Honesty and fairness reduce the sunk-cost effect

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The sunk-cost effect (SCE) is the tendency to continue investing in an unsuccessful activity because of previous investments that cannot be recovered. We examine the SCE when continued investment is dishonest and unfair, and whether moral identity predicts decision-making in sunk-cost moral scenarios. Moral identity is the degree of importance of being moral to one's sense of identity, and prior research has found that moral identity predicts moral behaviour. We found that the SCE is smaller if continued investment is dishonest and unfair, and stronger moral identity predicted lower likelihood of further investment in dishonest and unfair scenarios. Participants were also more likely to cite moral reasons for their decisions than sunk-cost reasons in scenarios where sunk costs were high, and further investment would be dishonest and unfair. We suggest that people generally place a greater importance on being honest and fair compared to paying off previous investments, especially for those with a stronger moral identity. These findings may help explain decision-making in situations where sunk costs are at odds with moral considerations.

Keywords: sunk-cost effect, decision-making, moral identity, individual differences

Take a moment to imagine yourself in the following scenario: You just started a new sales job for a health product company after spending $1000 on a 3-month training course. A week after starting the job, you find it boring and are not enjoying it. How likely would you be to keep the job? If you think that you would be likely to continue with the job, you may be showing the sunk-cost effect. The sunk-cost effect (SCE) is the tendency to continue pursuing a cause with an uncertain or unfavorable outcome due to unrecoverable investments (i.e., money, time, effort; Arkes & Blumer, 1985). Traditionally, the SCE has been examined in the business decision-making literature where individuals and corporations have shown to continue with financial ventures to pay off previous investments. Take for example, the projected 75-million-dollar Shoreham Nuclear Power Plant which cost more than five billion dollars to build, only to remain un-operational after 23 years (Ross & Staw, 1993). Likewise, the Drug Abuse Resistance Education program (D.A.R.E) continued to receive billions of dollars in funding into the 2010's despite research dating back to the 1990's that suggested the program was unsuccessful (Schaumberg & Wiltermuth, 2014).

Now consider the hypothetical job scenario, except instead of the job being boring, you find out that the information you are providing customers is false and the health product does not actually work as advertised. Would the likelihood of you deciding to keep the job remain the same? There has been some interest in the SCE in the realm of moral decision-making (e.g., Frechen & Brouwer, 2021; Hamzagic, 2021; Meyers et al., 2019). Examining decision-making when sunk costs are at odds with moral considerations may provide insight into real-life examples such as the continued American involvement in the Iraq War, where proponents argued that withdrawing from the war would be a waste of the soldiers' lives lost in the cause. As president Bush stated, "I'm not going to allow the sacrifice of 2,527 troops who have died in Iraq to be in vain by pulling out before the job is done" (Schwartz, 2006). Additionally, consider Volkswagen installing software to cheat US emission tests after investing heavily into their marketing campaign to sell their diesel cars in America (Hotten, 2015).

Early research on the SCE in moral scenarios has come from the business literature and suggests escalation of commitment in business ventures via repeated investments is associated with more unethical business decisions (Armstrong et al., 2004; Jensen et al., 2011; Street & Street, 2006). For example, greater investment in a project predicted lower likelihood to report environmental safety violations (Armstrong et al., 2004), increased concealment of information that could undermine the success of the business endeavour (Jensen et al., 2011) and greater illegal insider trading (Street & Street, 2006). Later research has examined decision-making in scenarios where moral costs have been incurred (Frechen and Brouwer, 2021; Meyers et al., 2019). Frechen and Brouwer (2021) found that most people who made a utilitarian decision to harm one person to save others (i.e., a moral cost) later doubled down with the utilitarian choice to kill this person to save the others. Moreover, people were less likely to make the utilitarian decision to kill one person if this was a standalone decision where participants did not incur a moral cost of harming this same person in a previous utilitarian dilemma. For example, if participants indicated they would perform a blood transfusion that would paralyze one person to save the lives of five others, they would be more likely to indicate they would then kill the paralyzed patient to save the five

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when the blood transfusion was ineffective. In contrast fewer participants indicated they would kill the patient to save the life of five others if they were not asked prior whether they would paralyze this person to save the others. Additionally, Meyers and colleagues (2019) found that people were more likely to show the sunk-cost effect in scenarios where their previous investments harmed others. For example, participants were more likely to indicate they would forcefully displace residents and bulldoze their land to finish the construction of a highway if they had already done so at an earlier stage of the project compared to if they had not. Additionally, participants judged moral violations to be more acceptable if they incurred prior moral costs (e.g., already displaced some of the people). In both of these studies, greater moral costs (e.g., harm towards others) resulted in greater likelihood to pursue the cause despite causing further harm. However, the moral and sunk-cost aspects of these studies are somewhat confounded, whereby previous costs are moral costs. Moral sunk costs may be more likely to distort moral and sunk-cost evaluations through processes like self-justifications and moral licencing (Meyers et al., 2019).

To our knowledge, only one study to date has examined decision-making when sunk costs are directly at odds with moral concerns. Hamzagic and colleagues (2021) found that harming others reduced but did not eliminate the SCE. Their study differed from Frechen and Brouwer (2021) and Meyers and colleagues (2019) in that previous costs were financial and not moral, resulting in scenarios where decisions based on one's previous financial investments (i.e., continue investing) differed from decisions to avoid harming others (i.e., discontinue investing). For example, people were less likely to say they would continue watching an expensive movie if children found it terrifying compared to if the movie was boring. In their study, Hamzagic and colleagues (2021) specifically examined moral scenarios pertaining to the moral principle of care (i.e., sensitivity to the wellbeing of others). According to the Moral Foundations Theory, all people possess several innate common foundational moral principles (Haidt & Joseph, 2004). Sensitivity to the wellbeing of others (harm/care) is one such moral foundation. Other moral principles such as being fair and honest may also be important to most individuals' sense of morality (Graham et al., 2011). Therefore, if harming others reduces the SCE as a function of violating one's moral principles, we may see a similar effect for other moral principles as well. Additionally, there may be individual differences such as moral identity strength and utilitarian thinking that influence decision-making in these types of sunk-cost moral dilemmas.

Moral identity – "the degree to which being a moral person is important to an individual's identity" (Hardy & Carlo, 2011, p. 212) – is associated with increased moral behaviour and decision-making. In a meta-analysis of 111 studies, Hertz and Krettenauer (2016) found moral identity to be a significant predictor of moral behaviour. Krettenauer (2022a, b) ar-

gues that moral identity can be conceptualized as a goal, whereby the goal to be a moral person and behave in accordance with one's moral values is more salient for those who posses a stronger moral identity (Krettenauer, 2022b; Krettenauer & Stitcher, 2023). Krettenauer and Stitcher (2023) argue that, like other goals, moral goals are strongest and most capable of overcoming competing situational goals if the goal to be moral carries certain characteristics. Two of these characteristics are internal motivation and regulatory fit. Internal motivation refers to the intrinsic importance, whereby satisfying one's moral goals are important to maintain one's personal moral values (as opposed to being externally motivated for impression management). Regulatory fit refers to the congruence between activity (i.e., action or avoidance) and regulatory orientation (e.g., belief that it is more important to actively promote positive actions or avoid negative actions; Shah et al., 1998). Greater regulatory fit has shown to facilitate stronger and more successful goal attainment (Higgins 2012; Shah et al., 1998). In other words, moral goals are stronger when they are important to oneself (i.e., being honest and fair because it feels like the right thing), and are regulatorily congruent (i.e., individuals with a promotion-oriented moral identity may be better at actively engaging in positive moral actions than those with a prevention-oriented moral identity). Stronger moral goals are better able to overcome other situational competing goals (e.g., personal investment). Possessing internal and promotion[1] moral goal characteristics represents a stronger moral identity and increased motivation to make moral decisions when faced with competing goals (Krettenauer, 2022a). Research has also shown that the strength of one's moral identity and sensitivity to justice predicts greater sharing of rewards with others in unfair situations, even if it comes at a personal cost (Baumert et al., 2014) and reduces the effectiveness of moral disengagement (Aquino et al., 2007; Hardy et al., 2015). It should be noted that other situational goals like previous investments may also be salient to individuals and potentially outweigh moral goals if they are sufficiently large and personally meaningful.

Moral judgements and decisions may also differ depending on one's disposition towards utilitarian or deontological philosophies. Utilitarian philosophy argues that moral judgements maximize benefits for the greatest number of people. Whereas deontological philosophy states that moral judgements depend on upholding moral values (Gawronski & Beer, 2017). In the job example, individuals may make moral decisions for utilitarian reasons (e.g., it is more harmful to a greater number of people for me to sell this deceptive product than for me to lose my investment and find a new job), or for deontological reasons (e.g., selling this deceptive product violates honesty and fairness moral values which are important to me). Because the moral

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[1] Note that the moral goal theory posits that, by adulthood, internal moral identity goals are more important than external moral identity goals.

rightness and wrongness of a decision depends on the outcome for those that favor utilitarian philosophy, the same decision could be seen as both morally acceptable and unacceptable depending on the situation. For example, deceiving people to spend their money on a harmless product that does not work would be considered morally acceptable if it meant a greater number of people would benefit (e.g., employing a greater number of people to earn a living). On the other hand, people who subscribe to deontological moral philosophy should be more inclined to say deceiving customers is wrong, regardless of the outcome.

In the current study, we seek to examine decision-making when sunk costs in the form of previous personal financial investments are at odds with the moral values of honesty and fairness. We address several limitations of the previous literature. First, we seek to extend the work by Hamzagic and colleagues (2021) to examine whether moral principles other than caring for others/harm-avoidance similarly reduce the SCE. We examine less salient morally harmful transgressions like dishonesty and unfairness. We also seek to examine individual differences that may explain decision-making in scenarios where moral values compete with sunk costs. Lastly, we use qualitative and quantitative mixed methods to strengthen the interpretation of our results. Purely quantitative methods only allow for an assumption of the reason behind decision-making differences across the high/low sunk-cost and moral/non-moral scenarios (e.g., in high sunk-cost scenarios, greater likelihood to continue is assumed to be due to the large previous investment). Although the vignettes were designed to manipulate the salience of sunk cost and moral transgression, there may be other aspects of the scenario that participants base their decisions on. Therefore, qualitative analyses allow us to explicitly examine the reasons for decisions in sunk-cost moral scenarios.

We examined the effect of the moral values of honesty and fairness on the SCE using a 2 (sunk cost: low vs. high) × 2 (vignette type: no honesty/fairness moral transgression vs. honesty/fairness moral transgression) within-groups experimental design. The dependent variable was the likelihood rating to continue with the investment in the vignette from 0 to 100. We measured the SCE by taking the difference score between the high sunk-cost and low sunk-cost conditions. Therefore, a positive difference score indicates the presence of the SCE, and a greater positive difference score represents a stronger SCE. We had the following preregistered hypotheses:

H1: There will be a main effect of sunk cost, such that the likelihood rating to continue will be higher in high sunk-cost vignettes than in low sunk-cost vignettes.

H2: There will be a main effect of vignette type, such that the likelihood rating to continue will be higher when there is no honesty/fairness moral transgression than when there is an honesty/fairness moral transgression.

H3: There will be a sunk cost by vignette type interaction, such that the difference between low- and high-sunk cost conditions for the rating to continue will be larger in no honesty/fairness moral transgression vignettes than in honesty/fairness moral transgression vignettes. In other words, honesty and fairness transgressions are expected to reduce the SCE.

Note that we preregistered hypotheses concerning age differences between younger and older adults. Age differences in sunk-cost decision-making are not the focus of this article, so we do not discuss it further. We report the results of these analyses in a footnote in the results section. We preregistered no specific hypotheses about moral identity, deontological/utilitarian thinking, or qualitative analyses of the decision rationales. We examine these questions via exploratory analyses.

Method

Participants

A power analysis by Hamzagic and colleagues (2021) indicated a required sample size of 128 participants to detect small-to-medium effects ($\beta = .80$; $\alpha = .05$; $f = .15$, $\rho_{rm} = .5$) for the interaction between sunk cost and vignette type using the same paradigm as the current study. We collected data from the psychology research pool ($n = 150$) at a mid-sized university in Southern Ontario and from the online crowd-sourcing platform Prolific.com ($n = 160$). Participants recruited via the psychology research pool received 0.5% course credit towards an eligible undergraduate psychology course, and participants from Prolific.com received £4.50 for their participation. All Prolific.com participants resided in Canada, except for 17 participants who resided in the USA. Thirty-three participants were removed due to missing data, and eight were removed due to failed attention check questions. This project was reviewed and approved by Wilfrid Laurier University's Research Ethics Board (REB #7132).

In total, there were 310 participants from age 17 to 76 ($M_{age} = 41.09$). Of the total sample, 82 (26.5%) identified as male, 224 (72.3%) as female, and 4 (1.2%) as non-binary, preferred not to disclose, or other. The most commonly self-reported ethnicities were White/European (72.6%), Southeast Asian (10%), and South Asian (6.8%).

Measures

Sunk-cost/honesty/fairness vignettes. To examine decision-making in sunk-cost and honesty/fairness moral scenarios, we used eight vignettes. Three vignettes were adapted from Hamzagic and colleagues (2021) to elicit dishonesty and unfairness rather than

harm, and the other five vignettes were created for this study. All vignettes were pilot tested prior to the study.

Vignettes belonged to one of four conditions that varied by sunk cost (high or low) and vignette type (no honesty/fairness transgression, or honesty/fairness moral transgression). Because it is hard to separate honesty and fairness with the everyday scenarios we used in the vignettes (e.g., breaking a commitment to help a friend), some vignettes may be more honesty or fairness focussed. Yet, all vignettes have an aspect of both honesty and fairness moral values. For that reason, we do not treat vignettes as singularly honesty or fairness driven. An example of a high sunk-cost honesty/fairness moral transgression vignette reads: "Imagine that you want to watch a movie. You spend $30 on a non-refundable ticket to the 3D showing. Before you leave to go to the movie, you remember that you promised your friend that you would help them set up a surprise party for their child's birthday". In the low sunk-cost version, the movie tickets are free, and in the non-moral transgression versions the movie has bad reviews. Participants were asked to rate the likelihood that they would continue investing in the scenario (e.g., continue going to the movie) on a 0-to-100 slider scale (the initial position of the slider was at 0). See Appendix A for all vignettes.

Participants were also asked to provide a brief free-response rationale for their decision for each vignette. As part of an exploratory, non-preregistered procedure, the first author and an undergraduate thesis student created a coding scheme to analyze the decision rationales. Because we were unsure of what the decision rationales would look like before creating a usable coding scheme, we examined 100 participants' data. Based on these 100 participants, we established a coding scheme consisting of five categories of decision rationales, including: sunk-cost reasons, other reasons explicitly mentioned in the vignette (vignette relevant), reasons not mentioned in the vignette (non vignette relevant), moral reasons, and uncategorizable/no reason given. These categories were further divided into reasons to continue or discontinue investing in the vignette scenario (except for the moral category which only included reasons to discontinue). See Table 1 for the coding scheme and examples. When participants mentioned more than one codable reason for their decision, we coded both reasons (a detailed description of coding scheme can be found on the OSF preregistration). After creating the coding scheme, the two coders independently coded another 100 participants' data and reached acceptable reliability ($\kappa = .76$). We chose to independently code the rest of the data and resolve disagreements through discussion. We aggregated reasons to continue and discontinue within the same category (e.g., sunk-cost reason to continue and discontinue aggregated to 'sunk-cost reason'). We summed the number of times each decision rationale category was mentioned across conditions. For example, there are four possible times participants may mention moral reasons for their deci-

sions (participants see two low and two high sunk-cost honesty/fairness transgression vignettes).

Moral identity. To measure moral identity, we used a measure similar to the Self-importance of Moral Identity Questionnaire (SIMIQ; Aquino & Reed, 2002) that was adapted to be developmentally sensitive by measuring three aspects of moral identity: concrete vs. abstract level of abstraction, internal vs. external motivation, and prevention vs. promotion orientation (see Krettenauer, 2022b; Lefebvre et al., 2024). Note that in the current study, we focus on the internal and external promotion moral identity orientations because they most closely resemble the internalization and symbolization subscales from the SIMIQ which have been used in much of the moral identity research[2] . Many of the moral identity attributes we used in our moral identity measure share similar traits as those belonging to well-established personality factors such as the BIG 5's agreeableness and conscientiousness factors and the HEXACO's honesty factor (see preregistration for the full list of attributes). Like these personality traits, moral identity has been argued to be a stable trait-like dimension of identity that differs across individuals (Blasi, 1983; Frimer & Walker, 2009).

Promotion-oriented moral identity, or the importance of actively exemplifying moral values was measured by asking participants to choose nine to twelve positive moral identity attributes that describe a moral person from a list of 50 matched pairs of concrete and abstract moral descriptors. For example, concrete descriptors were specific actions like 'helps others', 'does not tell lies', and 'does not play favourites', while the abstract matched descriptors were more general values like 'caring', 'honest', and 'fair'. For the purposes of this study, we did not examine the level of abstraction of the moral value descriptors. All 50 descriptors were presented in random order. Participants then rated how important it is to them to exemplify each of their selected moral descriptors on a 5-point Likert scale from 1 (unimportant to me) to 5 (extremely important to me).

To measure internal and external moral motivation, participants then responded to seven statements regarding internal (e.g., 'being this way is a part of who I am', 'this is the way I like to be'; $\alpha = .91$), and external (e.g., 'I want to stand out in a good way', I want to leave a good impression on others'; $\alpha = .81$) motivations to exemplify their selected moral descriptors using a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). Internal and external promotion moral identity strengths were conceptualized as the average of the seven internal and external motivation items respectively.

In a parallel and independent step, we measured prevention orientation moral identity by asking

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[2] We used this newly developed moral identity measure in this study to also collect data for another study that examined age-related trends in the development of moral identity as it relates to abstractness, internality, and promotion/prevention orientation. See Lefebvre and colleagues (2024).

Table 1. Free Response Coding Scheme

Category	Criteria	Example (verbatim responses)
1: Sunk-cost reason to discontinue	Response cites sunk costs as a reason to discontinue	"The movie was free so it's not like any money would be lost by not going to it."
2: Sunk-cost reason to continue	Response cites sunk costs as a reason to continue	"I value my hard-earned dollars and if I cant get my money back, I darn well better get my moneys worth."
3: Vignette relevant reason to discontinue	Response cites reason mentioned in the vignette as a reason to discontinue	"I don't do 3D movies but on top if it if it is bad and boring, I would be wasting my time."
4: Vignette relevant reason to continue	Response cites reason mentioned in the vignette as a reason to continue	"Reviews are often wrong, or at least different than my taste."
5: Vignette non-relevant reason to discontinue	Response cites reason not mentioned in the vignette as a reason to discontinue	"Since I can see mov[i]e at home later."
6: Vignette non-relevant reason to continue	Response cites reason not mentioned in the vignette as a reason to continue	"The child won't even remember the party."
7: Non-codable	Response that is missing, mentions it depends on different factors, or does not give an explicit reason	"Will help the person until its time to go to the movie."
8: Moral reason to discontinue	Response cites moral reason to discontinue	"If I made a commitment then I must honor it."

Note. All examples are for the movie vignette.

participants to select nine to twelve descriptors of an immoral person (e.g., 'uncaring', 'tells lies', and 'unfair') from a list of immoral attribute descriptors. The immoral descriptors were the opposite of the moral descriptors and were similarly comprised of concrete and abstract matched pairs. Like the promotion measure, participants rated how important it is to avoid each of their selected immoral descriptors and responded to internal and external motivations to avoid exemplifying these descriptors. For the purposes of this study, we do not examine prevention-orientation moral identity.

Utilitarianism. To measure utilitarianism, participants responded to eight utilitarian vignettes used in previous research (Foot, 1967; Greene et al., 2001; Regan, 1983; Thomson, 1986). An example of a utilitarian vignette reads: "You are the late-night watchman in a hospital where an accident has occurred in one of the on-site testing labs, and now there are deadly fumes rising up through the hospital's ventilation system. The fumes are headed to a certain area where there are five patients who will surely die. If you flip a switch, the ventilation system will cause the fumes to bypass this room and enter a room containing a single patient, killing him". For each vignette, participants were asked whether they would make the utilitarian choice (e.g., In this situation, would you flip the switch? Yes or No). Utilitarianism was conceptualized as the number of 'yes' responses.

Procedure

Participants completed the study online via Qualtrics. Participants first responded to the eight vignettes. The vignettes were presented in counterbalanced order using a Latin-square design, where participants responded to one of the four experimental conditions for each vignette. Participants then completed the moral identity measures and the eight utilitarian vignettes.

Two attention-check questions asked participants not to respond and proceed to the next question. The attention-check questions appeared in the middle of the moral identity measure, and after the utilitarian vignettes.

Results

Preregistered analyses

For the three preregistered hypotheses, we examined a 2 (sunk cost: low vs. high) × 2 (vignette type: no honesty/fairness moral transgression vs. honesty/fairness moral transgression) repeated measures ANOVA, with the dependent variable being the likelihood rating to continue investing in the vignette ($\alpha = .05$).[3]

Affirming *H1*, there was a strong main effect of sunk cost, $F(1, 309) = 34.31$, $p < .001$, $\eta_p^2 = .1$, such that the likelihood rating to continue investing was greater in the high sunk-cost conditions ($M = 36.59$, $SD = 16.39$) compared to the low sunk-cost conditions ($M = 29.76$, $SD = 15.61$).

Affirming *H2*, there was a strong main effect of vignette type, $F(1, 309) = 430.74$, $p < .001$, $\eta_p^2 = .58$, such that the likelihood rating to continue investing was greater in the no honesty/fairness moral transgression conditions ($M = 45.66$, $SD = 16.81$) compared to the honesty/fairness moral transgression conditions ($M = 20.69$, $SD = 15.60$).

Affirming *H3*, there was a significant interaction between sunk cost and vignette type, $F(1, 309) = 4.88$, $p = .03$, $\eta_p^2 = .016$, such that the sunk-cost effect was larger in the no honesty/fairness moral transgression conditions ($M = 9.36$, $SD = 32.07$) compared

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[3] We also preregistered Bayesian analyses to compliment the NHST analyses. The results of the Bayesian analyses can be found in the supplementary materials on the OSF link: `https://osf.io/xp7hf/?view_only=12c8eb5e5ec64891894248dcd17904d8`

to the honesty/fairness moral transgression conditions ($M = 4.29$, $SD = 25.08$). Bonferroni corrected pairwise comparisons showed that the SCE was present in both the no honesty/fairness moral transgression condition ($p < .001$) and the honesty/fairness moral transgression condition ($p = .003$). See Figure 1. Although not preregistered, we also examined our directional hypothesis that the SCE is larger in the no honesty/fairness moral transgression condition than the honesty/fairness moral transgression condition using a paired-samples t-test, $t(309) = 2.21$, $p = .028$, $d = .08$. Therefore, although a small effect, dishonesty and unfairness reduced but did not eliminate the SCE.[4]
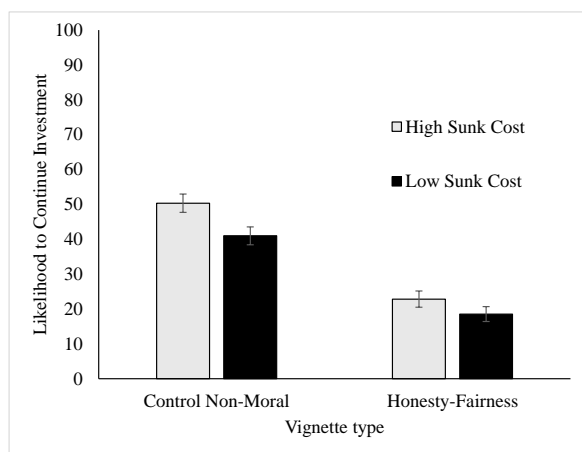

Figure 1. Sunk cost by vignette type interaction. The SCE is smaller but not eliminated in the honesty/fairness moral transgression condition compared to the no honesty/fairness moral transgression condition. Error bars represent 95% confidence intervals.

Exploratory analyses

To supplement and provide stronger evidence for our inferred explanation of the reduced sunk-cost effect being a result of individuals' sensitivity to moral transgressions, we conducted some exploratory analyses. To examine the roles of moral identity and utilitarianism on decision-making, we ran a series of exploratory multiple regressions. We examined both internal and external promotion moral identity orientations as predictors because they most closely resemble the internalization and symbolization subscales from the SIMIQ which have been used in much of the moral identity research. We also examined utilitarianism as a predictor separate from these moral identity orientations. All predictor variables were standardized as z-scores. Regression tables for all exploratory regressions can be found in Appendix B. Unsurprisingly, internal and external moral identity, as well as utilitarianism did not meaningfully predict the likelihood to continue investment in the in the high ($F(3,305) = .542$, $p = .65$, $R^2 = .011$) and low ($F(3,305) = 1.09$, $p = .354$, $R^2 = .005$) no honesty/fairness moral transgression conditions. Internal and external moral identity and utilitarianism predicted 6.3% of the variance in the likeli-

hood to continue investment in the low sunk-cost honesty/fairness moral transgression condition, $F(3,305) = 6.82$, $p < .001$, and 2.8% of the variance in continued investment in the high sunk-cost honesty/fairness moral transgression condition, $F(3,305) = 2.96$, $p = .032$. For both regressions that examined continued investment in the honesty/fairness moral transgression conditions, internal promotion moral identity was the only significant predictor ($p < .001$ and $p = .01$ respectively). A one standard deviation increase in internal promotion moral identity was associated with a decrease in continued investment of 4.56 units (~5% of the 100-point scale) in the low sunk-cost honesty/fairness moral transgression condition. Similarly, a one standard deviation increase in internal promotion moral identity was associated with a decrease in continued investment of 3.23 units (~3% of the scale) in the high sunk-cost honesty/fairness moral transgression condition. Therefore, greater self-importance of actively being a moral person predicted lower likelihood to continue investment when doing so was dishonest and unfair, regardless of the level of previous investment. However, internal and external moral identity and utilitarianism did not meaningfully predict the SCE (high sunk-cost condition – low sunk-cost condition) in the honesty/fairness moral transgression conditions, $F(3,305) = .44$, $p = .72$, $R^2 = .004$. Therefore, internal promotion moral identity predicted lower likelihood to continue investment in both high and low sunk-cost honesty/fairness moral transgression conditions but did not reduce the sunk-cost effect when continued investment was dishonest and unfair.

We also examined the qualitative data for the free responses regarding the explanations for decisions. We found a positive correlation between internal moral identity strength and moral reasons cited in the honesty/fairness moral transgression conditions, $r(309) = .28$, $p < .001$, such that individuals with a stronger internal moral identity were more likely to cite moral reasons for their decisions. Moreover, we found a negative correlation between the number of moral reasons to discontinue investment and the likelihood to continue investment in honesty/fairness moral transgression scenarios, $r(310) = -.54$, $p < .001$, such that the more often individuals cited moral reason not to continue investment, the less likely they were to say they would continue investment when doing so would be dishonest and unfair.

To examine explanations in the high sunk-cost honesty/fairness moral transgression scenarios, we ran a one-way repeated measures ANOVA for sunk-cost, moral, relevant, and non-relevant explanations for decisions. We excluded non-codable reasons because we wanted to examine valid reasons for decisions. The test of sphericity was violated, $\chi^2(5) = 145.08$, $p < .001$.

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[4] We report the following preregistered analyses that are not the focus of this paper. We found no interaction between sunk-cost and age group (18-22 and 50+), $F(1, 308) = 1.39$, $p = .24$, $\eta_p^2 = .004$. There was no three-way interaction between sunk-cost, vignette type, and age group, $F(1, 308) = 1.12$, $p = .29$, $\eta_p^2 = .004$.

Therefore, we report the Greenhouse-Geisser corrected test ($\epsilon = .74$). The ANOVA was significant, $F(2.23, 689.46) = 192.77$, $p < .001$. Bonferroni corrected pairwise comparisons revealed that moral explanations ($M = 1.08$, $SE = 0.04$) were more common than sunk-cost ($M = 0.17$, $SE = 0.02$, $p < .001$), relevant ($M = 0.19$, $SE = 0.02$, $p < .001$), and non-relevant ($M = 0.26$, $SE = 0.03$, $p < .001$) explanations. No other comparisons were significant. Therefore, in the high-sunk cost honestly/fairness moral transgression scenarios where moral considerations compete with other considerations (including high sunk costs), people were more likely to cite moral considerations for their decisions than other considerations.

Discussion

We examined the effects of dishonesty and unfairness on decision-making in sunk-cost scenarios. We also examined whether moral identity and utilitarianism predicted these decisions. First, we found evidence for the sunk-cost effect, whereby participants were more likely to indicate they would continue investing in a scenario when previous investments were high compared to low. Participants were also less likely to indicate they would continue investing if doing so was dishonest and unfair. We also found that the sunk-cost effect was reduced but not eliminated in vignettes where continued investment was dishonest and unfair. Additionally, internal promotion moral identity strength predicted being less likely to continue investment when doing so was dishonest or unfair. Lastly, qualitative analyses of decision rationales supported our interpretation that adhering to moral values reduced people's likelihood to continue investment in sunk-cost situations that were dishonest and unfair.

We replicate Hamzagic and colleagues' (2021) findings that violating moral values reduces but does not eliminate the SCE. We extend this previous research to include violations of dishonesty and unfairness. Together, this research suggests there may be a general moral attenuation effect on the sunk-cost effect. We found that the decreased likelihood to continue investment in sunk-cost vignettes (low and high) was influenced by the self-importance of actively being a moral person and not external moral motivations like impression management, or utilitarianism. Therefore, individuals indicated they would be less likely to continue to invest in situations because being dishonest or unfair violated their internal moral values and standards. Because internal moral identity predicted a lower likelihood to continue investment in the honesty/fairness moral transgression vignettes compared to the non-honesty/fairness moral transgression vignettes, we can be confident that the moral aspect of these vignettes is what primarily predicted lower likelihood to continue investment, and not some other cost/benefit type of calculation (e.g., the cost of potentially losing a friend for seeing the movie instead of upholding your promise to help them). This interpretation is strengthened by the qualitative data, which showed that people often cite moral reasons to discontinue investment in these situations (e.g., it is unfair to the friend). The paradigm used in the current study allowed us to examine how sunk costs compete with other situational factors like moral transgressions.

Violations of moral standards may be more salient to individuals with stronger internal moral identities in situations where personal investments are at odds with moral values. Such individuals may focus more on the moral aspect of the situation than the sunk-cost aspect. Our qualitative data supports this proposition. In high-sunk-cost honesty/fairness moral transgression vignettes, moral reasons to discontinue investment were more commonly cited than any other decision-making rationale, including sunk costs. Cognitive theories of moral decision-making argue that recognition of moral transgressions and moral motivation predict moral decisions (Rest, 1986; Rest et al., 1999). Moreover, Krettenauer and Stitcher (2023) argue that morality can be though of as a goal, whereby individuals who have stronger moral identities have stronger moral goals and are more motivated to make moral decisions. Additionally, stronger moral goals are better able to overcome other competing goals (like sunk costs). Therefore, individuals with stronger moral identities may be better at recognizing moral transgressions in sunk-cost scenarios, and overcome potentially self-serving motivations, resulting in moral decisions.

It is important to note that the attenuating effect of moral violations on the SCE was small, and dishonesty and unfairness did not eliminate the SCE. Participants were still more likely to indicate they would continue in the honesty/fairness moral transgression vignettes if previous investment was high compared to low. Other researchers on the SCE in moral scenarios have also found that the SCE occurs when prior investments are at odds with moral considerations (Armstrong et al., 2004; Jensen et al., 2011; Street & Street, 2006). Although we found that stronger internal promotion moral identity predicted lower likelihood to continue in high sunk-cost honesty/fairness moral transgression vignettes, internal promotion moral identity did not reduce the SCE (difference between high and low sunk-cost conditions) in honesty/fairness moral transgression conditions. The SCE is a robust decision-making bias that has been shown to occur in many contexts, such as financial investments, professional sports, committed relationships, and public support for war (Guler, 2007; Keefer, 2015; Rego et al., 2018; Schott et al., 2011). Our results suggest that previous personal investments still matter and compete with moral values in sunk-cost scenarios.

Individuals may approach moral sunk-cost situations with different decision-making styles or strategies that reflect the different theories of sunk-cost decision-making. Yet, the introduction of moral transgressions may disrupt these assumed decision-making processes that underlie sunk-cost decision-making. For example, some researchers think of the SCE as a decision-making heuristic that relies on fast automatic deci-

sions based on heuristics like the waste-not rule (Arkes, 1996; Arkes & Blumer, 1985; Klaczynski & Cottrell, 2004). The introduction of competing moral considerations may disrupt these quick heuristic-based decision processes and result in more deliberate and contemplative decision-making strategies because there is a new conflicting element in the situation to consider. This disruption of heuristic sunk-cost processes may be stronger for those with stronger moral identities who are motivated to make moral decisions and focus more on the moral aspect of the scenario. Others argue that the SCE results from individuals not wanting to admit that they made poor investment decisions and are motivated to justify their decision-making ability through continued investment, hoping the outcome will work out in the end (Brockner, 1992). With the introduction of a moral transgression, it may be that individuals find it more difficult to justify immoral actions than poor investment decisions and use the moral decision to escape the SCE and restore confidence in their decision-making ability. For those with stronger moral identities, it may be more important to justify moral decisions to oneself than poor previous investments. Lastly, some theorists suggest the prospect theory explains sunk-cost decision-making (Kahneman & Tversky, 1979; Whyte, 1986). According to the prospect theory, individuals are likely to make sunk-cost decisions when they evaluate potential outcomes based on gain and loss relative to their initial financial position, rather than total gains or losses. When considering whether to continue investment, people who focus on the unrecoverable sunk costs are faced with the prospect of guaranteed loss of their previous investment or uncertain loss of continued future investment. People tend to be loss averse and prefer uncertain compared to guaranteed loss, resulting in continued investment with the hope the outcome pays off eventually. The introduction of moral violations may interrupt this type of loss/gain probability calculation. Continuing means guaranteed moral "costs", and our results show that moral violations seem to be more salient than financial costs. Moreover, moral costs likely do not equate financial costs (e.g., what is the financial equivalent of losing people's trust or disadvantaging other people?). If the outcome is seen to not be worth the continued investment, individuals are less likely to show the SCE (Tan & Yates, 1995). Therefore, the moral cost of continued investment may result in the perception of a lose-lose situation (loss of financial investment, and loss of doing the morally wrong thing) – especially for people with stronger moral identities who are more sensitive to moral transgressions. Overall, individuals may approach sunk-cost situations with different strategies that may belong to any of these theories, yet moral transgressions may disrupt each strategy in different ways.

Limitations and future considerations

It is important to note that we examined scenarios in which moral considerations oppose previous invest-

ments. There may be situations in which moral considerations may increase the SCE. For example, if discontinuing would contradict moral values, or if previous investments also carried moral consequences. For example, Frechen and Brouwer (2021) presented people with two successive utilitarian decisions and found that most people who made the initial utilitarian decision to harm one person to save others later doubled down with the utilitarian choice to kill this person to save the others. Importantly, people were less likely to make the utilitarian decision to kill one person if this was a standalone decision not preceded by a similar utilitarian dilemma to harm this person. Moreover, Meyers and colleagues (2019) found that people were more likely to show the sunk-cost effect when doing so harmed others if their previous investments also resulted in harm. They also found that these moral violations were not perceived to be as bad if they had incurred previous moral costs. In situations where moral considerations are confounded with sunk costs, moral transgressions may not disrupt sunk-cost decision-making processes discussed previously. For example, people may feel the need to justify previous moral costs with future investment or still engage in a cost-benefit calculation (e.g., paralyzing the person and having the others die is a certain loss, but killing the paralyzed person may still result in the others living). Future researchers may want to examine how sunk costs influence moral evaluations. Additionally, individuals may be more likely to show the SCE for unsuccessful prosocial causes (Schaumberg & Wiltermuth, 2014).

Although we did our best to construct the vignettes in a way that focus on honesty/fairness transgressions and sunk costs, there are other considerations present in the vignettes that could have influenced decision-making. For example, participants may have thought about not wanting to lose their friend if they did not fulfill their promise or face potential legal consequences for being dishonest about a product they are selling. We also attempted to use high costs that would be realistic to the scenarios, but the value of the sunk cost may not have been consistent for all participants. The high sunk-cost financial value may be perceived differently by different people. For example, $30 for a movie may not seem as bad to someone who is financially well-off compared to someone less financially stable. It is important for researchers who examine scenarios where sunk costs are at odds with moral values to consider appropriate and realistic commensurability between moral transgressions and financial costs. In our scenarios, there was likely variance in the strength of sunk costs and moral transgression across vignettes (e.g., for most people, 30 dollars for a movie may be less of a high sunk cost than 500 dollars for a bike). Moreover, the commensurability between the moral transgression and the sunk costs may have also varied across vignettes. For example, in our dinner vignette we found that the prospect of being dishonest and serving a meal that violated other's religious values heavily outweighed the 100-dollar investment

to prepare the meal.We attempted to overcome these limitations by including different vignettes that depict a variety of every-day realistic scenarios with no systematic factors other than sunk costs and honesty and fairness. Nevertheless, our free response exploratory analyses revealed participants still based their decisions on factors other than sunk costs and moral transgressions. Future research may also want to carefully construct vignettes to reduce the influence of other situational factors. Moreover, it is possible that higher sunk costs may erase or reverse the interaction effect we found with moral transgressions. For example, there may be a threshold at which financial costs outweigh moral costs. Future research may want to examine this dynamic between relatively high and low moral and financial costs. Additionally, our sunk-cost measures were hypothetical scenarios. It may be that decisions would be different when there are real investments and real moral consequences at stake. Future research may want to examine this research question behaviourally and investigate moderating factors like moral emotions. It is also possible that completing the moral identity measures first could have primed participants to think about their moral selves and influenced their decision-making on the sunk-cost vignettes. Because doing the vignettes first could have also similarly influenced the moral identity measures, we chose to keep the order of these measures consistent for all participants. Lastly, the interaction between sunk cost and vignette type is potentially removable (see Loftus, 1978, and Wagenmakers et al., 2012).

Conclusion

In the current study we extend work by Hamzagic and colleagues (2021), who found that harming others reduces the SCE. We found that the supressing effect of moral transgressions on the SCE applies to other moral values as well – honesty and fairness. Moreover, we found that one's internal moral identity predicts the ability to make moral decisions despite large sunk costs, and individuals who make moral decisions in sunk-cost scenarios are more likely to cite moral reasons (compared to other reasons) for their decisions. Overall, we suggest that violating one's moral values reduces but does not eliminate the SCE.

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Appendix A: Vignettes

Vignette: Teacher

Non-Moral Conditions: Imagine that you are a teacher, and you are creating lesson plans for a 4-month course you are teaching. You used free teaching materials to create the lesson plans. (You paid $500 on teaching materials to create the lesson plans.) You then realize that the materials you used for your lesson plans are not engaging and would be boring. You think the course would be better if you used different materials.

Moral conditions: Imagine that you are a teacher, and you are creating lesson plans for a 4-month course you are teaching.

You used free teaching materials to create the lesson plans. (You paid $500 on teaching materials to create the lesson plans.) You then realize that the materials you used for your lesson plans require the students to have a high level of English proficiency which is a large disadvantage for the students who speak English as a second language. You think the course would better if you used different materials.

Choice: How likely are you use the original lesson plans you created?

Explanation (open ended): Please briefly explain why you made this decision.

Vignette: Movie

Non-Moral Conditions: Imagine that you want to watch a movie. You use free movie vouchers (spend $30) on a non-refundable ticket to the 3D showing. Before you leave to go to the movie, you read the reviews that all say the movie is really bad and very boring.

Moral conditions: Imagine that you want to watch a movie. You use free movie vouchers (spend $30) on a non-refundable ticket to the 3D showing. Before you leave to go to the movie, you remember that you promised your friend that you would help them set up a surprise party for their child's birthday.

Choice: How likely are you to go to the movie?

Explanation (open ended): Please briefly explain why you made this decision.

Vignette: Bike

Non-Moral Conditions: Imagine that your car breaks down and will be in the shop for 3 weeks to get fixed. Along with another co-worker, you decide that this is a good opportunity to start biking to work to live a healthier lifestyle. You get a non-refundable bike (for $500) for $30 from a used bike shop. After two trips to work, you realize you dislike the bike ride since it is harder and takes longer than you expected.

Moral Conditions: Imagine that your car breaks down and will be in the shop for 3 weeks to get fixed. Along with another co-worker, you decide that this is a good opportunity to start biking to work to live a healthier lifestyle. You get a non-refundable bike (for $500) for $30 from a used bike shop. After two trips to work, you see posters around town that show your new bike is actually a stolen bike, and that owner is looking for it.

Choice: How likely are you to keep using the bike to get to work?

Explanation (open ended): Please briefly explain why you made this decision.

Vignette: New Job

Non-Moral Conditions: Imagine that you just started a new salesperson job for a health product company. You spent 3 days in orientation training for this job ($1000 on a 3-month training course for this job). A week after starting the job, you find it really boring and are not enjoying it at all.

Moral Conditions: Imagine that you just started a new salesperson job. You spent 3 days in orientation training for this job ($1000 on a 3-month training course for this job). A week after starting the job, you find out that the product information you are telling customers is false and the health product does not actually work as advertised.

Choice: How likely are you to stay at this job?

Explanation (open ended): Please briefly explain why you made this decision.

Vignette: Phone

Non-Moral conditions: Imagine that you need a new smartphone, so you get used one for ($200) $20 from craigslist. After using it for a little bit, you realize the battery life is not as long and the phone is not as fast as you had wanted.

Moral conditions: Imagine that you need a new smartphone, and you get used one for ($200) $20 from craigslist. The phone has a custom phone case on the back. A few days later you see a "stolen phone" poster for the phone you just bought at the bus stop that says the owner is looking for it.

Choice: How likely are you to keep the phone?

Explanation (open ended): Please briefly explain why you made this decision.

Vignette: Dinner

Non-Moral Conditions: Imagine that you (spend $100 on ingredients) use ingredients from home to prepare a meal for you and your family. After testing a few bites of it, you realize that it tastes slightly burnt. Even after adding some spices, it still tastes slightly burnt and you dislike the taste of it.

Moral Conditions: Imagine that you (spend $100 on ingredients) use ingredients from home to prepare a meal for new neighbors that just moved next door. Before you serve the meal, they mention they do not eat one of the ingredients you used for religious reasons.

Choice: How likely are you to serve the meal?

Explanation (open ended): Please briefly explain why you made this decision.

Vignette: Restaurant

Non-Moral Conditions: Imagine that you and a friend want to go to a new fancy restaurant that opened up across town. You spend $50 on a taxi to get there. (You use free taxi vouchers to get there). Once you arrive, you see the restaurant is very busy and there will room for only a few new customers before the restaurant closes for the night. You look at the menu and realize you might not enjoy the food.

Moral Conditions: Imagine that you and a friend want to go to a new fancy restaurant that opened up across town. You spend $50 on a taxi to get there. (You use free taxi vouchers to get there). Once you arrive, you see that the restaurant is very busy and there will not be any room for new customers before the restaurant closes for the night. However, the front desk mistakes you for a couple that has reservations in 10 minutes who have not arrived yet, and offers to take you in.

Choice: How likely are you to stay at the restaurant for dinner?

Vignette: Advertising

Non-Moral Conditions: Imagine that you are the owner of a fitness gym. You have invested ($1 thousand) $10 thousand into advertising a new fitness program at your gym. The marketing team shows you the advertisement campaign and you realize it is potentially boring and may not capture people's attention.

Moral Conditions: Imagine that you are the owner of a fitness gym. You have invested ($1 000) $10 000 into advertising a new fitness program at your gym. The marketing team shows you the advertisement campaign and you realize the effectiveness and end results of the fitness program are inaccurate and greatly exaggerated.

Choice: How likely are you to use the current advertisement campaign?

Explanation (open ended): Please briefly explain why you made this decision.

Appendix B: Regression Tables

Regression Predicting Likelihood to Continue in the Low Sunk Cost No Honesty/Fairness Moral Transgression Conditions

Predictor	β	SE	B	95% CI	p
Utilitarianism	.00	1.31	.02	-2.56, 2.60	.99
Internal Promotion Moral Identity	.08	1.39	1.85	-0.90, 4.59	.19
External Promotion Moral Identity	-.10	1.39	-2.23	-4.97, 0.51	.11

Note. Predictor variables are standardized as z-scores.

Regression Predicting Likelihood to Continue in the High Sunk Cost No Honesty/Fairness Moral Transgression Conditions

Predictor	β	SE	B	95% CI	p
Utilitarianism	.05	1.35	1.10	-1.55, 3.74	.42
Internal Promotion Moral Identity	.05	1.43	1.26	-1.56, 4.07	.38
External Promotion Moral Identity	-.04	1.43	-0.86	-3.67, 1.95	.55

Note. Predictor variables are standardized as z-scores.

Regression Predicting Likelihood to Continue in the Low Sunk Cost Honesty/Fairness Moral Transgression Conditions

Predictor	β	SE	B	95% CI	p
Utilitarianism	-.10	1.06	-1.86	-3.95, .24	.08
Internal Promotion Moral Identity	-.24	1.13	-4.60	-6.82, -2.38	.00
External Promotion Moral Identity	.07	1.13	1.33	-.89, 3.55	.24

Note. Predictor variables are standardized as z-scores.

Regression Predicting Likelihood to Continue in the High Sunk Cost Honesty/Fairness Moral Transgression Conditions

Predictor	β	SE	B	95% CI	p
Utilitarianism	-.07	1.18	-1.45	-3.77, .87	.22
Internal Promotion Moral Identity	-.16	1.25	-3.23	-5.69, -.77	.01
External Promotion Moral Identity	.09	1.25	1.78	-.68, 4.24	.16

Note. Predictor variables are standardized as z-scores.

Regression Predicting the SCE in the Honesty/Fairness Moral Transgression Conditions

Predictor	β	SE	B	95% CI	p
Utilitarianism	.02	1.43	.40	-2.41, 3.22	.78
Internal Promotion Moral Identity	.06	1.52	1.37	-1.61, 4.36	.37
External Promotion Moral Identity	.02	1.52	.45	-2.532, 3.44	.77

Note. Predictor variables are standardized as z-scores.