

Malleable Memories:
The Role of Mindsets in Reconstructing History

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Consumers hold companies culpable for negative events—especially when they are perceived as recent—with far-reaching implications. We develop a model for reconstruction of such past events in memory, where such perceptions of temporal distance and culpability are affected by construal mindsets (i.e., thinking abstractly vs. concretely). Prior knowledge is a critical moderator of these relationships. Through four studies involving real events, we show that while consumers with *less* prior knowledge about a negative event feel greater temporal distance from it and find parties more culpable when recalling it in an *abstract* (vs. concrete) mindset, those with *greater prior knowledge* feel greater temporal distance and find parties more culpable when recalling it in a *concrete* (vs. abstract) mindset. We demonstrate that this reversal of the traditional relationship between construal level and distance is due to the underlying structure of information in memory, partially mediated by retrieval effort. Our research has implications for the literature on memory and temporal judgments, as well as for managing public relations for companies that suffer from negative publicity.

Keywords: Temporal distance, Memory, Mindsets, Attributions, Prior knowledge

*Time is of your own making;
Its clock ticks in your head.
The moment you stop thought
Time too stops dead.*

- Angelus Silesius, German mystic and poet

At what point did the financial markets collapse? How long ago were those salmonella-tainted peanuts recalled? Given the media's obsession with scandal, consumers are bombarded daily with tales of corporate and individual bad behavior. Perceived temporal distance from these events can, in turn, affect other important judgments such as culpability (e.g., How responsible is the Obama administration for the current crisis?) or consumption (e.g., When is it safe for me to start eating peanuts again?). Yet while an important array of consumer decisions is associated with temporal judgments, these judgments are frequently malleable and imprecise as human memory is prone to reinterpretation or invention (see Schacter 1999 for a review). Given that upwards of \$7 billion a year is spent on public relations worldwide with the express purpose of shaping public perception—the Bush administration alone spent some \$1.6 billion on such efforts over 30 months (Klein 2006)—our research investigates factors affecting how memories for past events are reconstructed, influencing perceptions of temporal distance and culpability.

If perceptions of time, as Silesius postulates, are of our “own making,” then an important factor can influence the reconstructive process: consumer mindset. A mindset is a “mental attitude or disposition that predetermines a person's responses to and interpretations of situations” (American Heritage Dictionary). A particular mindset at the time of recall can influence the type of information made accessible and the manner in which it is interpreted. Our work focuses on this unexplored factor—more specifically, the effect of concrete versus abstract construal mindsets on how past events are reconstructed from memory.

Construal Level Theory (CLT) illustrates that with greater temporal distance into the future or from the past, events are represented more by high-level, schematically abstract

features that convey the gist of an event than by low-level, concrete incidental details (Trope and Liberman, 2003). This relationship extends to other dimensions of psychological distance—spatial, social, and hypothetical (see Liberman and Trope 2008 for review)—and influences consumer judgments (Castaño et al. 2008; Cheema and Patrick 2008; Malkoc and Zauberan 2006). There is also a reciprocal relationship between construal level and temporal distance when looking into the *future* (Liberman et al. 2007). But, previous work has not examined how construal mindsets can influence perceptions of temporal distance when looking into the *past*.

One reasonable hypothesis is that an event recalled in an abstract mindset—versus a concrete one—will feel more temporally distant. Concrete details tend to fade more quickly than abstractions in memory, and events in the distant past tend to be represented more abstractly than those in the recent past (Wyer and Srull 1986). Thus, bringing concrete details of an event to mind in a concrete mindset can lead to the assumption it occurred more recently.

However, the relationship between construal level and temporal distance is not as straightforward when looking to the past. People who know more about a topic tend to hold more information in memory in a more finely-defined hierarchical structure and more abstract format (Alba and Hutchinson 1987; Chase and Ericsson 1981). At the same time, the phenomenological experience of recall can influence temporal judgments (Brown and Schopflocher 1998). We predict the phenomenological experience of recall will differ under a concrete versus abstract mindset and depending on prior knowledge. In the context of memory, we propose and find that prior knowledge moderates the relationship between construal mindset and temporal distance. For those with less prior knowledge about an event, an abstract mindset can make an event seem more distant than near. But the reverse is the case for those with greater prior knowledge about an event—an abstract mindset can actually make an event seem more near rather than distant..

Through a series of four studies involving real news events that posed serious public relations problems for companies, individuals, or institutions—the Dell laptop battery recall, the Dole spinach recall, Heath Ledger’s drug overdose, and the New Orleans evacuation for Hurricane Katrina—we investigate this interaction between construal mindset and prior knowledge. We find that construal mindsets can have opposite effects not only on perceptions of temporal distance depending on prior knowledge (studies 1-4), but also on judgments of culpability (studies 2-4), purchase intent (study 3), and victim compensation (study 4). We delineate a potential mechanism driving this effect: effort required to retrieve the information from memory (study 3). Thus, while PR managers can change how past events are reconstructed in memory and affect judgments of temporal distance and blame, they must consider the knowledge base of those individuals whose opinions they most want—or need—to influence.

CONSTRUAL MINDSETS, TEMPORAL DISTANCE AND CULPABILITY

Temporal information is challenging to encode and retrieve, making temporal judgments—objective and subjective—particularly vulnerable to distortion. Backward telescoping effects (i.e., when more recent events seem more distant) and forward telescoping effects (i.e., when more distant events seem more recent) are quite common with temporal judgments (see Morwitz 1997 for a review). After a few months, memory for specific dates becomes undifferentiated and people often remember core details of an event, like what happened, but misremember peripheral details, like when it occurred (Thompson et al. 1996). Compared to purely visual or auditory information, temporal information for events is associative in nature, requiring significant attention and effort and multiple brain regions at both encoding and recall (Davachi, Mitchell, and Wagner 2003; Hayes et al. 2004).

These cognitive constraints are the reason temporal judgments are primarily reconstructed using two types of information. One is information *about* the target event (e.g. When I met my mom for lunch, I was wearing my favorite red sweater and had a tasty bowl of soup). The other is information *outside* the target event used to infer temporal distance (e.g. I usually wear sweaters and eat soup in the winter—that lunch with mom must have been in January; see Friedman 1993). Using information central to the event, events are typically judged as more recent if the information recalled seems more vivid, numerous, or elaborate (Brown, Rips, and Shevell 1985; Hinrichs 1970). Using information outside of the target event, knowledge of temporal patterns—such as seasons, life phases, or proximity to a significant event—is used to infer temporal judgments. More recent research has examined how other information external to the focal event, such as perceived causality between events (Faro, Leclerc, and Hastie 2005) or the number of event markers following a target event, can influence subjective temporal judgments (Zauberman et al. forthcoming).

A natural question that follows, but is unexplored, is how a mindset shapes what information is made accessible at all and how that information might be interpreted. Can construing the same event—whether about tainted peanuts, poisonous toys, celebrity DUIs, or over-inflated Wall Street bonuses—in a concrete versus abstract mindset affect its reconstruction and influence perceptions of temporal distance and culpability?

To answer this question, we turn to previous work describing the relationship between temporal judgments, attributions, and construal level. Increasing temporal distance from an event in memory through the natural passage of time has been shown to result in more dispositional attributions that take circumstantial factors of a situation into account less as these circumstantial details tend to fade with memory (Moore et al. 1979). Explicitly manipulating temporal frame in

the future, work in CLT demonstrates that framing a situation as more distant (in a year) versus near (in a day) results in a greater tendency to make more moral, dispositional attributions and underweight situational constraints (Eyal, Liberman, and Trope 2008; Nussbaum, Trope, and Liberman 2003), consistent with a high-level, abstract representation of the event.

Illustrating the converse association between construal level and temporal distance, describing events in the future in more superordinate terms leads people to conclude they will occur in the more distant future than when describing them in more subordinate terms (Liberman et al. 2007). In the only work other than ours that examines CLT in the context of memory, Semin and Smith (1999) found that cuing recall using more abstract predicates (e.g. adjectives) versus concrete predicates (e.g. verbs) elicited autobiographical instances of social behavior that were temporally dated many months previous to those when using concrete predicates (e.g., instances when one was helpful, honest, or friendly). In other words, construal level through linguistic cues influenced the *objective* temporal distance of memories recalled. They also found an association between greater temporal distance and the propensity to make more attributions towards the self versus others in social situations. Thus, generally speaking, there is an association between abstract construal level, increased objective temporal distance, and propensity to make more dispositional attributions about a target.

In our paper, we are interested in the role of construal level as an underlying mindset, rather than a linguistic frame, in influences *subjective* temporal distance. Can construal mindsets influence when people feel an event occurred in time and the culpability of involved parties? The relationships we examine are depicted in figure 1. First, how do abstract versus concrete construal mindsets influence perceptions of *subjective* temporal distance (path A)? Mindset could affect the type of information made differentially accessible in memory. A concrete

mindset (versus an abstract one) might make details of an event more accessible and lead to the conclusion it occurred more recently given that concrete details of events usually fade over time. Second, are changes in *perceptions* of temporal distance—not only *actual*—also associated with a propensity to make more dispositional attributions of culpable parties? One possibility is that culpability judgments are tied to those of perceptions of temporal distance (path B), as previously illustrated in the literature on attributions. Another is that construal level directly influences judgments of culpability (path C), but previous work has not shown a direct link in the absence of temporal judgments. Or some combination of these two paths could be at work.

– Insert figure 1 about here –

Together, this theorizing suggests that events reconstructed in a more abstract mindset will seem more temporally distant and result in judgments of greater culpability compared to those reconstructed in a more concrete mindset. However, this theorizing makes an important assumption: that there is no effect of prior knowledge variability on the reconstructive process. This is, of course, unlikely for real world events.

THE MODERATING EFFECT OF PRIOR KNOWLEDGE

More than a century ago, Ebbinghaus (1913) pioneered the study of human memory through experimental approaches using nonsense syllables because he assumed that personal knowledge and experience shape how information is structured in human memory. Differential levels of prior knowledge can influence information search (Brucks 1985; Moorman et al. 2004) and evaluation strategies (Park and Lessig 1981; Peracchio and Tybout 1996; Sujan 1985), due to differences in the underlying structure of knowledge depending on how much people know (Alba and Hutchinson 1987; Sujan, Sujan and Bettman 1988). Such differences manifest in the

experience of recall itself and, in turn, influence recency judgments (Brown and Schopflocher 1998; Raghbir and Menon 2004)

Those with greater knowledge in a domain not only have more information in memory, but also store it in a more refined, multi-level hierarchical structure with a greater number of higher level, abstract representations and stronger associations between concepts (Barsalou 1990; Chase and Ericsson 1981). For such more knowledgeable individuals, abstract representations are typically more frequently used, and thus more accessible than the underlying, more specific information upon which the representation was originally based (Wyer and Srull 1986).

Previous work in memory suggests that abstract representations aid the process of recall, particularly for those who know more. Identification of category-instance pairs is faster if the category is presented before the instance (Collins and Loftus 1975) and abstract representations allow for greater flexibility at recall (Hintzman 1986). Experts are able to recall things more quickly when they are part of a hierarchical structure (Ericsson and Kintsch 1995). Work in fuzzy-trace theory illustrates that when making decisions, experts are more likely to rely upon gist-driven, abstract representations than more verbatim, concrete representations and that these abstract representations are easier to manipulate in decision making (Reyna and Lloyd 2006).

Thus if an abstract construal mindset makes abstract concepts of a memory more accessible or leads to reconstruction from a more abstract perspective, people with *greater prior knowledge* may find the process of recall easier under an abstract mindset than a concrete one. They hold information as higher level, abstract representations and—assuming they exist—these abstract representations are easier to manipulate in memory. Thus, events might feel more *near* in an *abstract* mindset. However, because activation spreads through any superordinate connections that exist until some criterion is reached (Collins and Loftus 1975), making concrete

aspects of a memory more accessible through a concrete mindset might lead to a less organized, more effortful search process as attempts are made to connect these lower level concepts at a more abstract level. Thus events might feel more *distant* in a *concrete* mindset.

However, for people with *less prior knowledge* that lack more elaborate knowledge hierarchies, a concrete mindset might make concrete details more easily accessible, particularly if they might otherwise have difficulty remembering the event at all. A *concrete* mindset might aid in making the event feel more *near*. Conversely, an abstract mindset that brings to mind abstract aspects of a memory that were previously non-existent or without more well-established connections to other details might make the process of recall more effortful as these representations are newly constructed. Events might feel more *distant* in an *abstract* mindset.

Because judgments of culpability are linked to those of distance, we propose that prior knowledge serves as a moderator for construal mindsets on perceptions of temporal distance and culpability (i.e. the role of prior knowledge in figure 1).

OVERVIEW OF STUDIES

For several reasons, we test our theory using real news events involving corporations (Dell and Dole), individuals (Heath Ledger) and institutions (federal and local governments). First, by using real events widely covered by the media, we can measure *perceptions* of temporal distance because the actual date of the events is known (versus using autobiographical events specific to individuals). Second, actually manipulating the underlying structure of information in memory in an experimental context would be artificial and a central idea is to examine the role of prior knowledge with some realism. And third, real events provide an externally valid way of testing whether events can be reconstructed in differential ways to influence important judgments

such as culpability, purchase intent, and victim compensation.

We use the following general paradigm for the studies, unless noted. Participants are told they are participating in a series of unrelated studies and are given three studies in the following order: (1) *News Events Study*: They are asked whether or not they have heard of a series of news events and their subjective knowledge about them. Embedded within this series of events is the target event in question. Those that had not heard of the target event were removed from the analysis since they would not have information to reconstruct from memory. (2) *Construal Mindset Manipulation*: Participants complete an ostensibly unrelated study, which is the mindset manipulation. (3) *Target Event Study*: Participants are given a brief description of the target event, in most cases including the exact date to minimize the effect of date guessing on perceptions of temporal distance. They then complete the key dependent measures.

In our studies, we measure subjective knowledge—operationalized in several different ways—rather than objective knowledge. The former is related to people’s perceptions of what they know and is typically more related to decision making strategies while the latter is related to whether what they know is actually accurate (Brucks 1985; Park, Mothersbaugh, and Feick 1994; Sujon 1985). We now describe each of our studies and the specific hypotheses tested.

STUDY 1: BLAZING BATTERIES

We first test our basic theory that construal mindsets have a differential influence on perceptions of temporal distance depending on prior knowledge (path D in figure 1).

Specifically, based on our discussion before, we hypothesize that when recalling an event:

H1a: Individuals with *less* prior knowledge about an event will experience greater perceptions of temporal distance in an *abstract* mindset than a concrete one.

H1b: Individuals with *greater* prior knowledge about an event will experience greater perceptions of temporal distance in a *concrete* mindset than an abstract one.

The target event was the Dell laptop battery recall (August 14, 2006). The batteries had an overheating problem that caused a laptop to catch on fire. While the number of laptops damaged was small, Dell had to recall some 4.1 million batteries at an estimated replacement cost of \$50 each. The study was conducted approximately two months after the event occurred.

Method

Participants and Design. Thirty-eight undergraduates from a northeastern university participated in this paper-and-pencil task for partial course credit. We used a two-factor between-subjects design in which each participant was randomly assigned to a concrete vs. abstract construal mindset and prior knowledge was measured on a continuous scale.

Procedure. Participants completed the “News Events Study” described in the general paradigm indicating whether they had ever heard of the event (Yes/No) and their familiarity with “events surrounding the Dell battery recall” (1 = not at all familiar, 7 = very familiar) as a measure of subjective knowledge (Brucks 1985).

For the construal mindset manipulation, participants completed a slightly modified version of the “How versus Why” manipulation (Freitas, Gollwitzer, and Trope 2004) which previous work has illustrated is effective in creating concrete versus abstract mindsets (Agrawal and Wan forthcoming; Fujita et al. 2006). Participants were asked about the goal to “prevent the battery recall situation,” and those in the abstract mindset condition answered a series of three “why” questions, promoting increasingly high-level thinking, while those in the concrete mindset condition answered a series of three “how” questions, promoting increasingly low-level thinking.

Finally, to measure perceptions of temporal distance, participants were asked “When do you feel the events of the Dell battery recall occurred” (1 = very recently, 7 = not at all recently).

Results

Perceptions of Temporal Distance (Hypothesis 1). We performed a regression on perceptions of temporal distance with construal level (effect coded with abstract = 1 and concrete = -1 for this study and all subsequent studies), familiarity with the event, and the interaction between the two as independent variables. The results revealed a significant interaction ($\beta = -.33$, $t(31) = -2.90$, $p < .01^{1,2}$). For this and all subsequent regression analyses, we follow the procedure outlined by Aiken and West (1991) and advocated by Fitzsimmons (2008), conducting follow-up contrasts using spotlight analyses one standard deviation below and above the mean of subjective knowledge (i.e., “familiarity” for this analysis). At one standard deviation below the mean, participants with less prior knowledge felt greater temporal distance from the event in an abstract (vs concrete) mindset, supporting H1a ($\beta = -.70$, $t(31) = -2.35$, $p < .05$). The reverse was the case at one standard deviation above the mean—those participants with greater prior knowledge felt greater distance from the event in a concrete (vs abstract) mindset, supporting H1b ($\beta = .53$, $t(31) = 1.77$, $p = .09$; this difference is statistically different at $p < .05$ at 1.5 standard deviations above the mean).

– Insert figure 2 about here –

Discussion

The results of study 1 support hypothesis 1 and confirm path A—prior knowledge can serve as a moderator for construal mindsets on perceptions of temporal distance from past events. Those participants with less prior knowledge about the Dell battery recall felt further from it in an abstract mindset—in line with CLT, while those with greater prior knowledge felt

further from it in a concrete mindset—the reverse of what is expected with CLT.

In study 2, we examine whether this relationship also holds for judgments of culpability (path C in figure 1). We also employ a construal manipulation outside of the target event as a cleaner test of how construal mindsets influence memory reconstruction. Writing about materially different types of information in study 1 could have influenced temporal judgments.

STUDY 2: SULLIED SPINACH

As discussed, there is an association between abstract construals, greater temporal distance, and greater propensity to make dispositional attributions more and take mitigating external circumstances into account less. But what happens when construal level and temporal distance are “decoupled,” as for individuals who have greater prior knowledge about an event? One possibility is that temporal distance drives culpability judgments via paths A and B (figure 1): Perceptions of greater temporal distance drive those of greater culpability, regardless of which construal mindset. A second possibility is that construal level drives culpability judgments independent of temporal distance (path C): An abstract mindset drives greater propensity to assign blame regardless of the differential influence construal level has on temporal judgments depending on prior knowledge. Given that previous work has not illustrated a relationship between construal level and attributions independent of temporal distance, we hypothesize that propensity to make judgments of culpability will follow those of temporal distance:

H2a: Individuals with *less* prior knowledge about an event will find blameworthy parties more culpable in an *abstract* mindset than a concrete one.

H2b: Individuals with *greater* prior knowledge about an event will find blameworthy parties more culpable in a *concrete* mindset than an abstract one.

As the target event, we used the Dole organic spinach recall due to *e. coli* contamination (September 21, 2006). While Dole distributed and recalled the spinach, Natural Selection Foods managed the farms where the spinach originated. Nearly 150 people were hospitalized and the recall led to an industry-wide decline in spinach consumption that cost more than \$350 million (Weise and Schmit 2007). The study was conducted approximately three weeks after the event.

Method

Participants and Design. Thirty-seven undergraduates from a northeastern university participated in this paper-and-pencil task for partial course credit. We used the same two-factor (construal, prior knowledge) between-subjects design as in study 1.

Procedure. Participants first completed the “News Events Study,” indicating whether they had heard of the event (Yes/No) and their familiarity with “events surrounding the recent spinach recall” (1 = not at all familiar, 7 = very familiar). For the construal mindset manipulation, participants were given a 30-word variation of the categories or exemplars task by Fujita et al. (2006). They were presented with 30 words (e.g., *pasta*, *actor*). For each, those in the abstract condition were asked “_____ is an example of what,” generating superordinate categories, and those in the concrete condition were asked “an example of _____ is what,” generating subordinate exemplars. Finally, participants were given a “Spinach Recall Study” with a brief description of the event and key dependent measures. They indicated when they felt “the events of the spinach recalled occurred” (1 = very recently, 7 = not at all recently) and were asked to “allocate a total of 100 points towards factors that can account for events related to the spinach recall.” The factors listed included Dole (brand of spinach recalled), Natural Selection Foods (producer of the spinach), and circumstances beyond anyone’s control. These factors are

used to create an index of culpability described in the results. The date was not provided for this study because it occurred three weeks after the event, and we did not want to make it too salient.

Results

Manipulation Check. Following the method described in (Fujita et al. 2006), two judges coded participant answers to the categories versus exemplars task. If a response was in the form “[response] is an example of [target word],” it was coded as -1. If a response was in the form “[target word] is an example of [response],” it was coded as +1. Responses fitting neither criterion were coded as 0. Responses for each participant were summed, potentially ranging from -30 (more concrete) to +30 (more abstract). The agreement between raters was high ($r = .99$) and their ratings were averaged into an index. Confirming the effectiveness of the manipulation, participants who completed the category task wrote more abstract responses ($M = 16.89$) than those who completed the exemplars task ($M = -18.18$, $F(1, 35) = 422.30$, $p < .001$)³.

Perceptions of Temporal Distance (Hypothesis 1). A regression on perceptions of temporal distance using construal level, familiarity with the events of the spinach recall, and an interaction term revealed a significant interaction ($\beta = -.27$, $t(32) = -3.54$, $p < .01$), supporting hypotheses 1a and 1b. At one standard deviation below the mean of familiarity, participants with less prior knowledge felt further from the event in an abstract (vs. concrete) mindset ($\beta = -.25$, $t(32) = -1.80$, $p = .08$; this difference is significant at $p < .05$ at 1.5 standard deviations). One standard deviation above the mean, participants with greater prior knowledge felt further from the event in a concrete (vs. abstract) mindset ($\beta = .38$, $t(32) = 2.18$, $p < .05$).

– Insert figure 3 about here –

Culpability (Hypothesis 2). To measure the extent to which participants blamed Dole for

events related to the spinach recall versus extenuating external circumstances, we calculated culpability as a ratio of [points allocated to Dole] / [points allocated to circumstances beyond anyone's control]. We performed a regression on culpability using the same three independent variables as the previous analysis. The results revealed a significant interaction ($\beta = -3.38$, $t(32) = -2.79$, $p < .01$). One standard deviation below the mean of familiarity, those with less prior knowledge found parties more culpable in an abstract (vs. concrete) mindset ($\beta = -3.94$, $t(32) = -1.73$, $p = .09$; this difference is significant at $p < .05$ at 1.5 standard deviations, supporting H2a). One standard deviation above the mean of familiarity there was no significant difference ($\beta = 4.06$, $t(32) = 1.73$, $p = .09$; this difference is significant at $p < .05$ at 1.5 standard deviations; supporting H2b).

Discussion

Study 2 replicates the interaction between construal mindset and prior knowledge on perceptions of temporal distance, even when only three weeks after the event. This interaction was also significant for judgments of culpability. They found involved parties more culpable in an abstract mindset than a concrete one, mirroring judgments of greater perceived temporal distance.

In study 3, we address limitations of previous studies by increasing sample size, allowing more time to pass between the target event and time of recall, and employing a multi-item scale for subjective knowledge as a more robust measure of subjective knowledge (Carlson et al. 2008). We also test the hypothesized role of retrieval effort in mediating temporal judgments.

STUDY 3: ADIEU TO AN ACTOR

Because individuals with greater prior knowledge about an event are accustomed to storing and manipulating information in a more abstract format in memory, the process of recall is likely to feel less effortful in an abstract (vs concrete) mindset that makes abstract representations more readily accessible. However, individuals with less prior knowledge might find the process of recall less effortful in a concrete (vs abstract) mindset that makes the details of an event more readily accessible without activating or forcing the formation of higher level structures that are not already in place. Thus we hypothesize that:

H3: Retrieval effort mediates the interactive effect of construal mindset and prior knowledge on temporal judgments.

The target event was Heath Ledger's death (January 22, 2008), due to what was ruled an accidental drug overdose. The study was conducted approximately nine months after the event occurred, several weeks before the *Dark Knight*—in which Ledger played the joker in the role that posthumously bestowed him an Academy Award—was released on DVD.

Method

Participants and Design. One hundred and three undergraduates from a northeastern university participated in this computer study for partial course credit. We used the same two-factor (construal mindset, prior knowledge) between-subjects design as the previous studies.

Procedure. Participants first completed the “News Events Study,” indicating whether they had heard of a series of news events (Yes/No) and their prior knowledge about these events on multi-items scales. Participants answered three measures related to their knowledge of the event: “How familiar are you with the events of Heath Ledger's death,” (1 = not at all familiar, 7 = very familiar), “how well do you feel you know about the events of Heath Ledger's death,” (1

= don't know it well at all, 7 = know it very well), and “how much information do you feel you know about Heath Ledger's death,” (1 = none at all, 7 = a great deal).

Participants then completed the 40-word version of the categories versus exemplars task described in study 2, then completed the “Heath Ledger Study,” which included a brief description of the event—including the date—and the key dependent measures. They indicated how long ago they felt the event occurred (1 = very recently, 9 = not at all recently) and were asked to allocate a total of 100 points towards “factors that could account for events related to Heath Ledger's death.” The factors included Heath himself, the doctors that prescribed the medications he was taking, and circumstances beyond anyone's control. They were also asked how likely they were to purchase *The Dark Knight* when it came out on DVD (1 = highly unlikely, 7 = highly likely). We then elicited perceptions of how vivid the event was in their memory (1 = not at all vivid, 7 = very vivid). Finally, we asked questions about retrieval effort, the hypothesized mediator (effort to recall the event, 1 = no effort, 7 = a lot of effort; thought required to recall the event, 1 = no thought, 7 = a lot of thought).

Results

Manipulation Check. The same procedure was used as for study 2, but because there were 40 responses, the scores ranged from -40 (more concrete) to +40 (more abstract). The agreement between raters was high ($r = .99$) and their ratings were averaged into an index. As predicted, those participants who completed the category task wrote more abstract responses ($M = 25.46$) than those who completed the exemplars task ($M = -20.81$; $F(1, 102) = 386.24, p < .001$)⁴.

Perceptions of Temporal Distance (Hypothesis 1). An index of knowledge was created by averaging the three prior knowledge measures: familiarity with the event, knowledge about

the event, and amount of information known about the event (Cronbach's $\alpha = .90$). A regression on perceptions of temporal distance with construal level, the prior knowledge index, and an interaction term revealed that the interaction was significant ($\beta = -.29$, $t(99) = -2.22$, $p < .05$). One standard deviation below the mean, participants with less prior knowledge felt more distance from the event in an abstract (vs. concrete) mindset ($\beta = -.56$, $t(99) = -1.76$, $p = .08$, this difference is significant at $p < .05$ at 1.5 standard deviations, H1a supported). One standard deviation above the mean, participants with greater prior knowledge felt more distance from the event in a concrete (vs. abstract) mindset ($\beta = .44$, $t(99) = 2.02$, $p < .05$, H1b supported).

– Insert figure 4 about here –

Culpability (Hypothesis 2). Similar to study 2, we calculated culpability for the events of Health Ledger's death as [points allocated to Heath] / [points allocated to doctors]. We performed a regression on culpability using the same independent variables as for temporal distance. The results revealed a significant interaction between construal level and prior knowledge ($\beta = -2.65$, $t(99) = -2.89$, $p < .01$). One standard deviation below the mean, participants with less prior knowledge found parties more culpable in an abstract (vs concrete) mindset ($\beta = -3.16$, $t(99) = -1.81$, $p = .07$, significant at $p < .05$ at 1.5 standard deviations; H2a supported), mirroring judgments of temporal distance. One standard deviation above the mean, participants with greater prior knowledge found parties more culpable in a concrete (vs abstract) mindset ($\beta = 4.03$, $t(99) = 2.80$, $p < .01$, supporting H2b), also mirroring judgments of temporal distance.

Mediation of Temporal Judgments through Retrieval Effort (Hypothesis 3). An index of retrieval effort was created by averaging responses to the questions about how much effort and thought were required to recall the event (Cronbach's $\alpha = .89$). To test whether retrieval effort

mediates the interaction between construal level and knowledge on perceptions of temporal distance, we conducted a mediated-moderation analysis using Preacher and Hayes (2004) bootstrapping method using the Preacher and Hayes (2008) SPSS bootstrapping macro.⁵ The results indicate that retrieval effort mediates the effect of the interaction between construal level and knowledge on perceptions of temporal distance. The interaction between construal level and prior knowledge has a statistically significant effect on the mediator: retrieval effort ($\beta = -.26$, $t(98) = -2.29$, $p < .05$). Retrieval effort has a statistically significant effect on perceptions of temporal distance ($\beta = .29$, $t(98) = 2.53$, $p < .05$). Supporting H3, the effect of the interaction between construal level and prior knowledge is reduced when including effort as a mediator (from $\beta = -.29$, $t(98) = -2.22$, $p < .05$ to $\beta = -.22$, $t(98) = -1.66$, $p > .10$). The 95% confidence interval spans $-.20$ to $-.01$ (i.e. does not include 0), indicating statistical significance at $p < .05$.⁶

– Insert figure 5 about here –

Purchase Intentions. We expected people to have higher purchase intent when they blamed Heath Ledger less for and felt less temporal distance from the events of his death. We measured intent to purchase the *Dark Knight* on DVD on a 7 point scale (1 = highly unlikely to purchase, 7 = highly likely to purchase) and performed a regression on purchase intent using the same independent variables as the previous analysis and also included as a covariate the extent to which subjects indicate they were a fan of Heath Ledger (1 = not at all, 7 = quite a lot.) The results revealed a significant interaction between construal level and prior knowledge ($\beta = .69$, $t(98) = 2.26$, $p < .05$). One standard deviation below the mean, those that knew less about Heath Ledger's death were more likely to have high purchase intent in a concrete (vs abstract) mindset ($\beta = 1.06$, $t(98) = 1.93$, $p = .06$). One standard deviation above the mean, those that knew more were more likely to have high purchase intent in a abstract (vs. concrete) mindset ($\beta = -.91$, $t(98)$

= 1.80, $p = .08$). Both spotlight analyses are significant at $p < .05$ at 1.5 standard deviations from the mean.

Vividness. We performed a regression on the vividness of the memory using the same three independent variables. The results revealed only a significant effect of prior knowledge ($\beta = .66$, $t(99) = 4.60$, $p < .01$)—those with greater prior knowledge recalled it more vividly.

Discussion

As with studies 1 and 2, those individuals with less prior knowledge about the circumstances of Heath Ledger's death felt greater distance from it and blamed associated parties more when reconstructing the memory in an abstract mindset. But those with greater prior knowledge felt greater distance from the event and blame associated parties more when in a concrete mindset. Mirroring these judgments, participants indicated higher intent to purchase the *Dark Knight* on DVD in those conditions where they felt less temporal distance and blamed culpable parties to a lesser extent.

Furthermore, retrieval effort partially mediates the interactive effect of construal mindset and prior knowledge on perceptions of temporal distance. People felt closer to the events of Heath Ledger's death when the memory was easier to recall—a more concrete mindset for those with less knowledge and an abstract one for those with more. Construal level did not affect the vividness with which people recalled the event, suggesting something about the underlying structure of knowledge that drives this effect. We next extend our work to objective temporal distance, employing a measure of prior knowledge that better reflects underlying information.

STUDY 4: HORRENDOUS HURRICANE

The main goal of study 4 is to triangulate the results observed in studies 1-3 for robustness by using different measures for similar constructs. We demonstrated the interaction between construal mindset and prior knowledge on *subjective* temporal distance, but also wanted to test our model for judgments of *objective* temporal distance (e.g. event dates). Also, while in studies 1–3, we asked participants to self-assess knowledge, in this study we operationalize prior knowledge in a way more directly related to underlying information in memory. We use a knowledge-type quiz, but rather than scoring it according to accuracy, we score it according to whether participants felt they had knowledge in memory. The target event was the evacuation of New Orleans for Hurricane Katrina (August 29, 2005), widely recognized as a massive failure in appropriate government response that resulted in deaths, looting, and displacement of most of the city’s population. The study took place approximately one year after the event.

Method

Participants and Design. Ninety-five undergraduates from a northeastern university participated in this computer study in exchange for partial course credit. We used the same two-factor (construal mindset, prior knowledge) between-subjects design as the previous studies.

Procedure. In a slightly different procedure, participants first completed a 30-word version of the categories versus exemplars task. They then completed the “Hurricane Katrina Study” with a brief description of the event without the date. Participants were asked, “To the best of your recollection, what was the date that Hurricane Katrina made landfall in Louisiana?” They then allocated a total of 100 points towards factors that led to the “difficulties in the evacuation due to Hurricane Katrina,” which included city and local officials, federal government officials, and circumstances beyond anyone’s control. They were then told that the

victims of Hurricane Katrina who had to leave their homes were given checks of \$2000 per month from the Federal Emergency Management Agency and asked how much they felt these victims *should* have been compensated per month while they were displaced. They were then asked how vivid the event was in their memory (1 = not at all vivid, 7 = very vivid).

Participants then completed an unrelated filler task to separate the prior knowledge measure from the construal manipulation. In the final task, participants were told we were interested in understanding what people feel they remember about events after they have passed. They were presented with fourteen statements related to Hurricane Katrina and for each, asked to indicate “True,” “False,” or “Don’t know” with the first response that came to mind and not focus on accuracy. The answer to these questions was scored and used as a measure of prior knowledge. These questions were not placed before the construal manipulation, as with the previous measures more surreptitiously measuring knowledge, to avoid unduly influencing expectations about knowledge given the specific nature of the questions.

Results

Manipulation Check. The procedure for the manipulation check was identical to that of study 2. The agreement between the raters was high ($r = .99$) and their ratings were averaged into an index. Participants who completed the category task wrote more abstract responses ($M = 15.79$) than those who completed the exemplars task ($M = -15.41$; $F(1, 94) = 809.61, p < .001$).⁷

Perceptions of Temporal Distance (Hypothesis 1). We created a knowledge score for each participant based on their answers to the true/false/don’t know questions. Because we are interested in how much people *felt* they knew, and not the accuracy of what they knew, answers were scored as 0 for “don’t know” and 1 for *either* “true” or “false.” A final score was summed

as the measure for subjective knowledge (possible scores ranging from 0 to 14). We confirmed the effectiveness of the filler task in separating the construal manipulation from the knowledge quiz—construal level did not have an effect on subjective knowledge ($F(1, 94) = .65, p > .40$).

To simplify the analysis with dates, we calculated the difference between the actual event date and each participant's estimate of event date. Lower values indicate participants feel closer to the event and higher ones indicate they feel further from it. The regression on this value with construal level, prior knowledge (measured by the quiz score), and the interaction revealed a significant interaction ($\beta = -15.64, t(91) = -2.70, p < .01$), supporting hypothesis 1. One standard deviation below the mean, participants with less prior knowledge felt greater temporal distance from the event when recalling it in an abstract (vs. concrete) mindset ($\beta = -40.81, t(91) = -1.73, p = .09$, this difference is significant at $p < .05$ at 1.5 standard deviations). One standard deviation above the mean, participants with greater prior knowledge felt further from the event when recalling it in a concrete (vs. abstract) mindset ($\beta = 54.34, t(91) = 2.26, p < .05$).

– Insert figure 6 about here –

Culpability (Hypothesis 2). We calculated culpability for events related to the evacuation of New Orleans for Hurricane Katrina as [points allocated to the federal government + city and local officials] / [points allocated to circumstances beyond anyone's control] because there was no significant variability in the allocation of points to city and local officials. A regression with the same independent variables above on net culpability revealed a significant interaction between construal level and prior knowledge ($\beta = -.14, t(91) = -2.12, p < .01$), supporting hypothesis 2. One standard deviation below the mean, participants with less prior knowledge allocated more blame to parties when in an abstract (vs concrete) mindset ($\beta = -49, t(91) = -1.78, p = .08$; difference is significant at $p < .05$ at 1.5 standard deviations), mirroring judgments of

temporal distance. One standard deviation above the mean, participants with more prior knowledge allocated more blame to parties when in a concrete (vs. abstract) mindset ($\beta = .57$, $t(91) = 1.78$, $p = .08$; difference is significant at $p < .05$ at 1.5 standard deviations).

Victim Compensation. We conducted a regression on the compensation per month participants felt should be awarded to evacuation victims using the same independent variables as the previous analyses.⁸ The results revealed a significant interaction between construal level and prior knowledge ($\beta = -229.67$, $t(87) = -2.51$, $p < .01$). One standard deviation below the mean, those who knew less about the evacuation felt victims should be compensated more when in an abstract (vs concrete) mindset ($\beta = -805.27$, $t(87) = -2.08$, $p < .05$). One standard deviation above the mean, those with greater prior knowledge felt victims should be compensated more in a concrete (vs abstract) mindset ($\beta = 591$, $t(87) = 1.70$, $p = .09$).

Vividness. A regression performed on the vividness of the memory with the same independent variables revealed only an effect of prior knowledge ($\beta = .099$, $t(91) = 1.73$, $p = .09$).

Discussion

In this study, we demonstrate that the interaction between construal level and prior knowledge applies to objective—as well as subjective—temporal distance, and when using a measure of prior knowledge more closely linked to objective knowledge. The interaction also applies to judgments of culpability and compensation for the victims of Hurricane Katrina. Those with less prior knowledge believed victims should be compensated more in an abstract mindset than a concrete one, in line with judgments of greater culpability for the federal government. Those with greater prior knowledge felt victims should be compensated more in a concrete mindset, also in line with judgments of greater culpability. Again, we show that vividness alone

cannot account for the differential effect of construal mindset depending on prior knowledge.

GENERAL DISCUSSION

While previous research has illustrated the myriad ways information—whether about events or temporal timelines—can influence temporal distance, our research investigates the effects of underlying mental mindset on how events are reconstructed in memory. We theorize and find an interaction between construal mindset and prior knowledge. Four studies illustrate that people with less prior knowledge about an event felt more distant from it and blamed culpable parties more when recalling it in an abstract mindset than a concrete one, consistent with Construal Level Theory. However, for those with greater prior knowledge, the effect of construal mindsets is reversed: They felt more distant from the event and blamed culpable parties more when recalling it in a concrete mindset than an abstract one. This effect held: 1) for both subjective (studies 1-3) and objective (study 4) time estimates; 2) whether parties involved were corporations (studies 1-2), individuals (study 3), or institutions (study 4) even for judgments of purchase intent (study 3) and victim compensation (study 4).

We also found retrieval effort partially mediates the effect of the interaction between construal level and prior knowledge on perceptions of temporal distance (study 3). Perceptions of increased temporal distance were associated with a more effortful recall experience—a more abstract mindset for individuals with less prior knowledge and a concrete one for those with more. This suggests that when reconstructing memories for past events, construal mindsets might make differential types of information more readily accessible, while prior knowledge influences what information is even available and how it is structured in memory. These two interact to influence retrieval effort, and thus, judgments of temporal distance.

One natural question with our work is whether perceptions of temporal distance mediate culpability judgments. We find an association between the two, but do not find mediation.. Construal level, temporal distance, and attributions are inextricably linked. Changes in culpability or attribution can come through changes in temporal distance (figure 1, paths A and B) or some direct relationship with construal level (path C). With the “decoupling” of construal level and temporal distance when considering prior knowledge, some combination of these paths might be at work, accounting for the lack of a mediated effect. Our work is consistent with previous work in autobiographical memory and attribution theory showing a strong association between temporal distance and culpability, but interrelationships between these constructs and their differential sensitivity to changes in construal level open avenues for future research.

Our results have several important theoretical implications for work in memory, temporal judgments, and Construal Level Theory and managerial implications for those managing brand reputations, opening doors for several rich future research paths.

Memory. Our work is novel in showing that mindsets can influence reconstruction of past events in systematic ways, depending on construal level and prior knowledge. The interaction between these two implies different types of information are made more accessible depending on mindset, manifested as differences in retrieval effort and highlighting the importance of prior knowledge in the reconstruction of memories. Further work could focus on how other types of mindsets influence memory reconstruction and to what extent prior knowledge plays a role.

Temporal Judgments for Past Events. While previous work focuses on the various roles of information in drawing temporal judgments, we find underlying mindsets can define the context in which information is recalled and that their effect depends on prior knowledge. Furthermore, even changes in subjective temporal distance are associated with material

differences in judgments of culpability, purchase intent, and victim compensation. While this has been illustrated to some extent in the domain of autobiographical memory and self-motivated influences (Wilson and Ross 2003), we find a strong association between subjective temporal distance and culpability even for non-autobiographical, real world events.

Construal Level Theory. Looking to the far less-explored past, we illustrate that construal mindsets influence subjective temporal distance and judgments of culpability, which has not—surprisingly—been shown in the past. More importantly, we find an important interaction between construal level and prior knowledge and are the first to illustrate a reversal of the relationship between construal level and distance. Those with greater prior knowledge about an event actually feel *more* distance from it when recalling it in a *concrete* mindset.

Why might this be the case with respect to memory? In CLT, an abstract mindset typically leads people to transcend dimensions of distance. Events in the past are, by definition, removed from the present. At the same time prior knowledge can serve as another form of distance—people feel closer to those things they know more about. But knowledge about the event is structured differently for those who know more versus less about an event, which can result in a differential effect of a concrete versus abstract mindset, as suggested in the mediating effect of retrieval effort in study 3. Those that know less might also start from a point where the event feels more distant while those that know more start from one where it feels more near or motivated distancing might be at work. Further work might clarify these possible mechanisms and how prior knowledge, where proximity is associated with abstract construal, interacts with other dimensions of psychological distance.

What Information is Accessible? Our work suggests different types of information are made accessible in concrete versus abstract construal mindsets, but we did not explicitly test

what information comes to mind when in an abstract versus concrete mindset. Putting such thought protocols immediately after the construal manipulation would have more overtly influenced temporal judgments, and after judgments of temporal distance and culpability, thought protocols would have been influenced by the prior judgments. Future work can provide a more direct test of differential information made accessible by mindset.

What about Positive Events? In the context of public relations and marketing, we focused on negative events, which are associated with greater causal reasoning than positive events (Bohner et al. 1988). The partial mediation of temporal judgments through retrieval effort for negative events suggests a similar effect for positive events, but temporal judgments may not be as strongly associated with “credit” for positive events, particularly non-autobiographical ones where people lack a more self-motivated reason to engaging in more extensive reasoning (see Taylor and Brown 1988 for a review). This would be an interesting test for future work.

Managing Bad Behavior. Those managing PR nightmares might not be able to rewind instances of bad behavior, but they can shape how people remember them. While we employed construal manipulations primarily outside the context of events to isolate factors influencing memory reconstruction, other work might explore whether describing the central event in different linguistic predicates (Semin and Smith 1999) or pictures versus words (Amit et al. 2008) yields similar effects. Managers can design communication to induce more concrete versus abstract reflection on past events, but they must consider whose good opinion they want to influence. At times, it might be the general public that knows, on average, less about what is going on, but in others, it might be your best customers that know the most about you. Thus, as Silesius suggests, time and its associated judgments can be of “your own making,” but you must determine who you wish to influence most.

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FOOTNOTES

¹ Three participants had not heard of the event and were removed from the analysis.

² Note that all coefficients are unstandardized and all continuous independent variables were centered

³ One participant had not heard of the event and was removed from the analysis.

⁴ No participants were removed from the dataset because they had all heard of the event.

⁵ Preacher and Hayes (2004) method allows for a more rigorous test of statistical significance for indirect effects than the Sobel test, particularly for smaller sample sizes. The macro from Preacher and Hayes (2008) was originally intended for multiple mediators, but also allows for the testing a single mediator while taking into account other covariates. Our estimates are based on 5,000 bootstrap samples with a 95% confidence interval using perceptions of temporal distance as the dependent variable, the interaction between construal and prior knowledge index as the dependent variable, the effort index as the potential mediator, and construal level and the prior knowledge index as statistical controls.

⁶ Results significant at $p = .09$ using Baron and Kenny (1986) method and Sobel test.

⁷ No participants were removed from the dataset because they had all heard of the event.

⁸ Four participants that gave non-numerical answers were removed from the analysis.

FIGURE 1
THEORETICAL MODEL: FACTORS INFLUENCING MEMORY RECONSTRUCTION

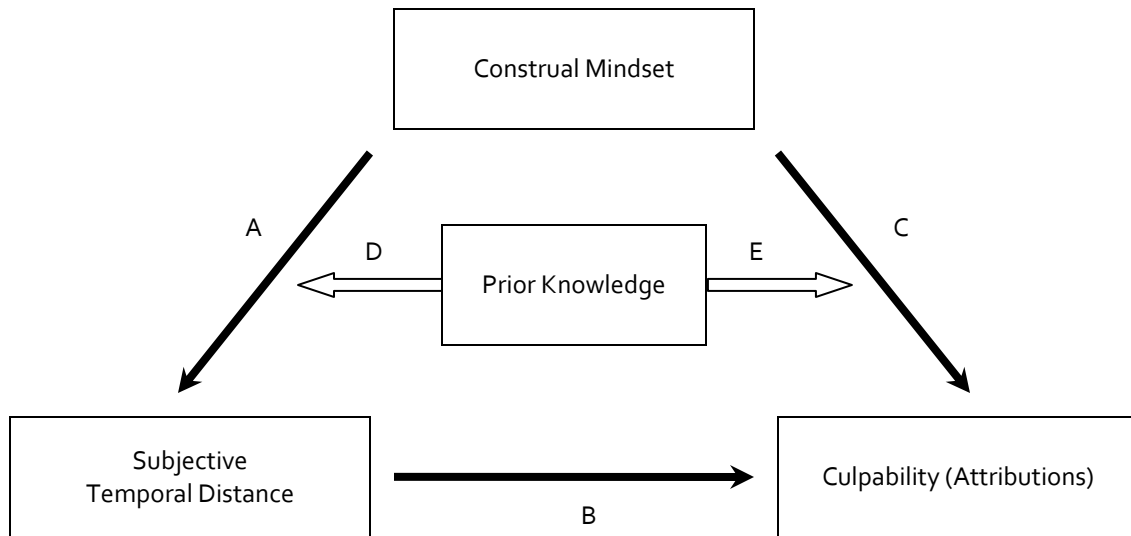
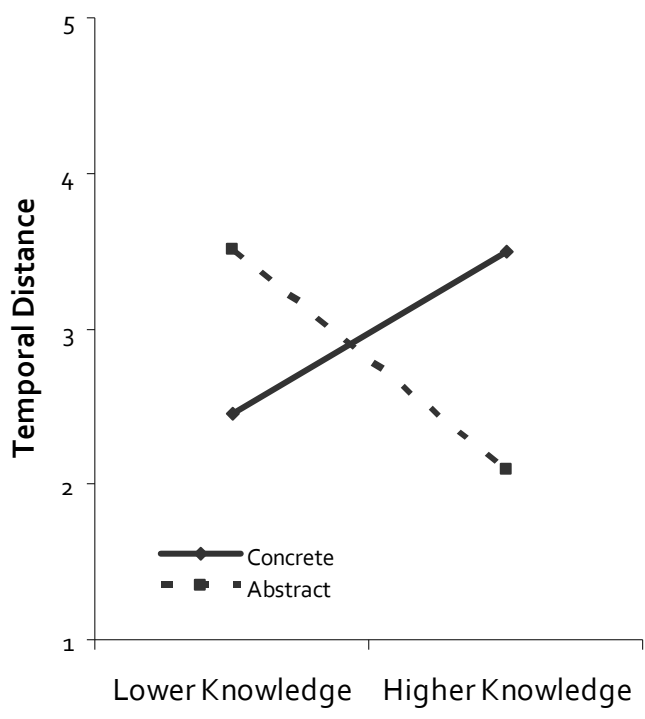


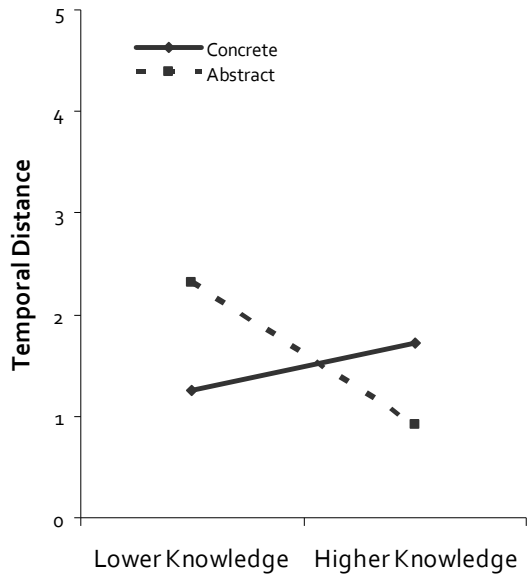
FIGURE 2
STUDY 1 (DELL BATTERY RECALL): INTERACTION OF CONSTRUAL MINDSET AND
PRIOR KNOWLEDGE ON TEMPORAL JUDGMENTS



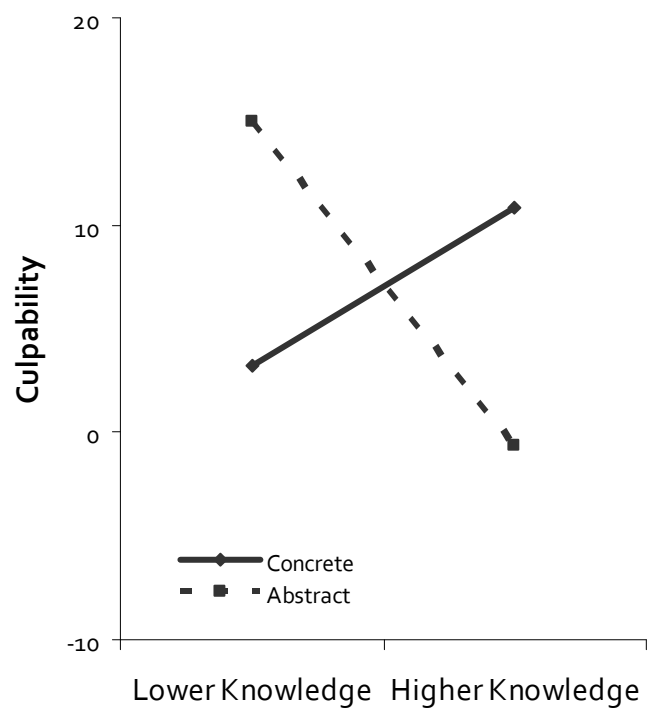
Temporal distance: 1 = very recently, 7 = not at all recently
Knowledge: One standard deviation above the mean = higher knowledge, one standard deviation below the mean = lower knowledge (and in all other studies)

FIGURE 3
STUDY 2 (DOLE SPINACH RECALL): INTERACTION OF CONSTRUAL MINDSET AND PRIOR KNOWLEDGE

A. Temporal Judgments



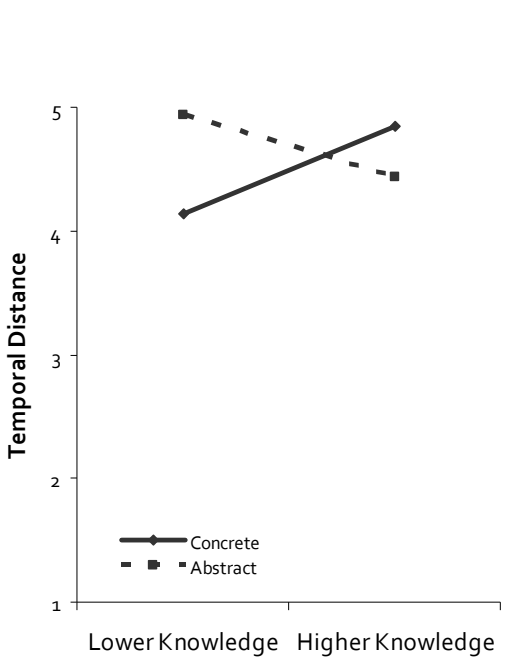
B. Culpability Judgments



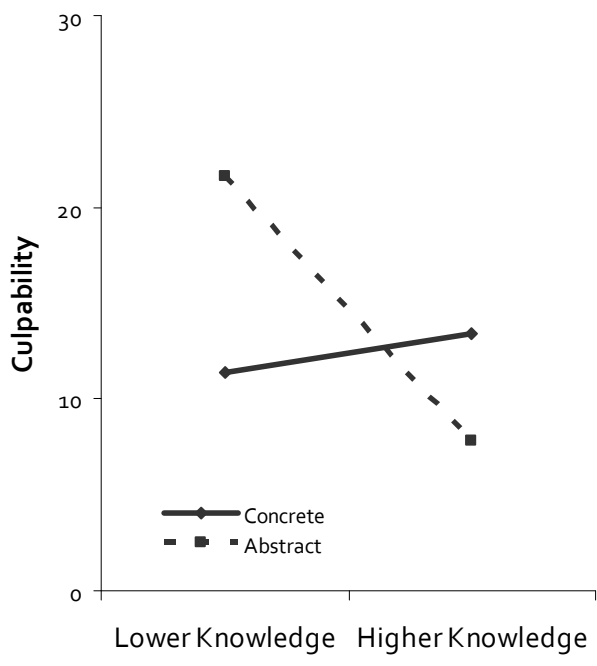
Temporal distance: 1 = very recently, 7 = not at all recently
Culpability: [Points to Dole] / [Points to external circumstances]

FIGURE 4
STUDY 3 (HEATH LEDGER): INTERACTION OF CONSTRUAL MINDSET AND PRIOR KNOWLEDGE

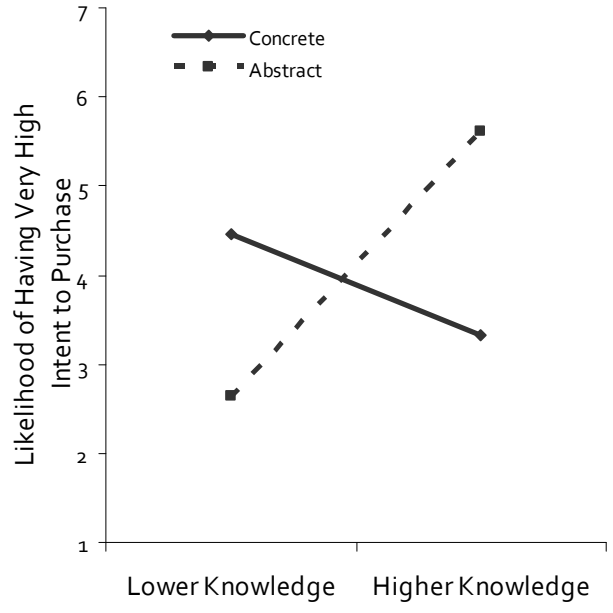
A. Temporal Judgments



B. Culpability Judgments



C. Purchase Intent



Temporal judgments: 1 = very recently, 9 = not at all recently
Culpability: [Points to Heath] / [consideration of external circumstances]
Very high intent to purchase: Purchase intent of 6 or 7 where 1 = highly unlikely to purchase and 7 = highly likely to purchase

FIGURE 5
STUDY 3 (HEATH LEDGER): PERCEIVED EFFORT MEDIATES THE EFFECT OF THE
CONSTRUAL X KNOWLEDGE INTERACTION ON TEMPORAL JUDGMENTS

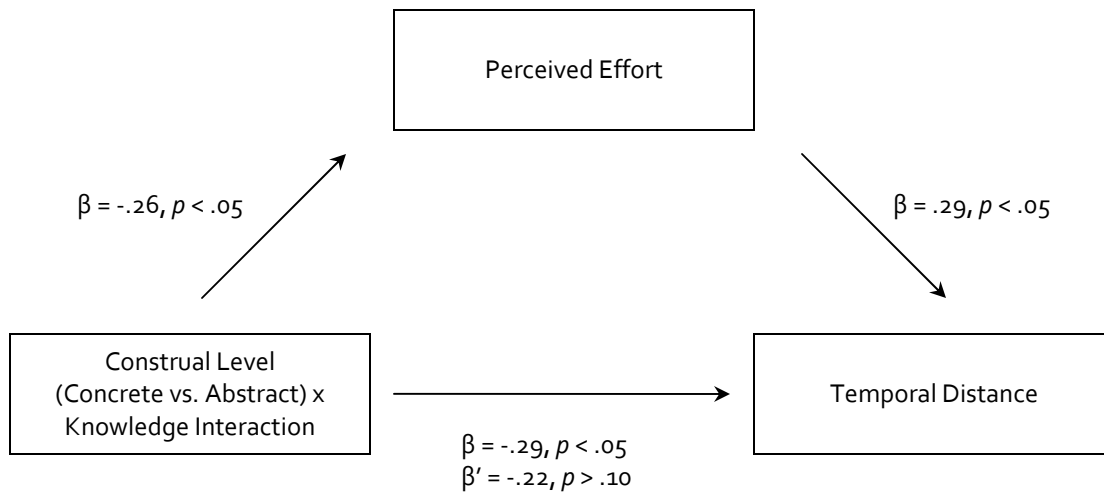
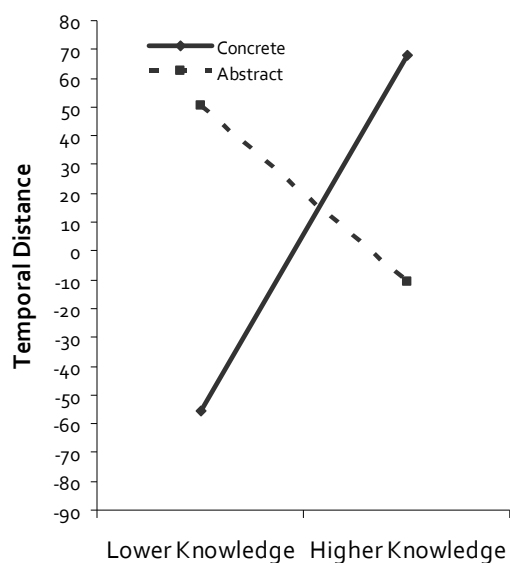
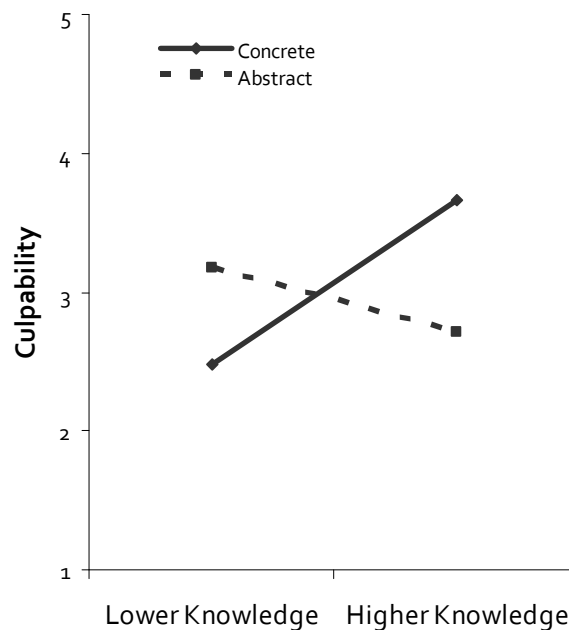


FIGURE 6
STUDY 4 (HURRICANE KATRINA): INTERACTION OF CONSTRUAL MINDSET AND PRIOR KNOWLEDGE

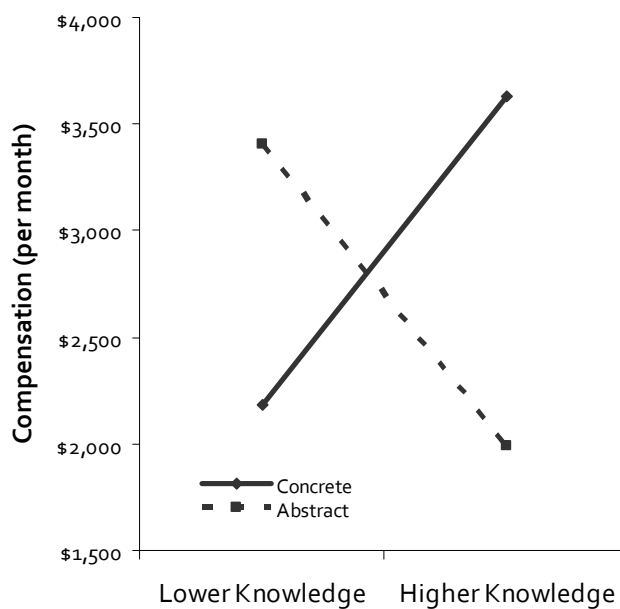
A. Temporal Judgments



B. Culpability Judgments



C. Victim Compensation



Temporal distance: Number of days between participants date estimate and the actual date

Culpability: [Points to federal government + city and local officials] / [Points to circumstances beyond anyone's control]