

Construal level and temporal judgments of the past: the moderating role of knowledge

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Abstract The vast majority of work in construal level theory has found a robust relationship between construal level and temporal judgments for *future* events: Distance is associated with the abstract, and nearness is associated with the concrete. Our work looks at the *past* and proposes a critical moderator that reverses this relationship: knowledge. Through experiments involving real news events, we demonstrate that people with less knowledge about events felt nearer to them when recalling them in a concrete mindset versus an abstract one. However, this relationship reverses for those with greater knowledge: They feel closer to past events when recalling them in an abstract mindset versus a concrete one. We provide evidence that this reversal stems from feelings of metacognitive ease that inform temporal judgments when knowledge (which drives what information is held available and accessible in memory) and construal mindset (which drives what information is sought from memory) coincide. Our findings suggest that in memory, there are instances where the abstract seems near and the concrete seems distant.

Keywords Memory · Mindsets · Time perception · Construal level theory · Ease of retrieval

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What determines a person's judgment of when a past event occurred? While previous work has focused on how temporal judgments reflect the qualities of recalled information (Friedman, 1993) or the quantity of information recalled about intervening events (Zauberman, Levav, Diehl, & Bhargava, 2010), we examine the influence of construal mindsets. Previous work in construal level theory has demonstrated a robust association between construal level and distance: Distant events are represented by high-level, abstract features conveying the essence of an event, while near events are represented by lower-level, concrete, incidental details (Trope & Liberman, 2010). An event is construed as more concrete when framed as temporally near (e.g., "playing basketball outside") but is construed as more abstract when framed as temporally distant (e.g., "having fun"). In contrast to the previous decade of work primarily investigating the future, we focus on the past and how different construal mindsets at the time of recall—abstract versus concrete—affect temporal judgments. Most important, we identify a critical moderator that actually reverses the relationship between construal level and distance: knowledge. Thus, there are instances where the abstract seems *near* and the concrete seems *distant*.

We posit that when temporal judgments are formed, an interaction can occur between information most available and accessible in memory (as dictated by knowledge) and information sought from memory (as dictated by construal mindset). People with greater knowledge in a domain not only have more information stored in memory, but also store that information in a hierarchical structure with higher-level, abstract representations that stem from inference making (Chase & Ericsson, 1981). They also recall information more quickly with higher-level retrieval cues, because abstract representations are the most accessible in memory (Ericsson & Kintsch, 1995). Reyna and Lloyd (2006) found that when making treatment decisions for cardiac patients, more

experienced physicians relied more upon gist-driven, abstract processing than upon verbatim, concrete processing. In contrast, those with less knowledge in a domain draw fewer higher-level inferences and store information in a more episodic and disparate format, closer to that of the originally encoded information (Alba & Hutchinson, 1987).

While knowledge determines what information is held in memory, construal mindset drives what information is sought from memory. Freitas, Gollwitzer, and Trope (2004) found that when activating an abstract mindset, people pursued more abstract information consistent with higher-level goals and that when activating a concrete mindset, people pursued information more consistent with lower-level goals. Thus, when an event is recalled from memory, an abstract mindset should encourage search for abstract, higher-level information that stems from inference making, while a concrete mindset should encourage search for concrete, episodic information. Thus, a match can occur between knowledge and construal mindset, resulting in feelings of metacognitive ease that inform other judgments (Herzog, Hansen, & Wänke, 2007).

When a past event is recalled, why might a mismatch between knowledge and construal mindset cause greater feelings of effort? Individuals with greater knowledge have both higher- and lower-level information in memory, but the higher-level, abstract concepts are the most accessible. According to theories of spreading activation, superordinate, higher-level connections activate lower-level ones until a goal is reached (Collins & Loftus, 1975). Thus, a search for concrete, lower-level information activates a rich network of both higher- and lower-level associations, resulting in greater elaboration. Lower-level associations that have not been recently accessed feel difficult to recall. In contrast, individuals with less knowledge hold information in a more disparate format with fewer—if any—higher-level inferences (Alba & Hutchinson, 1987). A concrete mindset leads to a search for lower-level information actually available in memory. However, an abstract mindset leads to a search for higher level-information that may not exist. If this higher-level information is constructed at the time of recall, recall will feel more effortful in an abstract mindset relative to a concrete one.

Temporal judgments are challenging to encode and retrieve because they are not automatically encoded (Thompson, Skowronski, Larsen, & Betz, 1996). Thus, people typically reconstruct temporal judgments and rely on ease of retrieval as a source of information: Easy-to-recall episodes are judged as more recent (Peterson, 1980). In Experiment 1, we test the hypothesis that individuals with less knowledge find past events easier to recall and judge them as closer when in a concrete mindset, while those with greater knowledge find past events easier to recall and judge them as closer when in an abstract mindset. We also demonstrate that ease of retrieval is a mediator in this interaction. In Experiment 2, we test the hypothesis that drawing attention to ease of retrieval during

recall eliminates this interaction. We also demonstrate that those with less knowledge elaborate more on an event when recalling it in an abstract mindset, while those with greater knowledge elaborate more on an event when recalling it in a concrete mindset.

Experimental paradigm

We use news events for experimental stimuli because they allow for variation in knowledge, while also allowing for more precise measurement of subjective temporal distance because the events occurred at an objective point in time. Both experiments employ the following paradigm, in which participants were told that they would receive a series of unrelated studies:

- (1) *News events study*: Participants rated their subjective knowledge for a series of news events, including the target event, in order to mask the purpose of the “target event study.” Celebrity and corporate news events familiar to undergraduates were chosen. Participants rated how knowledgeable they were (1 = *not at all*, 9 = *very*), how familiar they were (1 = *not at all*, 9 = *very*), and how much information they had (1 = *none at all*, 9 = *a great deal*) for each event. The average of these three measures for the target event was used to compute one measured independent variable, the *subjective knowledge index* (SKI: Experiment 1, $\alpha = .90$; Experiment 2, $\alpha = .93$).¹
- (2) *Construal mindset manipulation*: Participants completed an ostensibly unrelated “word games study” that was the well-established categories versus exemplars construal mindset manipulation (Fujita, Trope, Liberman, & Levin-Sagi, 2006). For each word (e.g., *pasta*), those in the abstract condition were asked, “_____ is an example of what?” to generate superordinate categories. Those in the concrete condition were asked, “an example of _____ is what?” to generate subordinate exemplars.
- (3) *Target event study*: Participants were given a one-sentence description specifying the target event and were asked to complete the key dependent measures.
- (4) Participants who had not heard of the target event were eliminated from the analysis because they had no information to recall from memory. This included 1 participant from each experiment.

¹ We conducted a pretest confirming that for news events, participants higher on the SKI recalled more about the event and described it using more abstract (vs. concrete) language.

Experiment 1

The target event for this experiment was actor Heath Ledger's death of an apparent drug overdose.

Method

One hundred three undergraduates participated in this experiment for partial course credit.² The two factors were construal mindset (abstract vs. concrete, between subjects) and SKI (measured). As was described in the [Experimental Paradigm](#) section, participants completed the “news events study” (SKI measure), the “word games study” (construal mindset manipulation), and the “Heath Ledger study” (key dependent measures). The event date was provided to prevent inaccurate objective temporal distance judgments from contaminating measurement of subjective temporal distance (“On January 22, 2008, Heath Ledger was found dead of an apparent drug overdose in his apartment”). Participants then indicated how long ago they felt that “Heath Ledger's death occurred” (1 = *very recently*, 9 = *not at all recently*) and answered questions for an ease-of-retrieval index, 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*, $\alpha = .89$).

Results and discussion

The model regressing temporal distance on construal mindset (effect coded: concrete = -1, abstract = 1), event SKI (mean-centered), and the interaction between the two (product of the previous two variables) was significant, $R^2 = .11$, $F(3, 98) = 3.92$, $p = .01$, and revealed a significant interaction, $\beta_{\text{interaction}} = -.36$, $t(98) = -2.93$, $p = .004$. Following procedures detailed by Aiken and West (1991), we conducted additional regression analyses for one standard deviation below and above the mean of knowledge as planned contrasts for lower- versus higher-SKI participants. Lower-SKI participants felt closer to the event when recalling it in a concrete, versus abstract, mindset, $\beta_{\text{construal}} = .44$, $t(98) = 2.27$, $p = .03$, while higher-SKI participants felt closer to the event when recalling it in an abstract, versus concrete, mindset, $\beta_{\text{construal}} = -.37$, $t(98) = -1.98$, $p = .05$ (see Fig. 1). Thus, *abstractness* is associated with distance for participants with a lower SKI, but *concreteness* is associated with distance for participants with a higher SKI.

² Tsai and Thomas (2011) employed similar construal manipulations in the domain of fluency and report, $\eta^2 = .09$ (Study 2) and $.05$ (Study 3). This translates to a medium effect size ($f = .30$ and $.23$, respectively; Cohen, 1988). A regression analysis with a medium effect size ($f^2 = .15$; Cohen, 1988), a power of $.80$, three predictors, and a $.05$ significance level requires a minimum sample size of 76.

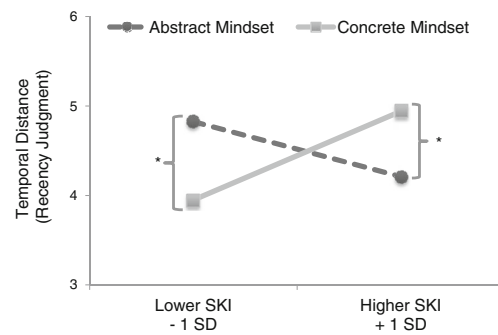


Fig. 1 Temporal distance by construal mindset for lower (1 *SD* below the mean) and higher (1 *SD* above the mean) levels of the subjective knowledge index (SKI) in Experiment 1. All values are predicted values based on regression results (Aiken & West, 1991). Asterisk (*) denotes differences significant at $p < .05$

Using the ease-of-retrieval index, we conducted a mediated-moderation analysis employing the bootstrapping method (Preacher & Hayes, 2008). The results (see Fig. 2) provide evidence that ease of retrieval partially mediates the effect of the construal mindset \times knowledge interaction on temporal distance and that participants judged the event as more recent when it was easier to recall. However, given that ease of retrieval did not fully mediate the effect, we more directly test its role in the next experiment.

Experiment 2

Previous work has shown that when ease-of-retrieval information is provided before a judgment, it ceases to serve as a source of information (Menon & Raghuram, 2003), because attention is drawn to its use as a cue (Schwarz, 1998). If ease of retrieval from a construal mindset and knowledge match serves as a source of information for temporal judgments, drawing attention to it *before* making temporal judgments should eliminate the effect of the construal mindset and knowledge match. Furthermore, if greater elaboration on the event decreases retrieval ease, we would expect those with less knowledge to elaborate more on an event in an abstract mindset, while those with greater knowledge would do so in a concrete mindset. We test these hypotheses in this experiment, where the target event was Britney Spears's custody loss of her two sons due to erratic behavior (October 1, 2007).

Method

One hundred twenty-six undergraduates participated in this study for partial course credit.³ The three factors were

³ Using the same justification for sample size as in Experiment 1, but with seven predictors instead of three, the minimum required sample size is 103 (Cohen, 1988).

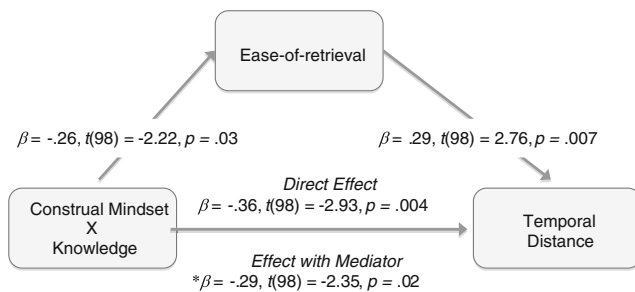


Fig. 2 Ease of retrieval as mediator of construal mindset \times knowledge interaction on temporal distance for Experiment 1. Mediated moderation analysis was conducted controlling for construal mindset and SKI. *The estimated 95 percent confidence interval for ease of retrieval was $-.19$ to $-.004$, indicating the change is statistically significant at $p < .05$ (5,000 bootstrap resamples, 95 % confidence interval). Partial effect of control variables: construal mindset, $\beta = -.026, t(98) = -0.20, p = .84$; SKI, $\beta = .16, t(98) = 1.32, p = .19$

construal mindset (between subjects), SKI (measured), and retrieval-ease salience (salient vs. not, between subjects). Participants completed the “news events study” (SKI measure), the “word games study” (construal mindset manipulation), and a “Britney Spears study” in which they were asked to “take a moment to think about the events related to Britney Spears losing custody of her children.” Before making temporal judgments, only participants in the retrieval-ease salient condition were asked how easy or difficult it was to recall the event (1 = *very easy*, 9 = *very difficult*) and how much effort it took to recall the event (1 = *no effort*, 9 = *a lot of effort*). Then all participants were asked to indicate “how near or far you feel from the event” by dragging a knob to the left on a slider scale anchored at “right now” on the right. The slider scale results were recorded on a 100-point scale where higher values represented greater distance. They were then asked to “write any thoughts and memories you have about this event or related to this event.”

Results and discussion

The model regressed temporal distance on the following independent variables: construal mindset (effect-coded: $-1 =$ concrete, $1 =$ abstract), SKI (mean centered), ease-of-retrieval salience (effect-coded: $-1 =$ not salient, $1 =$ salient), the three two-way interaction terms, and the three-way interaction term. The overall model was marginally significant, $R^2 = .10, F(7, 117) = 1.93, p = .07$, and revealed a marginally significant main effect of SKI, $\beta_{\text{SKI}} = 1.91, t(117) = -1.84, p = .07$, and a significant three-way interaction, $\beta_{3\text{-way}} = -2.25, t(117) = -2.18, p = .03$. The main effect of SKI is consistent with previous work that illustrates that events are judged as more recent when more information is recalled (Brown, Rips, & Shevell, 1985).

Using the four statistical contrasts recommended by Aiken and West (1991), we conducted a series of four regressions to

test the significance of the effect of construal mindset for lower- versus higher-SKI participants about the event both when ease of retrieval was salient and when it was not. Consistent with Experiment 1, when ease of retrieval was not salient, lower-SKI participants judged greater distance from the event in an abstract (vs. concrete) mindset, $\beta_{\text{construal}} = 9.16, t(117) = 1.99, p = .05$, and higher-SKI participants judged greater distance from the event in a concrete (vs. abstract) mindset, $\beta_{\text{construal}} = -9.03, t(117) = -1.98, p = .05$. However, when ease of retrieval was made salient before temporal judgments, the coefficient for construal mindset was not significant for lower-SKI ($p = .19$) or higher-SKI ($p = .17$) participants (see Fig. 3). Thus, ease of retrieval ceases to serve as an automatic input into temporal judgments when attention is drawn to it before these judgments are made.

The overall model regressing the number of words written on the same independent measures was significant, $R^2 = .16, F(7, 117) = 3.17, p = .004$, and revealed a significant three-way interaction, $\beta_{3\text{-way}} = 2.88, t(117) = 2.27, p = .03$. Using the same statistical contrasts, when ease of retrieval was not salient, lower-SKI participants wrote more about the event when recalling it in an abstract (vs. concrete) mindset, $\beta_{\text{construal}} = 10.77, t(117) = 1.91, p = .058$ (marginally significant), while higher-SKI participants wrote more when recalling it in a concrete (vs. abstract) mindset, $\beta_{\text{construal}} = -14.92, t(117) = -2.67, p = .009$. When ease of retrieval was made salient before temporal judgments, the coefficient for construal mindset was not significant for lower-SKI ($p = .88$) or higher-SKI ($p = .96$) participants. These results mirror those of temporal judgments and provide support for our theory that those with greater knowledge tend to elaborate more when recalling an event in a concrete mindset, while those with less knowledge do so in an abstract mindset.

General discussion

Prior work has shown that in low-knowledge situations, events seem closer when recalled in a concrete mindset versus an abstract one (Kyung, Menon, & Trope, 2010). In this work, we examined variation in people’s knowledge about events and the match between knowledge (the information available and accessible in memory) and construal mindset (the information sought from memory). This match results in feelings of fluency that, in turn, inform temporal judgments. Drawing attention to ease of retrieval before temporal judgments eliminates this effect. Those with less knowledge about an event elaborated on it less, found it easier to recall, and judged it as more near in a concrete (vs. abstract) mindset. However, those with greater knowledge elaborated on it less, found it easier to recall, and judged it as more near in an abstract (vs. concrete) mindset. This is the first reversal of the

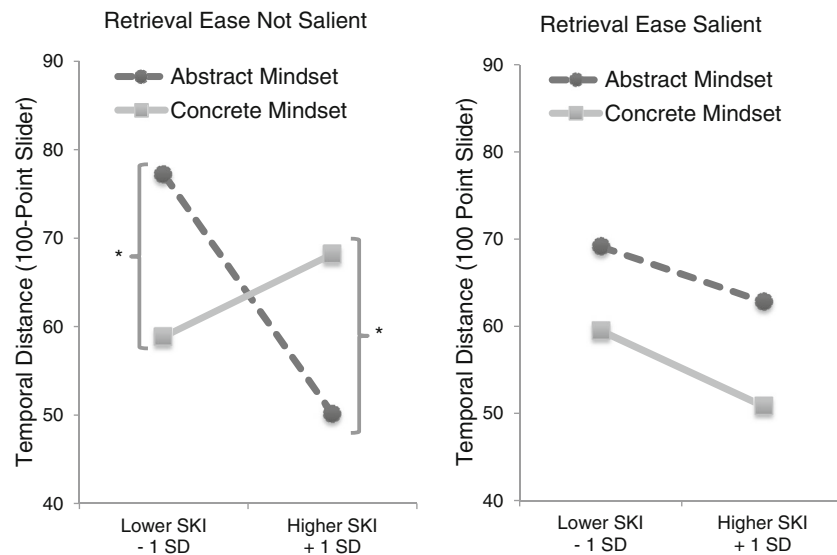


Fig. 3 Temporal distance by construal mindset for lower- and higher-SKI levels when ease of retrieval was not salient versus was salient for Experiment 2. Asterisk (*) denotes differences significant at $p < .05$. All

values are predicted values based on regression results (Aiken & West, 1991). Regression interaction terms: mindset \times SKI, mindset \times ease salience, SKI \times ease salience, mindset \times SKI \times ease salience

relationship between construal level and distance observed in over a decade of work.

There are several possible explanations for why this interaction has not been observed in previous work in construal level theory. First, most work examining the relationship between construal level and distance has involved future events where knowledge levels did not vary because the objects were unfamiliar (e.g., evaluating new digital cameras, potential jobs) or specialized knowledge was not required (e.g., opening a bank account, subscribing to a newspaper; see Trope & Liberman, 2010, for a review). Second, much prior research focused on the influence of temporal distance (e.g., a day vs. a year away) on the construal of events. Far less work has examined the influence of concrete versus abstract mindsets on judgments of temporal distance (Trope & Liberman, 2010). The only other research that does so is Kyung et al. (2010). Finally, Semin and Smith (1999) found a relationship between the objective distance of social events and their linguistic representation in memory. More distant events were described in more abstract language, and retrieval cues employing more abstract language led to recall of more distant examples of such events. Those studies did employ personal events where participants would have had high knowledge, but the association between distance and linguistic predicates, on which the work focused, would have acted as a stronger cue for judgments than feelings of fluency.

Thus, our work is unique in examining the influence of construal mindsets when people have different levels of knowledge. Given the explanations outlined above, further work could examine how construal mindsets influence judgments about the future when people vary in knowledge—for example, when thinking about a very good

friend versus an unknown other. Understanding the relationship between these constructs for the future versus the past is important given the asymmetries demonstrated in such judgments (Caruso, Van Boven, Chin, & Ward, 2013). Further research can also examine the relative impact of distance, construal mindsets, and other factors that influence construal level—such as linguistic predicates or fluency—on judgments. These factors can also interact, which is another important area for future research. Alter and Oppenheimer (2008) found that people who experience disfluency are more likely to interpret situations abstractly and perceive them as more distant. Tsai and Thomas (2011) found that whether or not fluency influences evaluations depends on whether people are engaged in abstract versus concrete thinking. We found that retrieval-ease can arise from an interaction between knowledge and construal mindset, which can contribute to judgments of temporal distance.

We have found that this effect is robust across other types of news events and manipulations of construal mindset. In an experiment employing a paradigm similar to that of Experiment 1, participants with less knowledge felt the Dole spinach recall (October 6, 2006) due to *E. coli* contamination was more recent when recalling it in a concrete mindset, $\beta_{\text{construal}} = .46$, $t(34) = 2.97$, $p = .005$, and participants with greater knowledge felt it was more recent when recalling it in an abstract mindset, $\beta_{\text{construal}} = -.33$, $t(34) = -2.13$, $p = .04$; $\beta_{\text{interaction}} = -.21$, $t(34) = -3.55$, $p = .001$; $R^2 = .42$, $F(1, 34) = 12.60$, $p = .001$. In another experiment, we manipulated construal mindset by asking participants to think of three reasons why (abstract) versus three reasons how (concrete) the events of the Dell battery recall (August 14, 2006) occurred, a variant of the how versus why manipulation from

Freitas et al. (2004). Again, participants with less knowledge felt closer to the event when recalling it in a concrete mindset, $\beta_{\text{construal}} = .69$, $t(32) = 1.73$, $p = .09$ (marginally significant), and participants with greater knowledge felt it was more recent when recalling it in an abstract mindset, $\beta_{\text{construal}} = -.85$, $t(32) = -2.13$, $p = .04$; $\beta_{\text{interaction}} = -.28$, $t(32) = -2.32$, $p = .03$; $R^2 = .15$, $F(1, 32) = 5.38$, $p = .03$.

However, further research could examine other contexts and factors that influence the effect of knowledge as a moderator on judgments. Because memory-based judgments are based on some combination of the content recalled and the experience of recall itself (Koriat, 2007), in what contexts does content override feelings of fluency and attenuate this interaction? Experiment 2 illustrated an instance where the construal mindset and knowledge interaction had an effect even with a marginally significant main effect of knowledge. But when might the sheer amount of information recalled (Brown et al., 1985) override any feelings of fluency when temporal judgments are made? Furthermore, Experiment 2 demonstrated that drawing attention to ease of retrieval before temporal judgments were made eliminated the effect of the interaction on temporal judgments, but Experiment 1 illustrated that ease of retrieval partially mediated the effect of the interaction on temporal judgments. Construal mindsets might influence additional aspects of event recall—for example, the vividness of the information or the emotions associated with that information, which might vary by the type of event.

In sum, our work is novel in introducing a moderator that reverses the relationship typically observed between construal level and distance and highlights the importance of pursuing further work to understand factors that moderate the relationship between construal level and distance when examining both the future and the past.

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