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When Does Feeling of Fluency Matter? How Abstract and Concrete Thinking Influence Fluency Effects

Claire I. Tsai[1] and Manoj Thomas[2]
[1]Rotman School of Management, University of Toronto, and [2]S.C. Johnson Graduate School of Management, Cornell University

Abstract

It has been widely documented that fluency (ease of information processing) increases positive evaluation. We proposed and demonstrated in three studies that this was not the case when people construed objects abstractly rather than concretely. Specifically, we found that priming people to think abstractly mitigated the effect of fluency on subsequent evaluative judgments (Studies 1 and 2). However, when feelings such as fluency were understood to be signals of value, fluency increased liking in people primed to think abstractly (Study 3). These results suggest that abstract thinking helps distinguish central decision inputs from less important incidental inputs, whereas concrete thinking does not make such a distinction. Thus, abstract thinking can augment or attenuate fluency effects, depending on whether fluency is considered important or incidental information, respectively.

Keywords

abstract thinking, construal level, fluency, feelings, evaluation, charitable giving

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People make judgments on the basis of not only information but also the feelings they experience during judgment. In fact, a substantial body of research has shown that feelings can exert powerful influences on judgments (Pham, 2009; Schwarz, 2004). We examined ways in which people respond to an important class of feelings: fluency. We proposed that the activation of abstract thinking can reduce the influence of feelings on judgment, thereby attenuating and even reversing the effects of fluency. Studies have shown that people consider fluent (easy to process) stimuli more likeable, familiar, frequent, true, and intelligent than similar but less fluent stimuli, and those feelings of fluency affect judgment, even when the judgment target has nothing to do with the actual causes of fluency (Alter & Oppenheimer, 2009). One approach commonly adopted to mitigate such fluency effects is to prevent people from misattributing fluency to value by drawing their attention to the actual causes of fluency (Schwarz, 2004). However, this debiasing approach can be difficult to generalize to real-world settings because it is not feasible to identify the causes of fluency (or disfluency) whenever people experience it in everyday judgments.

We took a different approach to eliminating fluency effects, namely, inducing abstract thinking (as opposed to concrete thinking). Unlike judgment-specific moderators of fluency, abstract and concrete thinking operate at the level of mind-sets (Trope & Liberman, 2010) and can be induced using priming tasks completely unrelated to judgment.[1] For example, abstract thinking can be enhanced by considering abstract categories for everyday objects: Soda can be construed as a beverage, chocolate can be construed as a sweet, and so forth. Conversely, concrete thinking can be enhanced by recalling concrete exemplars of objects: An example of soda is Coke, an example of chocolate is dark chocolate, and so forth. The ease with which these mind-sets can be activated suggests that implementing them beyond laboratory studies should be relatively easy.

Prior research has suggested that abstract thinking evokes schematic processing and helps people focus on the big picture by putting information in a larger perspective (Shanks & Darby, 1998; Trope & Liberman, 2003, 2010). Consequently, abstract thinking distinguishes central decision inputs from incidental inputs during judgment. Because subjective feelings are generally considered less important than objective

Corresponding Author:
Claire I. Tsai, Rotman School of Management, University of Toronto, 105 St. George St., Toronto, Ontario, Canada M5S 3E6
E-mail: claire.tsai@rotman.utoronto.ca

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information (Hsee & Tsai, 2008), we expected abstract thinking to reduce the relevance of fluency as a decision input and thus weaken the effects of fluency on judgment. In contrast, concrete thinking focuses people's attention on specific details: They see the trees rather than the forest. Consequently, concrete thinking makes no distinction between central decision inputs (e.g., information content) and incidental decision inputs (e.g., subjective feelings) and allows fluency to be taken into consideration in judgment. Because fluency is likely to be interpreted as value, we expected concrete thinkers to like fluent stimuli more than less fluent stimuli.

In sum, we hypothesized that fluency influences evaluative judgments under the condition of concrete thinking but not of abstract thinking. We tested this hypothesis in two ways. In Study 1, we manipulated fluency by presenting a text stimulus in a clear or an unclear font. Because presenting information in an unclear font renders processing more difficult without changing the information being conveyed, we expected that abstract thinking would attenuate the effect of fluency. In Study 2, we further demonstrated the moderating effect of abstract thinking by asking participants to generate a few or many supporting arguments for an evaluation. Participants who were asked to list a larger number of supporting arguments not only experienced more difficulty, but also generated more information. Because abstract thinking increases reliance on information content, we expected abstract thinkers' evaluation to become more favorable as information content increased, despite the accompanying increase in processing difficulty. Finally, in Study 3, we obtained evidence for the proposed mechanism underlying the moderating effect of abstract thinking.

Study 1

Study 1 tested the hypothesis that inducing abstract thinking will moderate the effect of processing fluency on judgments of liking in a subsequent unrelated task.

Method

Seventy-one students (23 males, 48 females; age range = 16–37 years) from the University of Toronto participated and received $5 as compensation. Study 1 employed a 2 (mind-set: abstract thinking vs. concrete thinking) × 2 (fluency: blurry advertisement vs. clear advertisement) between-subjects design. The study consisted of two ostensibly unrelated tasks. The first was a word-generation task that induced abstract or concrete thinking. The second task involved reading an advertisement for chocolate. This task enabled us to examine the moderating role of abstract thinking.

The word-generation task has been used successfully in previous studies to manipulate subjects' degree of abstract thinking (Fujita, Trope, Liberman, & Levin-Sagi, 2006). Participants were presented with 39 words (e.g., "soda," "computer"). In the abstract-thinking condition, participants generated a superordinate category label for each word by answering the question, "_____ is an example of what?" Participants in the concrete-thinking condition generated a subordinate exemplar for each word by answering the question, "An example of _____ is what?"

Next, in an ostensibly unrelated study, participants read an advertisement for LeVour chocolate, which we adapted from extant research (Labroo & Kim, 2009). Depending on the experimental condition, participants were shown either a blurry (difficult to process) advertisement or a clear (easy to process) advertisement (see the Supplemental Material available online for reproductions of the two stimuli). Everything else about the advertisement was held constant across conditions.

After reading the advertisement, participants rated how much they wanted to eat the chocolate, how desirable it was, and how tempting it was; they responded to each question separately on a scale from 1 (*not at all*) to 7 (*very*). As manipulation checks, participants rated how difficult it was to read the advertisement, how effortful reading it was, and how clear the text of the advertisement was (reverse-coded for analysis); they rated each measure of difficulty separately on a scale from 1 (*not at all*) to 7 (*very*). Finally, participants rated their mood on a scale from 1 (*very bad/very sad*) to 7 (*very good/very happy*) and indicated how much attention they had paid to the advertisement on a scale from 1 (*a little*) to 7 (*a lot*).

Results

Responses to the three items that measured the difficulty of reading the advertisement were averaged to form a difficulty index ($\alpha = .90$). A two-way analysis of variance (ANOVA) confirmed that the blurry advertisement was more difficult to read than the clear one (blurry: $M = 5.07$; clear: $M = 2.62$), $F(1, 67) = 72.53$, $p < .001$. Neither the main effect of mind-set nor the interaction of fluency and mind-set had a significant effect on the difficulty index (Fs < 1). Mood and attention did not differ across conditions (Fs < 1).

The three ratings of the LeVour chocolates were averaged to form a liking index ($\alpha = .93$). A two-way ANOVA on the liking scores revealed only a significant interaction of mind-set and fluency, $F(1, 67) = 8.99$, $p = .004$, $\eta_p^2 = .12$. As expected, participants in the concrete-thinking condition liked the chocolate more when the advertisement was easy to process ($M = 5.83$, $SD = 1.51$) than when it was difficult to process ($M = 4.42$, $SD = 1.39$), $F(1, 67) = 8.95$, $p = .004$, $\eta_p^2 = .12$. By contrast, processing fluency did not affect liking in the abstract-thinking condition (blurry: $M = 5.38$, $SD = 1.01$; clear: $M = 4.77$, $SD = 1.56$), $F(1, 67) = 1.59$, $p = .21$, $\eta_p^2 = .02$ (see Fig. 1).

Mediation analyses were conducted separately for the abstract-thinking and concrete-thinking conditions (Baron & Kenny, 1986). As predicted, the difficulty index mediated the effect of fluency on liking in the concrete-thinking condition (Sobel $z = 2.15$, $p = .03$), but not in the abstract-thinking

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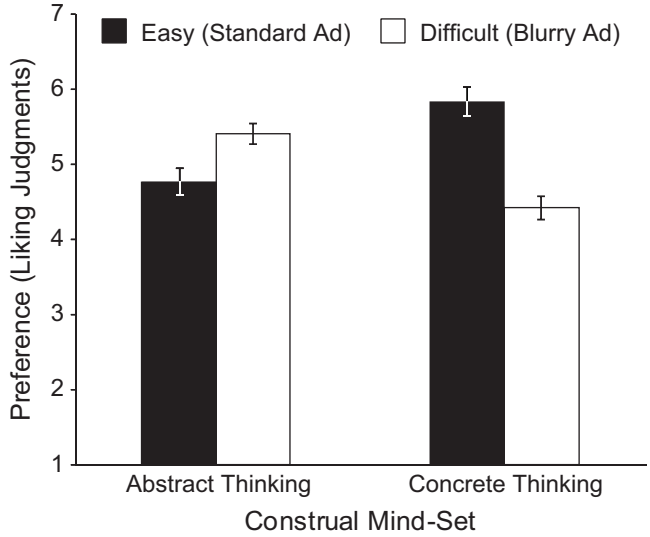

Fig. 1. Results from Study 1: participants' mean liking for chocolate shown in an advertisement as a function of whether the ad was easy or difficult to read and whether participants had been induced to think abstractly or concretely. Liking judgments were made on a scale from 1 (*not at all*) to 7 (*very*). Error bars represent standard errors of the mean.

condition (Sobel $z = 1.24$, $p = .21$). For the concrete-thinking condition, regression analyses confirmed a significant effect of fluency on liking for LeVour chocolate, $\beta = 0.71$, $SE = 0.24$, $t(34) = 2.72$, $p = .006$; a significant effect of fluency on the difficulty index, $\beta = -1.46$, $SE = 0.19$, $t(34) = -7.88$, $p < .001$; and a significant effect of the difficulty index on liking, $\beta = -0.31$, $SE = 0.14$, $t(34) = -2.23$, $p = .03$. When liking was regressed simultaneously on the difficulty index and on fluency, the effect of fluency was reduced in significance ($p = .09$). For the abstract-thinking condition, regression analyses revealed that neither fluency nor the difficulty index had a significant effect on liking (both ps > .20). However, fluency had a significant effect on the difficulty index, $\beta = 0.98$, $SE = 0.22$, $t(33) = 4.47$, $p < .001$, a result confirming that regardless of the degree of abstract thinking, the blurry advertisement was more difficult to read than the clear one. These results support our hypothesis that fluency increases liking when viewers are thinking concretely, but has no effect on liking when viewers are thinking abstractly.

Study 2

Study 2 further demonstrated the moderating effect of abstract thinking. We expected abstract thinking to reverse the fluency effect when increased processing difficulty was accompanied by increased supporting information for judgment. Study 2 expanded our findings by using a different procedure to alter mind-set. Abstract thinking and concrete thinking differ not only in whether broad categories or specific exemplars, respectively, are considered, but also in the differential emphasis placed on end states of actions (the *why* of activities; abstract thinking) or the means by which actions are accomplished (the *how* of activities; concrete thinking; Trope & Liberman, 2010). Study 2 investigated whether thinking about the why or how aspects of an activity would moderate the fluency effect. To increase generalizability, we used nonhedonic stimuli and a behavioral measure of liking judgment (charitable giving).

Method

Ninety-six students from the University of Toronto participated. Study 2 employed a 2 (mind-set: abstract thinking vs. concrete thinking) × 2 (fluency: two reasons vs. eight reasons) between-subjects design. Donation for charity was the dependent variable. Participants first completed a task that induced either abstract or concrete thinking. Depending on the experimental condition, participants were asked to write a detailed description of either why or how to study for an important exam; we confirmed in pretesting that this procedure successfully altered mind-set. All participants were asked to describe an important class they were taking and were given an entire page to write down either reasons for doing well on the final exam (the why-focused abstract-thinking condition) or a detailed step-by-step study plan (the how-focused concrete-thinking condition; see Tsai & McGill, in press, for more details of the procedure).

Next, participants worked on a supposedly unrelated task involving conserving the habitats of polar bears (see the Supplemental Material for information given to participants). Depending on the experimental condition, participants generated either two reasons (easy) or eight reasons (difficult) for donating in support of the polar bears. They were then asked how much money they would donate. To give their decision monetary consequences, we stated that 5 participants would be randomly selected to receive $10 as a bonus and asked participants how much they would donate if they received the bonus. To ensure participants understood that the decision was real, we told them that we would deduct the donated amount from the bonus (and we did do so). Finally, as manipulation checks, participants rated on 7-point scales how difficult it was to generate reasons to donate (1 = *not at all*, 7 = *very*), how much attention they paid to the information about the conservation efforts (1 = *little*, 7 = *a lot*), and how the information made them feel (1 = *makes me feel bad*, 7 = *makes me feel good*).

Results

A two-way ANOVA revealed a significant main effect of fluency on the difficulty of thought generation (eight reasons: $M = 6.16$;. two reasons: $M = 4.50$), $F(1, 92) = 17.74$, $p < .001$. This result confirmed that generating eight reasons for donating money was more difficult than generating two reasons for donating money. Neither the main effect of mind-set on the difficulty of thought generation nor the interaction of mind-set

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and fluency was significant (Fs < 1). Attention paid to and feelings toward the advertisement did not differ across conditions (Fs < 1).

As expected, a two-way ANOVA on donation revealed a significant interaction of mind-set (abstract vs. concrete) and fluency, $F(1, 92) = 9.11$, $p = .003$, $\eta_p^2 = .09$ (see Fig. 2). Other main effects were not significant, Fs < 1. As expected, in the concrete-thinking condition, participants who had to generate only two reasons donated more (M = \$5.56, SD = 3.08) than participants who had to generate eight reasons (M = \$3.68, SD = 3.42), $F(1, 92) = 4.99$, $p = .02$, $\eta_p^2 = .05$. Conversely, in the abstract-thinking condition, participants who had to generate eight reasons donated more money (M = \$5.27, SD = 2.88), despite the increased difficulty of their task, than participants who had to generate only two reasons (M = \$3.26, SD = 2.94), $F(1, 92) = 4.24$, $p = .04$, $\eta_p^2 = .04$.

As in Study 1, results of mediation analyses showed that processing difficulty mediated the fluency effect in the concrete-thinking condition (Sobel $z = 2.24$, $p = .02$), but not in the abstract-thinking condition ($p > .60$). For the concrete-thinking condition, regression analyses confirmed a significant effect of fluency on donation, $\beta = 0.94$, $SE = 0.44$, $t(53) = 2.14$, $p = .03$; a significant effect of fluency on difficulty of thought generation, $\beta = -0.77$, $SE = 0.27$, $t(53) = -2.87$, $p = .006$; and a significant effect of difficulty of thought generation on donation, $\beta = -0.69$, $SE = 0.19$, $t(53) = -3.55$, $p = .001$. When donation was regressed simultaneously on difficulty of thought generation and on fluency, the effect of fluency was no longer significant ($p = .30$).

In sum, the results of Study 2 show that fluency increases the amount of money people are willing to donate when they are thinking concretely, and that information content, rather than fluency, affects how much money people are willing to donate when they are thinking abstractly. The results from Studies 1 and 2 also challenge the assumption that global, abstract processing induces low-effort heuristic processing (e.g., Smith et al., 2006). If abstract thinking reduces processing effort, the effect of fluency should have been more pronounced in the abstract-thinking condition than in the concrete-thinking condition. However, consistent with other studies suggesting that global processing does not alter processing effort (Bless et al., 1996; Trope & Liberman, 2010; Vallacher & Wegner, 1987), our study shows that fluency has no effect when people think abstractly, and this suggests that the effect of abstract thinking operates independently of processing effort.

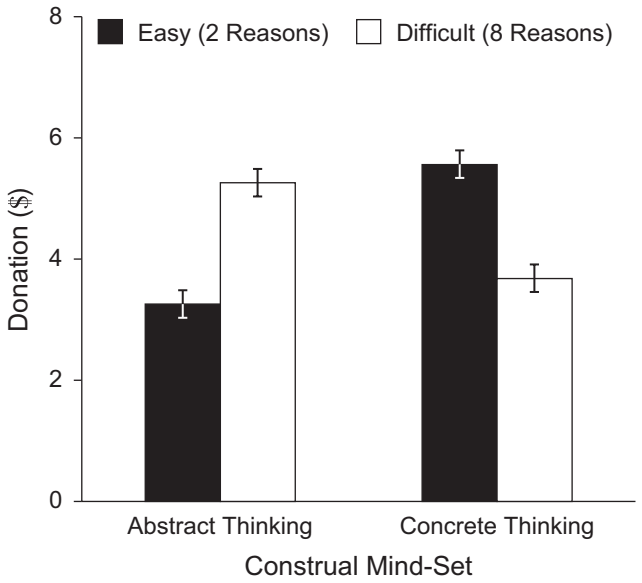

Fig. 2. Results from Study 2: mean amount of money that participants were willing to donate as a function of mind-set (abstract vs. concrete) and fluency (providing two vs. eight reasons for making donations). Error bars represent standard errors of the mean.

In our next study, we directly tested the mechanism posited to underlie the moderating effect of abstract thinking. A key premise of our hypothesis was that abstract thinking omits fluency from judgment because feelings (such as those about how fluent information processing is) are considered less relevant decision inputs than information content. However, concrete thinking does not distinguish central information from incidental information, and thus fluency, rather than being dismissed as irrelevant, is unconsciously misattributed to the judgment variable and interpreted as value under conditions of concrete thinking.[2] We tested this premise by prioritizing decision inputs: We instructed participants to focus on either feelings or information content. If our assumption is correct, then instructing abstract thinkers to focus on feelings because feelings are important decision inputs should augment, rather than attenuate, fluency effects. But the same manipulation may elicit a different response from concrete thinkers. Explicitly highlighting the importance of feelings should make concrete thinkers aware of their unconscious misattribution. This awareness is likely to thwart the misattribution process and eliminate fluency effects (Berkowitz, Jaffee, Jo, & Troccoli, 2000).

Consequently, when product information signaled value, we expected to replicate the findings of Study 1: That is, we expected fluency would increase liking in the concrete-thinking condition but would have no effect on liking in the abstract-thinking condition. By contrast, when feelings signaled value, we expected the opposite pattern: Fluency would increase liking in the abstract-thinking condition because feelings would be perceived as a worthwhile source of information, and, therefore, fluency would be interpreted as value. Conversely, fluency would have no effect in the concrete-thinking condition because drawing attention to reliance on feelings would disrupt the misattribution process.

Study 3

Moving beyond statistical mediation analyses, Study 3 directly tested the proposed mechanism underlying the moderating effect of abstract thinking. We prioritized decision inputs for participants by manipulating the source of value: product information or feelings.

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Method

One hundred fourteen students from the University of Toronto participated. We used a 2 (source of value: product information vs. feeling) × 2 (mind-set: abstract thinking vs. concrete thinking) × 2 (fluency: blurry advertisement vs. clear advertisement) between-subjects design. As in Study 1, participants first completed a word-generation task that induced either abstract or concrete thinking. Next, participants evaluated the chocolate advertisement from Study 1. Before they read the LeVour advertisement, participants in the feeling condition were told to focus on their instinctive feelings while evaluating the chocolate. Participants assigned to the product-information condition were asked to focus on the content of the advertisement (see the Supplemental Material available online for instructions provided to participants in both conditions). Participants then viewed either a clear or a blurry print advertisement. The dependent measures were the same as in Study 1.

Results

As expected, the blurry advertisement was rated as more difficult to read than the clear advertisement (blurry: $M = 5.69$; clear: $M = 2.56$), $F(1, 106) = 185.95$, $p < .001$. A 2 × 2 × 2 ANOVA on the averaged liking ratings for LeVour chocolate ($\alpha = .95$) revealed a significant three-way interaction, $F(1, 106) = 5.49$, $p = .02$, $\eta_p^2 = .05$. Specifically, when participants were told to focus on the content of the advertisement, the results replicated the findings of Study 1 (see Fig. 3a). Fluency increased liking in the concrete-thinking condition (blurry: $M = 4.36$, $SD = 1.27$; clear: $M = 5.64$, $SD = 0.89$), $F(1, 106) = 5.38$, $p = .02$, $\eta_p^2 = .04$, but had no effect in the abstract-thinking condition (blurry: $M = 5.04$, $SD = 1.01$; clear: $M = 5.02$, $SD = 0.94$), $F < 1$. However, when participants were told to focus on their feelings, the effect was reversed: Fluency increased liking in the abstract-thinking condition (blurry: $M = 4.12$, $SD = 1.16$; clear: $M = 5.27$, $SD = 1.01$), $F(1, 106) = 4.29$, $p = .04$, $\eta_p^2 = .05$, but had no effect in the concrete-thinking condition (blurry: $M = 4.98$, $SD = 1.77$; clear: $M = 4.80$, $SD = 1.47$), $F < 1$ (see Fig. 3b).

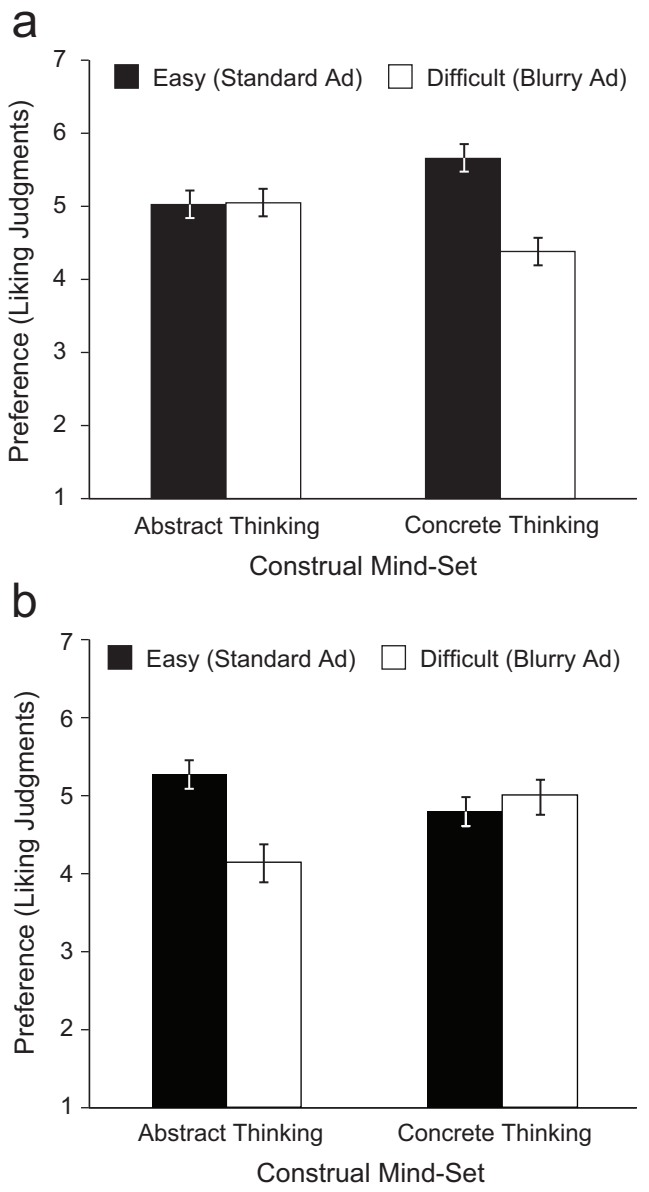

Fig. 3. Results from Study 3: participants' mean liking for chocolate shown in an advertisement as a function of whether the ad was easy or difficult to read and whether participants had been induced to think abstractly or concretely. Results are shown for (a) participants who were instructed to focus on the content of the ad and (b) participants who were instructed to focus on their feelings about the chocolate. Liking judgments were made on a scale from 1 (*not at all*) to 7 (*very*). Error bars represent standard errors of the mean.

General Discussion

Our studies show that the activation of a general mind-set, abstract thinking, can eliminate fluency effects on judgment and real behavior. We also tested the mechanism underlying the moderating effect of abstract thinking and demonstrated that abstract thinking can attenuate fluency effects if feelings are considered less relevant signals of value or can augment fluency effects if feelings are considered more relevant signals of value. By contrast, concrete thinking makes no distinction between central and incidental information and thus leads people to misattribute fluency to value, except when the misattribution process becomes evident.

Our findings dovetail with recent work by Häfner and Stapel (2010), which suggests that rather than signaling value, fluency can increase the usability of ambiguous information for judgment. Using rhymed information as a fluent stimulus, Häfner and Stapel found that fluency had no effect on how people use unambiguous information, and they concluded that this was because processing unambiguous information was easy regardless of whether the information rhymed or not. By contrast, fluency (rhyming) increased the usability of ambiguous information

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and polarized evaluations, making positive attributes more positive and negative attributes more negative.

We examined fluency from a different angle: Rather than seeing how fluency affects information processing, we considered how abstract or concrete thinking moderated fluency effects when fluency served as a source of information (Schwarz & Clore 2007). We found that concrete thinking treated central and incidental information as equally usable, leading people to attribute fluency to value. By contrast, abstract thinking treated incidental information as less usable than central information and discounted fluency when feelings were considered less important inputs than information content. However, when feelings were considered important, the situation was reversed. Moreover, our work advanced the field by examining fluency effects in the context of mind-sets, which can be induced by tasks completely unrelated to the primary judgment—a distinction of substantive practical and theoretic importance.

Further, our research has important implications for studies on feeling-based judgment. Other classes of feelings—specific emotions, affect, mood, and proprioception—can also influence judgment. Given that the mechanism underlying judgments made on the basis of fluency is often the same as the mechanism underlying judgments made on the basis of other classes of feelings (i.e., the feeling-as-information framework; Pham, 2009; Schwarz & Clore, 2007), abstract thinking may produce parallel effects across different classes of feelings. It would be fruitful to further investigate the interplay between abstract thinking and feeling-based judgment.

Our work suggests that abstract thinking may reduce judgment biases arising from overuse of contextual information. When judgment seems complicated, people tend to employ mental shortcuts or heuristics (e.g., availability heuristic: Tversky & Kahneman, 1974; affect heuristic: Slovic, Finucane, Peters, & MacGregor, 2002). Abstract thinking may help mitigate judgment biases by reducing reliance on contextual information in the same way that it reduced reliance on fluency in our studies. This is important because numerous studies have shown that judgment biases are hard to eliminate (Camerer & Hogarth, 1999). Our work suggests that activating abstract thinking may be a promising debiasing strategy.

Our results also raise an interesting question concerning the typical level of abstractness of thinking in previous fluency studies. Prior research suggests that people generally process information abstractly (Vallacher & Wegner, 1987), but they are likely to think concretely and exhibit fluency effects when performing unfamiliar tasks in laboratory experiments (e.g., making risk judgments about cardiovascular disease). This proposition is consistent with prior findings that fluency effects occur for unfamiliar tasks but not for familiar ones (Haddock, Rothman, Reber, & Schwarz, 1999) and that unfamiliar or difficult tasks induce lower-level processing (Navon, 1977; Vallacher & Wegner, 1987). Although our results support these findings, further investigation is required to determine people's typical level of abstraction and explore its implications for fluency effects.

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Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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Supplemental Material

Additional supporting information may be found at http://pss.sagepub.com/content/by/supplemental-data

Notes

1. Drawing on prior work on procedural mind-set (Xu & Wyer, 2007), we considered abstract thinking and concrete thinking to be processing schema that operate at the level of mind-sets. Therefore, when abstract thinking and concrete thinking are activated in one context, they influence subsequent judgments in completely unrelated contexts.
2. Several studies have shown that unconscious misattribution is responsible for the effect of fluency on preferences (e.g., Menon & Raghubir, 2003; Schwarz et al., 1991).

References

Alter, A.L., & Oppenheimer, D.M. (2009). Uniting the tribes of fluency to form a metacognitive nation. *Personality and Social Psychology Review*, *13*, 219–235.

Baron, R.M., & Kenny, D.A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology*, *51*, 1173–1182.

Berkowitz, L., Jaffee, S., Jo, E., & Troccoli, B.T. (2000). On the correction of feeling-induced judgmental biases. In J.P. Forgas (Ed.), *Feeling and thinking: The role of affect in social cognition* (pp. 131–152). New York, NY: Cambridge University Press.

Bless, H., Clore, G.L., Schwarz, N., Golisano, V., Rabe, C., & Wölk, M. (1996). Mood and the use of scripts: Does being in a happy mood really lead to mindlessness? *Journal of Personality and Social Psychology*, *71*, 665–679.

Camerer, C., & Hogarth, R. (1999). The effects of financial incentives in experiments: A review and capital-labor-production framework. *Journal of Risk and Uncertainty*, *19*, 7–42.

Fujita, K., Trope, Y., Liberman, N., & Levin-Sagi, M. (2006). Construal levels and self-control. *Journal of Personality and Social Psychology*, *90*, 351–367.

Haddock, G., Rothman, A.J., Reber, R., & Schwarz, N. (1999). Forming judgments of attitude certainty, importance, and intensity: The role of subjective experiences. *Personality and Social Psychology Bulletin*, *25*, 771–782.

Downloaded from pss.sagepub.com at CORNELL UNIV on February 17, 2011

Häfner, M., & Stapel, D.A. (2010). Information to go: Fluency enhances the usability of primed information. *Journal of Experimental Social Psychology*, *46*, 73–84.

Hsee, C.K., & Tsai, C.I. (2008). Hedonomics in consumer behavior. In C. Haugtvedt, P. Herr, & F. Kardes (Eds.), *Handbook of consumer psychology* (pp. 639–658). Mahwah, NJ: Erlbaum.

Labroo, A.A., & Kim, S. (2009). The "instrumentality" heuristic: Why metacognitive difficulty is desirable during goal pursuit. *Psychological Science*, *20*, 127–134.

Menon, G., & Raghubir, P. (2003). Ease-of-retrieval as an automatic input in judgments: A mere-accessibility framework? *Journal of Consumer Research*, *30*, 230–243.

Navon, D. (1977). Forest before trees: The precedence of global features in visual perception. *Cognitive Psychology*, *9*, 353–383.

Pham, M.T. (2009). The lexicon and grammar of affect as information in consumer decision making: The GAIM. In M. Wänke (Ed.), *Social psychology of consumer behavior* (pp. 167–200). London, England: Psychology Press.

Schwarz, N. (2004). Metacognitive experiences in consumer judgment and decision making. *Journal of Consumer Psychology*, *14*, 332–348.

Schwarz, N., Bless, H., Strack, F., Klumpp, G., Rittenauer-Schatka, H., & Simons, A. (1991). Ease of retrieval as information: Another look at the availability heuristic. *Journal of Personality and Social Psychology*, *61*, 195–202.

Schwarz, N., & Clore, G.L. (2007). Feelings and phenomenal experiences. In E.T. Higgins & A. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (2nd ed., pp. 385–407). New York, NY: Guilford.

Shanks, D.R., & Darby, R.J. (1998). Feature- and rule-based generalization in human associative learning. *Journal of Experimental Psychology: Animal Behavior Processes*, *24*, 405–415.

Slovic, P., Finucane, M., Peters, E., & MacGregor, D.G. (2002). The affect heuristic. In T. Gilovich, D. Griffin, & D. Kahneman (Eds.), *Heuristics and biases: The psychology of intuitive judgment* (pp. 397–420). New York, NY: Cambridge University Press.

Smith, E.R., Miller, D.A., Maitner, A.T., Crump, S.A., Garcia-Marques, T., & Mackie, D.M. (2006). Familiarity can increase stereotyping. *Journal of Experimental Social Psychology*, *42*, 471–478.

Trope, Y., & Liberman, N. (2003). Temporal construal. *Psychological Review*, *110*, 403–421.

Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review*, *117*, 440–463.

Tsai, C.I., & McGill, A.L. (in press). No pain, no gain? How construal level and fluency affect consumer confidence. *Journal of Consumer Research*.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, *185*, 1124–1130.

Vallacher, R.R., & Wegner, D.M. (1987). What do people think they're doing? Action identification and human behavior. *Psychological Review*, *94*, 3–15.

Xu, A.J., & Wyer, R.S. (2007). The effect of mindsets on consumer decision strategies. *Journal of Consumer Research*, *34*, 556–566.

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