When Imagination Hinders Behavior:
The Effects of Outcome versus Process-Oriented Thinking
on Decision Difficulty and Performance

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We investigate the effect of process versus outcome-oriented thinking on consumers’ subjective experiences during the decision-making process. Across four studies, we show that relative to outcome-oriented thinking, process-oriented thinking systematically increases decision difficulty when individuals face trade-offs between desirability and feasibility. Our results suggest that decision difficulty increases because process-oriented thinking leads to a heightened focus on attribute trade-offs, resulting in negative consequences such as greater willingness to postpone choice, lower commitment to choices and degraded task performance.
When choosing products, consumers frequently rely on mentally simulating their future experience with the product. Indeed, mental simulation is often encouraged by marketers with direct appeals (e.g. “Imagine how it would be.”) or by engaging consumers in narrative stories, drama ads, slice-of-life ads, or transformational ads. The use of this strategy is supported by a number of studies suggesting that imagining the product experience can have powerful effects on consumers’ behavior (Escalas 2004; Gregory et al. 1982; Keller and Block 1997). Yet, there are different types of mental simulation in which consumers can engage. For example, one may imagine the process of using the product or alternatively, imagine the end benefits of having the product. The present investigation examines the relative effectiveness of these two strategies and reveals new insights into the effects of process- and outcome-oriented thinking on choice and post-choice implementation behavior.

Existing research on process- and outcome-oriented thinking suggests that process-oriented thinking has more favorable effects than outcome-oriented thinking. For example, process-oriented mental simulation can make consumers more discerning in their use of ad information (Escalas and Luce 2003), facilitate goal achievement (Pham and Taylor 1999), and decreases the gap in consumer preferences resulting from indirect and direct experiences (Hamilton and Thompson 2007) as well as from considering near and distant future purchase situations (Zhao, Hoeffler and Zauberman 2007). Although these findings tend to favor process-oriented mental simulation, they are based on scenarios in which consumers are evaluating a single goal or product, rather than choosing among two or more alternatives. However, a different set of cognitive processes may occur when consumers are choosing among alternatives. For example, when consumers evaluate more than one product, differences in attribute values across products are more salient than when they evaluate a single product (Hsee and Zhang
2004). Furthermore, outcome- and process- oriented thinking may foster differential focus on the desirability and feasibility of product attributes. As previous research has shown, concrete, process-oriented thinking increases the likelihood that the consumer will choose the more feasible of the two alternatives (Hamilton and Thompson 2007; Liberman and Trope 1998; Trope and Liberman 2000).

We propose that along with evoking focus on different attribute sets, process and outcome mental simulation also have different effects on consumer’s subjective experiences during the decision process. More specifically, in contrast to previous research demonstrating the positive effects of process-oriented mental simulation, we examine the possibility that process-oriented thinking may increase the difficulty of making a choice, which can hinder subsequent implementation of the decision. Although previous investigations have not examined the effects of process- and outcome- oriented thinking on consumers’ subjective experiences, research in other domains suggests that consumers’ judgments are influenced not only by the content of relevant information, but also by the perceived difficulty of making a choice. For example, the perceived difficulty of processing product information (Lee and Labroo 2004), recalling reasons for purchasing a product (Menon and Raghubir 2003) or imagining the product experience (Petrova and Cialdini 2005) can significantly affect subsequent product evaluations. However, little is known about how focusing on the outcomes of purchasing the product (end benefits) or the process of using it (means) influences consumers’ decision difficulty and subsequent product evaluations.

Understanding factors that influence consumers’ decision difficulty is important for at least three reasons. First, decision difficulty may affect consumers’ readiness to make a decision, potentially delaying the purchase process (Dhar 1997). Second, decision difficulty may result in
lower choice consistency over time and increased likelihood to choose a compromise alternative at a later point (Novemsky et al. 2007). Finally, consumers may infer from a difficult decision experience that the chosen and the rejected alternative are close in attractiveness, increasing the likelihood that the rejected alternative will be selected in the future (Liberman and Föster 2006). Therefore, if using process-or outcome-oriented thinking changes consumers’ perceptions of decision difficulty, recommendations to use either process- or outcome-oriented thinking should consider not only the effects on initial choices, but also the potential effects on consumers’ subjective experiences during the decision process.

Our research offers three main contributions. First, we show that process-oriented thinking can significantly increase decision difficulty relative to outcome-oriented thinking by increasing the salience of means-end trade-offs. Second, we examine whether the enhanced decision difficulty emerging from process-oriented thinking impacts subsequent judgments. Specifically, we test the effects of outcome and process-oriented thinking on perceived differences among the alternatives, willingness to postpone choice, and likelihood of forgoing an initial choice for a compromise option offered subsequently. Finally, we explore the differential effects of process and outcome-oriented thinking on the implementation of individuals’ choices, examining whether process-oriented thinking can hinder performance.

CONCEPTUAL BACKGROUND

Process-Oriented and Outcome-Oriented Thinking

Research on mental simulation differentiates between two types of elaboration: outcome-oriented and process-oriented thinking (Pham and Taylor 1999). Outcome-oriented thinking
encourages individuals to focus on the end state they want to achieve (e.g., a student envisioning getting a high grade), while process-oriented thinking involves elaboration on the step-by-step process that leads to a desired outcome (e.g., a student envisioning the activities she would perform to achieve a high grade).

Previous research has suggested that process-oriented mental simulation is more effective than outcome-oriented simulation in terms of goal implementation, self-regulation, and coping. Mentally rehearsing the steps to reach a goal leads to appropriate changes in behavior, increasing the likelihood that the goal will be obtained, as opposed to mentally simulating the end state or not engaging in mental simulation at all (Taylor et al. 1998). For example, students preparing for a mid-term exam who were told to imagine themselves studying for the exam in a way that would lead them to get a high grade (i.e., sitting at their desks, going over lecture notes) spent more hours studying and outperformed students who were told to imagine themselves having gotten a high grade on the exam (i.e., learning that they had received a high grade, feeling confident and proud; Taylor et al. 1998). In another study, participants who used process-oriented thinking to imagine a stressful event in their lives reported more positive affect immediately after performing the mental simulation than participants who used outcome-oriented thinking, and this effect persisted for at least a week (Taylor et al. 1998). Moreover, Kruger and Evans (2004) show that unpacking a target task (e.g., preparing food) into the various steps required to perform it (e.g., slice fruit, boil shrimp, etc) increases the accuracy of predicted completion times.

In a consumer context, process-oriented thinking has been shown to elicit several beneficial effects as well. Hamilton and Thompson (2007) show that encouraging consumers to use process-oriented thinking increases the consistency in their preferences across indirect
experiences (e.g., reading product descriptions or seeing a product on display) and direct product experiences (e.g., product trial). Similarly, Zhao, Hoeffler, and Zauberman (2007) found that process-oriented thinking can make consumers’ preferences when imagining distant-future events more consistent with their near-future preferences. Finally, Hoeffler (2003) showed that process-oriented thinking can help decrease uncertainty when estimating the usefulness of really new products.

Process-oriented thinking has also been shown to make consumers more discerning when reacting to advertising than outcome-oriented thinking (Escalas and Luce 2003). Inducing process-oriented thinking during exposure to ads with strong arguments led to significantly higher behavioral intentions than inducing outcome-oriented thinking. However, this effect was reversed when the advertisement contained weak arguments because behavioral intentions are not generated when a behavior’s ability to achieve the desirable outcome is weak (Escalas and Luce 2003). This effect holds even when consumers have relatively low cognitive resources, when we would normally expect insensitivity to argument strength (Escalas and Luce 2004).

Although these findings support the positive effects of process-oriented thinking, previous research has only examined the effects of process- and outcome-oriented thinking when consumers are considering a single target object or event, and not when consumers are considering multiple alternatives. Thus, the effects of these two types of mental simulation on subjective experiences such as choice difficulty have not been considered.

Effects of Process- and Outcome-Oriented Thinking on Choice Difficulty

We propose that holding the composition of the choice set constant, process and
outcome-oriented thinking will influence choice difficulty because they evoke different types of elaboration. Outcome-oriented thinking promotes elaboration on the outcomes or end states a person wants to achieve (Taylor et al. 1998), while process-oriented thinking generates a spontaneous planning process in which individuals link actions and outcomes into a step-by-step plan (Escalas and Luce 2004; Taylor et al. 1998). Notably, thought protocols suggest that while consumers using outcome-oriented thinking seem to elaborate primarily on the outcome of the target activity, consumers using process-oriented thinking elaborate not only on the process but also on the outcome of the target activity. For example, Escalas and Luce (2004) found that participants who received process instructions prior to ad exposure reported thinking both about the process and the outcome of using the advertised products, while participants who received outcome instructions reported thinking primarily about the outcome of using the products.

Because outcome-oriented thinking triggers elaboration primarily on the benefits associated with attaining one’s goals, the desirability of the goals (i.e., end benefit) is expected to be more salient than their feasibility (i.e., cost in terms of effort, time, or money required to achieve end benefit) when individuals are evaluating alternatives. In contrast, process-oriented thinking should activate action-outcome linkages, making both feasibility and desirability considerations salient to process-oriented individuals. Thus, for decisions that require means-end tradeoffs, such as the apartment choice described in the introduction, the decision should be more difficult for those who engage in process-oriented thinking than for those who engage in outcome-oriented thinking.

We predict that the enhanced decision difficulty emerging from process-oriented thinking will have important implications for consumers, influencing their commitment to the chosen option, subsequent judgments, and behavior. Previous research suggests that decision difficulty
lowers consumers’ satisfaction with the decision process (Fitzsimons 2000), increases
willingness to postpone choice (Dhar 1997), and increases the likelihood of switching to a compromise option (Simonson 1989). Additionally, choice difficulty can hamper intrinsic motivation and performance. For example, Iyengar and Lepper (2000) found that increasing the number of essay topics that students could select for a particular assignment, which increased the difficulty of the decision-making process, led to lower completion rates and worse performance, as indicated by essay quality scores.

To test the effects of process and outcome-oriented thinking on consumers’ decision difficulty, we conducted a series of four studies in which we present participants with choice sets involving different types of trade-offs and encourage them to engage in either outcome-oriented or process-oriented thinking. Across different choice contexts, we show that encouraging participants to adopt process-oriented thinking systematically increases decision difficulty when participants are faced with trade-offs involving desirability (end benefits) and feasibility (means) attributes, but not when the trade-offs involve only end benefits. Finally, our studies explore whether the negative effect of process-oriented thinking on decision difficulty is consequential by examining its effect on consumers’ satisfaction with the decision process, willingness to postpone choice, the perceived distinctiveness of the choice alternatives, willingness to forgo an initial choice for a compromise option presented later, and subsequent task performance.

STUDY 1

In this study, we tested the effect of process versus outcome-oriented thinking on choice difficulty and satisfaction with the decision process.
Design and Participants

Seventy-one undergraduate students were randomly assigned to conditions using a 2 mental simulation instructions (process vs. outcome-oriented thinking) x 2 alternative (desirable vs. feasible) mixed design. Mental simulation instructions were varied between subjects and alternatives were varied within-subjects.

Stimuli and Procedures

Participants’ choice set was composed of two apartments, described in terms of square footage, distance to campus, and price. Although both options were priced equally ($700/month), they presented a trade-off in terms square footage (end benefit) and distance to campus (means). Apartment A was smaller (500 square feet) but closer to campus (1 mile). Apartment B was larger (900 square feet), but the tenant would have to endure a longer commute to enjoy this benefit (9 miles from campus).

The study was administered using Media Lab software. Participants were asked to imagine that they were looking for an apartment to live in by themselves, and that they had narrowed down their choices to two alternatives. Participants were given the descriptions of the two apartments, one at a time. Immediately after reading the description of apartment A, participants in the process-oriented thinking condition read the following instruction:

As you consider Apartment A, focus on how living in this apartment will affect your daily routine and habits. Imagine how you would feel living in this apartment every day. That is, focus on the steps you would take to follow your daily routine and how you would feel as you were taking them.
After participants reported their thoughts regarding apartment A, participants read the same process-oriented instructions about apartment B. In contrast, in the outcome-oriented thinking condition, participants were given the following instructions:

As you consider Apartment A (B), focus on the benefits of living in this apartment and what you would gain from it. Imagine how you would feel being a tenant of this apartment. That is, focus on the benefits of this apartment and what you would value about living there.

Measures

After reporting their thoughts for both apartments in an open-ended format, participants rated the difficulty of following the mental simulation instructions. In the process-oriented thinking condition, participants rated the difficulty of imagining the daily routine of living in the apartments (not difficult/very difficult). In the outcome-oriented thinking condition, participants rated the difficulty of imagining the outcome of living in the apartments (not difficult/very difficult). Next, participants chose between the two apartments. Choice difficulty was measured using two items: participants rated the difficulty of choosing between the apartments (not difficult/very difficult) and their confidence in their decision (not confident/very confident, reverse coded). Satisfaction with the decision process was measured by asking participants to rate their agreement with the following three items based on Fitzsimons (2000): “I found the process of deciding which apartment to choose frustrating,” “I would be happy to make a similar choice for my next choice of apartment to live,” and “I found the process of deciding which apartment to choose interesting.” Next, participants rated how much they thought about the square footage of the apartments and about the distance from campus while considering the two
alternatives (Not at all/very much). Finally, participants rated their mood state (bad/good). All items used seven-point scales.

Results

*Manipulation checks.* There were no significant differences across conditions in the perceived difficulty of engaging in process- or outcome-oriented mental simulation ($M_{process} = 2.15, M_{outcome} = 2.13, p > .95$). Participants listed a similar number of thoughts in the process and outcome-oriented thinking conditions ($M_{process} = 7.0, M_{outcome} = 6.4, p > .35$), suggesting that the level of elaboration did not differ across conditions. Two independent judges content analyzed participants’ thought protocols and coded thoughts as relevant to the apartments’ size (end benefit), distance to campus (means), or as other unrelated thoughts. The reliability index ranged from .87 to .89 (Perreault and Leigh 1989). As expected, participants in the process-oriented condition indicated a higher number of thoughts about distance to campus ($M_{process} = 4.0, M_{outcome} = 3.0, F(1, 69) = 16.0, p < .001$) and a similar number of thoughts about square footage ($M_{process} = 1.7, M_{outcome} = 2.3, F(1, 69) = 2.7, p > .10$) relative to participants in the outcome-oriented condition.

Participants’ beliefs about their thoughts were consistent with our content analysis of their protocols. Although participants in the process-oriented thinking condition reported that they thought about the size of the apartment as much as those in the outcome-oriented condition ($M_{process} = 4.6, M_{outcome} = 5.2, F(1, 69) = 1.6, p > .21$), they reported that they thought more about distance to campus ($M_{process} = 6.8, M_{outcome} = 5.4, F(1, 69) = 6.1, p < .05$). Both measures suggest that process-oriented thinking tends to elicit similar elaboration on end benefits, but
greater elaboration on means than outcome-oriented thinking.

Choice and decision process. As expected, process-oriented instructions increased preferences for the closer apartment ($M = 91\%$) relative to outcome-oriented instructions ($M = 70\%$) ($\chi^2 (1) = 4.64, p < .05$). Importantly, consistent with our prediction, process-oriented participants rated the decision making process as more difficult than outcome-oriented participants ($M_{process} = 3.1, M_{outcome} = 2.3, F (1, 69) = 5.87, p < .05$). Relative to outcome-oriented thinking instructions, process-oriented thinking instructions also significantly lowered satisfaction with the decision making process ($M_{process} = 4.6, M_{outcome} = 5.4, F (1, 69) = 5.7, p < .05$). Decision difficulty and satisfaction were negatively correlated ($r = -.68, p < .001$).

Not surprisingly, participants’ mood ratings were negatively correlated with perceived choice difficulty ($r = -.42, p < .001$) and positively correlated with satisfaction with the decision process ($r = .38, p < .01$). Outcome-oriented participants reported a more positive mood ($M = 5.74$) than process-oriented participants ($M = 5.0, F (1, 69) = 5.04, p < .05$).

Discussion

The results of study 1 show that outcome-oriented and process-oriented mental simulation affect consumers’ subjective experiences during the choice process in different ways. Consistent with our prediction, process-oriented thinking heightened consumers’ focus on both the feasibility (distance to campus) and desirability (square footage) attributes, increasing choice difficulty and lowering decision satisfaction relative to outcome-oriented thinking.

In a follow up study ($N = 103$) using similar stimuli and mental simulation instructions,
we exposed participants to non-vivid (i.e., strictly factual information) or vivid (i.e., narrative description with pictures) apartment descriptions to test whether vividness moderates study 1 results. Previous research suggests that the vividness of alternative descriptions can induce narrative transportation (i.e., immersion into a text), reducing analytical elaboration on product attributes (Green and Brock 2000). Notably, we found no significant moderating effect of vividness ($ps > .43$). Participants instructed to use process-oriented mental simulation during decision making reported significantly more choice difficulty ($M = 3.5$) than participants instructed to use outcome-oriented mental simulation ($M = 2.9$, $F(1, 99) = 5.06, p < .05$), regardless of the vividness of the alternatives.

**STUDY 2**

Study 2 extends study 1 in two ways. First, to increase the generalizability of our findings, we tested the effect of process- and outcome-oriented thinking on decision difficulty using another product category and different manipulations of means-end conflict. Second, we explore whether the enhanced decision difficulty that arises from process-oriented thinking leads to a lower spreading of the alternatives. Recent research shows that people infer the relative attractiveness of choice alternatives from experienced decision difficulty (Liberman and Förster 2006). Specifically, a difficult decision leads to inferences that the chosen and rejected alternatives are close to each other in attractiveness, while an easy decision signifies that the alternatives are remote from each other in attractiveness. In this study, we measure the perceived distinctiveness (spreading) of the alternatives by computing the difference between the evaluations of the chosen and rejected alternatives. We predict that process-oriented thinking
will lead to less perceived post-decisional spreading of alternatives than outcome-oriented thinking.

Design and Participants

Fifty two students were randomly assigned to a 2 mental simulation instructions (process vs. outcome focused thinking) x 2 alternative (desirable vs. feasible) mixed design. Instructions were manipulated between subjects. Each participant evaluated two alternatives and the order of product presentation was counterbalanced between subjects.

Stimuli and Procedures

Participants chose between two dietary supplements intended to increase energy levels. To create a means-end trade-off, we used two attributes commonly found in energy supplements: the presence of antioxidants and vitamins and the number of tablets to be taken each day. One supplement offered antioxidants and vitamins (end benefit) but required consumers to take a tablet three times per day (means). The other supplement alternative did not offer antioxidants and vitamins, but required only one tablet per day. We used names and pictures of real energy supplements currently available in the market (Energize and Energy Matrix) to accompany these descriptions.

The study was administered using Media Lab software. Participants were asked to imagine that they were considering taking dietary supplements to increase and sustain their energy. They were asked to evaluate two energy supplements and they read the product
description one at a time. Before seeing the descriptions of the supplements, participants in the process-oriented thinking condition read the following instruction:

While you read the product descriptions, we would like you to imagine the PROCESS of using these energy supplements (e.g., opening the plastic container, getting out a tablet, drinking water to swallow the tablet). Imagine how you would incorporate the supplements into your daily routine. That is, focus on the process of using the supplements - focus on how you would feel about taking the supplements on a daily basis.

Participants in the outcome-oriented condition read the following instruction:

While you read the product descriptions, we would like you to imagine the END BENEFITS that you would gain from using these energy supplements (e.g., academic success, energy to work out, overall health). Imagine how you would feel if your energy and health improved as a result of using these supplements. That is, focus on the end result of using the supplements - focus on how you would feel as a result of using the product.

After viewing descriptions of each supplement, participants read the instructions again, reported their thoughts about the supplements, and responded to the dependent measures.

Measures

Participants rated the difficulty of making a choice (not difficult at all/very difficult), the extent to which they thought about the benefits of the supplements (not at all/very much) and the extent to which they thought about the process of taking the supplements every day (not at all/very much). Next, we asked participants how likely they would be to select each of the supplement options (very unlikely/very likely) and whether they were looking for energy-enhancing supplements. All items used seven-point scales. Finally, as control measures, we asked participants whether they had ever used dietary supplements, if they were currently taking...
one, and to rate the importance of antioxidants and vitamins and the number of tablets to be taken each day.

Results and Discussion

Participants rated the presence of antioxidants and vitamins ($M = 4.83$) and number of required tablets per day ($M = 4.85$) as equally important attributes when evaluating dietary supplements ($p > .95$), and these importance ratings were not affected by the study conditions ($ps > .41$). Participants’ previous experiences with dietary supplements were included as covariates in all analyses and did not change any of the results.

Manipulation checks. Consistent with our prediction that process-oriented thinking increases participants’ focus on means-end trade-offs, process-oriented participants reported thinking more about the step-by-step process of taking the supplements every day ($M_{\text{process}} = 5.6$, $M_{\text{outcome}} = 4.2$, $F (1, 50) = 6.6, p < .05$) than participants in the outcome-oriented condition, but were equally focused on end benefits of using the product ($M_{\text{process}} = 4.5$ and $M_{\text{outcome}} = 5.0$, $F (1, 50) = 1.5, p > .22$).

Choice and decision process. Replicating study 1 results, participants using process-oriented thinking experienced higher choice difficulty than participants using outcome-oriented thinking ($M_{\text{process}} = 3.1$ vs. $M_{\text{outcome}} = 2.3$, $F (1, 50) = 4.3, p < .05$). As shown in figure 1, purchase likelihood ratings were also influenced by mental simulation instructions. Consistent with previous research (Liberman and Trope 1998), purchase likelihood ratings for the desirable alternative were significantly higher in the outcome condition than in the process condition.
(M_{process} = 3.5 vs. M_{outcome} = 4.5, F (1, 50) = 4.15, p < .05), but there was no difference across conditions in purchase likelihood ratings for the feasible alternative (p > .75).

**Spreading of alternatives.** We computed a spreading score for each participant as the difference in purchase likelihoods of the chosen and rejected alternatives (Liberman and Förster 2006). Decision difficulty and post-decisional spreading were negatively correlated (r = -.53, p < .001). As expected, when participants engaged in process-oriented thinking, the alternatives were perceived to be more similar to each other (i.e. lower spreading) than when participants engaged in outcome-oriented thinking (M_{process} = 1.6, M_{outcome} = 2.7, F (1, 50) = 5.15, p < .05). In other words, process-oriented thinking led to less polarized preferences.

Overall, the results of study 2 replicate the negative effect of process-oriented thinking on decision difficulty using a different product category. In addition, we show that this enhanced difficulty affects the perceived distinctiveness of the choice alternatives. When participants were faced with a conflict between means and ends, process-oriented thinking increased the focus on attribute trade-offs, increasing decision difficulty and enhancing subsequent interest in both alternatives.

**STUDY 3**

Study 3 extends our initial findings in several important ways. First, instead of explicitly instructing participants to adopt either outcome or process-focused thinking, we manipulated mental simulation indirectly in study 3, priming participants to induce either an outcome-focused or a process-focused mindset (Freitas, Gollwitzer and Trope 2004). Second, we manipulated the type of attribute trade-off participants faced in their decision process. If our assumption that end
benefits are equally salient to both process and outcome-oriented participants is correct, we should not observe a differential effect of mental simulation on choice difficulty when the trade-off involves only end benefits, as opposed to a means-end conflict. Third, to further explore the impact of process and outcome-oriented thinking, we measured participants’ willingness to postpone choice and their tendency to forgo their initial choice for a compromise option. Finally, for generality, we tested our proposed effects using a third product category and different operationalizations of attribute trade-offs.

Design and Participants

One hundred fifty-one undergraduate students were assigned to a 2 mental simulation (process vs. outcome-oriented thinking) x 2 type of trade-off (end benefits trade-off vs. means-end trade-off) between subject design. Each participant was exposed to two product alternatives. We counterbalanced the order in which the alternatives were presented between subjects.

Stimuli and Procedures

Participants chose between two digital cameras described in terms of their functionality and ease of use. In the means-end trade-off condition, the two alternatives presented a trade-off between functionality (end benefit) and ease of use (means). Camera A offered fewer capabilities (6 basic features) but was easier to use (ease of use rating = 5 out of 5), while Camera B offered more capabilities (6 basic features and 6 additional features) but was more difficult to use (ease of use rating = 1 out of 5). In the end benefits trade-off condition, ease of use was identical across the two alternatives (ease of use rating = 3 out of 5), and the two digital cameras presented
a trade-off in terms of functionality. Each camera offered the same set of 6 basic features plus a unique set of 6 additional features.

Participants were given a booklet divided into two parts. The first part contained an outcome vs. process mindset induction, which has been shown to transfer to subsequent tasks (Freitas, Gollwitzer, and Trope 2004). This manipulation is an elaboration task designed to induce participants to adopt either an abstract, outcome-focused mindset (i.e., why we do the things we do?) or a concrete, process-focused mindset (i.e., how we do the things we do?). Participants were asked to consider the goal of learning a new language. In the outcome condition, they were prompted to think increasingly abstractly, thinking about why they would engage in this activity. In the process condition, participants were asked to thinking increasingly concretely, considering how they learn a new language. After spending approximately 5 minutes on this mental exercise, participants were asked to describe the activity of learning a new language. Next, they took part in an unrelated study about digital cameras. Participants were asked to imagine they were considering the purchase of a digital camera and were given a description of two alternatives.

Measures

After reading about the two alternatives, participants were asked to rate their relative preference between the two cameras (definitely prefer Camera A/ definitely prefer Camera B) and choose their preferred model. Following choice, participants rated choice difficulty (not difficult at all/very difficult, not confident at all/very confident [reverse coded]). Next, participants reported their willingness to postpone choice using two items: how ready are you to
make a choice (not ready at all/very ready, reverse coded) and how much would you like to postpone making a choice (not at all/very much). Then, they rated the importance of the capabilities and ease of use of a digital camera (not important at all/very important), and their familiarity with digital cameras (not familiar at all/very familiar). At the end, to capture participants’ commitment to their initial choices, we followed a procedure suggested by Muthukrishnan and Wathieu (2007). We described a compromise alternative (Camera C) and asked participants which digital camera (Camera A, B or C) they would most likely choose if this new alternative were added to the choice set. All items used seven-point scales.

Results

Product capability and ease of use were rated as equally important ($M_{\text{capability}} = 5.22$ and $M_{\text{ease of use}} = 5.13$; $t(150) = .48$, $p > .63$), and the ratings were unaffected by our manipulated factors ($ps > .20$). Participants’ familiarity with digital cameras was positively correlated with their relative preferences ($r = .19$, $p < .05$) and initial choices ($r = .23$, $p < .05$). Including familiarity as a covariate in our analyses did not change any of the results.

*Initial choice and decision process.* A 2 mental simulation (process vs. outcome-oriented thinking) x 2 type of trade-off (end benefits trade-off vs. means-end trade-off) ANOVA x 2 presentation order on participants’ relative preference between the products indicated no significant effects ($ps > .16$). Similarly, we do not find significant effect of process and outcome-oriented thinking on initial choice across the different trade-off conditions ($ps > .49$). Nevertheless, as predicted, we find systematic differences in terms of decision difficulty. A 2
mental simulation (process vs. outcome-oriented thinking) x 2 type of trade-off (end benefits trade-off vs. means-end trade-off) x 2 presentation order ANOVA revealed a significant main effect of mental simulation \( (F(1, 143) = 6.19, p < .05) \) and a significant main effect of trade-off \( (F(1, 143) = 30.5, p < .001) \). Specifically, priming participants with process-oriented thinking increased decision difficulty \( (M = 3.46) \) relative to priming participants with outcome-oriented thinking \( (M = 2.93) \). Moreover, the end-benefits trade-off was perceived to be more difficult \( (M = 3.79) \) than the means-end trade-off \( (M = 2.60) \).

These main effects were qualified by a significant mental simulation by type of trade-off interaction \( (F(1, 143) = 8.85, p < .01) \).\(^1\) Consistent with our prediction, the two-way interaction shows that inducing participants to adopt process-oriented thinking significantly increased choice difficulty relative to outcome-oriented thinking when the alternatives entailed a means-end conflict \( (M_{\text{process}} = 3.2 \text{ vs. } M_{\text{outcome}} = 2.0, F(1, 74) = 18.3, p < .001) \). However, when the two alternatives presented a trade-off involving only end benefits, the differences in choice difficulty across outcome and process-oriented thinking disappeared \( (M_{\text{process}} = 3.7 \text{ vs. } M_{\text{outcome}} = 3.8, F(1, 69) = .10, p > .75) \).

Willingness to postpone choice and select a compromise option. A 2 x 2 x 2 ANOVA on willingness to delay choice revealed a significant mental simulation by trade-off interaction \( (F(1, 143) = 6.49, p < .05) \). As expected, when the decision task involved a means-end tradeoff, participants primed with process-oriented thinking reported more desire to postpone choice \( (M_{\text{process}} = 3.84) \) than participants primed with outcome-oriented thinking \( (M_{\text{outcome}} = 2.53, F(1, 74) = 12.1, p < .01) \). This effect disappeared when the task involved trading off only end benefits.

\(^1\) This analysis controls for all presentation order effects. There was a marginal main effect of order \( (p > .058) \), a marginal trade-off by order interaction \( (p > .06) \) and a significant mental simulation by order interaction \( (p < .05) \).
\( M_{\text{process}} = 4.42 \) vs. \( M_{\text{outcome}} = 4.50 \), \( p < .84 \).

Although participants’ preferences were not initially affected by our manipulation of process vs. outcome mindset, we observed a significant effect on their commitment to these choices. Table 1 displays preferences for the two initial alternatives in the choice set, A and B, as well as the compromise option, C, which was presented to participants at the end of the experiment. Consistent with our prediction, in the means-end trade-off condition, process-oriented participants were significantly more likely to switch to a compromise alternative than outcome-oriented participants (56.4% vs. 33.3%, \( Z = 2.04, p < .05 \)). In contrast, in the more difficult end benefits trade-off condition, process and outcome-oriented participants were equally likely to select a compromise alternative (63.2% vs. 65.7%, \( Z = .28, p > .81 \)).

Discussion

Study 3 shows that participants primed to use process-oriented thinking reported significantly more choice difficulty than participants primed to use outcome-oriented thinking, and when faced with a means-end tradeoff, expressed greater willingness to postpone choice and switch to a compromise option that was offered later. Thus, inducing process-oriented thinking affects consumers’ readiness to make decisions and their subsequent choices, reinforcing the importance of considering the decision maker’s subjective experience, even when initial choices are not affected by the type of mental simulation.

By examining a boundary condition, study 3 also provides insights about why process-oriented thinking may lead to greater decision difficulty. The lack of significant differences in decision difficulty when the choice set presents a tradeoff involving only end benefits, not
means, is consistent with the notion that process and outcome mental simulations are equally focused on the end-state of a target action. Thus, it seems that differential effects of process and outcome thinking on decision-making occur only when participants must decide between alternatives offering either higher feasibility or higher desirability, as in our opening example.

Taken together, the results of studies 1, 2 and 3 provide convergent evidence that process-oriented thinking increases decision difficulty relative to outcome thinking when the alternatives involve a means-end conflict. Based on these findings, an interesting question that arises is whether process-oriented thinking can actually hinder individuals’ ability to subsequently implement their choices, lowering their performance. Previous research suggests that choice difficulty can be demotivating (Iyengar and Lepper 2000). We predict that, analogous to the effect of increasing the number of alternatives in the choice set (Iyengar and Lepper 2000), encouraging process-oriented thinking during the predecisional stage will lower participants’ subsequent performance.

**STUDY 4**

As mentioned earlier, previous research shows that encouraging students to adopt process- versus outcome-oriented thinking while preparing for a class exam significantly improved performance by reducing anxiety and facilitating planning (Pham and Taylor 1999). Notably, in Pham and Taylor’s research, participants did not have a choice about whether to take the exam or among different types of assignments. If choice difficulty can be demotivating, as shown by Iyengar and Lepper (2000), then our initial findings suggest that process-oriented thinking may in fact hinder performance when individuals choose between options that vary in
their desirability and feasibility.

In this study, we investigate whether the opportunity to choose a preferred alternative moderates the effect of process and outcome-thinking on performance. We manipulate type of mental simulation and whether participants choose or do not choose a subsequent task. We expect to find a significant interaction between mental simulation and choice on task performance. When participants are assigned to a task, and do not make a choice, we expect to replicate previous findings that process-oriented thinking improves performance relative to outcome-oriented thinking (Pham and Taylor 1999). However, when participants choose between desirable and feasible options, process-oriented thinking should increase choice difficulty relative to outcome-oriented thinking and lower participants’ task performance.

Design and Participants

One hundred sixty-nine undergraduate students were assigned to a 2 mental simulation instructions (process vs. outcome thinking) x 2 choice (choice/no choice) between-subjects design. Participants in the choice condition were asked to select between two articles which entailed a means-end trade-off. Those in the no-choice condition were randomly assigned to an article. Four participants did not complete the proposed task and were removed from the analyses.

Stimuli, Procedures and Measures

Participants were asked to read an article and write a short essay summarizing the main
idea of the article and their thoughts in response to the article. Although the underlying theme of both articles was similar (i.e., how the mind works), two articles were selected to create a tradeoff between interestingness (end benefit) and length (means). The feasible article, “How Memory Works,” was short (3/4 of a page, 363 words) but relatively uninteresting, describing the process of creating, storing and retrieving memories. The desirable article, “The Eureka Moment,” was longer (1½ pages, 790 words) but more interesting, describing methods for improving the likelihood that the mind will generate sudden, smart insights.

The study was administered as part of an hour long research session that involved several marketing experiments. Participants in the choice condition were given a short description of both articles as well as information about the length of both articles. They rated how interesting and effortful reading each of the articles would be (not interesting at all/very interesting, not much effort at all/a lot of effort). Hard copies of both articles were available to the participants during the choice process. Participants in the no choice condition were randomly assigned to either the feasible or desirable article and read a short description of the assigned article as well as information about its length. They rated how interesting and effortful reading their assigned article would be.

Before reading and summarizing the article, participants received either process or outcome thinking instructions. In the process condition, they were instructed to spend a few moments thinking about the process of completing the proposed task, such as reading the article from beginning to end, reflecting on its main points, and writing their first thoughts. They were asked to write down their thoughts on how they would complete the proposed task. In the outcome condition, participants were instructed to think about the end result of completing the proposed task, such as learning new information, enhancing their mental skills, and improving
their academic performance. Instead of writing about how they would complete the task, participants in the outcome condition wrote down their thoughts about the outcomes of completing the task.

After completing the mental simulation, participants in the choice condition selected their preferred article, answered three items about choice difficulty (not difficult/very difficult, not confident at all/very confident, not conflicted at all/very conflicted), the extent to which they had figured out how they would complete the task (2 items, I have no idea/ I have figured out exactly, I have not planned/I have an exact plan) and predicted how well they would do in the task (not well at all/very well). Participants in the no choice condition rated these same items, but did not answer the choice-related questions. After reading the article, all participants wrote a short essay summarizing the main ideas of the article and their thoughts in response to it. The number of words in each essay was counted, and the essays were coded by two independent raters for form and content.

After participants finished writing their essays, we asked them to rate the quality of their essays (low quality/high quality), how well they summarized the article (not well at all/very well), their satisfaction with their performance (very dissatisfied/very satisfied) and how enjoyable the task was (not at all/very much). Those in the choice condition also rated how enjoyable they thought the task would have been if they had selected the other article (not at all/very much). At the end, participants reported the extent to which they thought about the steps they would follow to summarize the article and the end result of doing this task (not at all/very much). All items used 7-point scales.

Results
Manipulation checks. As expected, choosing between the two articles presented a means-end trade-off. Participants rated the desirable article as more interesting ($M_{\text{feasible}} = 4.66$, $M_{\text{desirable}} = 5.02$, $F (1, 77) = 3.83, p = .054$) but more effortful ($M_{\text{feasible}} = 3.13$, $M_{\text{desirable}} = 4.08$, $F (1, 77) = 38.6, p < .001$) than the feasible article. Mental simulation instructions did not affect these ratings ($ps > .15$).

As predicted, process-oriented thinking elicited greater elaboration on means relative to outcome-oriented thinking, but similar elaboration on end benefits. Participants who received process thinking instructions reported being more focused on the steps they would follow to perform the task ($M_{\text{process}} = 3.38$) than participants who received outcome thinking instructions ($M_{\text{outcome}} = 2.62$, $F (1, 161) = 11.05, p = .001$). Replicating our previous results, participants in the process and outcome thinking conditions were equally focused on the end result of performing the target task ($M_{\text{process}} = 3.30$, $M_{\text{outcome}} = 2.94$, $p > .13$). The presence vs. absence of choice did not influence there ratings ($ps > .21$).

Choice and decision process. Mental simulation instructions had a significant effect on participants’ choices. Process-oriented participants were more likely to select the shorter but less interesting article ($M = 86.5\%$) compared to outcome-oriented participants ($M = 47.6\%$, $\chi^2 (1) = 13.21, p < .001$). Importantly, replicating our previous findings, process-oriented thinking significantly increased choice difficulty relative to outcome thinking ($M_{\text{process}} = 3.60$, $M_{\text{outcome}} = 2.64$, $F (1, 77) = 9.02, p < .01$).

Task implementation. A 2 mental simulation (process vs. outcome) x 2 choice (choice vs. no choice) x 2 article (feasible vs. desirable) ANOVA on task planning revealed that, consistent with previous research (Pham and Taylor 1999), process-oriented thinking facilitated planning
relative to outcome-oriented thinking ($M_{\text{process}} = 4.40, M_{\text{outcome}} = 3.16, F(1, 157) = 24.22, p < .001$). This reinforces the effectiveness of our mental simulation manipulation. In addition, there was a main effect of choice on planning ($F(1, 157) = 3.83, p = .052$). Participants who chose their preferred article ($M = 3.54$) indicated less planning than those who did not choose the article ($M = 4.03$). No other effects reached significance ($ps > .34$).

A 2 x 2 x 2 ANOVA on task enjoyment indicates only a main effect of mental simulation. Overall, process-oriented participants reported enjoying reading the target article more ($M = 3.67$) than outcome-oriented participants ($M = 2.78, F(1, 157) = 9.70, p < .01$). No other effects were significant ($ps > .13$). However, for those in the choice condition, we observed a significant effect of mental simulation on regret. Process-oriented participants were more likely to report that they would have enjoyed the target task more ($M = 3.68$) if they had chosen the other article in the choice set than outcome-oriented participants ($M = 2.60, F(1, 75) = 8.22, p < .01$).

Consistent with the lower postdecisional spreading of alternatives that we observed in study 2, this suggests that the non-chosen alternatives were evaluated more favorably in the process condition than in the outcome condition.

Although subjective assessments of performance did not vary significantly across conditions ($ps > .20$) objective measures of participants’ performance did. We gathered two objective measures of task performance: essay length (i.e., number of words) and essay quality (content and form). Two independent judges, unaware of participants’ conditions, graded essay content in terms of breadth and depth and essay form in terms of structure and grammar, using 10-point scales (extremely poor/excellent). The inter-rater correlation was $r = .79 (p < .001)$ for content scores, and $r = .76 (p < .001)$ for form scores. We averaged the judges’ ratings to create one content and one form score for each participant. The final essay quality score was the
average of each participant’s content and form score \( (r = .70, p < .001) \). Means across conditions are presented in Table 3.

A 2 x 2 x 2 ANOVA on essay length (i.e., number of words) revealed a significant main effect of mental simulation \( (M_{\text{process}} = 76, M_{\text{outcome}} = 106, F(1, 157) = 14.64, p < .001) \) and a marginal effect of choice \( (M_{\text{no choice}} = 99, M_{\text{choice}} = 84, F(1, 157) = 3.64, p < .06) \) qualified by a significant two-way interaction between mental simulation and choice \( (F(1, 157) = 12.85, p < .001) \). No other effects were significant \( (ps > .17) \). When participants chose which article to summarize, inducing process-oriented thinking (vs. outcome-oriented thinking) cut essay length by more than half \( (M_{\text{process}} = 55 \text{ words}, M_{\text{outcome}} = 113 \text{ words}, p < .001) \). Conversely, when participants were assigned an article to summarize, mental simulation did not affect essay length \( (M_{\text{process}} = 98 \text{ words}, M_{\text{outcome}} = 99 \text{ words}, p > .87) \).

The results for essay quality scores followed a similar pattern. A 2 x 2 x 2 ANOVA showed a significant main effect of mental simulation \( (M_{\text{process}} = 6.1, M_{\text{outcome}} = 7.6, F(1, 157) = 19.25, p < .001) \) and article \( (M_{\text{feasible}} = 7.3, M_{\text{desirable}} = 6.4, F(1, 157) = 6.86, p = .01) \) and a significant two-way interaction between mental simulation and choice \( (F(1, 157) = 12.36, p = .001) \). No other effects were significant \( (ps > .12) \). In the choice condition, eliciting process-oriented thinking (vs. outcome-oriented thinking) significantly decreased the quality of participants’ essays \( (M_{\text{process}} = 5.3, M_{\text{outcome}} = 7.9, p < .001) \). However, in the no choice condition, the detrimental effect of process-oriented thinking on essay quality disappeared, and there was no difference in essay scores across conditions \( (M_{\text{process}} = 7.0, M_{\text{outcome}} = 7.2, p > .52) \).

Discussion

Study 4 replicates our previous findings about the effect of process-oriented thinking on
choice difficulty in a different setting. When choosing between writing assignments that varied in both their degree of interest and the level of effort required, eliciting process-oriented thinking led to a similar consideration of the tasks’ end benefits and greater focus on the steps required for task implementation relative to outcome-oriented thinking, increasing the perceived difficulty of the choice.

Importantly, study 4 also extends our previous findings by showing that in the presence of a means-end trade-off, process mental simulation can be demotivating, hindering subsequent task implementation. Similar to the negative effect of increasing the number of choice options on individuals’ performance (Iyengar and Lepper 2000), we find that encouraging process-oriented thinking (vs. outcome-oriented thinking) led to significantly shorter and lower quality essays when participants were allowed to choose their preferred assignment. However, although our finding that process thinking led to greater planning than outcome thinking is consistent with Pham and Taylor (1999), we did not replicate their finding that process mental simulation improved participants’ performance in the no choice condition. Two factors may explain this inconsistency. First, differences in the difficulty of the target tasks seem to moderate the positive effects of process simulation on performance. For example, previous research shows that forming implementation intentions (“I intend to perform X when I encounter situation Y”) improves goal completion for difficult goals but not for easy goals, perhaps because the implementation of easy goals is more habitual than the implementation of difficult goals (Gollwitzer and Brandstätter 1997). Thus, mentally rehearsing how to complete a target task may have only negligible effects for less difficult tasks such as writing an article summary. Second, the amount of time dedicated to mental simulation may contribute to the strength of its effect. While Pham and Taylor’s (1999) participants engaged in process mental simulation for an
extended period of time (5 minutes a day for a week) as they prepared for a class exam, our participants engaged in process simulations for only a few minutes in preparation for a relatively simple and short task. Because examining the variables that moderate the positive effect of process thinking in the absence of choice goes beyond the scope of this paper, further research is needed to shed more light in this direction.

**GENERAL DISCUSSION**

The present research examines the effect of process and outcome-oriented thinking on consumers’ subjective experiences during the decision-making process, as well as on their subsequent judgments and behavior. Across four studies using different choice contexts, we show that when participants are faced with means-end trade-offs, inducing process-oriented thinking systematically increases decision difficulty. This has several important implications: process-oriented thinking lowered satisfaction with the decision process, increased willingness to postpone choice and reduced commitment to an initial choice when a new option was presented. Moreover, the results of study 4 show that when individuals face a means-end trade-off, process-oriented thinking can inhibit subsequent motivation and performance relative to outcome-oriented thinking.

Notably, the negative effect of process-oriented thinking on choice difficulty does not seem to be associated with a higher level of elaboration. Across our studies, we found that participants in both mental simulation conditions generated a similar number of thoughts, suggesting similar levels of elaboration. Similarly, study 1 shows that participants did not perceive process mental simulation to be more demanding than outcome mental simulation. Rather, it seems to be the specific content of participants’ simulations that affect subjective
experiences. Participants’ thought protocols suggest that process-oriented thinking makes decisions more difficult by encouraging consumers to focus on the process of using a target product (or engaging in a particular task) as well as on the outcomes. Process-oriented participants experience more conflict when choosing between a desirable option and a feasible option because they tend to elaborate equally on both dimensions, forming action-outcome links, compared to outcome-oriented participants, who focus primarily on information about end benefits.

Implications

Our results make several contributions to research in psychology and consumer behavior. First, our research adds to the literature on preference fluency by exploring a factor independent of the choice set that can affect the perceived difficulty of choice. Previous studies have provided considerable evidence that consumers can be influenced by metacognitive experiences that accompany the act of processing information (Schwarz 2004). For instance, Novemsky and colleagues (2007) show that making product descriptions easy or difficult to read and asking participants to think of few versus many reasons for their choice, two factors that are independent of the choice alternatives, increase perceived choice difficulty and choice deferral. Similarly, our studies indicate that process-oriented thinking can increase choice difficulty and lower preference fluency.

Second, our findings provide interesting insights about the effects of mental simulation on different stages of decision making, and in particular, about the differential effects of process- and outcome-oriented thinking during the predecisional and postdecisional stages (Gollwitzer,
Heckhausen and Ratajczak 1990). Although previous research indicates that process-oriented thinking can aid the postdecisional stage (i.e., goal implementation) by increasing planning and reducing anxiety (e.g., Pham and Taylor 1999), our findings show that it can increase the difficulty of the predecisional stage when individuals are comparing desirability and feasibility attributes. As a consequence, we find that process mental simulation decreases readiness to make a decision, potentially delaying action initiation and inhibiting implementation. These findings have both positive and negative implications for consumers. On the positive side, process-oriented thinking might attenuate overconfidence and help control impulsive purchase behavior during the predecisional stage, leading to better choices. On the negative side, however, process-oriented thinking might delay important decisions, such as those related to health (e.g., selecting among weight loss programs) and savings (e.g., selecting among retirement investments).

Moreover, our findings from study 3 add to the growing body of literature on construal level theory (CLT). Empirical research on CLT has demonstrated the effects of abstract and concrete construals on category breadth (Liberman, Sagristano and Trope 2002), preferences and choices (Liberman and Trope 1998), creative insight ( Förster, Friedman and Liberman 2004), and causal attributions (Nussbaum, Trope and Liberman 2003). Our results suggest that abstract (outcome-oriented) and concrete (process-oriented) mental representations also may influence the subjective experiences that accompany the act of choosing, such as choice difficulty and willingness to postpone a decision. In future research, it would be interesting to explore the extent to which manipulations of psychological distance (i.e., temporal, spatial, social distance) known to influence the abstractness/concreteness of thoughts will produce similar effects on decision difficulty.

Finally, our results contribute to recent research on attitude certainty (Rucker and Petty
2004) by suggesting that different types of mental simulation (process vs. outcome) may facilitate or inhibit attitude change. Rucker and Petty (2004) show that even if attitude valence and extremity do not change, a decrease in attitude certainty (i.e., confidence) is consequential because it makes it more likely that attitudes can be changed later. Our findings suggest that process-oriented thinking decreases consumers’ confidence in the presence of means-end attribute trade-offs. As a result, process-oriented thinking may lead to more malleable attitudes, which are easier to change in the future. Indeed, our finding that process oriented mental simulation increased the likelihood that participants would forgo their initial choice in favor of a subsequently presented compromise option supports this link between mental simulation and attitude certainty.
REFERENCES


Kruger, Justin and Matt Evans (2004), “If You Don’t Want to Be Late, Enumerate: Unpacking
Reduces the Planning Fallacy,” *Journal of Experimental Social Psychology*, 40, 586-598.


FIGURE 1 – Likelihood of Choosing Desirable and Feasible Alternatives in Study 2
### TABLE 2 – Choice Shares in Study 3

<table>
<thead>
<tr>
<th>Trade-off Condition</th>
<th>Mental Simulation</th>
<th>Camera A</th>
<th>Camera B</th>
<th>Camera C (Compromise Option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Means-end Process</td>
<td>18%</td>
<td>26%</td>
<td>56%</td>
<td></td>
</tr>
<tr>
<td>Outcome</td>
<td>26%</td>
<td>41%</td>
<td>33%</td>
<td></td>
</tr>
<tr>
<td>End benefits Process</td>
<td>16%</td>
<td>21%</td>
<td>63%</td>
<td></td>
</tr>
<tr>
<td>Outcome</td>
<td>17%</td>
<td>17%</td>
<td>66%</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 3 – Performance Scores in Study 4

<table>
<thead>
<tr>
<th>Choice</th>
<th>Mental Simulation</th>
<th>Essay Length (number of words)</th>
<th>Essay Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>No choice</td>
<td>Process</td>
<td>98 (53.1)</td>
<td>7.0 (2.2)</td>
</tr>
<tr>
<td></td>
<td>Outcome</td>
<td>97 (48.2)</td>
<td>7.2 (2.0)</td>
</tr>
<tr>
<td>Choice</td>
<td>Process</td>
<td>53 (35.0)</td>
<td>5.3 (1.64)</td>
</tr>
<tr>
<td></td>
<td>Outcome</td>
<td>110 (40.2)</td>
<td>7.9 (1.41)</td>
</tr>
</tbody>
</table>

NOTE – Marginal means controlling for article. Standard deviations in parentheses.