

# Wronging past rights: The sunk cost bias distorts moral judgment

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## Abstract

When people have invested resources into an endeavor, they typically persist in it, even when it becomes obvious that it will fail. Here we show this bias extends to people's moral decision-making. Across two preregistered experiments ( $N = 1592$ ) we show that people are more willing to proceed with a futile, immoral action when costs have been sunk (Experiment 1A and 1B). Moreover, we show that sunk costs distort people's perception of morality by increasing how acceptable they find actions that have received past investment (Experiment 2). We find these results in contexts where continuing would lead to no obvious benefit and only further harm. We also find initial evidence that the bias has a larger impact on judgment in immoral compared to non-moral contexts. Our findings illustrate a novel way that the past can affect moral judgment. Implications for rational moral judgment and models of moral cognition are discussed.

Keywords: sunk costs, morality, decision-making, judgment, open data, open materials, preregistered

## 1 Introduction

Torture is widely morally condemned (UNCAT, 1984). Nonetheless, six days after 9/11, the U.S. government allowed the CIA to use “enhanced interrogation techniques” to prevent further terrorist attacks. This decision reflected a utilitarian tendency to permit immoral actions when the potential benefits are sufficient. Having decided so, the US invested “well over \$300 million in non-personnel costs” (SSCI, 2014) and moral resources (e.g., reputation) into their interrogation program. As early as three months after interrogations began, reports suggested that these techniques were ineffective in preventing attacks, and yet the program persisted over the next decade (Dedman, 2006; SSCI, 2014). As such, the government persisted in immoral actions even when it became evident that this would not secure benefits.

In this paper, we suggest that persistence in immoral, but likely futile actions, may often reflect the sunk cost bias. This is the tendency for decision-makers to persist in an endeavor simply because they have already invested resources into it (Arkes & Ayton, 1999; Arkes & Blumer, 1985; Feldman & Wong, 2018; Sweis et al., 2018). For example, imagine yourself as the president of an aviation company. You have recently financed the development of a stealth plane. Unfortunately, you learn that one of your competitors has just begun to market a superior (more advanced and cheaper) stealth plane. Would you continue investing to finish the project? When people consider such decisions, they tend

to feel inclined to continue investing because they want to avoid waste (Arkes, 1996), to justify their past decisions (Aronson, 1969), or to avoid harming their social reputation (e.g., Kanodia, Bushman & Dickhaut, 1989). Returning to enhanced interrogations, the government may have persisted in using immoral techniques, simply because of the costs already sunk.

Investigating this possibility will be informative about how the past (in the form of sunk costs) affects present moral judgments and moral permissibility. We know that adults often consider the future when making moral judgments. For example, the future is at stake in almost all experiments on the permissibility of harming others to secure a greater good (as this benefit lies in the future) (Cushman, Young & Hauser, 2006; Greene & Haidt, 2002). However, less is known about how consideration of the past affects moral judgment. Work on moral licensing shows that people who committed good actions in the recent past believe they can now engage in less moral behavior (Blanken, van de Ven & Zeelenberg, 2015; Monin & Miller, 2001; Mullen & Monin, 2016). Likewise, work on escalation of commitment shows that an individual is more likely to engage in unethical behavior when their course of action is failing (Armstrong, Williams & Barrett, 2004; Street, Robertson & Geiger, 1997). For example, participants who imagined they had been recently hired to manage investments of a firm, were more likely to engage in insider trading when returns on past investments were poor (Street & Street, 2006).

We suggest that sunk costs are another way in which the past affects moral judgments. We see two ways this could happen. First, sunk costs could increase people's willingness to persist in immoral actions, and second, they could make these actions seem less immoral. For example, having committed moral misdeeds to help secure a positive goal,

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people could remain willing to engage in these misdeeds and view them as more acceptable, even after the actions are known to be futile. We might expect this if the mechanisms that normally underlie the sunk cost bias operate the same in situations involving immoral actions (e.g., enhanced interrogation). This possibility is broadly consistent with claims of a domain-general model of moral cognition where people are similarly sensitive to inputs (e.g., framing effects, omission bias) in both moral and non-moral contexts (Cushman & Young, 2011; Rai & Holyoak, 2010; for a review see Osman & Wiegmann, 2017).

Alternatively, the sunk cost bias might not affect judgments for immoral actions. We know that some interventions can reduce the bias (Hafenbrack, Kinias & Barsade, 2014; Northcraft & Neale, 1986). When considering the stealth plane scenario, for example, more people elect to end the project when this is framed as taking action (Feldman & Wong, 2018). Immorality may also counteract the sunk cost bias. To illustrate, if people learn that enhanced interrogation is futile for preventing future terrorist attacks, the moral repugnance of these actions may counteract the tendency to continue investing in failing courses of action. This possibility is broadly consistent with the application of specific moral heuristics such as “do no harm” (Rai & Fiske, 2011; for a review see Waldmann, Nagel & Wiegmann, 2012).

To assess the impact of sunk costs on moral judgments, we conducted two preregistered experiments. In Experiments 1A and 1B we demonstrate that people are more willing to proceed with a fruitless, immoral course of action when costs have been sunk. In Experiment 2 we show that sunk costs distort people’s perception of morality by increasing how acceptable they find actions that have received past investment. Across both experiments we find these results in contexts where continuing with the action would only cause further harm.

## 2 Experiments 1A and 1B

### 2.1 Method

Our data and materials are available online on the Open Science Framework (OSF) here: <https://osf.io/vxp56/>. These experiments were preregistered and the preregistrations are located here: <https://osf.io/urhda/> (Experiment 1A) <https://osf.io/8n5aq/> (Experiment 1B).

#### 2.1.1 Participants

Our samples (Experiment 1A,  $N = 391$ ; Experiment 1B,  $N = 518$ ) were recruited via Turk Prime (Litman, Robinson & Abberbock, 2016). We excluded further participants (Experiment 1A,  $n = 212$ ; Experiment 1B,  $n = 213$ ) who failed

at least one of two comprehension questions.<sup>1</sup> In all studies, participants were required to be U.S. residents and possess a Mechanical Turk HIT approval rating greater than or equal to 95%. Participants were only able to sign-up for one of the two experiments. All studies in this article were approved by the Office of Research Ethics at the University of Waterloo.

#### 2.1.2 Procedure

Participants read a single first-person vignette and rated their agreement with a proposed course of action; see Figure 1 for the materials. In each vignette, participants were assigned an important goal (developing a cure for a disease in Experiment 1A; building a highway to relieve traffic congestion in Experiment 1B). However, recent information indicated the goal was probably futile (another company had already developed a better drug; a different government agency had already devised a better solution to traffic congestion). Participants decided whether they should continue pursuing the goal even though this would require expending resources.

The vignette varied across participants in a 2 X 2 between-subjects design, manipulating: 1) Whether expending the resources required a moral violation (killing lab monkeys; confiscating and bulldozing citizen’s houses) or did not require this (killing farmed pine trees; bulldozing government-owned land). 2) Whether some costs had already been sunk (many monkeys or pine trees already killed for cure; many houses or government plots already bulldozed) or not.<sup>2</sup>

To respond, participants read a statement asserting they would pursue the goal (e.g., “I would conduct experiments on the 100 monkeys to finish developing my cure.”) and rated their agreement with the action on a 1 (Strongly Agree) to 6 (Strongly Disagree) scale; we reverse coded responses so that higher scores reflected greater agreement. Next, participants responded to two multiple choice comprehension questions and a few demographic questions.

### 2.2 Results

We examined responses from both experiments using separate cost (sunk, not-sunk) by morality (immoral, non-moral) ANOVAs. Both ANOVAs revealed main effects of both factors. Willingness-to-act was greater when costs were sunk than when they were not (Experiment 1A,  $F(1, 387)=20.31$ ,

<sup>1</sup>We initially recruited 603 for experiment 1A based on a power analysis suggesting that we would need 139 participants per cell in order to have an 80% chance to detect an effect of  $d = .30$  when making a between-subjects comparison. As  $d = .30$  is the average size of the sunk cost effect, and it is our effect of interest, we felt this value was appropriate to use in our power analysis. Due to the large number of exclusions in experiment 1A, we recruited more participants for experiment 1B in order to ensure that we would have our a priori sample size after applying our exclusion criteria.

<sup>2</sup>Some readers may be concerned that our vignettes do not depict immoral acts. However, as the data of Experiment 2 demonstrate, participants are nearly unanimous in judging that continuing with the project of either vignette in the absence of sunk costs is not morally acceptable.

Experiment 1A

You are a researcher for a medical company and are developing a cure for a painful but treatable disease, Gothymia. To develop the cure, you will have to conduct experiments on [1000/100] lab-grown [monkeys/pine trees]. Unfortunately, these experiments require the [monkeys/ pine trees] to be killed.

[After you have conducted tests on 900 [monkeys/ pine trees]/ Before you have conducted tests on any [monkeys/ pine trees], you learn that another medical firm has begun marketing a cure for Gothymia. Their cure is more effective and more economical than the cure you are developing.

"I would conduct experiments on the 100 [monkeys/ pine trees] to finish developing my cure."

Experiment 1B

You are a government engineer and are developing a new highway to relieve traffic congestion in your city. To build the highway, you will have to bulldoze [1000/100] plots of land. [Unfortunately, this land belongs to homeowners. Their land will be confiscated, their homes destroyed, and they will be forced to move/ Fortunately, this land belongs to the government. It mostly contains weeds and bushes that will be destroyed in the building].

[After you have bulldozed 900 plots/ Before you have bulldozed any plots], you learn that a different branch of government is building a bridge across a body of water to relieve the traffic congestion. The bridge will do a more effective job than the highway you want to develop, and its construction will not require any plots of land to be bulldozed.

"I would bulldoze the 100 plots of land currently owned by [homeowners/ the government] to finish building the highway."

FIGURE 1: Vignettes and action statement for Experiment 1A and 1B. Variations based on sunk cost condition feature black text within square brackets. Variations based on moral condition feature colored text (blue = Immoral, green = Non-Moral) within square brackets.

TABLE 1: Comparisons of Willingness-to-Act (Experiments 1A and 1B) and Moral Acceptability (Experiment 2) across Sunk Cost conditions (Sunk, Not-Sunk).

Experiment	Condition	t (df)	p	D [95 CI]
1A (Cure)	Immoral	4.71 (194)	<.001	.68 [.39, .97]
	Non-Moral	1.84 (193)	0.034	.26 [.02, .55]
1B (Bulldoze)	Immoral	6.68 (255)	<.001	.83 [.58, 1.1]
	Non-Moral	2.93 (259)	0.004	.36 [.12, .61]
2	Cure	3.72 (435)	<.001	.36 [.17, .55]
	Bulldoze	2.46 (244)	0.007	.31 [.06, .57]

Note. Levene’s test was significant ( $p < .05$ ) for the moral conditions of both experiment 1A and 1B but when tested with a Welch correction applied the results are nearly identical. Student’s t-tests are reported here for ease of reading.

$p < .001$ ,  $\eta_p^2 = .050$ ; Experiment 1B,  $F(1, 514) = 44.59$ ,  $p < .001$ ,  $\eta_p^2 = .080$ ), and for non-moral than immoral actions (Experiment 1A,  $F(1, 387) = 30.02$ ,  $p < .001$ ,  $\eta_p^2 = .050$ ; Experiment 1B,  $F(1, 514) = 14.63$ ,  $p < .001$ ,  $\eta_p^2 = .028$ ). There was also an interaction between these factors in Experiment 1B (highway) ( $F(1, 514) = 5.58$ ,  $p = .019$ ); as shown in Table 1, the

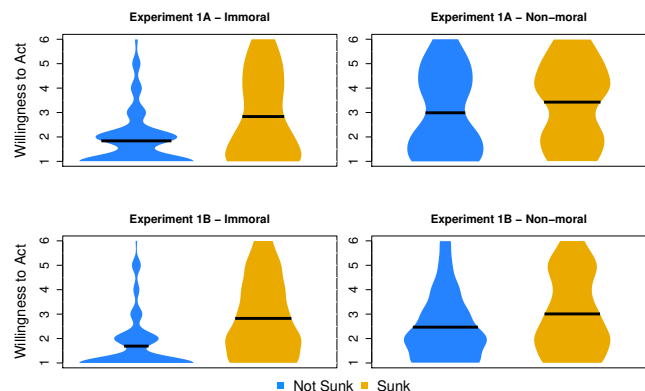


FIGURE 2: The distribution of willingness to act (WTA) across immoral/non-moral and sunk/not-sunk conditions of Experiments 1A and 1B. The dark bar represents the mean value of each condition. The width of the bars represents the number of participants choosing that value: the wider the portion the greater the number.

sunk cost effect was larger in the immoral condition than in the non-moral version; this interaction was not found in Experiment 1A (Medical Cure) ( $F(1, 387) = 3.10$ ,  $p = .079$ ), although the pattern of data was similar (Figure 2).

In summary, Experiments 1A and 1B demonstrated that sunk costs can impact our willingness to act not only in non-

moral contexts, but also contexts where the moral component is clear (e.g., sacrificing animals for scientific testing). Further, we found that sunk costs may have an even larger impact on our decision to act in an immoral context. However, this conclusion is tentative as the financial cost of the resources differed between the immoral and non-moral contexts (see General Discussion). These experiments provide initial evidence that past investments can impact our moral judgment by increasing our willingness to persist in immoral actions.

Next, we asked whether sunk costs could make immoral actions seem less immoral. Our test question in Experiments 1A and 1B did not directly address this because many factors besides morality can affect willingness to proceed with an action. For example, a person might be willing to proceed with an immoral action if they think it is in their self-interest. Hence, to directly focus on morality, we asked about the acceptability of acting.

## 3 Experiment 2

### 3.1 Method

This experiment was preregistered and is available here: <https://osf.io/c4esr/>.

#### 3.1.1 Deviation from pre-registration

Due to a coding error, twice the number of participants were recruited for the Medical Cure condition than we had planned. No other deviations occurred.

#### 3.1.2 Participants

Our final sample included 683 (Bulldoze  $n = 246$ ; Medical Cure  $n = 437$ ) participants recruited via Turk Prime. We excluded a further 407 participants who failed at least one of two comprehension questions.

#### 3.1.3 Procedure

Participants read a single vignette and then rated their agreement with the moral acceptability of a proposed course of action. The vignette was the immoral version of one of the two previously used vignettes (Medical Cure; Highway) and the conditions were the same (Sunk Costs: 900/1000 resources invested; No Sunk Costs: 0/100 resources invested). To rate moral acceptability, participants read a statement asserting the moral acceptability of pursuing the goal (e.g., "It would be morally acceptable to conduct experiments on the 100 monkeys to finish developing my cure.") and rated their agreement with the statement on a 1 (Strongly Agree) to 6 (Strongly Disagree) scale; we reverse coded responses so that higher scores reflected greater agreement. Participants

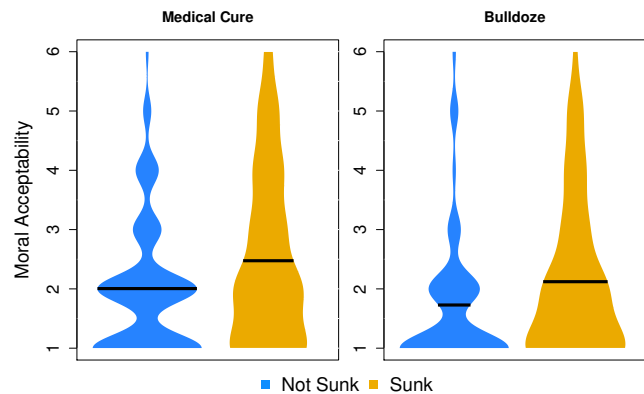


FIGURE 3: The distribution of agreement with a moral acceptability statement across the sunk cost conditions of each vignette. The black horizontal bar represents the mean value of each condition. The width of the bars represents the number of participants choosing that value: the wider the portion the greater the number.

were then asked the same comprehension and demographic questions used previously.

### 3.2 Results

We examined responses from both vignettes using separate one-tailed independent-samples  $t$ -tests. Both tests revealed sunk cost effects (see Table 1). Moral acceptability was greater when costs were sunk than when there were no sunk costs (see Figure 3). That is, extending the findings from Experiment 1A and 1B, sunk costs impacted participants' judgments of moral acceptability by increasing the moral acceptability of an immoral action.

## 4 General Discussion

We found that the sunk cost bias extends to moral judgments. When costs were sunk, participants were more willing to proceed with a futile, immoral action compared to when costs were not sunk. For example, they were more willing to sacrifice monkeys to develop a medical cure when some monkeys had already been sacrificed than when none had been. Moreover, people judged these actions as more acceptable when costs were sunk. Importantly, these effects occurred even though the benefit of the proposed immoral action was eliminated.

Our findings illustrate a novel way that the past can impact moral judgment. Moral research conducted to-date has focused extensively on future consequences (e.g., Baez et al., 2017; Miller & Cushman, 2013). Although this makes normative sense as only the future should be relevant to decisions, it is well known that choice is affected by irrelevant factors like past investment (Kahneman, 2011; Kahneman,

Slovic & Tversky, 1982; Szasz, Palinkas, Palfi, Szollosi & Aczel, 2018; Tversky & Kahneman, 1974). As such, our findings show that as is true with other (non-moral) judgments, people's moral judgments are affected by factors that rational agents "should" ignore when making them.

Further, our findings show that a major decision bias (i.e., the sunk cost effect) extends to moral judgment. This finding is broadly consistent with research showing that moral judgments are affected by such biases. This earlier work shows that when making moral judgments, people are sensitive to how options are framed (e.g., Shenhav & Greene, 2010) and prefer acts of omission over commission (e.g., Bostyn & Roets, 2016). For example, people make different moral judgments when the decision is presented in a gain frame than when it is presented in a loss frame, even though these two decisions are logically identical (Kern & Chugh, 2009). Likewise, people judge lying to the police about who is at fault in a car accident (a harmful commission), to be more immoral than not informing the police precisely who is at fault (a harmful omission) (Spranca, Minsk & Baron, 1991). However, unlike most of these previous demonstrations, our findings directly compare the presence of decision-making biases across moral and non-moral contexts (also see Cushman & Young, 2011).

In our first experiment, we also found that the sunk cost bias may be stronger in moral decision-making than in other situations. This is surprising. In non-moral cases proceeding with a futile course of action is wasteful. But in our moral version of the scenarios, proceeding is wasteful, harmful to others, and morally wrong. Yet, there was a greater discrepancy between willingness to act in response to sunk costs in the immoral condition. Increasing the reasons to not proceed with the action amplified the sunk cost bias. One potential explanation for this is that people are unwilling to admit their prior investments were in vain (Brockner, 1992). People succumb to the sunk cost bias in part because they feel a need to justify their past decisions as correct (Ku, 2008; also see Staw, 1976). Likewise, moral judgments seem to generate a much greater need to provide reasons to justify past decisions (Haidt, 2012). Thus, those making decisions in an immoral context might have additional pressures to justify their previous choice that stem from the nature of moral judgment itself.

Another explanation is that the initial investment was of a larger magnitude in the immoral compared to the non-moral condition. In both cases, participants incurred an economic cost, but only in one did participants incur an additional moral cost. People are more likely to succumb to the sunk cost bias when initial investments are large (Arkes & Ayton, 1999; Arkes & Blumer, 1985; Sweis et al., 2018). Perhaps sunk costs exerted a greater effect in the immoral condition because the past investments were greater (i.e., of two kinds: economic and moral, rather than just one: economic). However, as we do not know if the economic resources (e.g., pine

trees and lab monkeys) were of comparable value, the discrepancy between moral conditions may entirely stem from the lab monkeys being valued higher and thus larger in investment magnitude. Thus, we are hesitant to draw any strong conclusion from this finding. The difference in sunk cost magnitude could stem from differences in financial costs between the immoral and non-moral contexts.

Our finding that moral violations led to increased willingness to act is reminiscent of the "what the hell" effect, in which people who violate their diet then give up on it and continue to overindulge (Cochran & Tesser, 1996; Polivy, Herman & Deo, 2010). We see this as similar to persisting in an immoral course of action after costs have been sunk. After engaging in a morally equivocal act, people may feel disinhibited and willing to continue the act even when its immorality becomes clear. Likewise, people may persist in an attempt to maintain the status quo (Kahneman, Knetsch & Thaler, 1991; Samuelson & Zeckhauser, 1988). These accounts, though, may not explain why sunk costs changed people's moral perceptions. One possibility is that this resulted from cognitive dissonance between people's actions and their moral code (Aronson, 1969; Festinger, 1957; Harmon-Jones & Mills, 1999). For example, sacrificing monkeys to develop a cure may cause dissonance between not wanting to harm but having done so. To resolve this, people might change their moral perceptions, molding their moral code to fit their behavior.

We close by considering a broader implication of this work. The extension of decision biases to moral judgment has been previously construed as supporting domain-general accounts of morality that suggest moral judgment operates similarly to ordinary judgment (Greene, 2015; Osman & Wiegmann, 2017). This is because if morality is not unique, one could reasonably expect that a factor that affects ordinary judgment would likewise affect moral judgment. Thus, if information irrelevant to the decision at hand (e.g., past investments) influences whether we continue to bulldoze land to build a highway, so too should it influence the same bulldoze decision that requires confiscating the land. This is not conclusive however, and our findings could be interpreted to support domain-specific accounts instead (e.g., Mikhail, 2011). For instance, the sunk cost bias was demonstrably larger in moral judgments. Nevertheless, an interpretation of our results as evidence for a domain-general account of morality must explain how the varying effect of past investment on judgment is a difference in degree but not kind

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