students is nonsense.
5. b. Most students don't realize the extent to which their grades are influenced by accidental happenings.
6. a. Without the right breaks, one cannot be an effective leader.
6. b. Capable people who fail to become leaders have not taken advantage of their opportunities.
7. a. No matter how hard you try, some people just don't like you.
7. b. People who can't get others to like them don't understand how to get along with others.
8. a. Heredity plays the major role in determining one's personality.
8. b. It is one's experiences in life which determine what they're like.
9. a. I have often found that what is going to happen will happen.
9. b. Trusting fate has never turned out as well for me as making a decision to take a definite course of action.
10. a. In the case of the well prepared student there is rarely, if ever, such a thing as an unfair test.
10. b. Many times, exam questions tend to be so unrelated to course work that studying is really useless.
11. a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.
11. b. Getting a good job depends mainly on being in the right place at the right time.

12. a. The average citizen can have an influence in government decisions.
12. b. This world is run by the few people in power, and there is not much the little guy can do about it.
13. a. When I make plans, I am almost certain that I can make them work.
13. b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow

Appendix H

Selection of utilitarian dilemmas (Greene et al. 2001)

For each of the next items, you will read a brief scenario. At the end of each scenario, you are presented with a possible action which you could take in response to what is happening in the scenario. Then, you are asked whether it would be appropriate for you to take the suggested action. In response to this question, please use the scale provided below:

1	2	3	4	5	6	7
<i>Definitely not appropriate</i>						<i>Definitely appropriate</i>

1. Standard Trolley (extreme)

You are at the wheel of a runaway trolley quickly approaching a fork in the tracks. On the tracks extending to the left is a group of five railway workmen. On the tracks extending to the right is a single railway workman.

If you do nothing the trolley will proceed to the left, causing the deaths of the five workmen. The only way to avoid the deaths of these workmen is to hit a switch on your dashboard that will cause the trolley to proceed to the right, causing the death of the single workman.

How appropriate is it for you to hit the switch in order to avoid the deaths of the five workmen?

2. Environmental Policy A1

You are a member of a government legislature. The legislature is deciding between two different policies concerning environmental hazards.

Policy A has a 90% chance of causing no deaths at all and has a 10% chance of causing 1000 deaths. Policy B has a 92% chance of causing no deaths and an 8% chance of causing 10,000 deaths.

How appropriate is it for you to vote for Policy A over Policy B?

3. Speedboat (3)

While on vacation on a remote island, you are fishing from a seaside dock. You observe a group of tourists board a small boat and set sail for a nearby island. Soon after their departure you hear over the radio that there is a violent storm brewing, a storm that is sure to intercept them.

The only way that you can ensure their safety is to warn them by borrowing a nearby speedboat. The speedboat belongs to a miserly tycoon who would not take kindly to your borrowing his property.

How appropriate is it for you to borrow the speedboat in order to warn the tourists about the storm?

4. Stock Tip

You are a management consultant working on a case for a large corporate client. You have access to confidential information that would be very useful to investors. You have a friend who plays the stock market. You owe this friend a sizable sum of money.

By providing her with certain confidential information you could help her make a lot of money, considerably more than you owe her. If you did this, she would insist on canceling your debt. Releasing information in this way is strictly forbidden by federal law.

How appropriate is it for you to release this information to your friend so that she will cancel your debt?

5. Lifeboat (extreme)

You are on a cruise ship when there is a fire on board, and the ship has to be abandoned. The lifeboats are carrying many more people than they were designed to carry. The lifeboat you're in is sitting dangerously low in the water—a few inches lower and it will sink.

The seas start to get rough, and the boat begins to fill with water. It seems to you that there is only one way to stop the boat from sinking, and that is to start throwing other passengers overboard, starting with old people who are too weak to resist.

How appropriate is it for you to throw some of your fellow passengers overboard in order to save yourself and the remaining passengers?

6. Crying Baby (extreme)

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.

How appropriate is it for you to smother your child in order to save yourself and the other townspeople?

7. Preventing the Spread (extreme)

You are a doctor. One of your patients, whom you diagnosed as HIV positive, is about to be released from the hospital. He has told you, in the confidence of your doctor-patient relationship, that 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. It occurs to you that you could contaminate his medication with an untraceable poison that will kill him before he gets a chance to infect others.

How appropriate is it for you to poison this man in order to prevent him from spreading HIV?

8. Euthanasia

You are the leader of a small group of soldiers. You are on your way back from a completed mission deep in enemy territory when one of your men has stepped in trap that has been set by the enemy and is badly injured. The trap is connected to a radio device that by now has alerted the enemy to your presence. They will soon be on their way.

If the enemy finds your injured man they will torture him and kill him. He begs you not to leave him behind, but if you try to take him with you your entire group will be captured. The only way to prevent this injured soldier from being tortured is to shoot him yourself.

How appropriate is it for you to shoot this soldier in order to prevent him from being tortured by the enemy?

Appendix I

IRB Approval Letter

PENNSTATE



Vice President for Research
Office for Research Protections

The Pennsylvania State University
The 330 Building, Suite 205

Phone : (814) 865-1775
Fax: (814) 863-8699
Email : orprotections@psu.edu
Web : www.research.psu.edu/orp

Date: November 02, 2012

From: The Office for Research Protections - FWA#: FWA00001534
Stephanie L. Krout, Compliance Coordinator

To: Brianna L. Middlewood

Re: Determination of Exemption

IRB Protocol ID: 41222

Follow-up Date: November 1, 2017

Title of Protocol: Free Will and Morality

The Office for Research Protections (ORP) has received and reviewed the above referenced eSubmission application. It has been determined that your research is exempt from IRB initial and ongoing review, as currently described in the application. You may begin your research. The category within the federal regulations under which your research is exempt is:

45 CFR 46.101(b)(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Given that the IRB is not involved in the initial and ongoing review of this research, it is the investigator's responsibility to review [IRB Policy III "Exempt Review Process and Determination"](#) which outlines:

- What it means to be exempt and how determinations are made
- What changes to the research protocol are and are not required to be reported to the ORP
- Ongoing actions post-exemption determination including addressing problems and complaints, reporting closed research to the ORP and research audits
- What occurs at the time of follow-up

Please do not hesitate to contact the Office for Research Protections (ORP) if you have any questions or concerns. Thank you for your continued efforts in protecting human participants in research.

This correspondence should be maintained with your research records.

Table 1. Pilot Study Correlations and Descriptive Statistics

Correlations, reliability, means, and standard deviations of pilot measures

Measure	mean	sd	1	2	3	4	5	6
1. FAD	3.53	0.62	$\alpha = .87$					
2. NFC	2.81	0.97	0.33	$\alpha = .89$				
3. FI	3.44	0.69	0.18	-0.21	$\alpha = .74$			
4. CRT Sum	0.79	1.76	0.2	0.13	0.21	$\alpha = 0.38$		
5. Belief FW = 1, Det = 0	0.52	0.51	0.39*	0.23	.37*	0.04	1	
6. Method V=1, VIA = 0	0.55	0.51	-0.34	-0.15	0.11	-0.11	-0.04	1

Note. FW = Free will, Det = Determinism, V = Velten, VIA = Velten with induced agreement, FAD = Free will and Determinism aggregate. NFC = Need for cognition, FI = Faith in intuition * = $p < .05$

Table 2. Experiment 1 Correlations and Descriptive Statistics

Correlations, reliability, means, and standard deviations of Experiment 1 measures

Measure	mean	sd	1	2	3	4	5	6	7
1. FAD	3.39	0.5	$\alpha = .80$						
2. NFC	2.61	0.86	0.14	$\alpha = .84$					
3. FI	3.35	0.69	-.34*	-0.03	$\alpha = .76$				
4. CRT Sum	1.98	1.49	0.25†	0.03	-0.16	$\alpha = .55$			
5. LOC	6.68	2.2	0.27*	.39**	0.11	-0.04	$\Omega = .83$		
6. Helping	5.85	1.25	0.31*	0.11	-0.11	-0.05	0.09	$\alpha = .620$	
7. Belief FW = 1, Det = 0	0.48	0.5	0.36*	.27*	-0.1	0.14	0.16	0.29*	1

*Note. FAD = Free will and Determinism aggregate, NFC = Need for cognition, FI = Faith in intuition, CRT = Cognitive Response Test, LOC = Locus of control, FW = Free will, Det = Determinism † = $p < .10$, * = $p < .05$, ** = $p < .01$

Table 3. Experiment 2 Correlations and Descriptive Statistics

Correlations, reliability, means, and standard deviations of Experiment 2 measures

Measure	mean	sd	1	2	3	4	5	6
1. FAD	3.24	0.44	$\alpha = .70$					
2. NFC	3.63	0.53	0.009	$\alpha = .86$				
3. FI	3.48	0.54	0.03	0.17	$\alpha = .76$			
4. CRT Sum	1.38	1.98	0.04	-.29*	0.03	$\alpha = .77$		
5. Utilitarian	3.98	0.78	-0.18	0.07	-0.09	0.001	$\alpha = .44$	
6. Belief FW = 1, Det = 0	0.51	0.5	0.26*	-0.14	-0.2	-0.13	-0.29*	1

*Note. FAD = Free will and Determinism aggregate, NFC = Need for cognition, FI = Faith in intuition, CRT = Cognitive Response Test, FW = Free will, Det = Determinism, *= $p < .05$,