Research Article

The Value of Believing in Free Will

Encouraging a Belief in Determinism Increases Cheating

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ABSTRACT—*Does moral behavior draw on a belief in free will? Two experiments examined whether inducing participants to believe that human behavior is predetermined would encourage cheating. In Experiment 1, participants read either text that encouraged a belief in determinism (i.e., that portrayed behavior as the consequence of environmental and genetic factors) or neutral text. Exposure to the deterministic message increased cheating on a task in which participants could passively allow a flawed computer program to reveal answers to mathematical problems that they had been instructed to solve themselves. Moreover, increased cheating behavior was mediated by decreased belief in free will. In Experiment 2, participants who read deterministic statements cheated by overpaying themselves for performance on a cognitive task; participants who read statements endorsing free will did not. These findings suggest that the debate over free will has societal, as well as scientific and theoretical, implications.*

> We are always ready to take refuge in a belief in determinism if this freedom weighs upon us or if we need an excuse. (Sartre, 1943/1956, pp. 78–79)

The belief that one determines one's own outcomes is strong and pervasive. In a massive survey of people in 36 countries, more than 70% agreed with the statement that their fate is in their own hands (International Social Survey Programme, 1998). Yet the view from the scientific community is that behavior is caused by genes underlying personality dispositions, brain mechanisms, or features of the environment (e.g., Bargh, in press; Crick, 1994; Pinker, 2002). There is reason to think that scientists' sentiment is spreading to nonscientists. For example, the news magazine *The Economist* recently ran the headline, "Free to Choose? Modern Neuroscience Is Eroding the Idea of Free Will" ("Free to Choose?" 2006). What would happen if people came to believe that their behavior is the inexorable product of a causal chain set into motion without their own volition? Would people carry on, selves and behavior unperturbed, or, as Sartre suggested, might the adoption of a deterministic worldview serve as an excuse for untoward behaviors?

It is well established that changing people's sense of responsibility can change their behavior. For example, invoking a sense of personal accountability causes people to modify their behavior to better align with their attitudes (Harmon-Jones & Mills, 1999). Believing that outcomes are based on an inborn trait, rather than effort, also influences behavior. For instance, Mueller and Dweck (1998) observed 10-year-old children who were told that they had been successful on an initial task either as the result of their intelligence or through their hard work. In a second round, all the children encountered a task that was well beyond their performance level (i.e., they failed at it). When the children were given yet a third task, those who thought their earlier success was due to their intelligence put forth less effort and reported lower enjoyment than those who thought their initial success was due to their own effort. The authors concluded that the former children's belief that their performance was linked to their intelligence indicated to them that achieving a high score on the difficult problems in the second round was beyond their ability. Hence, faring poorly (on an admittedly difficult task) indicated to children in the intelligence condition that they were simply not smart enough for the task, which in turn led them to stop trying to perform well and to like the task less.

If reducing people's sense of control also reduces the amount of effort they put toward improving their performance, then

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advocating a deterministic worldview that dismisses individual causation may similarly promote undesirable behavior. In this vein, Peale (1989) bemoaned how quickly and consistently deviant behavior is tagged a "disease," a label that obviates personal responsibility for its occurrence. As a recent *Washington Post* article on neuroscience and moral behavior put it succinctly, "Reducing morality and immorality to brain chemistry—rather than free will—might diminish the importance of personal responsibility" (Vedantam, 2007, p. A01).

Although some people have speculated about the societal risks that might result from adopting a viewpoint that denies personal responsibility for actions, this hypothesis has not been explored empirically. In the two experiments reported here, we manipulated beliefs related to free will and measured their influence on morality as manifested in cheating behavior. We hypothesized that participants induced to believe that human behavior is under the control of predetermined forces would cheat more than would participants not led to believe that behavior is predetermined. Our experimental results supported this hypothesis.

EXPERIMENT 1

Method

Participants

Participants were 30 undergraduates (13 females, 17 males).

Procedure

Participants came to the lab individually. First, according to the condition to which they were randomly assigned, they read one of two passages from *The Astonishing Hypothesis*, a book written by Francis Crick (1994), the Nobel-prize-winning scientist. In the *anti-free-will* condition, participants read statements claiming that rational, high-minded people—including, according to Crick, most scientists—now recognize that actual free will is an illusion, and also claiming that the idea of free will is a side effect of the architecture of the mind. In the *control* condition, participants read a passage from a chapter on consciousness, which did not discuss free will. After reading their assigned material, participants completed the Free Will and Determinism scale (FWD; Paulhus & Margesson, 1994) and the Positive and Negative Affectivity Schedule (PANAS; Watson, Clark, & Tellegen, 1988), which we used to assess whether the reading manipulation affected their beliefs and mood.

Subsequently, participants were given a computer-based mental-arithmetic task (von Hippel, Lakin, & Shakarchi, 2005) in which they were asked to calculate the answers to 20 problems (e.g., $1 + 8 + 18 - 12 + 19 - 7 + 17 - 2 + 8 - 4 = ?$), presented individually. They were told that the computer had a programming glitch and the correct answer would appear on the screen while they were attempting to solve each problem, but that they could stop the answer from being displayed by pressing the space bar after the problem appeared. Furthermore, participants were told that although the experimenter would not know whether they had pressed the space bar, they should try to solve the problems honestly, on their own. In actuality, the computer had been rigged not only to show the answers, but also to record the number of space-bar presses. The dependent measure of cheating was the number of times participants pressed the space bar to prevent the answer from appearing. Afterward, participants were debriefed and thanked for their participation.

Results

Scores on the FWD Scale

We first checked to see whether participants' beliefs about free will were affected by the excerpts they read (anti-free-will vs. control condition). As expected, scores on the Free Will subscale of the FWD scale showed that participants in the anti-free-will condition reported weaker free-will beliefs ($M = 13.6$, $SD = 2.66$) than participants in the control condition ($M = 16.8$, $SD = 2.67$), $t(28) = 3.28$, $p < .01$. Scores on the other three subscales of the FWD scale (Fate, Scientific Causation, and Chance) did not differ as a function of condition, ts < 1.

Cheating

We first recoded the dependent measure by subtracting the number of space-bar presses from 20, so that higher scores indicated more cheating. Analysis of the main dependent measure, degree of cheating, revealed that, as predicted, participants cheated more frequently after reading the anti-free-will essay ($M = 14.00$, $SD = 4.17$) than after reading the control essay ($M = 9.67$, $SD = 5.58$), $t(28) = 3.04$, $p < .01$.

Does Rejecting the Idea of Free Will Lead to Cheating?

To test our hypothesis that cheating would increase after participants were persuaded that free will does not exist, we first calculated the correlation between scores on the Free Will subscale and cheating behavior. As expected, we found a strong negative relationship, $r(30) = -.53$, such that weaker endorsement of the notion that personal behavior is determined by one's own will was associated with more instances of cheating.

We next performed a mediation analysis to test our prediction that degree of belief in free will would determine degree of cheating. Using analysis of covariance (ANCOVA), we found support for this hypothesis: When Free Will subscale scores were entered as a predictor of cheating alongside experimental condition, the effect of condition failed to predict cheating, $F < 1$, whereas the effect of free-will beliefs remained significant, $F(1, 27) = 7.81$, $p < .01$.

Ancillary Measure: Mood

To ensure that the essays did not inadvertently alter participants' moods, we assessed positive and negative emotions using the PANAS. Mood did not differ between conditions, ts < 1.35, ps $> .19$.

EXPERIMENT 2

In Experiment 1, participants cheated more frequently on a simple arithmetic task after reading an essay that refuted the notion of free will than after reading a neutral essay. Moreover, reading the anti-free-will essay reduced participants' belief in free will, a change that accounted for the impact of the essay on cheating behavior.

Although the evidence in Experiment 1 is strong statistically, the way in which cheating was operationalized clouds interpretation of the results. Recall that cheating behavior was measured by the number of instances in which participants allowed answers to math questions to appear when they were supposed to be calculating the answers mentally. Although this is a well-validated method of assessing cheating (von Hippel et al., 2005), note that simply doing nothing is coded as cheating. Hence, the anti-free-will essay may have induced passivity generally, rather than immoral behavior specifically. Although participants were instructed to press the space bar to avoid receiving the answers, their failure to do so—counted as cheating—may not have been deliberately unethical.

Experiment 2 addressed this limitation by using a task that required active behavior in order to cheat (Mazar, Amir, & Ariely, 2007) and that made clear the moral ramifications of an infraction. We also included a condition intended to strengthen free-will beliefs so that we could systematically test our hypothesis about the relation between strength of free-will beliefs and moral behavior. Finally, to bolster confidence in the interpretation of our results, we added conditions in which we obtained participants' scores on the task when they could not cheat.

Method

Participants

Participants were 122 undergraduates (46 females, 75 males, 1 participant who did not specify gender). Data from 3 participants were unusable: One participant was a friend of the experimenter, and in two cases in which participants had the opportunity to cheat, only 1 person arrived at the experiment, which meant that a sense of anonymity was absent (see the next paragraph).

Procedure

Participants were randomly assigned to one of five conditions, in three of which cheating was possible. In the cheating-possible conditions (namely, the free-will, determinism, and neutral conditions), participants arrived at the laboratory in groups of 2 to 5, but were immediately shown to individual carrels, where they performed all tasks individually. This arrangement promoted a sense of anonymity, which was relevant for the cheating opportunity. In the two noncheating conditions, participants reported to the laboratory individually and were not given an opportunity to cheat.

In the cheating-possible conditions, participants first completed a task, similar to one used by Velten (1968), that involved reading and considering a series of statements meant to change beliefs or feelings. Participants were given a booklet of 15 statements (1 per page) and were asked to think about each statement for 1 min before turning the page. A tape-recorded voice indicated when to turn the page.

Belief in free will was manipulated by varying the content of the statements. In the *free-will* condition, participants read statements such as, "I am able to override the genetic and environmental factors that sometimes influence my behavior," and "Avoiding temptation requires that I exert my free will." In the *determinism* condition, participants read statements such as, "A belief in free will contradicts the known fact that the universe is governed by lawful principles of science," and "Ultimately, we are biological computers—designed by evolution, built through genetics, and programmed by the environment." In the *neutral* condition, participants read statements such as, "Sugar cane and sugar beets are grown in 112 countries." The neutral statements came from Velten's (1968) original method, whereas we created the free-will and determinism statements. After participants read and pondered all of the statements, they completed the FWD scale (Paulhus & Margesson, 1994) and the PANAS (Watson et al., 1988).

We then orchestrated an opportunity to cheat (e.g., Mazar et al., 2007). Participants were given a set of 15 reading-comprehension, mathematical, and logic and reasoning problems taken from the Graduate Record Examination practice tests. This type of task has been used previously to present subjects with a challenging but solvable set of problems (Schmeichel, Vohs, & Baumeister, 2003). Participants were told that the experimenter was investigating people's enjoyment of tasks when they receive feedback and rewards for performance, and hence that they would receive $1 for each problem they solved correctly.

At this point, the experimenter looked at her cellular telephone and announced that she had suddenly realized she had a meeting to attend. She indicated that participants should work for a maximum of 15 min, and then score their own problems and pay themselves $1 for each correct answer. The experimenter motioned to several answer sheets and a manila envelope containing $1 coins. She told participants to use the mechanical shredder to shred their answer sheets because she did not have permission to keep the sheets. The experimenter left the room but waited outside to debrief participants as they exited. Although this procedure did not allow us to determine individual participants' scores on the task or the amount of money each participant paid him- or herself, we were able to calculate the average payment per participant, and this average served as a proxy for each participant's number of correct answers.

Two comparison conditions, labeled *baseline experimenter-scored* and *determinism experimenter-scored*, enabled us to measure veridically the number of questions that participants answered

correctly (i.e., when participants were not in the self-scoring, self-payment situation). In the baseline experimenter-scored condition, participants simply completed the cognitive problems, which the experimenter scored; participants then received $1 for each correct answer. We did not ask participants in this condition to complete the FWD scale so as not to activate the concept of free will. In the determinism experimenter-scored condition, we gave participants the determinism statements and then the logic problems. The experimenter scored the problems and paid participants $1 for each correct answer. This comparison condition allowed us to assess whether reading the scientific-sounding determinism statements had the incidental effect of aiding in solving the logic problems.

Thus, there were three comparison conditions we could use to examine the effects of the determinism and free-will manipulations on cheating: a neutral condition, in which participants were allowed to cheat but were not exposed to statements that might change their beliefs about free will; a baseline experimenter-scored condition, in which participants' true scores on the cognitive task were calculated without any manipulation; and a determinism experimenter-scored condition, in which participants read deterministic statements but were not allowed to cheat, so that their true scores on the problem set were known.

Results

Scores on the FWD Scale

Participants in the free-will, determinism, and neutral conditions completed the FWD scale so that we could check whether the manipulations in the statement-reading task had been effective. Scores on the Free Will subscale differed as a function of condition, $F(2, 70) = 17.03$, $p < .01$. A planned contrast revealed that participants in the free-will condition reported stronger beliefs in free will ($M = 23.09$, $SD = 6.42$) than did participants in the neutral condition ($M = 20.04$, $SD = 3.76$), $t(70) = 12.54$, $p < .01$. A second planned contrast showed that participants in the determinism condition reported weaker beliefs in free will ($M = 15.56$, $SD = 2.79$) than did participants in the neutral condition, $t(70) = 3.52$, $p < .01$.

The manipulations also affected endorsement of statements on the Scientific Causation subscale, $F(2, 70) = 5.85$, $p < .01$. Specific contrasts showed that participants in the determinism condition had higher scores ($M = 23.14$, $SD = 2.69$) than those in the neutral and free-will conditions (neutral: $M = 20.40$, $SD = 3.40$; free will: $M = 20.78$, $SD = 3.21$), $t(70) = 2.98$, $p < .01$. Scores on the Fate and Chance subscales were unaffected by the manipulations, Fs < 0.2, ps $> .30$.

Assessment of Cheating Behavior

In three conditions, participants paid themselves after scoring (and shredding) their own answer sheets, whereas in two additional conditions, the experimenter paid participants according to their actual performance. Hence, to assess cheating behavior, we compared payments in the self-paid, cheating-possible groups with payments in the experimenter-scored groups. Recall that we did not have participants' answer sheets in the three self-paid conditions; therefore, we divided the number of $1 coins taken by each group by the number of group members to arrive at an average self-payment. These group averages, along with the known payments in the baseline experimenter-scored and determinism experimenter-scored conditions, were subjected to an analysis of variance, which showed a significant effect of condition, $F(4, 114) = 5.68$, $p < .01$. Planned contrasts revealed that participants who had read the determinism statements and who were allowed to pay themselves for correct answers walked away with more money than the others, $t(114) = 4.48$, $p < .01$ (see Fig. 1). None of the other groups differed from each other, ts < 1.

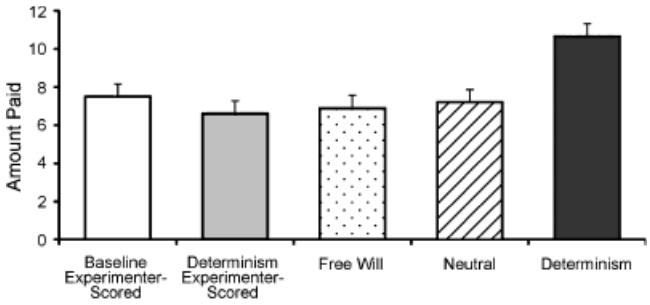

Fig. 1. Mean amount of money, in dollars, that participants received in the five conditions in Experiment 2. Participants in the free-will, neutral, and determinism conditions paid themselves $1 for each answer they claimed to have solved. Participants in the two experimenter-scored conditions were paid according to the true number of solutions. Error bars show standard errors.

Did Changing Beliefs About Free Will Change Cheating Behavior?

To test our hypothesis that discouraging a belief in free will would lead to cheating, we first calculated the correlation between scores on the Free Will subscale and average payments. As expected, we found a strong negative relationship, $r(71) = -.47$,[1] indicating that the more participants endorsed statements of free will, the less they paid themselves (on average) for the self-scored cognitive test.

Next, we performed a mediation analysis to assess our prediction that free-will beliefs determine cheating. In an ANCOVA in which Free Will scores and condition were entered as predictors of cheating, the effect of condition failed to predict cheating behavior, $F < 1$, whereas the effect of free-will beliefs remained significant, $t(67) = 10.72$, $p < .01$.

Ancillary Measure: Mood

To ensure that the statements did not inadvertently alter participants' moods, we assessed positive and negative emotions

[1]Note that there were fewer degrees of freedom for this analysis than for the main analysis because participants in the baseline experimenter-scored and determinism experimenter-scored conditions did not complete the FWD scale.

using the PANAS. There were no differences as a function of condition, Fs < 1.

GENERAL DISCUSSION

In two experiments, we found that weakening free-will beliefs reliably increased cheating. We measured cheating in Experiment 1 using a passive cheating opportunity. To avoid cheating, participants had to actively prevent the answer to an arithmetic problem from appearing on the computer screen. This scenario is perhaps akin to accidentally receiving too much change from a store clerk but not returning the extra money. In Experiment 2, we measured active cheating. We found that when participants were allowed to pay themselves for each correct answer on a difficult cognitive test, those who read statements promoting a deterministic worldview paid themselves more (in effect, claimed to have answered more items correctly) than did those who read other kinds of statements; moreover, participants who read deterministic statements and who paid themselves gave themselves more money than was earned by participants who were paid for their true performance.

One limitation of Experiment 2 is that we did not measure the amount of money that each individual took, but rather assessed the total amount of money taken by each group overall. However, this aspect of the procedure had the advantage of allowing participants in the cheating-possible conditions to not only score but also shred their own tests, which was crucial to establishing the anonymity necessary to measure active cheating in the lab. It is possible that only 1 or 2 participants in each group cheated, and that the remainder took their fair share of money (or less). With this procedure, we cannot be sure.

What we do know is that the average take-home pay was far greater for participants in the determinism condition than for participants in any of the other four conditions, including two additional conditions in which participants scored and shredded their own tests. Note, too, that participants who read deterministic statements claimed to have solved more problems correctly than participants who read the same deterministic statements but whose true scores on the logic task were known.

The fact that brief exposure to a message asserting that there is no such thing as free will can increase both passive and active cheating raises the concern that advocating a deterministic worldview could undermine moral behavior. The data from the experiments reported here are consistent with this hypothesis. Reading deterministic statements decreased people's self-reported belief in free will, and this change accounted for heightened cheating. Although people appear to have a tacit, default belief in free will (as evidenced both by participants' default responses on the Free Will subscale and by the lack of a difference in cheating behavior between the free-will and neutral conditions in Experiment 2), participants' views on this topic were in fact quite pliable. Indeed, brief exposure to messages arguing against free will was sufficient to alter participants' views (and consequent actions).

The present findings raise the genuine concern that widespread encouragement of a deterministic worldview may have the inadvertent consequence of encouraging cheating behavior. Consistent with this view are recent trends suggesting both a decrease in beliefs in personal control and an increase in cheating. A recent meta-analysis that took into account cohort effects (Twenge, Zhange, & Im, 2004) revealed substantial changes in Locus of Control scores from the 1960s to the 1990s. The Locus of Control scale (Rotter, 1966) assesses lay beliefs about whether internal (personal) or external (situational) factors are responsible for one's outcomes in life (Rotter, 1966). People's belief that they do not control their own outcomes (external locus of control) jumped more than three quarters of a standard deviation over the decades Twenge et al. studied.

With respect to cheating, reports from the academic realm indicate that levels of cheating have increased recently. One scientist who has been tracking cheating across several decades has found that self-reports of cheating have increased (Schab, 1991). The percentage of students who admitted that they had used a "cheat sheet" on an exam rose from 34% in 1969 to 68% in 1989. Other types of cheating have risen as well (e.g., allowing other students to copy work and lifting statements from printed material; Schab, 1991). There are numerous reasons why self-reported cheating might have increased in recent years. However, the concurrent decrease in belief in an internal locus of control, in combination with our findings, raises the ominous possibility that reduced belief in free will may contribute to an increase in cheating.

Although the study reported here raises concerns about the possible impact of deterministic views on moral behavior, it is important not to overinterpret our findings. Our experiments measured only modest forms of ethical behavior, and whether or not free-will beliefs have the same effect on more significant moral and ethical infractions is unknown. In addition, a deterministic viewpoint may have a host of possible consequences, and only some of these may be unfavorable. For example, adopting the view that behavior is a consequence of environmental and genetic factors could encourage compassion for the mentally ill and discourage retribution in legal contexts (Greene & Cohen, 2004). A deterministic outlook may also enhance people's sensitivity to the subtle influences known to affect their goals and actions (Bargh, in press).

It is also crucial to emphasize that the findings reported here do not speak to the larger issue of whether free will actually exists. It is possible that free will is an illusion that nevertheless offers some functionality. It may be that a necessary cost of public awareness regarding the science of human behavior will be the dampening of certain beliefs about personal agency (Wegner, 2002). Conversely, it may prove possible to integrate a genuine sense of free will into scientific accounts of human behavior (see Baumeister, in press; Dennett, 2003; Kane, 1996;

Shariff, Schooler, & Vohs, in press). Although the concept of free will remains scientifically in question, our results point to a significant value in believing that free will exists.

If exposure to deterministic messages increases the likelihood of unethical actions, then identifying approaches for insulating the public against this danger becomes imperative. Ultimately, in order to oppose the unfavorable consequences of deterministic sentiments, the field must first develop a deeper understanding of why dismissing free will leads to amoral behavior. Does the belief that forces outside the self determine behavior drain the motivation to resist the temptation to cheat, inducing a "why bother?" mentality (cf. Baumeister & Vohs, 2007)? Much as thoughts of death and meaninglessness can induce existential angst that can lead to ignoble behaviors (e.g., Arndt, Greenberg, & Solomon, 1997; Heine, Proulx, & Vohs, 2006), doubting one's free will may undermine the sense of self as agent. Or, perhaps, denying free will simply provides the ultimate excuse to behave as one likes.

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