

How Long Did I Wait? The Effect of Construal Levels on Consumers' Wait Duration Judgments

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We examine how construal levels affect wait duration judgments through two different routes: one based on consumers' subjective feelings (an affective route) and the other based on mental markers (a cognitive route). We further identify the conditions under which the affective versus the cognitive route operates. We theorize that low-level construal people generate more wait-unrelated thoughts during the wait than high-level construal people. This difference in turn affects duration judgments in opposite directions depending on the judgment strategy that people use. People spontaneously rely on their subjective feelings—how long they *feel* they have waited. In this case, low- (vs. high-) level construal consumers, who are more distracted by their wait-unrelated thoughts, find the wait to be less boring and hence judge it to be shorter. However, when subjective feelings become less accessible (after a delay) or diagnostic (perceived as less trustworthy), or when mental markers become more accessible, people resort to the number of thoughts they had during the wait to infer the duration—the more thoughts they had, the longer it must have been. In this case, low- (vs. high-) level construal people perceive the wait to be longer. Results from five studies support the proposed framework.

Keywords: construal level, waiting, duration judgment, time perception, mental marker

Consumers often have to wait to acquire products or services. They typically perceive these waiting

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experiences in a negative way (Larson 1987). An extended wait before receiving a product or service generally leads to reduced customer satisfaction (Taylor 1994) and less favorable attitudes toward the product or service provider (Davis and Vollmann 1990; Katz, Larson, and Larson 1991). Hence, reducing wait durations is essential to positive consumer experiences and successful business results. Interestingly, it is often the perceived wait time rather than the actual wait time that determines customer satisfaction. Yet people's perceived durations are not always accurate (Hornik 1984; Katz et al. 1991). Duration judgments can be influenced by a variety of factors, such as the number of activities people engage in during the wait (Taylor 1994), their emotional states (Angrilli et al. 1997; Hornik 1992), and other subtle environmental cues, such as music in the background (Kellaris and Kent 1992) or area carpets and queue guides in stores (Zhao, Lee, and Soman 2012). In this research, we aim to extend the understanding of

consumers' waiting experience by examining how construal levels (i.e., how abstractly or concretely people think) influence wait duration judgments.

Specifically, we theorize and find that low-level construal people generate more wait-unrelated thoughts during the wait compared to high-level construal people. This difference in turn could affect duration judgments in opposite ways depending on the strategy people use in making the judgments. We argue that, by default, people rely on their subjective feelings as a basis of duration judgments—how long they *feel* they have waited. In this case, low- (vs. high-) level construal consumers, who are distracted by their many wait-unrelated thoughts generated during the wait, will find the wait experience to be less boring and hence judge it to be shorter. However, there are situations in which people use the thoughts they have generated as mental markers to infer how long they have waited (i.e., the more thoughts I had during a wait, the longer it must have been). In this case, low- (vs. high-) level construal consumers who have generated more thoughts will judge the wait to be longer. We argue that people rely on the number of mental markers in duration judgments when subjective feelings become less accessible or less diagnostic, or when mental markers become more accessible. In the rest of the article, we first develop our theoretical framework on how construal levels affect wait duration judgments. We then present five studies that test our hypotheses. We discuss the theoretical contributions and implications of our research at the end.

THEORETICAL FRAMEWORK

Past research has shown that people's duration judgments are influenced by many factors, such as the nature of the wait itself (e.g., complexity and intensity of the wait experience; Ahn, Liu, and Soman 2009; Avni-Babad and Ritov 2003; Block and Zakay 1997; Goldstone, Lhamon, and Sechzer 1978) and various environmental features (e.g., background music; Hui, Dube, and Chebat 1997; Kellaris and Kent 1992). In contrast, the current research examines an important factor related to the *consumers* who are in the wait—their construal levels.

Construal Levels and Thoughts Generated during the Wait

According to construal level theory (CLT; Trope and Liberman 2003), information can be construed at either an abstract, high level or a concrete, low level. High-level construals are superordinate and decontextualized mental representations of information, and reflect a more general understanding of actions and events. In contrast, low-level construals are subordinate and contextualized mental representations, and reflect the details or specifics of actions and events. For example, the same act of locking a door can be

thought of as securing the house (a high-level construal) or putting a key in the lock (a low-level construal). As a result, low-level mental representations tend to be more complex, less schematic, and more detailed, whereas high-level representations are simpler, more schematic, and prototypical (Fiske and Taylor 1991; Smith 1998).

Central to our theorizing, CLT also proposes that people with high-level construals tend to focus on goal-relevant features that are essential to the meaning of an action or event. In contrast, people with low-level construals tend to focus on goal-irrelevant features, such as incidental features that are secondary to the primary goal (Trope and Liberman 2003). For example, high-level construals of an event of “watching a movie on TV” may contain mostly features of the movie itself; low-level construals of the same event may contain more goal-irrelevant features such as the commercials aired during the break, or the noise in the house while the movie was on. Consistent with this theorizing, Trope and Liberman (2000) showed that in choosing between two options, one superior on goal-relevant features and the other superior on goal-irrelevant features, participants put greater weight on goal-irrelevant features for near-future preferences (which are associated with low-level construals) than for distant-future preferences (which are associated with high-level construals).

This difference between high-level and low-level construals has important implications for our research. In the context of waiting, the primary goal is to wait for the products or services; hence, thoughts related to waiting are more goal-relevant and those unrelated to waiting are more goal-irrelevant. Therefore, we propose that compared to high-level construals, low-level construals will lead to a greater number of distinct wait-unrelated thoughts during a wait. We further propose that this difference in turn affects duration judgments depending on the strategy that people use for duration judgments.

Two Duration Judgment Strategies—Subjective Feelings versus Mental Markers

Past research suggests that people often form their duration judgments based on their subjective feelings during the wait. For example, Maister (1985) argued that people tend to focus on the experiential aspect of the wait and their duration judgments are influenced by how they feel during the wait, such as bored, anxious, or uncertain. Extant findings have also shown that when people have nothing to do while waiting and thus feel bored, time seems to stand still (Kellaris and Kent 1992). As William James (1890) observed, duration lengthens when “we grow attentive to the passage of time itself” (626). This suggests that when people think more about things that are unrelated to the wait, which distract them from the wait itself, they should feel less bored and time should seem to go by faster. Following this line of reasoning, we argue that when

people rely on their subjective feelings in making duration judgments, those with low- (vs. high-) level construals, who are more distracted by the greater number of wait-unrelated thoughts, should feel less bored during the wait and hence perceive the same wait to be shorter.

While there has been ample evidence showing that duration judgments can be based on subjective feelings, past research has also identified another commonly employed strategy for duration judgments. That is, people sometimes make duration judgments based on the number of markers that have occurred during a time period (e.g., the number of activities that have taken place; Ahn et al. 2009; Block and Zakay 1997). If a time period consists of more stimuli, people infer that the duration is longer (Ornstein 1969). For example, Zauberman et al. (2010) showed that an event in the past was judged to be more distant from now when more (vs. fewer) intervening events have occurred during the time period. In this case, people use the number of events that have occurred as mental markers to infer the length of the duration. In line with these findings, we argue that, when people rely on mental markers in making duration judgments, since those with low-level construals (vs. high-level construals) generate a greater number of wait-unrelated thoughts during the wait and their wait-related thoughts are not expected to differ, they should also have a greater number of *total* distinct thoughts and thus should judge the same wait to be longer (i.e., “the more things I have thought about during the wait, the longer it must have been”).

When Are Duration Judgments Based on Subjective Feelings versus Mental Markers?

Then the natural question is: When do consumers make duration judgments based on subjective feelings versus mental markers? Although little prior research has systematically examined the conditions under which people use one strategy versus the other, some research has provided initial evidence that duration judgments based on subjective feelings seem to be the default strategy.

Of particular relevance, Ahn et al. (2009) created either a rich or an impoverished experience by exposing participants to slideshows with different photographs. They showed that, when people judged the duration immediately after the slideshow, they considered a rich experience (e.g., viewing 30 different slides for 6 seconds each) to be shorter than an impoverished experience (e.g., viewing 6 different slides for 30 seconds each), presumably because participants were relying on their subjective feelings of boredom (a rich experience is less boring than an impoverished experience).

This finding is consistent with past research suggesting that feeling-based judgments are more automatic than cognitive-based judgments (Pham 1998; Schwartz and Clore 1996; Zajonc 1980). Therefore, we propose that people by default rely on their subjective feelings in making

duration judgments. In this case, people with low-level construals, who are distracted by a greater number of wait-unrelated thoughts, should feel less bored and hence judge the same wait duration as shorter than those with high-level construals.

Then when do mental markers come into play? Extant research suggests that the reliance on different judgment inputs depends on the *relative* accessibility and diagnosticity of such inputs (Feldman and Lynch 1988; Greifeneder, Bless, and Pham 2011). In the context of our research, this would suggest that how people make duration judgments depends on the accessibility and diagnosticity of both subjective feelings and mental markers. Although feeling-based duration judgments are the default, when feelings become less accessible or diagnostic, or when mental markers become more accessible or diagnostic, people will rely on mental markers to form duration judgments. Indeed, Ahn et al. (2009) showed that people were more likely to rely on mental markers in duration judgments after a delay, presumably because their subjective feelings had dissipated while the mental markers encoded during the wait were still stored in memory. In addition, Avnet, Pham, and Stephen (2012) showed that people relied on their feelings *only* when these feelings were perceived to be diagnostic to the judgment. Furthermore, findings from Zauberman et al. (2010) suggested that people’s duration judgments can also be influenced by the accessibility of event markers (the number of events that have occurred since the target event).

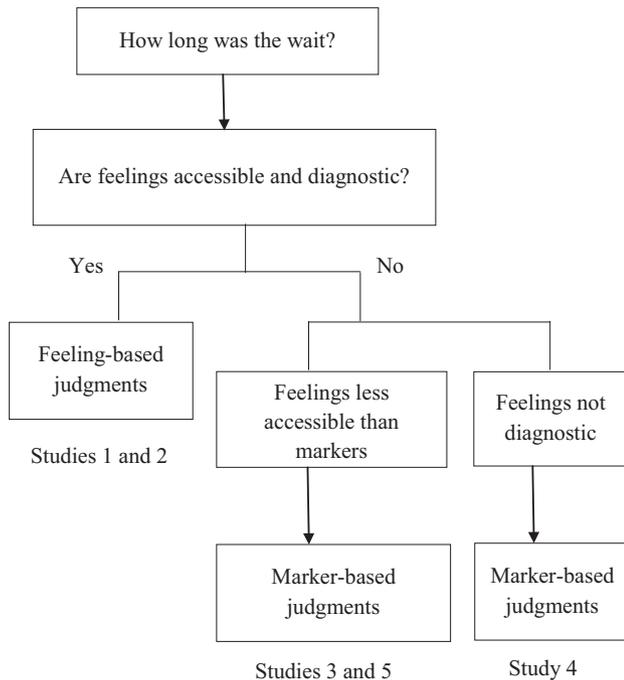
Building on these findings, we hypothesize that although people by default rely on their subjective feelings, they will resort to mental markers as the basis of their duration judgments when subjective feelings become less accessible, when their feelings are perceived to be less diagnostic, or when mental markers become more accessible. In such cases, low- (vs. high-) level construal people should judge the same wait to be longer because they infer the length of the duration based on the greater number of distinct thoughts generated during the wait. We have illustrated our conceptual model in figure 1.

OVERVIEW OF STUDIES

We tested our hypotheses in a series of five studies. In studies 1 and 2, we show that people spontaneously used their subjective feelings as the basis of duration judgments. Specifically, we show in study 1 (a field experiment) that low-level construal consumers judged the same wait as shorter than high-level construal consumers. In study 2, we replicate the findings of study 1 in a laboratory experiment. More importantly, through serial mediation, we show that construal levels affected participants’ wait-unrelated thoughts, which in turn affected their subjective feelings of boredom and, consequently, their duration judgments. In studies 3 to 5, we identify conditions under which people

FIGURE 1

DURATION JUDGMENTS BASED ON SUBJECTIVE FEELINGS VERSUS MENTAL MARKERS



resorted to mental markers as a basis of their duration judgments. We find that people used mental markers when subjective feelings became less accessible (i.e., when subjective feelings dissipated over time; study 3) or less diagnostic (i.e., when feelings were perceived to be less trustworthy; study 4), or when mental markers became more accessible (i.e., when mental markers were made more salient; study 5). In such cases, low-level construals led to longer duration judgments than high-level construals. It should be noted that although the diagnosticity of mental markers is also part of our conceptual model, we did not test it in our studies.

Across five studies, we employ different operationalizations of construal levels (measured and manipulated) and multiple research methods (field study and laboratory experiments) to demonstrate the validity and robustness of our findings. It is worth noting that both our theorizing and predictions are based on the *relative* differences between low-level and high-level construals. Thus, across all the studies, our focus of comparison is the contrast between low-level construal conditions and high-level construal conditions.

STUDY 1

Study 1 was designed to test our hypothesis that people spontaneously rely on their subjective feelings in duration

judgments, in which case low-level construal consumers judge the same wait duration as shorter than high-level construal consumers. To demonstrate external validity, we tested our prediction in a field setting that involved actual consumers waiting for a real product or service. Specifically, we approached café patrons who came to the café to buy their lunch. They went through a disguised construal-level manipulation and then estimated how long they had waited. Thus, this study employed a one-factor between-subjects design (high- vs. low-level construals). For greater managerial relevance, we also designed a more realistic construal-level manipulation that can be easily adopted by marketers to vary consumers' construal levels (and hence influence their duration judgments) in a real-world setting.

Method

Procedure. Forty-five university students (18 female) participated in this study. The study was conducted in a university café (hereafter referred to as the Coffee Shop), which is designed in such a way that allows a linear queue to form in front of the counter. As people enter the Coffee Shop, they join the line, order the food, and then proceed to the checkout counter. There is no clock in the Coffee Shop. One of our experimenters approached participants as they arrived at the Coffee Shop and before they joined the line. Participants were told that the study was about how people make dining decisions and that, should they agree to participate, they would answer a few questions before joining the line and a few more questions after checking out. As a token of appreciation, they would receive a coupon (about US\$3) to be used for the purchase of any food from the Coffee Shop. Once they agreed to participate in the study, the experimenter gave them a short questionnaire, which served as the construal-level manipulation.

In the questionnaire, participants responded to four questions: (1) What comes to your mind first when you think about the Coffee Shop? (2) What is the most attractive characteristic of the Coffee Shop for a student? (3) What is the most attractive characteristic of the Coffee Shop for a professor? (4) What is the most attractive characteristic of the Coffee Shop for a staff? The reason we included four similar questions was to strengthen the manipulation of construal levels, which was necessary given the amount of noise often involved in field settings. The order and wording of the questions were identical in both construal-level conditions. For each question, participants were given four options to choose from, describing the Coffee Shop on four dimensions—food quality, location, décor, and price. In both high- and low-level construal conditions, the four dimensions were the same; the only difference across the conditions was that the choices were framed in either concrete or abstract manners (see the appendix). We expected

that thinking about these different dimensions at either a concrete or an abstract level would induce different construal levels.

To validate our construal-level manipulation, we conducted a post-test with 57 participants from the same subject pool as in the main study. Roughly half of the participants completed the high-level construal questionnaire, and the rest completed the low-level construal questionnaire as described above. Afterward, they responded to the Behavioral Identification Form (BIF; Vallacher and Wegner 1989), a 25-item questionnaire that measures individuals' construal levels. For each question, participants indicated what an action (e.g., locking a door) meant to them by choosing one of two options corresponding to either a more abstract, high-level representation (e.g., securing the house) or a more concrete, low-level representation (e.g., putting a key in the lock). Each answer was coded as 1 if participants chose the high-level construal representation or as 0 if they chose the low-level construal representation. The responses to the 25 questions were summed up for each participant, yielding a BIF score. Higher BIF scores indicate a greater tendency toward high-level construals. A one-way ANOVA on participants' BIF scores revealed that participants who completed the high-level construal questionnaire had higher BIF scores ($M = 16.34$) than did those who completed the low-level construal questionnaire ($M = 14.00$, $F(1, 55) = 4.28$; $p < .05$, $\eta_p^2 = .07$). These results suggest that our construal-level manipulation successfully induced high- versus low-level construals.

After completing the construal-level manipulation, participants in the main study joined the line and ordered their food. Once they received their food and paid at the check-out counter, they were immediately greeted by another experimenter and responded to a second questionnaire. In this follow-up questionnaire, they estimated how long they had waited, which was defined as the time from when they joined the line to when they finished paying. The experimenter ensured that participants did not use any timekeeping device (watch or cell phone) during the wait or when filling out the questionnaire. Finally, they responded to some demographic questions and were thanked and given the coupon. The experimenters also tracked each participant's *actual* wait time by computing the difference between the time they joined the line and the time they finished paying.

Results and Discussion

Duration Judgments. Participants' wait estimates (in minutes) were subjected to a one-way ANCOVA with construal level as the predictor and their actual wait time as a covariate. Results revealed a marginally significant effect of construal level on duration judgments ($F(1, 42) = 3.82$; $p < .06$, $\eta_p^2 = .21$). Consistent with our predictions, café patrons who were primed with low-level construals

estimated their wait as shorter ($M = 3.45$ minutes) than those primed with high-level construals ($M = 4.50$ minutes). The effect of actual wait time on wait duration judgments was also significant ($F(1, 42) = 11.27$; $p < .01$, $\eta_p^2 = .08$). It is interesting to note that the actual average wait time was about 6 minutes, which suggests that participants in both construal-level conditions underestimated the wait time. Despite the general tendency toward underestimation, we still observed the predicted difference between high- and low-level construal participants.

The results of study 1 support our hypothesis that, by default, people with low-level construals judge the same wait duration as shorter than those with high-level construals. This is consistent with our theorizing that consumers spontaneously rely on their subjective feelings for duration judgments. We also demonstrated the external validity of our findings by testing the hypothesis in a field setting where participants waited for a real product or service. In addition, this study employed a realistic construal-level manipulation that can be readily adopted by marketers to vary consumers' construal levels and influence their perception of wait time.

However, despite having enhanced external validity, field studies are subject to many alternative influences and noises from the environment. Furthermore, one could argue that our construal-level manipulation might have rendered the environmental dimensions more salient in the low-level construal condition, which distracted our participants from the wait and led to shorter duration judgments. While this explanation is not entirely inconsistent with our theory, we would like to rule it out with a different construal-level manipulation. Therefore, in the next study, we aim to replicate our findings in a controlled laboratory setting and with a well-established construal-level manipulation. Furthermore, to shed light on the underlying process, we also examined participants' thoughts and feelings during the wait.

STUDY 2

According to our theory, people with low- (vs. high-) level construals have more wait-unrelated thoughts during the wait, and thus they are more distracted and feel less bored. Consequently, low- (vs. high-) level construal people perceive the same wait to be shorter. In other words, we expected the following sequential effects: low construal level \rightarrow more wait-unrelated thoughts \rightarrow less boredom \rightarrow shorter duration judgments. To provide evidence for the hypothesized process, we measured the extent to which participants' thoughts focused on wait-unrelated versus wait-related things in study 2. We also measured their subjective feelings of boredom. In addition, we counterbalanced the order of the duration judgments and mediators to account for any potential carryover effect due to

measurement order. Thus, we employed a 2 (construal level: high vs. low) \times 2 (measurement order: duration judgments measured first vs. mediators measured first) between-subjects design.

Method

Two hundred fifty-six MTurk participants (140 female) took part in the online study in exchange for \$1. Participants were randomly assigned to one of the two construal-level conditions. The construal-level manipulation involved a category- or exemplar-generation task (Fujita et al. 2006). Specifically, we gave all participants a list of 15 nouns (e.g., dog). Participants in the high-level construal condition were asked to generate a superordinate category label for each noun (e.g., pet), whereas those in the low-level construal condition were asked to generate a subordinate exemplar (e.g., golden retriever). After the word-generation task, participants were told that they would move on to a different study, but the next study would take some time to load. They were asked to wait while the next study was loading. It was emphasized that they should not leave their computer or do other things while the study was loading. A loading screen appeared as they waited. After 90 seconds, the computer advanced to a new screen. Participants were told that the next study was ready to begin.

Half of the participants were then asked to report how long they had waited for the study to load by indicating their perceived wait duration on a seven-point scale (1 = very short; 7 = very long). Afterward, they were asked to indicate how bored they felt while they were waiting for the study to load on a seven-point scale (1 = not at all bored; 7 = very bored). They also reported the extent to which they thought about wait-unrelated versus wait-related things by dragging a numbered slider (0–100) anchored from “my thoughts were all related to the wait” on the left end to “my thoughts were all unrelated to the wait” on the right end. A higher number indicates more wait-unrelated (vs. wait-related) thoughts during the wait. The other half of the participants reported boredom and wait-unrelated thoughts first, and then estimated wait duration. Finally, everyone completed demographic questions and was thanked and debriefed.

Results

Duration Judgments. To test our hypothesis that people with low-level construals judge the wait as shorter than those with high-level construals, we conducted a 2 (construal level) \times 2 (measurement order) ANOVA on participants' perceived wait duration. Consistent with our theorizing and replicating our findings from the field study, there was a significant main effect of construal level such that participants primed with low-level construals judged the wait as shorter than those primed with high-level

construals ($M_{\text{low-level}} = 4.12$ vs. $M_{\text{high-level}} = 4.51$; $F(1, 252) = 4.25$, $p < .05$, $\eta_p^2 = .02$). The main effect of measurement order and the interaction between construal level and measurement order were not significant ($F_s < 1$).

Feelings of Boredom. We conducted a similar 2 (construal level) \times 2 (measurement order) ANOVA on participants' feelings of boredom during the wait. Consistent with our hypothesis, the analysis yielded a significant main effect of construal level such that those with low-level construals felt less bored than did those with high-level construals ($M_{\text{low-level}} = 5.38$ vs. $M_{\text{high-level}} = 5.94$; $F(1, 251) = 5.13$, $p < .05$, $\eta_p^2 = .02$; the degree of freedom is smaller here due to a missing value). There was also a significant main effect of order such that participants reported feeling more bored when boredom was measured before the duration judgments ($M_{\text{mediator first}} = 5.93$ vs. $M_{\text{duration judgment first}} = 5.41$; $F(1, 251) = 4.30$, $p < .05$, $\eta_p^2 = .02$). This could be due to the fact that feelings of boredom were more salient right after the wait experience, when boredom was measured first. The interaction between construal level and measurement order was not significant ($F < 1$).

Wait-Unrelated Thoughts. A 2 (construal level) \times 2 (measurement order) ANOVA on participants' wait-unrelated thoughts revealed a marginally significant main effect of construal level such that the thoughts of low- (vs. high-) level construal participants were more wait-unrelated ($M_{\text{low-level}} = 58.76$ vs. $M_{\text{high-level}} = 52.51$; $F(1, 252) = 3.36$, $p < .07$, $\eta_p^2 = .01$). Neither the main effect of measurement order nor the interaction between construal level and measurement order was significant ($F_s < 1$).

Serial Mediation. We predicted that construal level affects participants' wait-unrelated thoughts during the wait, which in turn affects their subjective feelings of boredom and consequently their duration judgments. To examine the mediating role of wait-unrelated thoughts and boredom, we conducted a serial-mediation analysis using a bootstrapping procedure (model 6, Preacher and Hayes 2004, 2008; Zhao, Lynch, and Chen 2010). Since there was no interaction effect between construal level and measurement order on any of the mediators or the main dependent variable, we collapsed the data across the two measurement-order conditions. The first part of the model regressed wait-unrelated thoughts on construal levels (low-level construal was coded as 1 and high-level construal was coded as 2) and showed a marginally significant effect of the construal levels ($B = -6.25$, $p = .06$; $R^2 = .01$). Then, we regressed felt boredom on construal levels and wait-unrelated thoughts ($R^2 = .08$, $p < .001$). The effect of wait-unrelated thoughts on boredom was significant ($B = -.02$, $p < .001$), whereas the effect of construal levels on boredom was only marginally significant ($B = .45$, $p = .09$). The last part of the model ($R^2 = .21$, $p < .001$) regressed duration judgments on construal levels,

wait-unrelated thoughts, and boredom. The results revealed a significant effect of boredom ($B = .29, p < .001$), whereas the effects of construal levels ($B = .22, p > .15$) and wait-unrelated thoughts ($B = -.003, p > .3$) were no longer significant. Finally, consistent with our hypothesis, the serial mediation through wait-unrelated thoughts and boredom was significant (.0347, 95% CI [.0025, .0933]). We also conducted the same analysis with the mediators in the reverse order (boredom as the first mediator and wait-unrelated thoughts as the second mediator). The indirect effect was not significant when the order of the mediators was reversed (.0056; 95% CI: $-.0023$ to $.0285$).

Discussion

Replicating the field study findings, we showed in a controlled experiment that, by default, low-level construals led to shorter wait duration judgments than high-level construals. More importantly, consistent with our theorizing, we showed that low-level construals led to more wait-unrelated thoughts during the wait, which in turn led to less boredom and consequently shorter duration judgments. Taken together, the results from studies 1 and 2 support our hypothesis that people spontaneously rely on their subjective feelings in wait duration judgments.

In the next three studies, we aimed to identify the conditions under which people resort to mental markers as the basis for their wait duration judgments. Based on prior research (Feldman and Lynch 1988; Greifeneder et al. 2011), we hypothesized that people are more likely to rely on mental markers when the subjective feelings during the wait become less accessible (study 3), when such feelings are perceived to be less diagnostic (study 4), or when mental markers become more accessible (study 5). Under these circumstances, we expected low-level construal people to perceive the same wait duration as longer than high-level construal people.

STUDY 3

We designed study 3 to test the hypothesis that people are more likely to rely on mental markers when their subjective feelings during the wait become less accessible. We varied the accessibility of subjective feelings by including a delayed-duration-judgment condition. Consistent with prior findings (Ahn et al. 2009), we expect that when duration judgments are made after a delay, whereas visceral factors such as subjective feelings have dissipated, mental markers encoded during the wait are still stored in memory. Thus, people are more likely to rely on mental markers in making duration judgments after a delay, in which case people with low-level construals judge the same duration as longer than those with high-level construals. Thus, study 3 employed a 2 (construal level: high vs. low) \times 2 (timing of duration judgments: immediate vs. delayed) between-subjects design. We predicted that when participants make

duration judgments immediately after the wait (as in studies 1 and 2), we would replicate our earlier finding that people with low-level construals judge the wait as shorter than those with high-level construals. However, when participants make duration judgments after a delay, the reverse pattern would occur: people with low-level construals judge the wait as longer than those with high-level construals.

Method

Procedure. One hundred twenty-eight undergraduate students (76 female) participated in the study in exchange for payment. They were randomly assigned to one of the four experimental conditions. The study was conducted on computers and the system clock function was disabled so that participants could not tell the time from the computer.

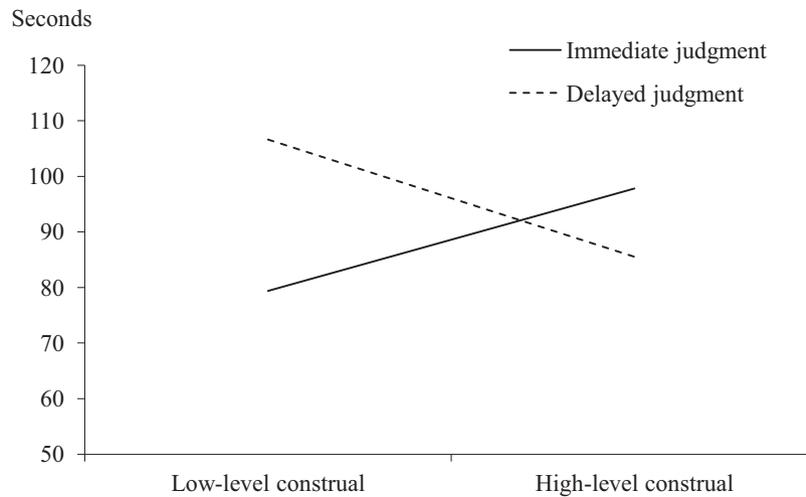
Participants first completed the same construal-level manipulation with the category- or exemplar-generation task as in study 2. Then, they were told to move on to a different study, but the next study would take some time to load. They were asked to wait while the next study was loading. A loading screen appeared as they waited. After 90 seconds, the computer advanced to a new screen. Participants were then told that the next study was ready to begin. In the immediate-duration-judgment condition, participants estimated how long they had waited before they started the next study by dragging a numbered slider anchored from 1 second on the left end to 200 seconds on the right end. In the delayed-duration-judgment condition, participants first completed some filler tasks for about 30 minutes. Afterward, participants estimated how long they had waited for the study to load on the same slider as described above. Finally, participants completed demographic information and were thanked and debriefed.

Results

Duration Judgments. Participants' estimated wait durations were first subjected to a logarithmic transformation because the duration estimations were positively skewed. All the analyses were conducted with log-transformed wait estimations, but the means reported below are raw numbers for ease of interpretation. A 2 (construal level) \times 2 (timing of duration judgments) ANOVA on participants' duration estimates revealed that neither of the main effects was significant ($p > .25$). Consistent with our prediction, there was a significant interaction between construal level and timing of duration judgments ($F(1, 124) = 8.38, ps < .01, \eta_p^2 = .06$; figure 2). In the immediate-duration-judgment condition, consistent with our earlier findings, participants in the low-level construal condition judged the wait as shorter than those in the high-level construal condition ($M_{\text{low-level}} = 79.38$ sec vs. $M_{\text{high-level}} = 97.76$ sec; $F(1, 124) = 4.83, p < .05, \eta_p^2 = .04$). However, in the

FIGURE 2

WAIT DURATION JUDGMENTS AS A FUNCTION OF CONSTRUAL LEVEL AND TIMING OF DURATION JUDGMENTS (STUDY 3)



NOTE.—Wait duration judgments in the figure are in raw numbers for ease of interpretation.

delayed-duration-judgment condition, the opposite pattern occurred as expected: low-level construal participants judged the wait as longer than high-level construal participants ($M_{\text{low-level}} = 106.62$ sec vs. $M_{\text{high-level}} = 85.53$ sec; $F(1, 124) = 4.96, p < .05, \eta_p^2 = .04$).

Discussion

Taken together, the results of the first three studies show that when subjective feelings are readily accessible (i.e., immediately after the wait), people rely on their subjective feelings in making duration judgments, in which case low-level construals lead to *shorter* duration judgments than high-level construals. However, when subjective feelings during the wait have dissipated (i.e., after a delay), people resort to mental markers as the basis of their judgments, in which case low-level construals lead to *longer* duration judgments than high-level construals. These results support our theorizing that people spontaneously rely on subjective feelings, but switch to mental markers for their duration judgments when subjective feelings during the wait become less accessible. These results are also consistent with findings from Ahn et al. (2009).

STUDY 4

We designed study 4 to achieve two objectives. First, we wanted to identify another situation under which people may resort to mental markers in duration judgments. Past research suggests that the use of feelings in judgments

depends not only on the accessibility of these experiential inputs (as shown in study 3) but also on the diagnosticity of such feelings (Greifeneder et al. 2011; Pham 2009). Hence we postulated that, although people spontaneously rely on subjective feelings in duration judgments, when such feelings are perceived to be less diagnostic, people are more likely to resort to mental markers. One determinant of the perceived diagnosticity of feelings is people's belief in the trustworthiness of their feelings—that is, to what extent people believe that using feelings would lead to the “right” judgments or decisions (Avnet et al. 2012).

To this end, prior to making duration judgments, we varied participants' perceived diagnosticity of subjective feelings by manipulating their trust in using feelings to make judgments. We predicted that when people consider subjective feelings to be diagnostic, they rely on their subjective feelings in duration judgments. In this case, low-level construals lead to shorter duration judgments than high-level construals, as we found in studies 1 and 2. However, when people perceive their subjective feelings to be less diagnostic, they resort to mental markers in their judgments, in which case low-level construals lead to longer duration judgments.

Our second objective was to demonstrate the robustness of our findings by using a different operationalization of construal levels. Rather than using a situational prime as in our earlier studies, we measured participants' chronic tendency to construe information at a high versus low level. Thus, study 4 employed a construal-level (measured) by trust-in-feelings (high vs. low) between-subjects design.

Method

Procedure. One hundred six undergraduate students (66 female) participated in the study in exchange for payment. They were randomly assigned to one of the two experimental conditions. The study was conducted on computers with the system clock disabled. Participants were told that they would take part in several different studies. They first completed a task designed to manipulate their trust in using subjective feelings in judgments. The manipulation was adapted from past research (Avnet et al. 2012). Specifically, in the high-trust-in-feelings condition, participants were told to describe a situation in which they trusted their feelings to make a judgment and it turned out to be the right thing to do. In the low-trust-in-feelings condition, participants were told to describe a situation in which they trusted their feelings to make a judgment and it turned out to be *not* the right thing to do.

After participants completed the task, they were told to move on to a different study. As in studies 2 and 3, they were told that the next study would take some time to load and were asked to wait while it loaded. A loading screen appeared as they waited. After 90 seconds, the computer program advanced to a new screen. Participants were then told that the next study was ready to begin and were asked to estimate how long they had just waited. Similar to study 3, participants were asked to indicate their wait estimates by dragging a numbered slider anchored from 1 second to 200 seconds. Afterward, all participants filled out the Behavioral Identification Form (BIF; Vallacher and Wegner 1989). Each answer was coded as 1 if participants chose the high-level construal representation or as 0 if they chose the low-level construal representation. The responses were summed up for each participant, yielding a BIF score ($\alpha = .68$). Higher BIF scores indicate a greater tendency toward high-level construals. Finally, participants completed some demographic questions and were thanked and debriefed.

Results

Duration Judgments. Participants' estimated wait duration was first subjected to a logarithmic transformation because the duration estimations were positively skewed. To test our hypothesis that trust in feelings would moderate the effect of construal level on duration judgments, we regressed the logarithmically transformed wait estimates with participants' chronic construal level (mean-centered BIF scores), trust in feelings ($-1 = \text{low}$, $1 = \text{high}$), and the interaction term as predictors ($F(3, 102) = 2.52$, $R^2 = .07$, $p < .07$). Neither of the main effects was significant ($ts < 1$). Central to our hypothesis, the interaction between construal level and trust in feelings was significant ($B = .03$, $p < .01$; figure 3). To understand the nature of the interaction, we conducted slope analyses to examine the

effect of construal level at each level of trust in feelings (Fitzsimons 2008). The analysis showed that in the high-trust-in-feelings condition, replicating the findings from studies 1 and 2, low-level construal participants judged the wait as shorter than high-level construal participants ($B = .03$, $t = 2.04$, $p < .05$). Supporting our theory, the opposite pattern emerged in the low-trust-in-feelings condition: low-level construal participants judged the wait to be *longer* than high-level construal participants ($B = -.04$, $t = -1.86$, $p < .07$), presumably because participants resorted to mental markers when their subjective feelings were perceived to be less diagnostic.

Discussion

Taken together, studies 3 and 4 replicated our findings from the first two studies that people spontaneously use their subjective feelings for duration judgments, in which case low-level construals lead to *shorter* duration judgments than high-level construals. More importantly, we find that when these subjective feelings become less accessible (i.e., after a delay) or when the diagnosticity of these feelings is questionable, people resort to mental markers as the basis for duration judgments. In this case, low-level construals lead to *longer* duration judgments than high-level construals.

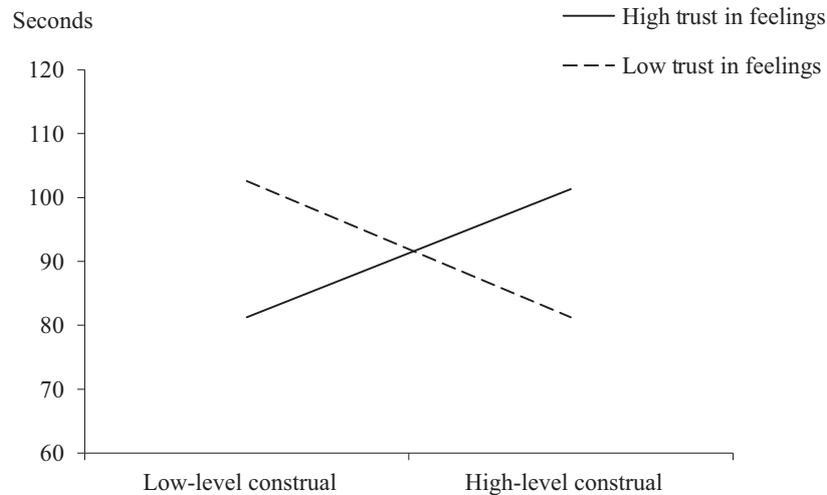
We argue that the reliance on subjective feelings versus mental markers in duration judgments depends not only on the accessibility and diagnosticity of subjective feelings, but also on the accessibility and diagnosticity of mental markers. Thus, in study 5, we aimed to identify another condition under which people rely on the mental marker strategy by making mental markers more accessible. Furthermore, we theorized that the effects of construal level on wait duration judgments arise because low-level construals lead to a greater number of wait-unrelated thoughts (and hence a greater number of total distinct thoughts) than high-level construals. But so far we have shown evidence only in study 2 using a global measure of wait-unrelated (relative to wait-related) thoughts. We conducted study 5 to delve into the nature of the thoughts that people generate during the wait, thereby offering further process evidence for our theory.

STUDY 5

We aimed to achieve two objectives in study 5. First, we wanted to test the hypothesis that people are more likely to resort to mental markers in duration judgments when these markers become more accessible. To vary the accessibility of mental markers, we asked half of the participants to list the thoughts they had during the wait *before* duration judgments, thereby making the mental markers more salient. We asked the rest of the participants to list their thoughts *after* making the duration judgment. We predicted that for

FIGURE 3

WAIT DURATION JUDGMENTS AS A FUNCTION OF CONSTRUAL LEVEL AND TRUST IN FEELINGS (STUDY 4)



NOTE.—Wait duration judgments in the figure are in raw numbers for ease of interpretation. High-level construal refers to one standard deviation above the mean, and low-level construal refers to one standard deviation below the mean.

participants who list their thoughts before the duration judgments, these mental markers are more salient and hence are more likely to serve as the basis for their judgments. As a result, people with low-level construals should judge the wait as longer than those with high-level construals. However, when participants list their thoughts after duration judgments, people still rely on their subjective feelings in making the judgments. Therefore, low-level construals should lead to shorter duration judgments than high-level construals, replicating the results of studies 1 and 2. Thus, study 5 had a construal-level (measured) by mental-marker salience (high vs. low) between-subjects design.

Our second objective was to shed further light on the underlying process for the mental-marker strategy by directly examining the thoughts that people generate during the wait. Our basic premise was that people with low- (vs. high-) level construals generate more wait-unrelated thoughts. As a result, they should also have a greater number of *total* distinct thoughts (since wait-related thoughts are not expected to differ across construal levels) and thus infer the same wait to be longer (i.e., “the more things I have thought about during the wait, the longer it must have been”). In this study, we aimed to demonstrate the mediating role of the total number of distinct thoughts when people use mental markers to infer duration.

Method

Procedure. Three hundred twenty-four undergraduate students (146 female) participated in the study for course

credits. They were randomly assigned to one of the two mental-marker-salience conditions. Their chronic construal levels were measured. The study was conducted on computers with the system clock disabled.

After participants completed an unrelated study, they were told that the next study would take some time to load and were asked to wait while it loaded. Similar to our previous studies, a loading screen appeared as they waited. After 90 seconds of waiting, the computer advanced to a new screen and participants were told that the next study was ready to begin. In the mental-marker-salient condition, participants first wrote down the thoughts they had during the wait. After they finished writing their thoughts, they estimated how long they had waited by dragging a numbered slider anchored from 1 second to 200 seconds. In the condition where mental markers were not salient, participants made their duration judgments first and then wrote down the thoughts they had during the wait. Afterward, all participants filled out the same Behavioral Identification Form (BIF; Vallacher and Wegner 1989) as in study 4 ($\alpha = .74$). Again, higher BIF scores indicate a greater tendency toward high-level construals. Finally, participants completed demographic questions and were thanked and debriefed.

Results

Thoughts Coding. To test our predictions, we first asked a coder unaware of the hypotheses to code the number of distinct thoughts that participants listed. Note that since participants with low-level construals may use more sentences or words to describe the same event, we analyzed

the number of distinct thoughts they listed rather than the number of sentences or words used in thought listing. For example, “I was thinking about what to do for lunch. I thought about going to Burger King or going home to eat” was coded as one thought (what’s for lunch). The number of distinct thoughts participants listed was summed up to form a total thought index ($M = 3.33$, $SD = 1.53$).

To shed further light on the nature of the thoughts, we also asked our coder to conduct a more fine-grained coding. Depending on the thought content, each thought was coded for its valence—whether it was positive (e.g., “this weekend’s football game is going to be very good”), negative (e.g., “this environment stresses me out”), or neutral (e.g., “the people I met at the door just now”). The number of thoughts of each valence was summed up to form a positive thought index ($M = .09$, $SD = .32$), a negative thought index ($M = 1.36$, $SD = 1.09$), and a neutral thought index ($M = 1.88$, $SD = 1.49$). In addition, each thought was coded in terms of whether it was wait-related (e.g., “why am I still waiting?”) or wait-unrelated (e.g., “I hope the weather stays nice”). The numbers of wait-related and wait-unrelated thoughts were summed up to form a wait-related thought index ($M = 1.26$, $SD = .99$) and a wait-unrelated thought index ($M = 2.08$, $SD = 1.51$).

Total Number of Distinct Thoughts. We predicted that low-level construals should lead to a greater number of total distinct thoughts. To test this prediction, we regressed the total thought index on participants’ chronic construal level (mean-centered BIF scores), mental-marker salience ($-1 = \text{low}$, $1 = \text{high}$), and the interaction term between the two factors ($R^2 = .05$, $F(3, 315) = 5.31$, $p < .001$). Consistent with our hypothesis, the analysis yielded a significant main effect of construal level such that low-level construal participants listed more thoughts than high-level construal participants ($B = -.05$, $t = -2.56$, $p < .05$). The main effect of mental-marker salience was also significant such that participants listed more thoughts when the thought-listing task came first ($B = .23$, $t = 2.78$, $p < .01$). The interaction between construal level and mental-marker salience was not significant ($B = -.03$, $t = -1.52$, $p > .12$).

Wait-Unrelated versus Wait-Related Thoughts. We also predicted that people with low-level construals would have more wait-unrelated thoughts. A regression analysis on the wait-unrelated thought index ($R^2 = .02$, $F(3, 315) = 1.81$, $p > .14$) revealed that, as predicted, there was a significant main effect of construal level such that participants with low-level construals had more wait-unrelated thoughts ($B = -.04$, $t = -2.11$, $p < .05$). Neither the main effect of mental-marker salience nor the interaction was significant ($ps > .34$). These findings are consistent with our theorizing that people with low-level construals tend to have more wait-unrelated thoughts, which distract them from the wait and make them feel less bored during the wait, as we

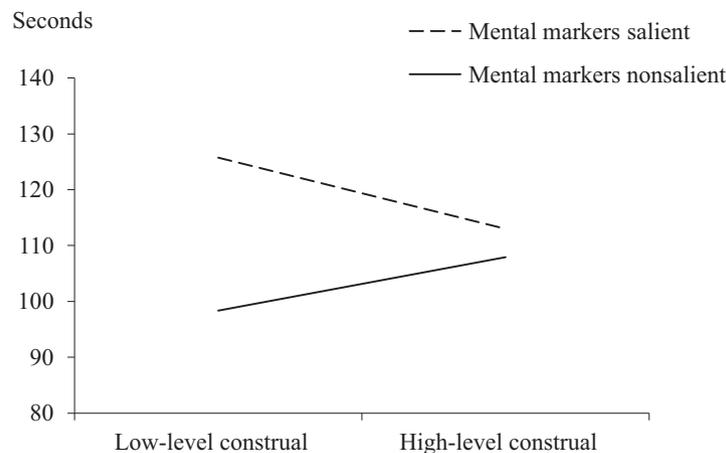
showed in study 2. A similar analysis on the wait-related thought index ($R^2 = .04$, $F(3, 315) = 3.95$, $p < .01$) yielded only a significant main effect of mental-marker salience such that participants had more wait-related thoughts when the thought-listing task came first ($B = .18$, $t = 3.26$, $p < .01$). Neither the main effect of construal level nor the interaction was significant ($ps > .37$).

Thought Valence. To examine whether thoughts of different valence (positive, negative, or neutral) would vary as a function of construal level and mental-marker salience, we also conducted similar regression analyses on the number of thoughts of different valences. For the positive thought index ($R^2 = .01$, $F(3, 315) = 1.01$, $p > .30$), neither the main effects nor the interaction was significant ($ps > .10$). The same was true for the negative thought index ($R^2 = .01$, $F < 1$, $p > .40$): neither the main effects nor the interaction was significant ($ps > .13$). For the neutral thought index ($R^2 = .04$, $F(3, 315) = 3.96$, $p < .01$), the main effect of construal level was significant such that participants with low-level construals had more neutral thoughts ($B = -.05$, $t = -2.77$, $p < .01$). There was also a marginally significant main effect of mental-marker salience such that participants listed more neutral thoughts when the thought-listing task came first ($B = .14$, $t = 1.68$, $p < .10$). The interaction term was not significant ($p > .15$). These results suggest that the effects of construal level on duration judgments are not likely to be attributable to thought valence.

Duration Judgments. Participants’ estimated wait duration was first subjected to a logarithmic transformation because the duration estimations were positively skewed. To test our hypothesis that mental-marker salience moderates the effect of construal level on duration judgments, we conducted a regression analysis on the logarithmically transformed wait estimations with participants’ chronic construal level (mean-centered BIF scores), mental-marker salience ($-1 = \text{low}$, $1 = \text{high}$), and the interaction term as predictors ($R^2 = .07$, $F(3, 320) = 7.96$, $p < .001$). The analysis yielded a significant main effect of mental-marker salience such that participants judged the wait to be longer when thought listing was measured first than when duration judgments were measured first ($B = .08$, $t = 4.02$, $p < .001$). The main effect of construal level was not significant ($t < 1$). More importantly, consistent with our hypothesis, the interaction between construal level and mental-marker salience was significant ($B = -.01$, $t = -2.78$, $p < .01$; figure 4). To understand the nature of the interaction, we conducted slope analyses to examine the effect of construal level at each level of mental-marker salience (Fitzsimons 2008). The analyses showed that when duration judgments were measured first, replicating the findings from studies 1 and 2, low-level construal participants estimated the wait as shorter than high-level construal participants ($B = .01$, $t = 1.83$, $p < .07$). Additionally, the

FIGURE 4

WAIT DURATION JUDGMENTS AS A FUNCTION OF CONSTRUAL LEVEL AND MENTAL-MARKER SALIENCE (STUDY 5)



NOTE.—Wait duration judgments in the figure are in raw numbers for ease of interpretation. High-level construal refers to one standard deviation above the mean, and low-level construal refers to one standard deviation below the mean.

reverse occurred when thought listing was measured first: low-level construal participants estimated the wait as longer than high-level construal participants ($B = -.01$, $t = -2.13$, $p < .05$).

To test our prediction that participants were more likely to rely on mental markers as the basis for their duration judgments when mental markers were more accessible, we conducted a mediation analysis in the mental-marker-salient condition in which the thought-listing task was administered before the duration judgments. The analysis showed that, compared to high-level construal participants, low-level construal participants generated a greater total number of distinct thoughts during the wait ($B = -.08$, $p < .01$) and judged the wait to be longer ($B = -.01$, $p < .05$). The total number of distinct thoughts also predicted estimated wait duration ($B = .07$, $p < .001$). However, when both construal level and the total number of distinct thoughts were included in the model to predict estimated wait duration, the effect of construal level became insignificant ($B = -.01$, $p > .18$), whereas the effect of the total number of distinct thoughts remained significant ($B = .06$, $p < .001$).

We established the significance of the indirect effect using bootstrapping procedures (Preacher, Rucker, and Hayes 2007; Zhao et al. 2010). The procedures generated a 95% confidence interval around the indirect effect, with zero falling outside the confidence interval (95% CI: $-.0103$ to $-.0017$), suggesting that the mediating pathway was significant. These results provide direct evidence for our hypothesis that people use the total number of distinct thoughts to infer the wait duration when these mental markers become more accessible. Note that our theory also

suggests that the effect of construal level on duration judgments may be mediated by wait-unrelated thoughts in the condition where duration judgments precede thought listing, which we did not observe. We suspect that this may be due to the fact that the number of wait-unrelated thoughts is too cognitive a measure, which cannot capture the feeling-based process in this condition.

Discussion

Study 5 showed that when mental markers are not salient (i.e., duration judgments followed by thought listing), replicating our findings from studies 1 and 2, people with low-level construals judged the wait as shorter than those with high-level construals. However, when we made mental markers more accessible by increasing their salience (i.e., having participants list their thoughts *before* duration judgments), the opposite occurred: people with low-level construals judged the wait as longer than those with high-level construals; and this effect was mediated by the total number of distinct thoughts that participants had during the wait.

We also showed that compared to those with high-level construals, low-level construal participants generated significantly more wait-unrelated thoughts. This is consistent with our theorizing that people with low-level construals tend to think about more things that are unrelated to the wait, which distracts them from the wait itself and thus makes them feel less bored, as we observed in study 2. In addition, our results suggest that the effect of construal level on duration judgments seems to be independent of

the valence of the thoughts that people have during the wait.

Taken together, the findings from studies 3 to 5 provide convergent support for our hypotheses that the use of subjective feelings versus mental markers in duration judgments depends on the relative accessibility and diagnosticity of both subjective feelings and mental markers. Although people spontaneously rely on subjective feelings to make duration judgments, they resort to mental markers as the basis of their judgments when subjective feelings become less accessible (study 3) or less diagnostic (study 4), or when mental markers become more accessible (study 5).

GENERAL DISCUSSION

In this research, we examine the effect of construal levels on consumers' wait duration judgments. In one field study and four laboratory experiments, we found support for our main hypothesis that people spontaneously rely on their subjective feelings in duration judgments, and as a result, consumers with low-level construals judge the same wait as shorter than those with high-level construals (studies 1–5). This effect was robust across different operationalizations of construal levels (administering a questionnaire that induces customers to think in a concrete versus abstract way in study 1, manipulating construal levels using a category- or exemplar-generation task in studies 2 and 3, and measuring participants' chronic construal levels in studies 4 and 5), different types of waiting scenarios (waiting for service in a café in study 1, and waiting online in studies 2 to 5), and different measures of duration judgments (perceptions of how long they have waited in study 2, and estimates of wait duration in studies 1, 3–5). Furthermore, we demonstrated that the default effect of construal level on duration judgments is reversed when consumers use their thoughts as mental markers for duration judgments. In that case, low-level construals lead to longer duration judgments than high-level construals. We postulated and showed that people's reliance on subjective feelings versus mental markers depends on the relative accessibility and diagnosticity of both judgment inputs. Specifically, we demonstrated that when subjective feelings became less accessible (study 3) or less diagnostic (study 4), or when mental markers became more accessible (study 5), low-level construals in fact led to longer duration judgments.

One might wonder whether under both duration-judgment strategies, the effects of construal level on duration judgments may be driven by the same mediator—the total number of thoughts. We agree that when judgments are based on memory markers, people's lay theory is likely to play a role: *the more thoughts I've had during a wait, the longer the duration*. However, when judgments are

based on subjective feelings, the reverse lay theory—*the more thoughts I've had during a wait, the shorter the duration*—is less plausible. Though this lay theory would predict the same direction of effect in the default condition (i.e., low-level construals lead to shorter duration judgments than high-level construals), we believe that the underlying mechanism is more likely to be a feeling-based process rather than an inferential process. As shown in study 4, when we reduced the diagnosticity of subjective feelings (with a trust-in-feeling manipulation), people resorted to mental markers for their duration judgments. This finding could not be explained by the dual lay theory account. Furthermore, in study 2, we showed in a serial mediation that *construal level* → *wait-unrelated thoughts* → *boredom* → *duration judgments*, whereas the reverse order (*construal level* → *boredom* → *wait-unrelated thoughts* → *duration judgments*) did not work. This suggests that, although thoughts play a role in the default condition, the effect of thoughts on duration judgments has to go through subjective feelings of boredom.

Our research makes several important contributions to the time perception literature. First, while most prior research examined how various *contextual* factors influence time perception, we showed that an important factor related to the *consumers* who are in the wait (i.e., their construal levels) has an impact on their duration judgments. Second, our research also contributes to extant time perception literature by integrating two strategies people employ in duration judgments. Past research has suggested that people sometimes make duration judgments based on subjective feelings about the wait. Time flies when people have fun, feel less bored, or have a richer experience (Kellaris and Kent 1992; Maister 1985). Alternatively, people may engage in memory-based duration judgments and form an estimation of elapsed time based on the number of memory markers (Ahn et al. 2009) or event markers (Zauberman et al. 2010) that have occurred during the elapsed time. The use of memory markers in duration judgments follows a numerosity rule: the greater the number of markers, the longer the duration. The current research extends past work by integrating these two strategies. Our results suggest that people spontaneously make duration judgments based on their subjective feelings during the wait. However, they resort to mental markers under certain conditions such as when subjective feelings have dissipated or are perceived as less diagnostic. Finally, it is also interesting to note that the memory or event markers used in time estimation in previous research are mostly *external* events or stimuli (Ahn et al. 2009; Zauberman et al. 2010). In contrast, our research shows that the number of *internal markers* that people generate (thoughts that come to mind during the wait) could also serve as a handy cue in duration judgments.

Our research also adds to the literature on construal level theory (CLT). Past research suggests that construal levels

can exert a systematic influence on various aspects of consumers' judgments and behaviors (Trope, Liberman, and Wakslak 2007). For instance, in judgment and decision making, construal levels can affect the weight of desirability versus feasibility considerations (Liberman and Trope 1998), primary versus secondary features of the situations (Trope and Liberman 2000), and gain versus loss information (White, MacDonnell, and Dahl 2011). Our research extends prior work on CLT by examining another important yet understudied consequence of construal levels—duration judgments. It should be noted that our research is different from prior literature showing that low- (vs. high-) level construals lead people to expect events to occur in the near (vs. distant) future (Liberman et al. 2007). In those studies, the focus was on how construal levels affect people's perception of when an event would happen (i.e., whether the event is distant from or close to the present), whereas in our research we examined how construal levels affect people's duration judgments (i.e., how long an event lasts).

Our research has important managerial implications for product and service providers. Since the perceived wait length is directly linked with customer satisfaction (Taylor 1994; Tom and Lucey 1997), our findings offer useful insights as to how to reduce consumers' perceived wait. Specifically, our finding that by default low-level construals lead to a shorter perceived wait suggests that product and service providers could potentially alter the waiting environment to induce low-level construals. For example, past research suggests that pictures tend to induce low-level representations, while words tend to induce high-level representations (Amit, Algom, and Trope 2009). This means that decorating the retail or service environment with more pictorial elements may induce low-level construals, which could potentially reduce consumers' perceived wait. Product and service providers could also consider varying the color of the environment to induce low-level construals. The color red (vs. gray), for instance, leads people to focus more on concrete details rather than global stimuli as a whole (Maier, Elliot, and Lichtenfeld 2008).

Finally, our research shows that consumers' chronic construal level is an important individual difference that could affect their wait perception. Consumers who have the disposition to process information at an abstract (vs. concrete) level may spontaneously perceive the same wait to be longer. Therefore, it would be desirable for marketers to identify the chronically abstract-minded segment (e.g., the senior segment; Hong and Lee 2010; Wang and Cole 2016) and make extra efforts to reduce wait perceptions for these consumers. Of course, caution is warranted in applying these strategies. As our findings suggest, the default effect of construal level on duration judgments could be reversed when people instead rely on mental markers. We also note that from the perspective of enhancing consumer welfare, marketers should focus more on reducing

consumers' actual wait time rather than their perceived wait time.

It is worth noting that construal levels may also affect consumers' wait experience in ways other than our proposed theory. For example, it is possible that low-level construal people tend to focus on the moment, whereas high-level construal people are more likely to see the big picture (i.e., why they are waiting) and hence are more patient. We suspect that this process may affect consumers' satisfaction of the wait experience more than the duration judgments themselves. Interestingly, one might expect a paradoxical phenomenon: although high-level construal consumers judge the wait to be longer (as suggested by our findings), they might be more satisfied (or less dissatisfied) than are low-level construal consumers because they can see the big picture and are more patient about the wait.

In addition, while we examine how construal level affects judgments in different ways when people engage in feeling-based versus cognition-based processing, future research could directly study how construal level influences people's reliance on feelings versus cognition in judgments. While some past research suggests that low-level construals lead to greater emotional intensity than high-level construals (Williams, Stein, and Galguera 2014), others have made a distinction between high-level emotions and low-level emotions (Chang and Pham 2013; Liberman, Trope, and Stephan 2007). This suggests that the relationship between construal level and the reliance on feelings versus cognition may be complicated, representing a promising avenue for future research.

DATA COLLECTION INFORMATION

The authors collected data for the five studies at the Hong Kong University of Science and Technology (studies 1, 3, 4), Amazon Mechanical Turk (study 2), and the University of Iowa (study 5) between autumn 2008 and summer 2017. The studies were conducted by research assistants under the supervision of the three authors. All three authors jointly analyzed data for all studies.

APPENDIX

CONSTRUAL-LEVEL MANIPULATION IN STUDY 1

Low-Level Construal Manipulation

Consumer Survey on Dining Preferences. We are interested in how consumers make their decisions about where to dine. Please answer the questions below carefully by choosing the ONE answer that best represents your opinion. There are no right or wrong answers

to the questions. We are interested in your honest feedback.

1. Please tell us what comes to your mind first when you think about Coffee Shop.
 - a. It has tasty sandwiches, pasta, Indian dishes, etc.
 - b. It is located very close to the classrooms and labs.
 - c. The tables and chairs are always clean and decorations are nice.
 - d. I can buy an afternoon tea set at 15 Hong Kong dollars.
2. In your opinion, the most attractive characteristic of Coffee Shop for a student is. . .
 - a. It has tasty sandwiches, pasta, Indian dishes, etc.
 - b. It is located very close to the classrooms and labs.
 - c. The tables and chairs are always clean and decorations are nice.
 - d. I can buy an afternoon tea set at 15 Hong Kong dollars.
3. In your opinion, the most attractive characteristic of Coffee Shop for a professor is. . .
 - a. It has tasty sandwiches, pasta, Indian dishes, etc.
 - b. It is located very close to the classrooms and labs.
 - c. The tables and chairs are always clean and decorations are nice.
 - d. I can buy an afternoon tea set at 15 Hong Kong dollars.
4. In your opinion, the most attractive characteristic of Coffee Shop for a staff is. . .
 - a. It has tasty sandwiches, pasta, Indian dishes, etc.
 - b. It is located very close to the classrooms and labs.
 - c. The tables and chairs are always clean and decorations are nice.
 - d. I can buy an afternoon tea set at 15 Hong Kong dollars.

High-Level Construal Manipulation

Consumer Survey on Dining Preferences. We are interested in how consumers make their decisions about where to dine. Please answer the questions below carefully by choosing the ONE answer that best represents your opinion. There are no right or wrong answers to the questions. We are interested in your honest feedback.

1. Please tell us what comes to your mind first when you think about Coffee Shop.
 - a. Taste
 - b. Convenience
 - c. Environment
 - d. Affordability

2. In your opinion, the most attractive characteristic of Coffee Shop for a student is. . .
 - a. Taste
 - b. Convenience
 - c. Environment
 - d. Affordability
3. In your opinion, the most attractive characteristic of Coffee Shop for a professor is. . .
 - a. Taste
 - b. Convenience
 - c. Environment
 - d. Affordability
4. In your opinion, the most attractive characteristic of Coffee Shop for a staff is. . .
 - a. Taste
 - b. Convenience
 - c. Environment
 - d. Affordability

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