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Culture-related factors affect sunk cost bias

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ABSTRACT

Reasoning and decision-making are fraught with systematic errors in thinking. One key example is sunk cost, a past investment that cannot be recovered, that influences ongoing decisions. A sunk cost bias occurs when previous choices affect present decisions. Sunk cost decision-making has been primarily studied in Western, individualistic cultures although some attention has been focused on comparing its prevalence in collectivist cultures such as Japan and China. We evaluated the influence of individualist and collectivist cultures, perceived control and the role of self. In Study 1 Americans and Indians were primed with cultural values and then presented with sunk cost decision scenarios. Results indicated Americans made more sunk cost decision errors than Indians and personal decisions were associated with more bias than decisions made on behalf of others. Cultural differences on sunk cost bias were consistent with self-justification theory. In Study 2 a new set of sunk cost scenarios varied environmental use and sustainability themes. Results indicated particular situations influenced error, although country of origin and perceived behavioral control were also effective at predicting sunk cost bias.

KEYWORDS: decision-making, cognitive bias, sunk cost, self-view, India, United States, environment

Reasoning and decision making are fraught with systematic errors in thinking, which adversely affect behavior. Much of the research on cognitive bias has been conducted on Western cultures with some comparisons to Eastern cultures, particularly China and Japan. Our purpose was to explore how different factors influence reasoning biases, specifically, how people with individualist cultural values in the United States differ from people with collectivist cultural values in India. To our knowledge, this is the first cognitive bias study reporting American and Indian responses to environmental issues designed to trigger sunk cost bias. While comparative research has studied sunk cost bias in China, Japan, and Mexico (Chow, Harrison, Lindquest & Wu, 1997; Greer & Stephens, 2001; Kitayama, Markus, Matsumoto, & Norasakkunkit, 1997), India's population and particular demographics are distinctive in many respects and therefore deserve independent scrutiny. Sunk cost biases, concerning environmental themes such as water and energy conservation, were used in this study; this particular content is salient because of the heavy demands on our environment for sustaining large populations and the implications for policy.

» DEFINING SUNK COST BIAS

A sunk cost is a past cost that cannot be recovered. A sunk cost effect occurs when past investment of time, money or effort influence a present investment decision (Arkes & Blumer, 1985). That prior investment is often considered the motivating factor in the decision to continue or escalate an investment. A sunk cost choice (i.e., a choice taking into account a sunk cost) is considered irrational because decisions are based on past investments, rather than on unbiased future outcomes. This cognitive bias can be very costly across a wide range of resources (e.g., Ross & Staw, 1993).

» WHY SUNK COST BIAS OCCURS

In business, economics and psychology, sunk cost has been used to explain choices as diverse as the maintenance of troubled relationships to financial speculation (e.g., Strough, Schlosnagle, Karns, Lemaster & Pichayayothin, 2013). Sunk cost bias provides a plausible explanation for poor decisions regarding the space shuttle Challenger (Economist, 2003), any number of military incursions into other countries, or even why we persist with some

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of the energy choices we make (Muehlenbachs, 2013). Some sunk cost research has focused on individuals' rationales when making sunk cost choices. Arkes and Blumer (1985) determined that the psychological justification for making sunk cost choices has to do with the desire to avoid waste (see also Bornstein & Chapman, 1995). That is, people do not want to appear extravagant or inefficient. Learning lessons from poor past decisions has also been provided as a secondary explanation (Bornstein & Chapman, 1995). In explaining their reasoning, people want to believe they are not repeating previous mistakes.

Apart from avoiding the appearance of waste, research on sunk cost has often pointed to two theories addressing why this bias occurs: prospect theory and self-justification theory. Prospect theory explains how people evaluate outcomes in terms of gains and losses. Prospect theory describes actual behavioral actions, where people underweight outcomes that are probable in comparison with those that seem certain (Kahneman & Tversky, 1979). When a decision is framed as a loss or when previous investments are involved, we are more willing to take risks to avoid the loss (Thaler, 1980). This corresponds to Whyte's (1986) finding that people are more risk-averse in gain situations and more risk-prone in loss situations. For example, in a gain situation, people prefer a certain win of $50 over a fifty percent chance of winning $100 or $0, and in loss situations people would rather take a fifty percent chance of losing $100 or $0 than a certain loss of $50 (Brockner, 1992). The destabilizing tendencies of loss aversion increase people's risk tolerance and the likelihood of sunk cost bias (Whyte, 1986).

Alternatively, self-justification theory posits that people do not like to admit error (Brockner, 1992). In sunk cost situations, self-justification theory predicts that people will choose to continue with an investment to 'reaffirm' their original investment decision was 'correct' (Brockner, 1992). Staw (1976) found that when feedback was negative, and decisions involved personal responsibility, people were more likely to escalate investment. This is congruent with self-justification theory, because Brockner (1992) found that both negative feedback and personal responsibility encourage reaffirmation of the original choice. However, a related concern is maintaining one's reputation for completing actions (Dixit & Pindyck, 1994; Milgrom & Roberts, 1992), even in the case of expected loss. Self-justification theory is important to the present study because of its focus on the self. How the self is viewed depends on culture (Markus & Kitayama, 1991), and self-justification theory may contribute to understanding sunk cost choices.

» PERCEIVED RESPONSIBILITY AFFECTS SUNK COST CHOICES

Responsibility to a group of peers, as opposed to personal responsibility, also impacts sunk cost bias, but not in consistent ways. Staw and associates (1976) manipulated responsibility and found that more responsibility escalated commitment. Arkes and Blumer (1985) followed up, noting the role of personal responsibility. More recently, Wong (2005) also found having a personal stake in a decision increased the likelihood of escalating commitment.

Alternatively, Simonson and Nye (1992) found that heighted responsibility improved decision-making, such that participants in a higher responsibility condition were less likely to make sunk cost choices than those with lower responsibility. In other words, participants who thought they had to explain their decisions to others and/or be evaluated by others were less likely to make sunk cost choices than those who thought their decisions were confidential. Accountability in the form of monitoring also reduced escalation of commitment (Kirby & Davis, 1998). Institutional decision makers must be able to explain themselves. If they are accountable to others, they may be more motivated to attend to and process information (Simonson & Nye, 1992). Petty and Cacioppo (1986) suggested either a central or more peripheral path of managing information, with higher responsibility tasks recruiting more elaborative, effortful path processing (Johnson & Eagly, 1989). When making judgments for ourselves, we might be less motivated to effortfully process information, bolstering our choices with self-justification. When making judgments for others, we may be more inclined to think carefully.

» CULTURE

Culture can be a potent influence on behavior. Often characterized by the dimension of relative collectivism or individualism (Triandis, 1995) Hofstede (1984) explains this dimension by a given culture's relative focus on the self or their group. Individualists are focused on promoting, and doing what is best for themselves, while collectivists are focused on care of others and harmony of the group (Hofstede, 1983; Hofstede, 1984). Geiger, Robertson, and Irwin (1998) applied Hofstede's (1983) distinctions of culture to sunk cost situations using self-justification theory. In self-justification theory a key focus is the personal desire to be correct and to fortify one's choices (Brockner, 1992). Because of the focus on the self, people from individualist cultures might be more likely to make sunk cost errors; following self-justification theory, they might reify and reaffirm their past decisions (Geiger et al., 1998). In contrast, collectivists might commit less sunk cost bias because their decisions may be focused on optimizing outcomes for the group.

On the other hand some business-oriented work has found that Chinese participants are more likely to escalate their commitment to projects, relative to U.S. subjects (Chow et al., 1997). Chinese participants may be more concerned about saving face, resulting in more commitment to prior decisions; however, that may be balanced by a greater willingness to tolerate risk. In a similar vein, Sharp and Salter (1997) found that Asian managers made riskier decisions than North American managers, particularly when there were long-term potential benefits for their firms. However, this seems to depend on time trajectories. Asian managers were less risky relative to North Americans when making short-term financial decisions but also more willing to take a longer-term orientation towards problem solving when making decisions. In another study Khan, Salter and Sharp (2000) manipulated previous resource investment and responsibility and found their multinational sample comparing Pacific Rim countries with North America had different responses to these dimensions. While all respondents were sensitive to framing, risk tolerance and personal involvement differed based on economic expectations and short or long-term time projections.

Weber and Hsee (1998) also found that people in individualist cultures took fewer risks than people in collectivist cultures. When comparing decisions made by Chinese, American, German, and Polish students, Weber and Hsee reported that American participants were considerably more risk-averse than their Chinese counterparts. In explaining these results, they argued that the cultural mesh in collectivistic societies offers the Chinese a "cushion" that reduces their perception of danger. This different perspective may make them appear less risk-averse although that may be because they rely on other contingencies.

To recap, there are a variety of cultural influences on sunk cost with some research pointing to individualistic cultures being more susceptible to bias, due to self-justification. Alternatively, other research finds more sunk cost bias in collectivist samples, explained in part by the benefits of group protection or different cultural expectations. Not surprisingly, type of issue or content under consideration is probably salient.

» COMPARING CULTURALLY-PRIMED AMERICANS AND INDIANS ON SUNK COST BIAS

In the first study, we primed participants either congruently or incongruently with their cultural values before asking them to read and respond to vignettes designed to elicit sunk cost bias. The goal of the priming intervention was to amplify cultural salience strategically, using the logic of experimentation, to separate influences. We evaluated three hypotheses in this study. First, we hypothesized that, like Geiger et al. (1998) and Kitayama et al. (1997) suggest, individualists will show more sunk cost bias than collectivists (H1), because of their enhanced self-focus (Hofstede, 1983). As the second hypothesis we posited that individualists should be more prone to sunk cost errors under conditions of personal responsibility (H2) as opposed to institutional responsibility, where responsibility is to peers as well as the self. Being more aware and accountable to others might increase deliberative thinking. In contrast, type of responsibility should have little effect on collectivists' sunk cost choices because they routinely attend to others. By definition, collectivists show more self- criticism (Kitayama et al., 1997) and focus on the group (Hofstede, 1983). That perspective should lead to greater focus on what is best for others. Who is or is not responsible should not be salient.

Our third hypothesis was that culture-consistent priming should enhance any sunk cost bias effects (Oyserman & Lee, 2008), while culture-inconsistent priming might balance or negate typical responses. That is, culture-consistent priming might accentuate sunk-cost errors across conditions of personal and institutional responsibility (H3). Oyserman and Lee suggest that priming all participants reduces questions about inference since one cannot assume that non-primed participants do not have a cultural frame of mind. Nevertheless, they point out that the concept of a priming manipulation is decidedly Western and note problems of cross-cultural priming comparisons. Previous research has tried to enhance cultural salience through priming. Oyserman and Lee (2008) review and critique different techniques. As will be discussed in the procedure, we modified a pronoun-priming task from Brewer and Gardner (1996), which Oyserman and Lee's meta-analyses indicated was moderately effective. Participants were asked to select pronouns out of a word matrix, rather than a paragraph, to reduce the amount of reading required.

» METHOD

Participants

The sample of 438 participants included 204 English-speaking Indian students ($M_{age\ male}$ = 19.74, SD = 1.19; $M_{age\ female}$ = 19.52, SD = .9) from colleges and professional schools in Gujarat, India 233 and 233 American students ($M_{age\ male}$ = 19.22, SD = 1.36; $M_{age\ female}$ = 19.16, SD = 2.05) from a small private university. The sample included 82 Indian females and 142 U. S. females. Indian participants were recruited by the third author, with the administrative support of the various schools in Gujarat. American students were recruited with administrative support from psychology and business departments. Following the Triandis (1995) classification, American students were used to represent an individualist culture whereas the Indian students represented a collectivist culture. Although we had an English-fluent Indian sample, for many Indians in our sample, English was not their first language. In part, to ensure full comprehension of our task, we limited our sample to those participants who correctly and quickly identified pronouns in the priming task. Accuracy on the pronoun-priming task indicated both understanding of the English language as well as motivation to be an engaged participant. Prior to applying this criteria, the original sample of 666 subjects included an additional 57 American and 171 Indian participants.

Materials and design

This study used a 2×2×2 ([country: India; U. S.] × [priming: culture-consistent vs. culture-inconsistent] × [responsibility: personal vs. institutional]) mixed design, with responsibility as a within-subjects factor. All materials used in this study were environmentally-themed and data collection used a web survey.

A modified version of Brewer and Gardner's (1996) and Gardner, Gabriel and Lee's (1999) priming task was used to increase the salience of cultural values. Participants viewed a matrix of 81 words in which 14 were target-pronouns; the rest were non-target nouns with environmental themes (e.g., air, oil). Participants were instructed to click the target pronouns as quickly as possible. Through computer-generated random assignment, half of the participants were presented with matrices containing only individualistic target pronouns (e.g., I, my, mine). Half were presented with matrices containing only collectivistic target pronouns (e.g., we, us, ours). The number of correct responses and completion times were recorded; participants with pronoun identification scores of less than 10 or longer response times (outliers from the normal distribution) were excluded from our sample to ensure comprehension and motivated participation. See Appendix A for this measure.

Upon completing the pronoun-priming task, participants read and made decisions using information presented in four sunk cost vignettes similar to stimuli used in past literature (Bornstein & Chapman, 1995; Navarro & Fantino, 2009; Rosenboim, Shavit, & Shoham, 2010). Each of the four vignettes described an environmental dilemma in the context of whether there was personal or

institutional responsibility, which was counterbalanced. Each situation framed a past investment decision as resulting in a likely loss and suggested alternative solutions. For example, participants read:

> *"It is important to **you/your company** to behave responsibly toward the environment and you are well aware of the projections of future water shortages. After years of planning your new low environmental impact **home/facility**, construction has begun. In trying to get the project off the ground and take advantage of short-term cost savings due to the slow economy, **you/your company** decide to purchase supplies for a traditional plumbing system for the new construction. In addition, this decision requires a non-refundable payment that covers one-third of the total cost of installation."*

After talking to a colleague who has been researching an innovative rainwater collection system, you learn that it would be feasible and more environmentally friendly to install this new system. This system does not allow ***you/your company*** to use the traditional plumbing supplies or the labor which has already been paid. Although this new system is not cheap, it is highly efficient without ongoing costs. However, admittedly it has not been tested over a substantial period of time. Should you continue with the partially paid traditional plumbing system or switch to the new rainwater collection system." See Appendix B for the remaining vignettes.

Vignette Response Format and Coding. Participants could choose to stay with the original plan, switch their course to the new plan, or present an alternative. This involved clicking on one of these choices; the alternative choice provided a box to type in a response. Responses ranged from 'stay,' coded as a 1, which indicated sunk cost bias, to 'switch,' coded as a 5. 'Alternative' responses ranged from 2 to 4, depending on their rationale, with 3 indicating a more novel alternative proposed by the subject. When their written alternative was highly similar but somewhat different from the described sunk cost, it was coded a 2. If their alternative was similar but at least somewhat different to the proposed new technique, it was coded a 4. A score of 3 reflected a more unusual or hybrid approach. Each vignette was scored separately. Lower scores indicated more sunk cost bias and preference for continuation of the status quo.

The first author created an extended coding scheme based on pilot data, with detailed explanations for determining a score of 2, 3, and 4. Judgments were only required for those respondents who selected 'alternative' and provided an explanation of their choice. As previously noted sunk cost bias was reflected with a response of stay and choosing the described alternative was coded as a 5. Four undergraduates were trained by the first author and then assigned to score alternative decisions from particular vignettes. Two raters, blind to respondent characteristics, coded all of the alternative choices from the four vignettes. Inter-class correlations were computed to determine inter-rater reliability; coefficients ranging from .72 to .93, denoting good to excellent agreement (Cicchetti, 1994).

Although individual scores were computed for each vignette, for our primary analyses we were more interested in our manipulated variables than in individual responses to particular vignettes, so we combined vignettes for each of the two responsibility conditions. Responses to the two institutional perspectives and the two personal perspectives were separately averaged for each participant, yielding one primary dependent variable for institutional responsibility and one for personal responsibility. In addition, each vignette was looked at separately, to identify separate patterns unique to specific environmental issues (e.g., energy, water conservation).

» PROCEDURE

After providing informed consent, data was collected using an online web application. Initially, participants responded to demographic questions. Then participants completed the pronoun priming task where they were randomly assigned to be primed in ways that were either consistent or inconsistent with their country of residence. Culturally consistent priming consisted of Americans being primed with individualistic values (e.g., targets included mine, me). Culturally inconsistent priming involved words consistent with collectivistic values (e.g., targets included ours, we). Time spent on task was recorded, as were the number of correct pronoun identifications. After the priming task, participants read and responded to four randomly presented but counterbalanced sunk cost vignettes. Participants were asked to decide to stay with the choice where resources had already been invested, switch to an effective, newer method, or select a third option that required an explanation of their solution. Although no time limits were imposed, time spent on task was monitored and recorded. After completing study procedures, participants were thanked for their participation and provided contact information for follow-up, if they were interested in learning about outcomes.

» RESULTS

Initially we verified there were a sufficient number of sunk cost errors made (m = 29.08%) in response to our environmental scenarios. There were more sunk cost errors in the U.S. relative to the Indian group, but percentages differed by vignette. Grouping responses by gender and country and separating by vignette, percentage of error ranged from as low as 9% (for Indian females) to as high as 63% (for American females). See Table 1 for numbers and percentage of error by vignette.

Separate chi-square analyses were used to test whether country of origin differentially affected decision. Responses were dichotomized as reflecting sunk cost (1) or solution switching (2-5). It was necessary to collapse responses to meet chi-square assumptions

Table 1. sunk cost error and percent listed by vignette theme for study 1

	coal energy		green growth		recycling		plumbing	
	count	percent	count	percent	count	percent	count	percent
India female	7	9	20	24	24	29	15	18
India male	15	12	31	25	46	37	27	22
U.S. female	22	15	30	21	66	46	90	63
U.S. male	19	21	42	32	37	41	54	59

* Not all participants responded to every computer-presented vignette.

of number of observations per cell. All four vignettes yielded significant country of origin effects. With Coal Energy, the Pearson chi-square analysis yielded $\chi^2_1 = 5.23$, $p = .02$. With Recycling, the results were $\chi^2_1 = 5.9$, $p = .01$; with Green Growth, the chi-square results were χ^2_1 of 3.7, $p = .05$, and Plumbing yielded a χ^2_1 of 120.77, $p < .001$. Americans made substantially more sunk cost errors, while Indians showed as much as 40% more likelihood of choosing the non-biased alternative.

To test our first hypotheses that country of origin would affect sunk cost, we ran a 2×2×2 ([country: India; U.S.] × [priming: culture-consistent vs. culture-inconsistent] × [responsibility: personal vs. institutional]) repeated measures ANOVA, with country of origin and type of pronoun priming as between subjects factors, and responsibility as a within subjects factor. As hypothesized, there was a significant main effect of country of origin, $F(1, 376) = 60.47$, $MSE = 119.67$, $p < .001$, $\eta^2_p = .14$, such that Americans were nmore likely to make sunk costs errors than Indians (H1).

Our second hypothesis was that individualists should be more prone to sunk cost errors under conditions of personal responsibility as opposed to institutional responsibility, where responsibility is to others. Because of collectivists' orientation to others, we hypothesized that the responsibility manipulation should have little effect on collectivists' choices. Results were consistent with this hypothesis as well. We found an interaction between responsibility × country of origin interaction, $F(1, 376) = 5.9$, $MSE = 11.57$, $p < .02$, $\eta^2_p = .02$ (see Figure 1). There was also a significant main effect of responsibility, $F(1, 376) = 11.64$, $MSE = 22.83$, $p < .001$, $\eta^2_p = .03$, such that personal responsibility yielded more sunk cost errors than institutional responsibility (H2). However this effect was mostly due to differences in the American sample.

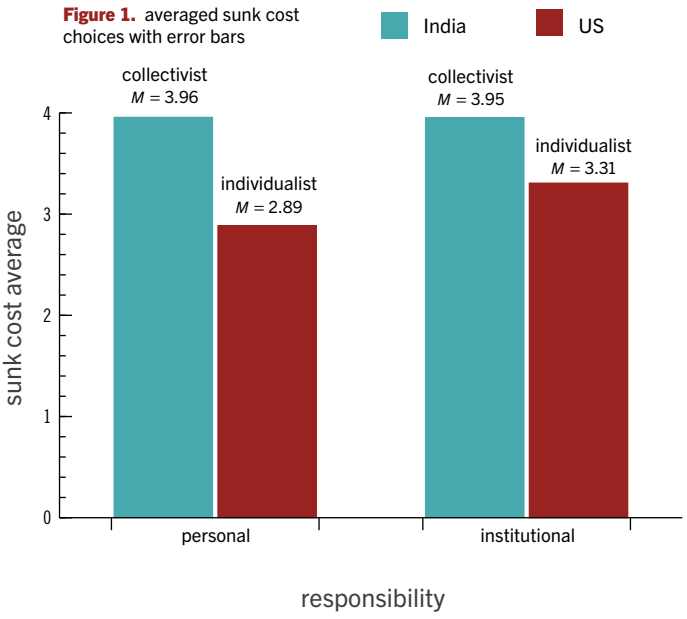

Figure 1. averaged sunk cost choices with error bars

Our third hypothesis was that culture-consistent priming should enhance these effects. Although priming did not yield a significant main effect, there was a significant three-way interaction between priming × country of origin × responsibility, $F(1, 376) = 6.94$, $MSE = 13.61$, $p = .02$, $\eta^2_p = .02$. See Figure 1. In analyzing this interaction, we found that scores for the Indian sample were more consistent than for Americans. Here, priming had little effect on the Indian sample. Among Americans, culture-consistent priming yielded sunk cost errors under conditions of personal responsibility (H3), as was predicted by the hypothesis. Priming

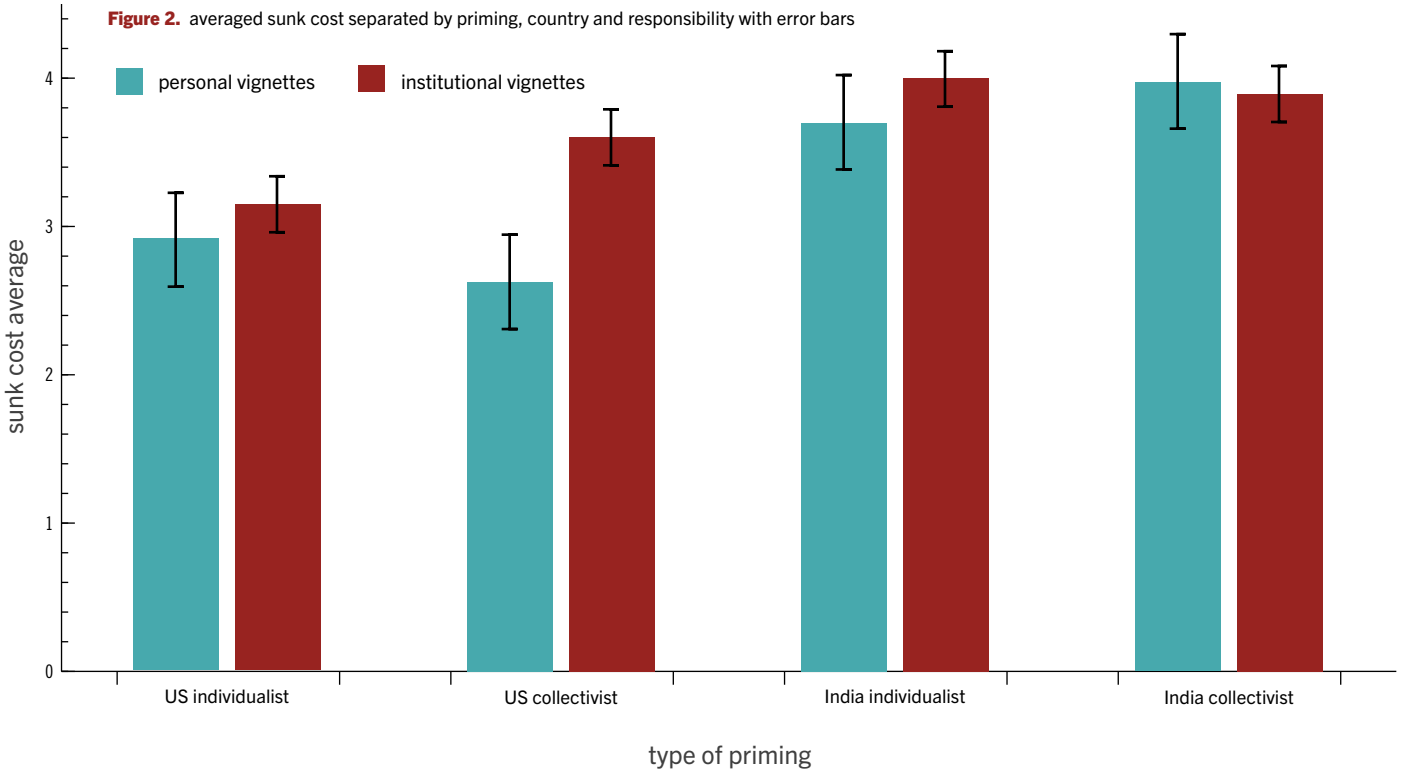

Figure 2. averaged sunk cost separated by priming, country and responsibility with error bars

counter-to-culture for Americans (e.g., priming collectivist thinking) had a greater effect on decision-making by decreasing bias in institutional decisions, making Americans less likely to make sunk cost choices. For Americans, bias was similar in personal responsibility regardless of priming condition.

» DISCUSSION

All participants were more likely to choose alternatives rather than make sunk cost errors, but differences between countries, as well as within each country and within differing types of responsibility were present. There is no particular reason to hypothesize that perceptions of loss (or possible gain) should differ by culture as would be suggested by prospect theory. Nevertheless, this cannot be ruled out. The more straightforward explanation of our results provides support for Geiger et al.'s (1998) hypothesis that individualists would be more likely to make sunk cost choices than collectivists. It may be that individualists make more sunk cost errors because their focus on themselves encourages reaffirming their original decisions. Self-enhancement may be at the core (Kitayama et al., 1997), with greater ego involvement in choices, adversely affecting decision-making. Since self-report does not allow us to know the complete reasoning behind choices, perhaps Americans were more sensitive to minimizing loss as prospect theory suggests, or more attuned to avoiding waste.

Overall, participants from both countries made fewer sunk cost errors when presented with situations involving institutional responsibility. There was an interaction between country of origin and responsibility, such that Americans were more likely to make sunk cost errors in situations with personal responsibility. This interaction is also consistent with the self-justification hypothesis, because it suggests that sunk cost bias might be driven by an internal need to support one's previous decisions, especially for the American sample. Apparently, when decisions are made on behalf of others, previously committed resources play a less influential role relative to others' assessments.

Indians made significantly fewer sunk cost errors, but this could reflect more interest in innovative environmental technologies. Priming had less demonstrable effect on their thinking. In reflecting on these outcomes, one might infer that Indians were more comfortable with change. While this may be accurate, Hofstede (1983) studied the related concept of uncertainty tolerance, defined as a society's ability to deal with uncertainty and unstructured, ambiguous situations. In his 50-country comparison study Hofstede found that India and the United States were very comparable, with both accepting a moderate level of uncertainty in decision-making. Our data supports Geiger and associates' (1998) theorizing and our hypotheses.

Only modest support was found for our hypothesis that culture-consistent priming would enhance these effects. Priming consistent with culture did enhance Americans' bias in situations of personal responsibility. The three-way priming interaction suggested Americans were susceptible to thinking more collectively *only* when making institutional decisions when primed counter to culture. For Indians, the priming might not have been very effective because the Indian sample experienced trouble comprehending the pronouns. However, this did not seem to be an issue because all included participants rapidly and correctly identified pronouns. As an additional test, we also compared an elite sample of only top performers (based on speed and complete pronoun accuracy) in this sample and still failed to get a priming main effect (H_2). It is interesting that priming counter-to-culture appeared to increase Americans' awareness of others with institutional responsibility while Indians showed little differential response to the priming manipulation. Inconsistent priming in Americans with personal responsibility yielded outcomes statistically similar to consistent priming.

We were interested in trying to identify factors that might have influenced our outcomes in this first study. In Study 2, because of possible preference for green solutions more evident in Indians' decision making, we created vignettes where sunk cost bias could be examined apart from green or innovative technologies. In reflecting on our findings we recognized that choosing novelty and innovation over tradition is often confounded in sunk cost studies and this change represented that awareness. Recognizing that country of residence is a weak proxy for culture, it seems likely that some variation might be attributable to different self-views. While self-view is influenced by culture and daily experiences, it also affects how we interpret, conceptualize, and respond to problems and make decisions.

Construction of the self

How we think about our self begins quite early. By or before two years of age, the majority of American and Canadian children recognize themselves in a mirror (Broesch, Callaghan, Henrich, Murphy, & Rochat, 2010). In contrast, there were few spontaneous self-orienting behaviors in non-western children. Nevertheless, children begin to distinguish themselves from others in early childhood in ways that depend on cultural opportunities. It is unlikely these early differences disappear in adulthood.

Depending on your experience growing up, Kitayama et al. (1997) provided evidence that the self is construed as an "interdependent and mutually connected entity" in collectivist cultures and an "independent and autonomous entity" in individualist cultures. Research suggests collectivists are more self-critical, being more likely to accept the accuracy of negative feedback and less likely to rationalize that information (Kitayama et al., 1997; Heine & Lehman, 1997). Self-criticism can help identify shortcomings, in order to ameliorate deficiencies and better fit into cultural standards of appropriateness (Heine & Lehman, 1997; Kitayama et al., 1997). The effects of self-criticism should apply equally to personal decisions and institutional decisions because decision makers want to meet the high expectations of their family and business partners. Individualists, on the other hand, may justify suboptimal choices to maintain self-esteem (Kitayama et al., 1997), especially with more personal, ego-involving decisions.

When considering how self-concept might influence willingness to escalate commitment Sivanathan, Molden, Galinsky, and Ku (2008) suggests that self-affirmation could both increase and reduce escalation. Individuals show decreased escalation of commitment when self-esteem reaffirmations offered an alternative route to cope with failed decisions. On the contrary, when self-affirmation highlighted how one's abilities lead to the unsuccessful decision,

participants escalated commitment (Sivanathan et al., 2008). Living in a collectivist society may generate comfort in their peers' support and create feelings of general worthiness, which decrease susceptibility to sunk cost bias. However, regardless of one's cultural heritage, any given individual may or may not fully embrace prominent cultural values. Individuals may differentially value taking care of others or making an independent contribution or consider both of these orientations equally worthy. Originally suggested by Markus and Kitayama (1991), self-construal may capture and explain the effects of culture on a variety of behaviors. One's self image is conceptualized as encompassing how one thinks, feels, and acts in relation to others and oneself, as distinct from others (Singelis, 1994). Those who value interdependence are focused on fostering harmony with others and meeting their expectations. Those who highly embrace independence are governed more by their internal thoughts and feelings, with personal expression valued. Interdependence and independence are orthogonal (Singelis, 1994). While these characteristics may coexist in any individual person, self-construal focuses more on relative strength and influence. How people construe the self, in relation to others, could influence how we think about decisions, providing an explanation for differences between cultural groups.

How much control we perceive we have over our choices may also influence decision making, apart from designations of authority or responsibility. One construct that might differentiate choices we make is perceived behavioral control, which provides an estimate of ease or difficulty in accomplishing a behavior (Azjen & Madden, 1986). This involves beliefs about controllability and efficacy of behavior, although Terry and O'Leary (1995) suggest it is more about perception of external constraints. Cheng, Cheung, Chio, and Chan (2013) did a meta-analysis of 152 independent samples, representing adults from across the world. Lower sense of control was related to anxiety and depression, especially in individualist societies. They noted that less control does not have the same (negative) value across culture, but beliefs about control do influence thinking (Cheung et al., 2013), which may, in turn, influence whether or not sunk cost errors occurred.

In Study 2 we expected to replicate the previously identified country and responsibility effects (H1, H3). Additionally, we hypothesized that self-construal would influence likelihood of cognitive bias (H4). We also hypothesized that perceived behavior control would influence decision-making (H5).

» STUDY 2 METHOD

As in Study 1, environmentally-focused vignettes were created to measure decision making. Themes of environmental sustainability and use were separately represented, and there were two levels of responsibility (personal, institution) for all vignettes; the purpose was to extend previous results, predicting sunk cost error.

Sample

The sample consisted of 94 English-fluent university students from India (male M_{age} = 19.9; SD = 1.7; female M_{age} = 19.6; SD = 1.5) and 144 undergraduate college students (male M_{age} = 19.8; SD = 1.5; female M_{age} = 19.7; SD = 1.4) from the U.S. who agreed to voluntarily participate in the study. This included 40 Indian females and 80 American females. In order to ensure that the stimuli were fully comprehended, only participants who were fluent in English were included in the analysis. We excluded participants who scored less than 3 on the linguistic fluency item. Prior to applying this criteria, the original sample consisted of 103 participants from India and 159 subjects from the United States.

Materials and measures

English language skills. Participants provided information about their spoken languages, preferred language, and fluency with language. A 5-point Likert scale item was used to self-report fluency and comfort with English. Only participants who indicated they were comfortable and proficient with English were included in our analyses.

Sunk cost vignettes. We created four new vignettes containing information about environmental practices, which we labeled donor, carbon, recycle2, and water. To control for theme and particular content, vignettes were written such that the optimal decisions (i.e., no sunk cost error) required, in some cases, environmental sustainability choices or in other cases, environmentally unfriendly choices. In the former, optimal decisions were associated with pro-environment themes (e.g., minimal carbon footprint policy, donation to green NGO) while the environmental use vignettes were optimized by choices that required deciding not to use impractical and expensive "environmentally-friendly" options (e.g., costly recycling; unreliable rainwater collection system).

As in Study 1, we used two versions of each vignette. In the first version, the participant had to make a decision for just him or herself, thus engaging in personal responsibility. In the first version, the decision was made on behalf of a group, thereby engaging in institutional responsibility. Rather than the open-ended response used in Study 1, all participants were given only two choices, either to continue making their investment or to withdraw from that practice and engage in an alternative. Here, optimal choices were coded as 0 and sunk cost errors were coded as 1.

Self-construal (SC). Singelis (1994) characterized self-construal as an individual's self -representation, captured with two separate subscales measuring interdependence and independence. Interdependence was assessed through response to items such as "I will sacrifice my self-interest for the group I am in," while independence was measured with items such as "I enjoy being unique and different from others in many respects." Each subscale consists of 12 items, which participants responded to using a 7-point Likert scale from strongly agree to strongly disagree. See Cross, Hardin and Gercek-Swing (2011) for a recent review of this much-used measure.

Table 2. sunk cost error and percent listed by vignette theme for study 2

	donor		carbon		recycle 2		water	
	count	percent	count	percent	count	percent	count	percent
India female	11	31	17	47	31	89	20	57
India male	18	40	12	27	37	82	19	42
U.S. female	54	68	38	48	59	74	37	46
U.S. male	38	61	24	39	43	69	28	44

Table 3. logistic regression predicting sunk cost error on the donation to green practice (conservation).

variable	*B*	*SE*	*p*	odds ratio
country	1.28	0.32	0.00	3.59
responsibility	0.21	0.31	0.01	2.30
PBC	–0.05	0.04	0.19	0.96
SC-interdependence	–0.01	0.02	0.58	0.99
SC-independence	0.00	0.02	0.80	1.00
constant	–0.75	1.49	0.61	0.47

adjusted $R^2 = 0.144$

Perceived behavioral control (PBC). This 10-item measure was created by Kraft, Rise, Sutton and Roysamb (2005) and modeled after Azjen and Madden's (1986) estimate of perceptions about personal control and efficacy in accomplishing targeted environmental behaviors. This is an example item: "I am in full control of my actions to protect the environment." See Appendix D for this ten-item measure.

» PROCEDURE

After providing informed consent and responding to demographic questions in our online survey format, participants were presented with a series of four randomly presented vignettes. Since differential level of responsibility might affect propensity to sunk costs, the study was balanced such that each participant responded to two institutional and two personal vignettes as in Study 1. Similarly, each participant responded to two environment-conservation themes and two environmental-use themes. After providing their response to the vignettes, participants responded to the SC measure, and the PBC. All responses were collected online with Qualtrics software.

» RESULTS

Sunk cost errors were generally higher in Study 2 relative to Study 1, ranging from as low as 27% (Indian men) to as high as 89% (Indian women) when looking at each vignette separately (see Table 2 for numbers and percentage of error by vignette). In conducting a 2×2 (country × response) Pearson chi-square analysis, "Recycle 2" yielded $\chi^2_1 = 4.95$, $p = .03$ and "Donor" yielded a $\chi^2_1 = 17.46$, $p < .001$, indicating that rate of error systematically differed between respondents from India and the United States. Error rates were higher for U. S. participants on these two vignettes. Neither "Carbon" nor "Water" yielded significant differences in this basic analysis. In general it appeared that situations, which required respondents to make decisions that ran counter to environmental protection, elicited more error from Indians relative to Indians' decisions on vignettes that were more consistent with environmental protection. To try to capture these complexities, we compared the American and Indian participants on PBC, Self-Construal, and demographics and gender or country differences were found, indicating these groups were equivalent on these measures.

Table 4. logistic regression predicting sunk cost error on the carbon footprint (conservation).

variable	*B*	*SE*	*p*	odds ratio
country	0.52	0.32	0.09	1.68
responsibility	0.02	0.30	0.96	1.02
PBC	–0.10	0.04	0.01	0.91
SC-interdependence	0.01	0.02	0.54	1.01
SC-independence	0.02	0.02	0.33	1.02
constant	–0.10	1.47	0.95	0.91

adjusted $R^2 = 0.076$

After assessing for multicollinearity and confirming that our measures were independent, logistic regression was conducted to assess whether country of origin, vignette responsibility type, PBC, SC interdependence and SC independence significantly predicted whether or not a participant made a sunk cost error. When all five predictor variables were considered together, they significantly predicted whether or not a participant made a sunk cost error. We found these results for all four environmental vignettes. Because our dependent variable of sunk cost error was dichotomous and particular environmental content influenced judgment, each will be presented separately.

Environmental conservation-oriented stimuli. When optimal decisions were oriented towards conservation, 114 participants committed the sunk cost error on 'donor' while 91 did not. Using all five predictors, the omnibus test of the model was significant, $\chi^2_5 = 23.30$, $p < .001$, $N = 205$. Nagelkerke's R^2 estimated variance accounted for 14%. Of the 114 participants who did commit the sunk cost error, 81% were predicted correctly with this model but only 51% of the 91 participants who did not commit the error were correctly predicted. Thus overall, the model correctly predicts 67% of the participants.

U. S. participants had a 3.6 to 1 increase in the odds of committing a sunk cost error. Also, the odds of making an error were 2.3 times larger with personal responsibility, as opposed to institutional responsibility. That is, Americans were more likely to commit sunk cost bias and errors were more likely when participants made decisions for themselves as compared to when they made decisions on behalf of a group or organization.

The carbon footprint vignette was also written such that the optimal solution involved a pro-sustainability choice. The model significantly predicted error, $\chi^2_5 = 11.79$, $p = .038$, $n = 205$, although only 8% of the variance was explained. Perceived behavioral control independently contributed to this model although there was a trend for Americans to make more sunk cost error, $B = .52$, $p = .10$.

One hundred twenty three participants did not commit sunk cost error while 82 did. Thus, if we were to consider participants who did not commit sunk cost error for this vignette, we would be correct 84% of the time. For the 82 that did commit sunk cost bias, only 29% were correctly predicted. Overall, the model correctly predicted choices in 62% participants.

Environmental use stimuli. With optimal decision making more oriented to using resources, errors on the recycle vignette were predicted by country and perceived behavioral control, $\chi^2_5 = 28.79$, $p < .001$, $N = 205$.

This model was effective at predicting sunk cost error in 96% of cases but substantially worse at predicting who would not make this error (25%). Overall, this model accounted for 20% of the variance. The odds ratio of Country suggests that the odds of

making an error had roughly a 3:1 ratio for Indians. That is, with this environmental-use themed content, Indians were more likely to make sunk cost errors by choosing the greener but less optimal choice. The odds ratio of PBC is significant and indicates that for each point increase in perceived behavioral control, a subject has 87% of the odds of making a sunk cost bias. This suggests that being Indian and having less behavioral control contributes to a greater chance of making a sunk cost error.

In 'water', the second decision making situation that required an environmental use choice in order to avoid error, the omnibus test of the model was also significant, $\chi^2_5 = 10.99$, $p = .05$, $N = 205$. The model only accounted for 7% of the variance. Here, only perceived control separately predicted error. Once again, less perceived behavioral control was predictive of greater likelihood of sunk cost error. Country was not a separate predictor of bias.

For this vignette, 110 participants made the logically correct choice whereas 95 made an error. Of the 110 that did not commit a sunk cost error, 68.2% were correctly predicted while only 42.1% of those who made errors were correctly predicted by this model. Overall, the model correctly predicted 56% of the errors made by the participants.

» DISCUSSION

Our respondents were strongly influenced by the described situations. Country of origin was not a consistent predictor of error, although Indians generally showed less cognitive bias, when choices were supportive of environmental sustainability. On decisions which required making choices that might seem environmentally unfriendly (recycle 2, water), people who perceived they had less behavioral control were more susceptible to cognitive bias. Perhaps, less perceived control elicited a greater need to be green or make a more socially acceptable choice in spite of contra-indicating factors. People who felt they had more control did not fall into this trap.

With the more typically framed situations, where avoiding sunk costs involve more environmentally friendly outcomes, American respondents were more vulnerable to error. Perceived responsibility was important in green choices, but not salient with regards to monetary donations. It appears that environmentally-themed circumstances influenced choices although some vignettes were easier to separate out ineffective previous costs relative to new circumstances. In particular, all groups found the impractical and expensive recycling system sufficiently attractive to reinvest in it, in spite of the fact that it was not economically or functionally viable. Participants, especially Indians, were more susceptible to error with this ineffectual recycling venture, perhaps reflecting different environmental experiences, stronger interest in making a sustainability choice, and/or less concern about inefficiency and cost. Desire to be ecologically appropriate may interfere with optimizing decision making, at least in young adult samples.

» OVERALL DISCUSSION

Likelihood of making sunk cost error is affected by many environmental circumstances. Values associated with culture play a role but our data indicate particular situations are sometimes more important. Country of origin contributed to explaining cognitive bias as did perceived behavioral control. Sunk cost choices were more likely in individual situations and less likely when making a decision on behalf of others, especially for Americans. However, these relationships were small, explaining little of the variability in people's decision making.

Table 5. logistic regression predicting sunk cost error on the recycle 2

variable	*B*	*SE*	*p*	odds ratio
country	1.04	0.43	0.015	2.84
responsibility	0.40	0.36	0.27	1.48
PBC	–0.17	0.04	0.00	0.87
SC-interdependence	–0.02	0.02	0.33	0.98
SC-independence	–0.01	0.02	0.59	0.99
constant	3.09	1.77	0.08	22.02

adjusted $R^2 = 0.196$

As initially theorized by Geiger et al. (1998) and reported by Kitayama et al. (1997) Americans were more susceptible to sunk cost bias in six different environmental decisions. The two environmental- use vignettes failed to find this relationship; both vignettes commanded high error rates from all groups. Indians were equally likely to make a sunk cost error on recycling, where cost and quality were not fully considered and previous choices were reified. We do not have a way to determine how much this error reflects environmental experiences. The water vignette also yielded a high overall error rate (47%) that country of residence did not discriminate. Perhaps circumstances concerning water use generate enough concern for both the peoples living in the southwestern United States and India, who share environmental concerns regarding drought and water scarcity. People may be willing to grasp at straws to avoid further loss. As prospect theory suggests, loss of a scarce resource may promote less considered reasoning, especially when respondents perceive they have little control.

Based on Study 1 where sunk cost errors differed by country of origin, we hypothesized that self-construal would partially explain differences in error rates. Particularly we expected that high levels of individualism without the moderating influence of high levels of interdependence would be related to greater likelihood of cognitive bias. As reported, it did not independently contribute to predicting sunk cost error. While the construct of self-construal continues to be considered highly relevant to understanding cultural differences (Cross, Hardin & Gercek-Swing, 2011; Dean & Gardner, 2014), Levine et al.'s (2003) review and analyses raise concerns about the reliability of this construct. Even though self-construal was

Table 6. logistic regression predicting sunk cost error on the water

variable	*B*	*SE*	*p*	odds ratio
country	1.14	0.31	0.65	2.15
responsibility	0.21	0.29	0.47	1.23
PBC	–0.10	0.03	0.00	0.91
SC-interdependence	–0.01	0.02	0.50	0.99
SC-independence	–0.00	0.02	0.79	1.00
constant	2.96	1.45	0.04	19.18

adjusted $R^2 = 0.070$

not individually effective in predicting sunk cost bias, it is interesting that when Americans were primed counter- to-culture (in ways that highlighted others), they thought more carefully when representing others. This increased awareness of others appeared to decrease their cognitive bias. This evidence does indirectly support the notion that self-view influences Americans' decisions and perhaps contributes to sunk cost error.

Perceptions of control were predictive of choices in both studies. In Study 1, when people made decisions on behalf of the group, fewer errors occurred. In Study 2, the institutional focus was more neutral and less personally involving than the vignettes in Study 1. This manipulation had less effect but the individual-level self-report of perceived behavioral control did predict responses in three of the four vignettes. People with a stronger sense of control of their behavior were less susceptible to making sunk cost errors. The sole vignette (donor) that was not affected by PBC involved a monetary donation that may have been less effective because the finances were hypothetical and the action more passive. It is interesting that personal and institutional responsibility was an effective predictor in Study 1, but not in any other vignette in Study 2 where PBC was significant. Whether we manipulate control or we measure people's behavioral intent, both of these efforts capture perceptions of control. Our findings from Study 2 suggest that perceived behavioral control is the more relevant construct (in contrast to manipulated personal and institutional responsibility). Not surprisingly, personal intent with regards to choices is more salient than responsibility, at least as manipulated in our vignette scenarios.

It is important to recognize beliefs and attitudes impact the assumptions that influence our choices, and these are influenced to some extent by culturally-influenced experiences. While we may ostensibly value careful reasoning, Americans and perhaps individualists more generally, may be unduly influenced by our need to protect both the self and previous choices, as self-justification theory suggests. Nevertheless, self-construal did not separately capture the group differences we found, although the priming interaction, which decreased American sunk cost error, does provide indirect support for self-focus contributing to cognitive bias.

Most of our effects accounted for little of the total variance. This may be partly due to our focus on environmental themes. While an environmental focus may be universally applicable, it may also decrease individual sense of responsibility and control to a greater extent than other issues. Because of the nature of environmental problems and the relatively small impact that one individual can have, even when acting on behalf of an entire corporation, one's choices may seem small when compared to the global scale of the issue. The diminished effectiveness of one person may have led to de-individuation effects that opposed the effects of responsibility to the self and to others. However, it is interesting that personal control mattered in predicting cognitive bias, in the different approaches of control used in Study 1 and Study 2.

Cultural equivalence is another concern, as is our exclusive use of English. Our sample was relatively young, and either engaged in their college years or slightly older; more heterogeneity in age would have likely increased response variability with people having more varied life experiences.

Given the identified cultural differences in sunk cost bias, our results suggest that different strategies for training and persuasion could be effectively used to educate, garner support for policy, or promote better decision making. It may also be the case that Indians are more comfortable and accustomed to change, and hence are more insulated from making the error of continuing to pour resources into an unsuccessful venture because of past investment. If Americans and those who are high in independence initially 'buy in' and do so without accountability to others, they may feel increased commitment to continued investment in further related decision making. Continuing investments following sunk costs may reflect living with past decisions, however suboptimal, because one is ultimately on one's own in individualist cultures. For individualists, caution is required; there is no safety net (Weber & Hsee, 1998). Reminding individualists of their responsibility to others may generate a more thoughtful analysis. When aware that others will make separate assessments of one's choices, individualists may apply more effortful strategies that involve more integrative and critical thinking. People with more interdependent values may be less likely to commit additional resources to failing ventures, at least when perceptions of risk are similar. Encouraging people to recognize their responsibility and agentic role also should improve decision making, since having a stronger sense of control was related to better choices.

Since we compared participants with two countries exuding high verticality, perhaps that dimension requires more scrutiny. Keil et al. (2000) also makes a convincing case for the role of uncertainty avoidance and suggests that group factors such as cohesion may interact with individual factors.

Altogether, this research points to factors that affect sunk cost choices. At least with sustainability situations, Indians made fewer sunk cost choices and Americans were more susceptible to errors, especially when making personal decisions. Likelihood of sunk cost error was greater for all respondents where optimal decisions involved leaving behind events previously considered environmentally innovative or effective. Interest in technology or innovation, environmental concern, and social desirability may also contribute.

With increasing communication and interaction between different cultures, it is important to know how different values can affect our reasoning and decisions. More research on cognition and common errors in thinking will improve our understanding of differences and promote better methods of working together. This seems particularly important with the current rate of globalization and recent increases in informational exchange that frequently function under different assumptions, modes of operation, and internal theories of appropriate behavior. ■

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APPENDIX A

» CULTURE PRIMING WITH CULTURE-CONGRUENT & INCONGRUENT PRONOUNS*

Instructions. In this task, you will be presented with a matrix of words. The task is to select the pronouns (e.g., we, us) as quickly and accurately as possible by clicking once on the word. Your time to completion will be recorded.

Tree wildlife soil desert ecology ***mine/we*** forest reserve glacier

Snow rock tiger koppe ***me/us*** mist crust cactus ***my/our***

Me/us tundra earth swamp typhoon cyclone ***I/we*** oil dust

Air ice ***myself/ourselves*** water crops core dam mineral rain

Park ***mine/we*** plains ***I/ours*** grass weather hawk resource crater

Cloud bear acidity stream river valley ***mine/ours*** power sand

Myself/we lake habitat crystal lava bee vapor volcano force

Cycle fern ocean fog ***me/we*** drought carbon ***mine/our*** drizzle

Sea nature terrain erosion ***me/us*** energy flood ***I/we*** climate

*Either individualist (I, me, my) OR collectivist (us, our, we) pronouns were displayed in regular non-boldfaced font.

APPENDIX B

» SUNK COST VIGNETTES* FOR STUDY 1

Please read and select the option that best fits your perspective. You may describe your thoughts in the alternative response box.

Coal energy

The government has been pressuring Alero International to make business practices more environmentally conservative. Two years ago ***you as Chief Financial Officer/The Board of Alero*** decided to refurbish its coal burning machines at significant cost. The equipment is under an extended warranty for another eight years. In addition, four years remain on the contract with Alero's coal supplier.

A new system of machines has been introduced on the market using hydropower, which is said to be more cost effective. If Alero changes to these new machines, factory emissions would be reduced by 40% and production and labor cost might decrease as much as 15%. However, the initial cost of these machines is substantial and would require extensive retraining of staff. Although a small portion of these costs would be offset by government tax rebates, installation would result in revenue loss due to construction and employee training. In addition, contract buyouts are unpredictable, but could be costly. If this equipment update should somehow fail, Alero might not survive. On the other hand, success would bring much-needed positive attention to ***you as their manager/Alero***. Should ***you/Alero*** stick with the coal burning equipment or change to the hydro-powered machines?

A) Stay with coal machines

B) Move to hydro-power machines

C) Alternative (explain)

Green growth

Green Growth, Inc. openly advertises their commitment to green policies and products. In your role as ***chief financial officer/newly hired associate***, you/your company are/is contemplating buying a new car/fleet of cars to send an important message about you and Green Growth's commitment to sustainability.

You/your company currently ***manage/owns*** a four door sedan/fleet of sedans purchased three years ago that will be paid off in full next year. The new hybrid car/fleet you were considering will potentially decrease gas cost substantially and will help promote Green Growth's core values. Trading in your current ***fleet/car*** will only cover 20% of the cost of the new ***fleet/car*** and will require you/your company to agree to a 60 month financing plan. This substantial cost will not allow you to invest in resources as you had planned. However, practicing what you preach builds credibility. Do you buy the new hybrid ***fleet/car*** or stick with the current transportation?

A) Stay with older transportation

B) Go with the hybrid

C) Alternative (explain)

Recycle

Support and costs for recycling in your city have risen steadily in the last three years. ***As a city manager you must/Your city has decided to allow residents to*** choose between continuing to use the same recycling group that has been in charge for the past 10 years, or to try a new system that advertises 33% lower monthly fees and reports use of more categories in sorting and better revenue from sold, recycled byproducts.

In reality, the old system worked fairly well and sorting was easy. The new system would require learning new sorting techniques. Additionally, ***the city/you*** would have to purchase new and more containers and this cost would be substantial. The new company guarantees the ***city contract/your monthly rate*** will be locked in for five years if the ***city/you*** decides to go with them. Do you stay with the old company or try out the new company?

A) Stick with the old company

B) Switch to the new company

C) Alternative (explain)

*Respondents saw either the institutional responsibility or the personal responsibility versions of these vignettes.

APPENDIX C

» PERSONAL AND INSTITUTIONAL SUNK COST VIGNETTES FOR STUDY 2

Environmental use

Please make a decision for the following problem: You have built an environmentally friendly home. The green materials and construction techniques increased the cost of your home by one third. Two months after moving in, a large storm ruined your environmentally friendly irrigation system using rainwater collection and solar energy. Should you rebuild the environmentally friendly system despite the high risk of a future storm damaging it, or should you opt for a standard irrigation system less sensitive to damage?

OR. Your company has built an environmentally friendly facility. The green materials and construction techniques increased the cost of your facility by one third. Two months after moving in, a large storm ruined your environmentally friendly irrigation system using rainwater collection and solar energy. Should your company rebuild the environmentally friendly system despite the high risk of a future storm damaging it, or should your company opt for a standard irrigation system less sensitive to damage?

A) Rebuild the environmentally friendly system despite the high risk of a future storm damaging it

B) Opt for a standard irrigation system less sensitive to damage

Please make a decision for the following problem. For five years you have been using an expensive service to recycle paper and plastic waste at a substantial cost each year. Because of your sustainable behavior, you have received several sustainability awards from your county. After relocating to a new city with fewer recycling initiatives, you could only find a recycling contractor of uncertain reputation that would charge you 100% more per year than the previous provider. Should you use the recycling service despite the cost increase or should you dispose of paper and plastic in the trash?

OR For five years, your company has been using an expensive service to recycle paper and plastic waste at a substantial cost each year. Because of your sustainable behavior, your company has received several awards from your local industry association. After relocating to a new city with fewer recycling initiatives, your company could only find a recycling contractor of uncertain reputation that would charge your company 100% more per year than the previous provider. Should your company use the recycling service despite the cost increase or should your company dispose of paper and plastic in the trash?

A) Use the recycling services despite the cost increase

B) Dispose of paper and plastic in the trash

Environmental conservation

Please make a decision for the following problem. You have decided to donate your supplemental pay this year to an NGO (Non-Governmental Organization) dedicated to the protection of the environment and global warming research. Before you complete the donation, your bank calls you to notify that, for the past five years, your account was subject to fraudulent charges adding up to more than your supplemental pay, which you had not noticed. Should you donate the money or not donate it and reconsider pledging next year?

OR: Your company has decided to donate the equivalent to all employees' supplemental pay to an NGO (Non-Governmental Organization) dedicated to the protection of the environment and global warming research. Before your company completes the donation, the bank calls to notify your company that, for the past five years, your company's account was subject to small fraudulent charges adding up to more than the annual supplemental pay, which your company had not noticed. Should your company donate the money or not donate it and reconsider pledging next year?

A) Donate the pledged amount

B) Not donate and reconsider pledging next year

Please make a decision for the following problem. You were planning on upgrading your car with a hybrid vehicle, paying an additional 40% to reduce your carbon footprint. A few days before completing the purchase, you learned that an investment had failed and you lost a similar amount of money. Should you buy the hybrid car or a gasoline car?

OR Your company was planning on upgrading its fleet of five cars with hybrid vehicles, paying an additional 40% (per car) to reduce your company's carbon footprint. A few days before completing the purchase, your company learned that an investment had failed and your company lost a similar amount of money. Should your company buy the hybrid cars or a fleet of gasoline cars?

A) Buy the hybrid car(s)

B) Buy the gasoline car(s)

APPENDIX D

» GREEN PERCEIVED BEHAVIORAL CONTROL (PBC)

Please click on the response that best reflects your perspective. (Response format was scaled on a 4-point Likert scale, ranging from 1: not at all true to 4: exactly true.)

1. I find it easy to be friendly with the environment.

2. I find it difficult to preserve resources and recycle. (R)

3. I am confident that I can protect the environment.

4. I can control my involvement in environmental preservation initiatives.

5. I am fully capable of protecting the environment.

6. Thanks to my resourcefulness, I always find a way to be friendly with the environment.

7. I am in full control of my actions to protect the environment.

8. I am good at leading a green lifestyle.

9. It is not easy for me to stick to my sustainability goals and preserve the environment. (R)

10. Being friendly with the environment is out of my hands. (R)