

Nonconscious and Contaminative Effects of Hypothetical Questions on Subsequent Decision Making

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In this article we examine the impact of asking hypothetical questions on respondents' subsequent decision making. Across several experiments we find that even though such questions are purely hypothetical, respondents are unable to prevent a substantial biasing effect on their behavior. Further, we find that an increase in cognitive elaboration increases the contaminative effects of hypothetical questions and that this increase occurs primarily when the hypothetical information is relevant. In-depth poststudy interviews with a subset of the participants suggest that the effects of hypothetical questions on choice occur beyond awareness and, as a result, are quite difficult to counteract.

Researchers have long known that the manner in which a question is asked can influence underlying psychological processes, and, consequently, can affect the response to the question (Coupey, Irwin, and Payne 1998; Feldman and Lynch 1988; Fischer and Hawkins 1993; Nowlis and Simonson 1997; Schwarz and Sudman 1996; Simmons, Bickart, and Lynch 1993). For example, research in eyewitness testimony has shown that asking questions in a misleading manner can lead to incorrect recall of events that may, in turn, lead to erroneous judgments of guilt and innocence (Loftus 1979). Further, recent research has shown that the act of asking a question can, in and of itself, go beyond biasing the response and actually change the respondent's behavior (Morwitz, Johnson, and Schmittlein 1993). In the current research, we examine the impact of asking purely hypothetical questions about future behavior on respondents' subsequent actual behavior. Hypothetical questions are used very frequently in many consumer, mar-

keting, and public policy settings as part of legitimate research programs, and they are designed to act as information-gathering tools. However, recent years have seen a dramatic increase in the use of hypothetical questions, not as a means for gathering information but as a technique designed to influence the respondent's decision making (see, e.g., Bowers 1996; *New York Times* 2000; Sabato and Simpson 1996). The focus of this article is on the latter use of hypothetical questions, in particular when respondents have strong reasons to suspect that the hypothetical content may not be factual.

What is intriguing about the increased use of hypothetical questions to influence behavior is that such questions have any effect at all on decision making. After all, these questions are hypothetical, a case in point being: "If you knew she (i.e., the opponent) voted against closing pornography businesses, would you vote for her?" This hypothetical question was used by candidate Virginia Fields in the 1997 Manhattan Borough president's race (incidentally, Deborah Glick, the opponent, had cast no such votes). Another example is: "If scientific studies show that cakes, pastries, etc. are healthier than they have been portrayed to be, would your consumption of cakes, pastries, etc. change?" Intuitively, such hypothetical questions should not influence decision making. Yet the increased use of hypothetical questions in the real world, despite a lack of empirical evidence, suggests that they may be effective at influencing subsequent behavior. The goal of this research is to shed more light on this intriguing issue.

More specifically, the goals of this research are (1) to demonstrate that hypothetical questions can influence sub-

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sequent decisions; (2) to build on recent work on constructive mental processes and explore when, why, and how the act of asking a hypothetical question can actually change subsequent behavior in substantial ways; and (3) to examine if these effects that have been predominantly found to occur on memory and judgment will extend to the choice domain as well. Research in constructive mental processes has shown that there are often unwanted responses that arise, sometimes unconsciously, from intrusions into such processes (e.g., Braun 1999; Fiedler et al. 1996a; Wilson and Brekke 1994). Wilson and Brekke label such unwanted intrusions as mental contamination, a “process whereby a person has an unwanted judgment, emotion, or behavior because of mental processing that is unconscious or uncontrollable” (Wilson and Brekke 1994, p. 117). We build on this work by proposing that the effects of hypothetical questions on decision making occur through the contamination of mental processes by the contents of such questions, despite their status as purely hypothetical pieces of information. We also explore the role of two factors in moderating the contaminative effects of hypothetical questions, the extent of cognitive elaboration and the relevance of the information contained in the hypothetical question, and we thereby make a contribution to the literature on constructive mental processes as well. Finally, we contribute to the literature on mental contamination by demonstrating that non-conscious processes that occur as a result of hypothetical questions result in contaminative effects on choice, not simply on memory or judgment.

HYPOTHETICAL QUESTIONS AND THEIR EFFECTS ON DECISION MAKING

Wilson and Brekke’s (1994) work on mental contamination presents a useful framework for examining the effects of hypothetical questions on decision-making processes. Wilson and Brekke argue that biases in human reasoning occur through some combination of two primary mechanisms: the failure of rule knowledge and mental contamination. By failure of rule knowledge they refer to errors in judgment that result from failure to apply a specific rule of inference (e.g., the sunk-cost principle). These rules are “consciously known and deliberately applied.” In contrast, errors in judgment through mental contamination occur when judgments or behaviors are influenced by factors that the decision maker would prefer not to be influenced by. For example, a professor who takes the attractiveness of a student into account when grading a paper might prefer not to do so, but he or she may unconsciously do so in any case. Wilson and Brekke (1994) propose several causes of contamination that are relevant to the specific context of hypothetical questioning. They suggest that limited access to mental processes and unwanted automatic processing are the two principal causes of contamination. Limited access to mental processes arises because decision makers are often quite good at recognizing the outcome of a process, but they are not nearly as good at determining the various contrib-

utors to that outcome (Nisbett and Wilson 1977). In the context of hypothetical questions, individuals may be aware of their judgments, but they may be unaware of the mental processes that actually give rise to these judgments.

Under unwanted automatic processing, Wilson and Brekke implicate the role of accessibility (of cognitions) in mental contamination (see also Higgins [1996] for the biasing effects of accessibility). Evidence of contaminative effects arising from the accessibility of cognitions can be found in the research on stereotyping (e.g., Devine 1989; Gilbert and Hixon 1991); even with the best of intentions, individuals find it difficult not to use highly accessible stereotypical beliefs in social judgments. Similarly, evidence garnered from numerous studies on human memory suggests that merely considering a false proposition can lead to mental contamination (e.g., Braun 1999; Fiedler et al. 1996a; Loftus 1979). For example, Braun (1999) had respondents taste orange juice that had been altered to worsen its taste (an experience that was clearly bad). One group of the respondents then watched commercials for the juice that portrayed the juice in a very positive light. A second group of the respondents did not watch any commercials (this was the control group). Test results clearly indicated that recall of the experience of drinking the juice had been contaminated by the “false information” provided in the commercials. In related research on the impact of misleading questions on postevent memory in the legal domain, Loftus (1979) found that inserting incorrect information into a question biased respondents’ memories of the event. For example, after watching a film of an automobile accident, respondents were either asked “How fast was the white sports car going when it passed the barn while traveling along the country road?” or “How fast was the white sports car going while traveling along the country road?” No barn had appeared in the film. However, those with the false information embedded in their question were six times more likely to recall seeing a barn as compared with the control group that received no false information.

Contaminative Effects of Hypothetical Questions

The findings reported in Fiedler et al. (1996b) suggest that these memory intrusions occur because considering false propositions enhances the accessibility of cognitions related to such propositions and, in turn, leads to inferences that are potentially based on knowledge structures only peripherally related to the original information. The findings also demonstrate that these memory intrusions are not dependent on forgetting of the original information. Thus, hypothetical questions may affect decision making through a lack of awareness of their contaminating effects by engendering highly accessible cognitions related to the content of such questions. These content-related cognitions that become associated in memory with the target of the hypothetical question may then be incorporated into subsequent judgments or even actions. Further, the biasing effects of hypothetical questions will be determined by the valence of the content that gives rise to content-related cognitions. Spe-

cifically, if the content of the question is negatively (positively) valenced, the decision maker's judgments of the target object will become more negative (positive) than they would otherwise be. With our focus in this research being on actual choice behavior rather than on memory and judgment (the predominant focus of prior research on mental contamination), the above discussion suggests that, if one is presented with a choice, the likelihood of choosing the option that was the subject of a negative (positive) hypothetical question will decrease (increase). Formally,

H1: Individuals presented with negative (positive) information in the form of a hypothetical question will have lower (higher) preference for and choice of the object of the hypothetical question, relative to individuals not presented with the question.

Moderating Role of Cognitive Elaboration

Wilson and Brekke (1994) propose that one factor that is likely to affect the accessibility of cognitions and, hence, mental contamination is the level of cognitive elaboration. Specifically, they propose that contaminative effects may either be enhanced or attenuated as the level of cognitive elaboration increases. The key to the nature of contaminative effects is whether or not the elaboration engenders in the individual an awareness that she or he may be engaging in a biased response. Specifically, the contaminative effects are likely to be attenuated (enhanced) when the elaboration does (not) engender such an awareness.

Evidence of enhanced contaminative effects can be found in Gilbert and Hixon's (1991) work on stereotyping. They find that the contaminative effects of undesirable stereotypical beliefs increase with cognitive elaboration, presumably because of a lack of awareness of the biasing responses despite higher levels of elaboration. Wilson and Brekke (1994) argue that, when there is a lack of awareness of the biasing effects, the resulting enhanced contaminative effects arise primarily from an increase in the accessibility of cognitions that are the focus of the enhanced elaboration. For instance, the more individuals cognitively elaborate on their prior stereotypical beliefs about a particular minority group, the more accessible cognitions about these beliefs are likely to become. The enhanced accessibility, in turn, is likely to increase the likelihood that these cognitions will affect subsequent judgments and behavior.

Alternatively, the extent of mental contamination could also diminish with an increase in cognitive elaboration. Considerable evidence has been garnered by Gilbert and his colleagues in support of this attenuation hypothesis (see, e.g., Gilbert 1991; Gilbert, Tatarodi, and Malone 1993). Gilbert argues that people tend to engage in a two-stage process when exposed to propositions that they would normally discount (e.g., propositions that are false). A characterization stage, which is associated with less effortful processing, results in initial acceptance of the propositions. In this stage, cognitions related to the propositions are likely to be rela-

tively more accessible and, hence, have an impact on subsequent judgments and behavior. If people engage in more elaborate processing, they enter the correction stage, where they are able to assess whether the propositions are true or not, that is, they become aware of their initial biased reactions to the false propositions. Any impairment of this second stage arising from a lack of cognitive elaboration will lead to mental contamination, with the propositions being accepted even if they are patently false. The evidence gathered by Gilbert is largely supportive of the characterization-correction model—the level of mental contamination has been found to be high when the level of elaboration is low, and this contamination has been found to get attenuated with increased elaboration.

The question of relevance to the current research is whether the mental contamination engendered by hypothetical questions increases or decreases with increased cognitive elaboration. In other words, will increased elaboration result in the individual becoming aware of the biasing effects of such questions as with the characterization-correction model? Or will the individual remain unaware of these effects despite increased cognitive elaboration, as with stereotyping effects? While there is little theoretical basis to provide a priori answers to these questions, the increased use of hypothetical questions in the political domain suggests that such questions are effective at influencing decisions even when the level of elaboration is high (assuming that the act of voting is characterized by high levels of cognitive elaboration). This, in turn, points to the possibility that individuals are not likely to become aware of the contaminative effects when the level of elaboration increases, and it suggests that increases in cognitive elaboration will result in an enhancement rather than an attenuation of these effects. However, given that there is limited theoretical basis for making predictions a priori, we formally present our moderating hypothesis in an "either/or" fashion, with the appropriate hypothesis for the context under investigation being contingent on an awareness of the potential biasing effects of hypothetical questions. We then empirically test which one of these two hypotheses is supported:

H2a: Individuals who respond to a hypothetical question containing negative (positive) assertions about a target, and who are unaware of the potential biasing effects of responding to such a question, will have a lower (higher) choice of the target when the level of cognitive elaboration is high than when it is low;

or,

H2b: Individuals who respond to a hypothetical question containing negative (positive) assertions about a target, and who are aware of the potential biasing effects of responding to such a question, will have a higher (lower) choice of the target when the level of cognitive elaboration is high than when it is low.

EXPERIMENT 1

Experiment 1 was carried out in the form of two separate studies. The goal of the first study was to demonstrate the effectiveness of hypothetical questions in affecting decision making. The second study served to examine the moderating role of cognitive elaboration. Cognitive elaboration was manipulated in this study by using standard procedures to vary the levels of respondents' motivation and opportunity-to-process, factors that have been widely considered as antecedents to cognitive elaboration (e.g., Chaiken, Wood, and Eagly 1996). A voting context was used in experiment 1 for two reasons. First, the use of hypothetical questions in the guise of research, a technique that has come to be known as push-polling in the political domain, has become widely prevalent, which suggests that political consultants believe in the efficacy of this tactic (see, e.g., Sabato and Simpson 1996). Yet little empirical evidence is available to support this belief. Second, while a substantial amount of research has been conducted in the domain of polling, only a small subset has focused on the issue of the behavioral impact of the poll itself (e.g., Greenwald et al. 1987; Morwitz and Pluzinski 1996).

Experiment 1a

Participants. One hundred and seventeen undergraduate students from the University of Pennsylvania participated in the study in partial fulfillment of a course requirement. Participants signed up for the study in class and were given instructions on how to take part in the study through a computer interface over a local area network within the university. On logging into the site, participants were randomly assigned to one of three conditions.

Design. The experiment employed a straightforward three-cell between-subjects design, where the factor manipulated was whether and how negative information about one of the choice alternatives was delivered. A third of the participants received no negative information (no-information condition), a third received the negative information in the form of a hypothetical question (hypothetical question condition), and the remaining third received the information in the form of a factual newspaper article (fact condition).

Procedure. On logging into the site, each participant received instructions explaining that this was a joint study between faculty members and a political action committee, Citizens for Change, that was interested in voter attitudes toward two political candidates that the participants would likely be unfamiliar with (they were running for office in Kansas). They were then presented with Web-site style information with photos and information about each of the two candidates, followed by five newspaper articles that were mildly supportive of either one or both candidates. At this point, the negative-information manipulation occurred (discussed below), after which participants were asked, "If you were voting in the Kansas congressional election, which

of the two candidates would you vote for?" The participants indicated their vote by checking a box beside a photo of each candidate, and, finally, they were debriefed.

The negative-information manipulation consisted of one of the three following options. If assigned to the no-information condition, participants simply proceeded from the last of the five articles to the voting screen. If assigned to the fact condition, participants read a sixth article, as follows, and then proceeded to the voting screen:

Clark past may haunt him

Topeka, KS. October 16, 1998—In a September 2, 1998 interview with The Manhattan Mercury, a senior official in the Kansas City District Attorney's office confirmed that Bob Clark, candidate for the U.S. House of Representatives' Second District, had been convicted of fraud in 1988. The charge stems from several illegal donations accepted and subsequently misrepresented during his successful campaign for State Treasurer.

Finally, if assigned to the hypothetical-question condition, participants were exposed to the negative information about the candidate in the form of a hypothetical question. After reading the five articles, participants were asked the following question:

If you learned that Bob Clark had been convicted of fraud in 1988 on a charge stemming from several illegal donations accepted and subsequently misrepresented during his successful campaign for state treasurer, would your opinion of him increase or decrease?

Responses to the hypothetical question were obtained using a sliding bar with end points "become more negative" and "become more positive" and a midpoint labeled "wouldn't change"; these were scaled from 1 to 99. After answering this question, participants proceeded to the voting screen.

Results. Based on our conceptualization, choice of Candidate A (i.e., Bob Clark, the target of the negative information either in a factual format or a hypothetical-question format) was expected to be lower in the hypothetical-question condition than in the no-information condition (Hypothesis 1). The results were consistent with our expectations. When no negative information was presented, 79.4 percent of the respondents voted for Candidate A (this candidate represented a party with broad appeal to the undergraduate-participant population). When the negative information was presented in the form of a hypothetical question (the hypothetical-question condition), the percentage of participants voting for Candidate A decreased substantially to 25 percent ($\chi^2 = 31.18, p < .001$). Hence, Hypothesis 1 was supported. Although not formally hypothesized, a secondary objective of this experiment was to compare the effects of negative information presented as a hypothetical question versus as a fact. Not surprisingly, when the negative information was presented as a fact, in the form of a newspaper article, the voting rate dropped substantially (to 34.9 per-

cent), as compared with that in the no-information condition (79.4 percent; $\chi^2 = 19.65, p < .001$). More interesting, when the negative information was presented in the form of a hypothetical question (the hypothetical-question condition), the percentage of participants voting for Candidate A seemed to drop even more substantially (25 percent; the difference between the fact and the hypothetical-question conditions was not, however, statistically significant; $\chi^2 = .98, p > .10$).

Experiment 1b

Participants. One hundred and sixteen undergraduate students from the same population as experiment 1a participated in the study in partial fulfillment of a course requirement.

Design. The experiment employed a 2 (Information Presentation: none/ hypothetical question) \times 3 (Level-of-Elaboration: impaired/normal/enhanced) between-subjects design. Using standard procedures employed in previous research, the level of cognitive elaboration was reduced from normal levels by impairing respondents' opportunity to process; the level of cognitive elaboration was enhanced from normal levels by increasing respondents' motivation to process.

Procedure. The cover story and basic procedures were quite similar to those used in experiment 1a, except for an absence of the fact condition (i.e., negative information presented as fact). Prior to being presented with Web-site-style information, with photos and information about each of the two candidates, participants either received one of two elaboration manipulations or a control manipulation where no elaboration manipulation occurred. If assigned to the impaired-elaboration condition, participants received a standard distraction manipulation, a digit-counting task (Jacoby 1998). They were instructed as follows:

As an additional part of this study, we would like you to keep track of how often three odd digits appear in a row in the box in the lower right hand corner of the screen. These digits will change every few seconds. For example, a string of 3, 5, 1 would count as one occurrence, while a string of 3, 5, 2 would not count. It is very important that you keep careful track of these odd number digits. At the completion of the study you will be asked for a final count. Please click below when you are ready to proceed and start counting.

If assigned to the enhanced-elaboration condition, participants received instructions designed to increase processing motivation. Again, as with the distraction manipulation used in the impaired-elaboration condition, a standard procedure adapted from previous work (e.g., Webster, Richter, and Kruglanski 1996) was used to increase processing motivation in the enhanced-elaboration condition:

Please pay very close attention to the choice you will be asked to make. We will be asking you to justify your decisions later in the study.

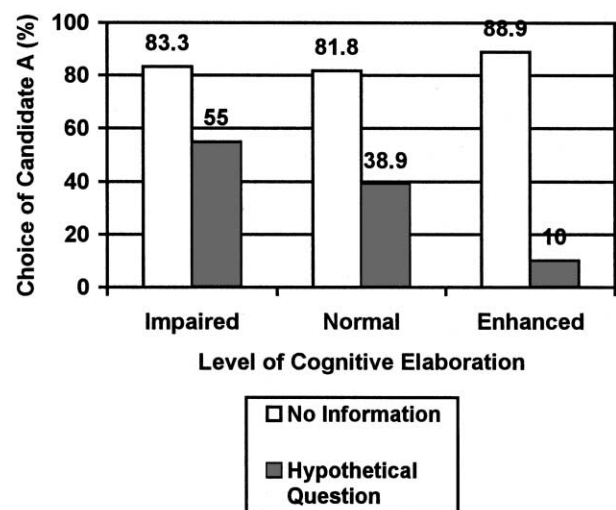
After the elaboration manipulation occurred, participants proceeded as in experiment 1a, with the impaired participants simultaneously performing the digit-tracking task until after they voted, at which point they were asked to report how many times three odd-numbered digits appeared in a row. Ultimately, all participants indicated their vote by checking a box beside a photo of each candidate, and then they were debriefed.

Results. Choice rates of Candidate A, Bob Clark, are shown in Figure 1 for each of the six conditions. A logistic regression analysis was performed with choice rate of Candidate A as the dependent variable. Consistent with Hypothesis 1, the results showed a main effect of information presentation ($\chi^2 = 25.8, p < .001$), such that negative information presented as a hypothetical question led to lower choice of Candidate A than when no negative information was presented. Within each level of elaboration, planned contrasts of the choice rates across the no-information and the hypothetical-question conditions demonstrated decreases in choice of Candidate A: 83.3 percent and 55 percent, respectively, within the impaired-elaboration conditions ($\chi^2 = 3.30, p = .07$), 81.8 percent and 38.9 percent, respectively, within the normal-elaboration conditions ($\chi^2 = 7.09, p < .01$), and 88.9 percent and 10 percent within the enhanced-elaboration conditions ($\chi^2 = 16.36, p < .001$).

Further, as conceptualized, there was a marginally significant two-way interaction between information presentation and level of elaboration ($\chi^2 = 5.01, p = .08$). Planned contrasts of the choice rates across the various hypothetical question conditions showed the following. First, the choice of Candidate A was significantly lower in the

FIGURE 1

CHOICE AS A FUNCTION OF LEVEL OF ELABORATION AND INFORMATION PRESENTATION (EXPERIMENT 1B)



enhanced-elaboration condition (10 percent) than in the normal-elaboration condition (i.e., the control condition; 38.9 percent; $\chi^2 = 3.86, p < .05$). Second, while choice of Candidate A was higher in the impaired-elaboration condition (55 percent) than in the normal-elaboration condition (38.9 percent), this difference was not significant ($\chi^2 = .98, p > .10$). Finally, the impaired-elaboration and enhanced-elaboration conditions differed significantly in terms of choice of Candidate A (55 percent vs. 10 percent, respectively; $\chi^2 = 7.59, p < .01$). These results suggest that the effects of the hypothetical question on decision making increased (Hypothesis 2a) rather than decreased (Hypothesis 2b) as the level of cognitive elaboration increased from impaired to normal to enhanced.

Discussion. In combination, experiments 1a and 1b suggest that asking consumers negative hypothetical questions about a candidate for office leads to decreased rates of voting for that candidate, providing support for Hypotheses 1 and 2a. Experiment 1a showed that this decrease in voting behavior was as severe as if the negative information had been presented as fact in the form of a newspaper article. In experiment 1b, those exposed to hypothetical questions in conditions of enhanced elaboration were more susceptible to the hypothetical negative information in terms of their observed voting behavior than those in conditions of impaired elaboration. The more the decision maker considered the hypothetical information, the more biased the subsequent voting behavior became. These results support Hypothesis 2a and suggest that the psychological processes engendered by hypothetical questions are more akin to those associated with stereotyping than with the characterization-correction model, in that individuals remain unaware of the biased responses despite high levels of cognitive elaboration.

Experiment 2 was designed to explore this issue in greater depth, as well as to examine the impact of hypothetical questions in a consumer choice context. Experiment 2 was also designed to reduce the viability of two alternative accounts for the results obtained in experiment 1, a demand-effect explanation and a conversational norm explanation. Note that in experiment 1, only respondents in the hypothetical-question conditions received a question; those in other conditions received either information as fact or no information at all. It is quite possible that the enhanced effects of hypothetical questions in experiment 1 came about because respondents in the hypothetical-question conditions felt that, because they had been asked a question about the target (Candidate Bob Clark), they were expected to vote for this target. The higher the cognitive elaboration, the greater the likelihood that respondents wondered about the experimenters' potential intentions, and, therefore, the greater was the impact of hypothetical questions on choice. We term this alternative account as the demand-effect explanation. In experiment 2, we attempted to provide evidence against this account by having hypothetical questions in all conditions (except the control condition) and demonstrating an interactive pattern of results that is incompatible with this alternative account.

The second alternative explanation arises from work related to conversational norms (e.g., Hilton 1995; Schwarz 1996). It is quite possible that participants in experiment 1 knew that the question was hypothetical in nature but, based on conversational norms, treated the assertions in the question as true. After all, why would we, the experimenters, pose such a question if it were not true. As a result, participants consciously accepted the assertions about the target and behaved accordingly. In other words, the pattern of results observed in experiment 1 came about, not due to mental contamination, that is, through processes occurring beyond awareness, but due to more conscious processes. We term this explanation as the conversational-norm explanation. Note that there are two necessary aspects to this explanation. First, respondents must consciously accept the assertion in the hypothetical question as being true, and, second, respondents must be conscious of the impact these assertions had on their decisions. In experiment 2, we attempt to reduce the viability of the conversational-norm explanation in several different ways: (1) by explicitly stating up front that the question participants will be reading is hypothetical (i.e., "not based on truth and put forth only on inconclusive grounds") and (2) by asking participants questions regarding the two aspects of this explanation after they made their choices.

EXPERIMENT 2

Experiment 2 served to accomplish several goals. Beyond reducing the viability of the two alternative accounts delineated in the previous section, a second goal was to replicate the findings of experiment 1 in a consumer-choice context similar to the ones used by Dhar and Wertenbrock (2000) and Strahilevitz and Myers (1998), with participants making actual choices rather than imaginary choices. A third goal was to examine if the effects of hypothetical questions observed in experiment 1 would occur if the target was familiar (i.e., cakes), and the assertion in the hypothetical question was positively valenced and inconsistent with prior beliefs related to the target (i.e., the assertion was that cakes are healthy, which, in general, is inconsistent with consumers' prior opinions about cakes). Recall that in experiment 1 the target of the hypothetical question was unfamiliar to the respondents, and the assertion in the hypothetical question was negative toward the target. Further, the negative assertion about the target may be considered as being consistent with people's general opinions about politicians. Although not formally hypothesized, a fourth goal of experiment 2 was to examine if the impacts of hypothetical questions on choices are mediated by changes in underlying belief structures.

A final goal of experiment 2 was to identify another factor that may moderate the effects of hypothetical questions on decision making. Several researchers (e.g., Chaiken et al. 1996; Higgins 1996; Wilson and Brekke 1994) have argued that the effects of activated cognitions on decision making depend not only on the accessibility of these cognitions but also on the relevance of the accessible cognitions to the

decision, that is, the diagnosticity of the accessible cognitions (Feldman and Lynch 1988). In other words, a hypothetical question asserting that cakes may yield substantial health benefits should be more relevant for decisions involving cakes than one asserting that cakes may yield only marginal health benefits. As a result of its increased relevance or diagnosticity, the former hypothetical question ought to be more effective at influencing the decision than the latter. More formally,

H3: The effects of hypothetical questions on decision making are likely to be greater when these questions focus on aspects that are more rather than less relevant to the decision.

To test Hypothesis 3, experiment 2 examined the relative effectiveness of two different hypothetical questions, both focusing on the health attribute but one presupposing that cakes yielded substantial health benefits and the other presupposing that cakes yielded only marginal health benefits. In addition to meeting this goal, comparing the effects of the two different presuppositions provides a test of the demand-effect explanation delineated before. Specifically, if the observed effects of hypothetical questions come about because participants feel that they are expected to choose the cake (since they have been asked a question about cakes), then, responding to such questions should result in enhanced choices of the cake irrespective of the relevance of the information provided in such questions. However, if the choice of the cake turns out to be higher when information relevance is high than when it is low (Hypothesis 3), then experimenter-demand is less likely to be a plausible alternative account.

Experiment 2 also differed from experiment 1 in that additional measures were collected. Unlike experiment 1b, measures were collected to assess the success of the level-of-elaboration manipulation. Further, after participants had engaged in the choice task, they were asked to indicate the thoughts that went through their minds when they were making their decisions. These thought protocols served to further rule out the viability of the demand-effect explanation (if experimenter-demand were driving the results in the hypothetical question conditions, then references to the hypothetical question ought to be present in the protocols). Also, to provide further evidence against this explanation, participants were asked during in-depth poststudy interviews if they thought that the experimenters had expected them to make their choices in a specific fashion, and if their choices had been influenced by these expectations. To reduce the viability of the conversational-norm explanation, participants were asked a direct question at the end of the instrument as to whether their responding to the hypothetical question influenced their subsequent behavior. Evidence against the viability of the conversational-norm explanation was further obtained by asking specific questions in the in-depth poststudy interviews carried out with a subset of the participants.

Main Experiment

Participants. Three hundred and seventy-seven undergraduate students from the University of Iowa and the University of Pennsylvania participated in the study in partial fulfillment of course requirements. (A subject-population dummy variable was included in the various analyses; the analyses indicated that the two samples were not different from each other and hence could be pooled.) The experimental sessions were run in small groups of seven to 12 students, and participants were randomly assigned to one of five experimental conditions.

Design. Experiment 2 used a 2 (Level of Elaboration: normal vs. high) \times 2 (Information Relevance: high vs. low) between-subjects design with an additional control group.

Procedure. The procedure that was used in experiment 2 was adapted from Shiv and Fedorikhin (1999). The experiment was carried out in two different rooms. In the first room, participants were provided with instructions stating that they would be taking part in two different studies being carried out by various marketing faculty and doctoral students. They were told that the first study would be conducted in the first room and the second study, which served only as a filler task, would be conducted partly in the first room and partly in the second room. The disguise used was that the second study was about the effects of a change in environment on how consumers express opinions about products. Further, respondents were told that they would be provided with a choice of snacks for participating in the study (no mention was made of the nature of the snacks; also note that the procedure was such that, as far as respondents were concerned, the choice task was incidental to the main experiment). The remaining instructions on the cover page of the booklet that were read out aloud by the experimenter were as follows:

This study is part of a main study that we plan to carry out with students like you toward the end of this semester. One goal of the main study is to find out how consumers make decisions about food products. On the subsequent pages you will be asked several questions, mostly about you and your opinions related to food-consumption. Some of these questions will be hypothetical in nature (in other words, not based on truth and put forth only on inconclusive grounds).

On the next page, participants in the control condition were asked roughly how many times a month they consume cakes, pastries, and so forth. Participants in the experimental conditions were asked the same question (to ensure that the task across the experimental and control conditions was as parallel as possible), and then they were asked to respond to another question (participants in the control condition were not presented with any question). This question, which was hypothetical in nature, focused on health benefits associated with the consumption of cake. In the high-information-relevance conditions, the hypothetical question stated:

If strong evidence emerges from scientific studies suggesting

that cakes, pastries, etc. are not nearly as bad for your health as they have often been portrayed to be, and may have some major health benefits, what would happen to your consumption of these items?

In the low-information-relevance conditions, the hypothetical question stated:

If strong evidence emerges from scientific studies suggesting that cakes, pastries, etc. are not nearly as bad for your health as they have often been portrayed to be, and may have some minor health benefits, what would happen to your consumption of these items?

As in experiment 1, the following was added to the above to induce high elaboration:

Please think carefully before you respond to the question. You will be asked to justify your response later.

After reading the hypothetical question, participants marked an X on a line with endpoints “it would decrease” and “it would increase.”

Participants then took part in a second study. To be consistent with the cover story that this study was about the effects of a change in environment on how consumers express opinions about products, subjects were told that they would express their opinions about the products again in another room. On exiting the first room, each participant was provided with directions to the second room. They were also instructed to walk over to a cart that was visible from the first room. Participants were told that they would find two snacks on display on the cart (no mention was made of the snacks) and that they were to decide on which snack they would like to have, pick a ticket for the snack of their choice, and then proceed to the second room. Two snacks—a piece of chocolate cake with cherry topping and a serving of fruit salad—in transparent plastic containers were placed on a cart stationed between the two rooms. To control for the prices and the supplier of the two snacks, a price sticker (\$1) obtained from a local grocery store was affixed to each of the two containers on display. In the second room, each participant received a booklet that contained measures related to the choice between the cake and the fruit salad, and each participant was then debriefed.

Pretests. A separate pretest was carried out with 43 participants from the same subject population as the main experiment. The procedure that was used in this pretest was very similar to that used in the main experiment. One difference was that immediately after reading the hypothetical question, all participants were asked to rate on three seven-point (very low [1]/very high [7]) scales the extent to which they thought about, the time they spent thinking about, and the amount of attention they paid to what was presented in the question. Since the Cronbach alpha was .82, the responses to these items were averaged to form a single variable (Elaboration). A second difference in the procedures was that, after respondents in the pretest made their choices and proceeded to the second room, they were asked to think

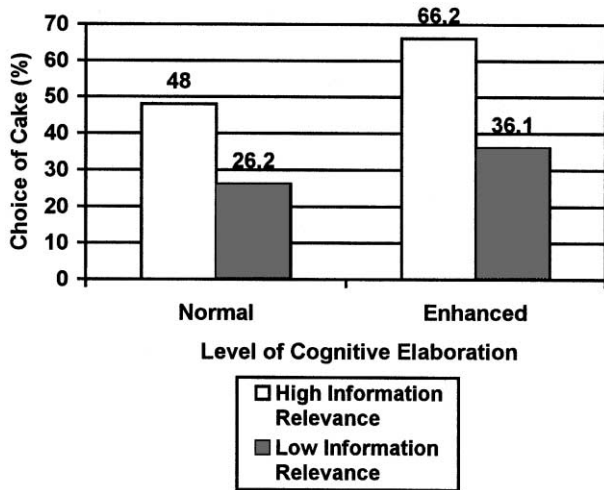
back to the hypothetical question and rate the magnitude of the health benefits that were asserted in the question. Three seven-point scales anchored by “minor (1)/major (7),” “marginal (1)/substantial (7),” and “very little (1)/very large (7)” were used for this purpose. Again, the Cronbach alpha was .98, so the responses to these items were averaged to form a single variable (Health Benefits). Two separate ANOVAs, with Information Relevance and Level of Elaboration as the independent variables revealed (1) a significant main effect of Level of Elaboration on Elaboration ($F(1, 39) = 22.52, p < .0001$), (2) a significant main effect of Information Relevance on Health Benefits ($F(1, 39) = 298.6, p < .0001$), and (3) none of the other treatment effects were significant. The extent of cognitive elaboration was higher in the high-level-of-elaboration conditions ($M = 5.26$) than in the low-level-of-elaboration conditions ($M = 3.93$). Further, respondents rated the magnitude of health benefits that were asserted in the hypothetical question to be higher in the high-information-relevance conditions ($M = 5.68$) than in the low-information-relevance conditions ($M = 1.84$).

Measures. In the second room, participants were first asked, “Just a moment ago you made a choice from two options, the cake and the fruit salad. Please indicate below the option that you chose.” Responses to this question were compared with the tickets for the snacks that participants had picked from the cart (across all respondents, the responses to the choice measure matched perfectly with the snacks indicated on the tickets). Respondents were then instructed, “describe, as completely as possible, whatever went through your minds while you were deciding between the two snacks.” The instructions for reporting thought protocols were similar to those used in Edell and Keller (1989) and Shiv, Edell, and Payne (1997). The thought protocols were later coded by an independent judge for any references to the first study about food products (presence of many such references would lend support to experimenter-demand effects being responsible for the results). Participants then reported their beliefs about consuming cake and fruit salad (one at a time, with order counterbalanced). Five items were used to measure respondents’ beliefs. These items, adapted from Crites, Fabrigar, and Petty (1994), were anchored by “harmful (1)/beneficial (7),” “not good for health (1)/good for health (7),” “a foolish choice (1)/a wise choice (7),” “bad (1)/good (7),” and “useless (1)/useful (7).” Responses to these items were averaged to form one consumption-belief variable for the cake (Belief-Cake; Cronbach alpha = .86) and one for the fruit salad (Belief-Fruit; Cronbach alpha = .81).

Participants were then asked to indicate (“yes”/“no”) if their responses to the questions about food consumption in the first study had any influence on what they chose. The purpose of this measure was to get at the conversational-norm explanation. Recall that, according to this explanation, respondents are conscious of the fact that they accepted the assertions in the hypothetical question as true and that these assertions had an impact on their choices. Hence, a substantial numbers of “no” responses to this question would

FIGURE 2

CHOICE AS A FUNCTION OF LEVEL OF ELABORATION AND INFORMATION RELEVANCE (EXPERIMENT 2)



question the viability of this alternative account. Finally, several demographic measures were collected.

Results: Choice. Consistent with our conceptualization, a logistic regression analysis revealed a significant Level of Elaboration by Information Relevance interaction ($\chi^2 = 10.82, p = .001$), in addition to a significant main effect of Level of Elaboration ($\chi^2 = 19.36, p = .0001$) and a significant main effect of Information Relevance ($\chi^2 = 17.12, p = .0001$). As seen in Figure 2, when the level of elaboration was normal, 48 percent of the respondents in the high-information-relevance condition chose the cake. Consistent with Hypothesis 1, this percentage was significantly higher than the percentage of participants choosing the cake in the control condition (25.7 percent; $\chi^2 = 7.90, p < .005$; note that both Hypotheses 1 and 2 ought to be read with the words in the parenthesis because the contents of the hypothetical questions were positively valenced in experiment 2). Further, consistent with Hypothesis 3, this percentage was significantly higher than the percentage of participants choosing the cake in the low-information-relevance condition (26.2 percent; $\chi^2 = 8.47, p < .004$).

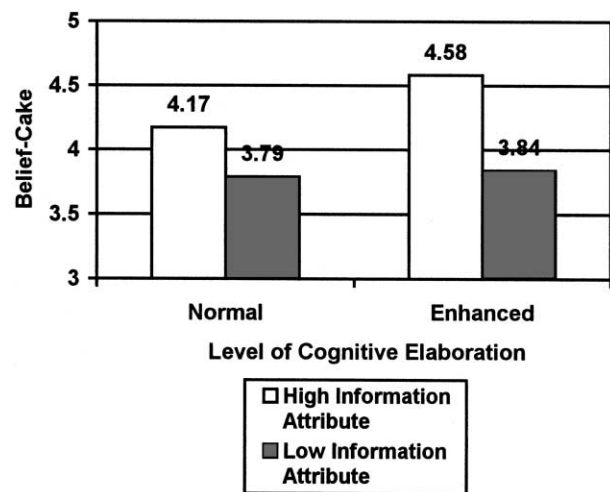
When the level of elaboration was high, 66.2 percent of the respondents in the high-information-relevance condition chose the cake, a percentage that was significantly higher than that in the control condition (25.7 percent; $\chi^2 = 24.18, p < .0001$), and in the low-information-relevance condition (36.1 percent; $\chi^2 = 14.4, p < .0001$). Further, in line with our conceptualization (Hypothesis 2a), within the high-information-relevance conditions, an increase in the level of elaboration significantly enhanced the percentage

of participants choosing the cake (66.2 percent vs. 48 percent in the high- and normal-elaboration conditions, respectively; $\chi^2 = 5.6, p < .02$). Also, as conceptualized, this enhancement did not occur within the low-information-relevance conditions (36.1 percent and 26.2 percent in the high- and normal-elaboration conditions, respectively; $\chi^2 = 1.73, p > .20$).

Results: Beliefs. As seen in Figure 3, the pattern of results on Belief-Cake mirrored that on Choice. (Since the hypothetical questions did not focus on the fruit salad, no effects of the independent variables on Belief-Fruit were expected. The results were consistent with this expectation.) An ANCOVA revealed a significant Information Relevance by Level of Elaboration interaction ($F(1, 372) = 4.07, p = .04$), in addition to significant main effects of Information Relevance ($F(1, 372) = 3.71, p < .05$) and Level of Elaboration ($F(1, 372) = 20.32, p < .0001$). Further, planned contrasts revealed that when the level of elaboration was normal, beliefs about consuming cake were more favorable, at marginal levels of significance, in the high-information-relevance condition ($M = 4.17$) than in the control condition ($M = 3.90$; $F(1, 372) = 2.78, p = .09$) and in the low-information-relevance condition ($M = 3.79$; $F(1, 372) = 3.15, p = .07$). Within the high-level-of-elaboration conditions, beliefs about consuming cake were more favorable in the high-information-relevance condition ($M = 4.58$) than in the low-information-relevance condition ($M = 3.84$; $F(1, 372) = 20.72, p = .0001$). Finally, within the high-information-relevance conditions, beliefs about consuming cake were significantly more favorable in the high-elaboration condition ($M = 4.58$) than in

FIGURE 3

BELIEF-CAKE AS A FUNCTION OF LEVEL OF ELABORATION AND INFORMATION RELEVANCE (EXPERIMENT 2)



the normal-elaboration condition ($M = 4.17$; $F(1, 372) = 7.81$, $p = .006$).

A test was carried out to examine if the significant interactive effect of the two independent variables on choice (reported in the previous section) was mediated by Belief-Cake. According to Baron and Kenny (1986), mediation is said to exist if three criteria are met: (1) the independent variable (here, the interaction between Information Relevance and Level of Elaboration) influences the potential mediator (Belief-Cake), (2) the potential mediator, Belief-Cake, influences the dependent variable (Choice), and (3) the relationship between the independent and dependent variables is weakened when the mediator is introduced as a covariate. An ANCOVA revealed that the first criterion for mediation was supported by a significant interactive effect of the two independent variables on Belief-Cake ($F(1, 372) = 4.07$, $p = .04$). A logistic regression analysis provided support to the second criterion for mediation by revealing a significant effect of Belief-Cake on Choice, ($\chi^2 = 44.02$, $p < .0001$). Another logistic regression analysis provided support to the third criterion for mediation. The significant two-way interaction (reported in the previous section under the heading Choice) was no longer significant once Belief-Cake was included as a covariate in the model ($\chi^2 = 2.63$, $p > .10$), while the Belief-Cake variable remained significant ($\chi^2 = 38.43$, $p < .0001$). Thus, complete support was obtained for all three criteria, suggesting that Belief-Cake did serve as a mediator between the independent variables and Choice.

Results: Alternative Explanations. Participants' thought protocols, which were collected at the beginning of the instrument and later coded by an independent judge, served to test the viability of the demand-effect explanation. None of the respondents made any references to the first study that contained the hypothetical question, reducing the viability of this account. Participants' responses to the question we posed at the end of the instrument (whether what they did in the first study had an effect on their subsequent choices) served to test the viability of the conversational-norm explanation. None of the respondents answered in the affirmative. This finding, together with other pieces of evidence garnered from poststudy in-depth interviews (to be discussed shortly), reduces the viability of this alternative explanation.

Discussion. Experiment 2 replicated the core findings of experiment 1 using an actual consumer-choice context, hypothetical questions that were positive about the target, and a different procedure to manipulate the level-of-elaboration factor. Experiment 2 also identified information relevance as another moderator to the effects of hypothetical questions on actual behavior. Consistent with our conceptualization, choice of the cake (the target of the hypothetical questions) was higher when individuals responded to a hypothetical question than when they did not. However, these effects on behavior occurred primarily when the hypothetical questions focused on information of high relevance. Also,

the moderating effects of cognitive elaboration found in experiment 1 were replicated in experiment 2, with the effects of hypothetical questions with high information relevance being amplified when the question was processed under higher levels of cognitive elaboration. These results supporting the amplification hypothesis (Hypothesis 2a) rather than the attenuation hypothesis (Hypothesis 2b) suggest that the underlying processes associated with hypothetical questions are similar to those occurring in stereotyping, that is, like stereotyping effects, people seem to remain unaware of the biasing effects of hypothetical questions even at increased levels of cognitive elaboration, resulting in an accentuation of the effects with increased elaboration.

The results on beliefs related to consuming cake were also consistent with our conceptualization. While increased elaboration seemed to enhance the accessibility of cognitions related to the content of the hypothetical question, these cognitions seemed to have a bigger impact on choice when the assertions contained in these questions were more rather than less relevant for the decision. The results also provide little support for the demand-effect alternative explanation. One piece of evidence against this account comes from the pattern of results on choice and from analyzing the written protocols (thoughts that went through respondents' minds when they were engaged in the choice task). Note that, if, based on the demand-effect explanation, the effects of hypothetical questions come about because respondents feel that they are expected to choose the cake, then the proportion of respondents choosing the cake ought to have been high in both the high- and low-information-relevance conditions. This was not the case. Also, if the demand-effect explanation were viable, respondents' written protocols ought to have had references to the hypothetical question. None of the subjects even mentioned the first study about food products in their protocols, further reducing the viability of the demand-effect explanation. Finally, as will be discussed in the next section, the in-depth interviews that were carried out with a subset of the respondents did not provide any support for this alternative account. The results also question the validity of the conversational-norm account. Evidence against this account was provided by respondents indicating whether their decisions had been influenced by what they did on the first task. Contrary to what the conversational-norm explanation would suggest, none of the respondents answered this question in the affirmative.

In-Depth Interviews

To provide further evidence against the demand-effect and conversational-norm explanations and to gain a better understanding of the underlying thought processes that participants engaged in during experiment 2, we conducted a series of postexperiment interviews. Following completion of the main experiment, five participants from each cell were randomly recruited to participate in in-depth interviews. The first phase of the interviews used a nondirective, open-ended interviewing style that was adapted from McQuarrie and

Mick (1999). Participants were told, "We would like to ask you a few questions about the three studies you participated in just now. Just to jog your memory, this was the first study." The interviewer then raised the first booklet and showed the second page (containing the question about their consumption of cakes, pastries, etc.; the hypothetical question was on the subsequent page, so respondents were not exposed to it during the interviews). This was to ensure that respondents did not see the instructions, which stated that one of the questions that followed would be hypothetical in nature. Showing these instructions could have affected participants' responses to a question we asked after the unstructured component of the interview about whether participants were aware that the hypothetical question was indeed hypothetical when they responded to it. The interviewer then continued: "Can you tell me all that you can remember about the first study—what was the study about, what were the questions that were asked, what were you thinking when responding to the various questions?" This procedure was then repeated for the second and third studies.

The second phase of the interviews was more directive in nature and asked participants to provide answers to specific questions about two issues. The first issue was whether the participants were aware of the fact that the hypothetical question and their responses to it had a potential impact on their subsequent choices. The second line of inquiry was whether participants were aware of the fact that the question that they responded to in study 1 was indeed hypothetical in nature. Responses to these questions served to throw more light on the alternative explanation related to conversational norms and on whether participants were aware of the contaminative effects of hypothetical questions.

The nondirective phase of the interviewing yielded a pattern of thoughts on several important issues. The most pervasive of these patterns was that participants clearly recognized that the question about cakes was hypothetical, despite receiving no prompt or suggestion to this effect from the interviewer. Of the 20 participants receiving a hypothetical question (the five control participants did not receive one), 18 indicated in their response that they understood the hypothetical nature of the question:

The study was about food items, cakes, how much I consumed and whether or not my consumption will increase if cakes are found to be healthy. (Respondent 1)

There was a question about how many times I eat cake. I don't eat much, maybe once a month. I used to eat more when I lived at home. My mom makes great cakes. Then you asked the question about will I eat more if cakes become healthy. (Respondent 2)

On the second page were the questions that you just showed. Then came the hypothetical question—what if scientific studies find cakes to be healthier or something like that. (Respondent 3)

These nondirective responses were further supported in the second phase of the interview when participants were

specifically asked whether they accepted the hypothetical content as true when they responded to the question:

No, I did not buy that. But I thought the question was not if it was true or not but, if it is true will I eat more cake. (Respondent 2)

No, it was not true. All it said was what if the studies showed that cakes are healthy. It did not say that cakes are really healthy. (Respondent 3)

That was a hypothetical question. So I did not think it was true. (Respondent 4)

With respect to the issue of whether participants believed the hypothetical question affected their subsequent choice, all poststudy participants were asked whether they felt that the first study affected their choice. Every respondent responded negatively:

No. I was just thinking about which one I'd have for lunch. I am kind of hungry. I did not think about that study. (Respondent 4)

No, I don't think it mattered at all. I mean I picked the fruit because it looked better. (Respondent 5)

When participants were specifically asked, "What if I told you that your choice was probably influenced by what you did on the first study, what would you say?" incredulous responses were given, with most participants unwilling to accept the possibility of influence:

I can't see how that could have happened. No, I am sure it did not affect me at all. (Respondent 5)

Beats me, I mean, I wasn't even thinking about that study when I picked the cake. Doesn't make sense. (Respondent 6)

That can't be true, right? I mean, the first study did not say that I should have cake. All it said was if cakes become healthy. But cakes are not healthy, so I could not have, I mean, that could not have prompted me to pick the cake. (Respondent 7)

The nondirective phase of the interviews also reflected a general belief that the hypothetical question would not affect the participants' actual choices, although some wished the information were true so that they could guiltlessly choose:

Then you asked some question about eating more cake if they are found to be healthy. That was kind of interesting. I don't think cakes can ever be healthy but then I am not the one to complain if they are. Healthy, that is. I like cake. I wish they could really find a way to make them more healthy. Then I can eat as much as I want. (Respondent 8)

I like cake, but I have to control myself. So when I got the question about some researchers finding cake is healthy, I was telling myself, wish this was true. Then I can eat all the cake that I want. (Respondent 9)

Finally, to further examine the viability of the demand-effect explanation (i.e., by asking a hypothetical question, participants were led to feel they were expected to choose cake), each of the participants were asked if they believed the experimenters expected them to choose a specific snack. Each of the 25 participants responded "no." Even if a demand effect were operating, one would expect it to affect all of the conditions similarly.

In summary, the results of our postexperiment in-depth interviews provide further support against two potential counterexplanations: a simple demand explanation and an explanation built around conversational norms. As stated earlier, two conditions are necessary for a conversational-norms explanation to adequately represent the data: (1) respondents must consciously accept the assertion in the hypothetical question as true, and (2) they must be conscious of the impact the assertion had on their decision. As the results of both nondirective and directive interview components clearly show, neither of these conditions received support from the data.

GENERAL DISCUSSION

Summary of Findings

The goal of this article was to examine the role played by hypothetical questions in the decision-making process. Based on prior work on constructive mental processes (e.g., Braun 1999; Fiedler et al. 1996a, 1996b; Wilson and Brekke 1994), our primary proposition was that changes in behavior will be greater among participants that respond to hypothetical questions than among those who do not respond to such questions. Experiment 1a demonstrated the basic effect by showing that negative information contained in a hypothetical question about a candidate for office led to substantially decreased rates of voting for the candidate. Experiment 1b showed that not only do hypothetical questions affect voting behavior, but more interesting, this effect is amplified rather than attenuated as consumers cognitively elaborate on the hypothetical question. In other words, the findings are less consistent with those related to the characterization-correction model (e.g., Gilbert et al. 1993) and more consistent with those in the stereotyping literature (e.g., Gilbert and Hixon 1991), where individuals remain unaware of their biased responses even when engaging in high cognitive elaboration.

Experiment 2 replicated the core findings of experiment 1 in a context where individuals chose between cake and fruit salad. First, it demonstrated that positive information contained in a hypothetical question about cakes, pastries, and so forth, led to substantially increased choice of the cake. Second, it demonstrated that elaboration on the hypothetical question further amplifies the effects of hypothetical questions on actual behavior. Further, experiment 2 provided support to our proposition that the effects of hypothetical questions on choice will be moderated by the relevance of the information that these questions focus on. By exposing individuals to a hypothetical question that fo-

cused on high-information-relevant content (cakes providing some substantial health benefits) or lower-information-relevant content (cakes providing some marginal health benefits), we found that the impact of hypothetical questions occurred only when information relevance was high and not when it was low.

Theoretical and Managerial Implications

Theoretically, this research adds to the growing body of work on mental contamination (e.g., Braun 1999; Fiedler et al. 1996a, 1996b; Wilson and Brekke 1994) in several important ways. First, we identify responding to hypothetical questions as yet another source of mental contamination. In line with Wilson and Brekke's definition of mental contamination, the findings from our in-depth poststudy interviews suggest that hypothetical questions influence behavior through unconscious processes. These interviews reveal that individuals are not aware of the influence of such questions on their choices. Second, in contrast to the bulk of work on mental contamination that has predominantly restricted its attention to effects on memory (for an exception, see Braun [1999]), we examine whether these effects extend to actual behavior as well. Not only were we able to demonstrate that hypothetical questions are effective in a voting and a consumer-choice context, but we also showed that these effects go well beyond memory and significantly affect consumer choices.

We also contribute to the work on mental contamination by identifying and examining some important moderators of the impact of hypothetical questions on choice. In line with one stream of work (e.g., Gilbert and Hixon 1991), we find that higher levels of cognitive elaboration at the time of answering the hypothetical question accentuate the level of mental contamination. These findings related to cognitive elaboration are intriguing and somewhat counterintuitive, because one would expect that when individuals elaborate on hypothetical questions, they would realize that such questions are only hypothetical and would correct for the potential behavioral biases. Apparently, what seems to account for the accentuation is that individuals are unaware of the biasing effects of such questions, and when they elaborate, the accessibility, and hence, the impact on choice of cognitions engendered by these questions is enhanced. From the perspective of Gilbert's (1991) characterization-correction model, decision makers initially accept the hypothetical content during a low-effort characterization stage. It is interesting, however, that under high-effort/elaboration conditions, while decision makers are able to recognize that the content of the question was hypothetical, they are unable to recognize that it may be affecting their decision making. As a result, no correction occurs, and the bias is not attenuated. On the contrary, because of the increased consideration of, and resulting heightened accessibility of the hypothetical content caused by enhanced elaboration, the links between hypothetical content and behavior are strengthened. This, in turn, results in an even more biased decision process under enhanced elaboration.

From a practical perspective, we believe that these findings should be directly of interest to consumer and public policy researchers, consumer-advocacy groups, and federal agencies like the Federal Trade Commission (FTC). The implications for those performing consumer research involving the use of hypothetical questions are quite substantial. Specifically, our research substantiates the view among political analysts like Sabato and Simpson (1996) that the use of hypothetical questions in the guise of research, a technique that has come to be known in the political domain as push-polling, is effective at changing behavior. What should particularly concern consumer-advocacy groups and the FTC is that a traditional debiasing technique such as asking respondents to think in more depth about the question (see Arkes [1991] for a review of debiasing approaches) actually results in an increased bias in this case.

Further, there are a number of other consumer-research domains in which consumers are encouraged to engage in hypothetical thinking or reasoning—focus groups, conjoint tasks, and scenario analyses. This is particularly true in the new-product domain. Researchers conducting focus groups at preliminary stages of product development will often ask participants to imagine (i.e., think hypothetically) using a new product in a certain way. They then probe and attempt to discover how the participants might feel about such a product. Similarly, conjoint tasks often involve asking consumers to imagine choices when making trade-offs between options that are also often hypothetical. Finally, the use of analogies, scenarios, and stories as a means of improving decision making also involves the use of hypothetical thinking (see, e.g., Holyoak and Thagard 1997). It seems quite reasonable to speculate that just as hypothetical questions may have some contaminative mental by-products so, too, may the use of hypothetical thought in other domains relevant to consumer research such as focus groups, conjoint analysis, and scenario analysis. These contaminative effects can become particularly problematic if the research methods are used to generate predictions about future behavior. After mental contamination due to hypothetical thinking, the behavior of the test sample will no longer reflect the actual behavior of consumers at large who are unlikely to engage in the types of hypothetical thinking that are embedded in the various research techniques. Our hope is that more research will be carried out on hypothetical questions with the goal of providing ways of inoculating individuals against the biasing effects of research techniques involving hypothetical thought.

Directions for Future Research

The magnitude of the preference shifts found in the two experiments were quite substantial—as high as 79 percentage points in experiment 1 and 40 percentage points in experiment 2. These findings are not inconsistent with the magnitude of effects found in prior question-behavior research. For example, Sherman (1980) found that 31 percent (22 of 46) of participants asked about willingness to volunteer three hours for the American Cancer Society actually

volunteered at a later time, while only 4 percent (two of 46) of their peers (not asked about willingness) volunteered. Thus, the act of asking participants to predict future behavior led to a substantial change in behavior (i.e. volunteer rates of 4 percent vs. 31 percent). Similarly, Morwitz et al. (1993) found that asking consumers an automobile-purchase-intent question led to increases in automobile purchasing of more than 30 percent. Considered in the context of results such as these, the magnitude of the hypothetical-question impact on behavior may not be nearly as shocking. However, it is quite possible that other factors, unique to the procedures and contexts used in our research, may have contributed to the magnitude of the effects. For example, it is possible that the magnitude of the effects were a result of the experiments being conducted in very controlled environments. Specifically, in both experiments, respondents made their choices only a few minutes after they had been exposed to the hypothetical question, which, in turn, could have heightened the impact of hypothetical questions on subsequent behavior. Future research needs to examine the effects of hypothetical questions after a time delay to better reflect what often occurs in real-world voting and shopping situations.

Two possibilities arise when time delay is taken into consideration. First, our findings seem to indicate that hypothetical questions influence behavior by enhancing the accessibility of cognitions related to the content of such questions. Higgins (1996) argues that accessibility of activated cognitions tends to decline with the passage of time. This, in turn, suggests that the effects of hypothetical questions on behavior are likely to diminish as the time delay between exposure to such questions and the actual decision becomes high. On the other hand, it is quite possible that, apart from changes in the accessibility of cognitions, hypothetical questions also affect preferences toward the target of such questions immediately after exposure. These preferences, in turn, could bias processes that occur when the decision is made at a later point in time (see, e.g., Russo, Meloy, and Medvec [1998] for the biasing effects of previously formed preferences; see also Kunda [1990] for arguments suggesting that prior opinions can lead to directional goals, which, in turn, could give rise to biased processes).

The size of the effects found in our research might have also resulted from the focus of the hypothetical questions that were used in the two experiments. In experiment 1, the hypothetical question focused on a political candidate and corrupt practices, a belief that is sometimes stereotypical of politicians. It is quite possible that hypothetical questions are extremely effective at shifting preferences when the assertions are consistent with strong prior beliefs that people maintain about groups of individuals and products. In a sense, having the hypothetical question focus on stereotypical beliefs might provide a means of associating these beliefs with the target of such questions, thereby affecting the respondents' evaluations of and actions toward the target. This would not, however, explain why the preference shifts were so large in experiment 2, where the assertions were

against prior beliefs about cake. It is a well-known fact that vice products such as cake involve a constant conflict between approach and avoidance—the hedonic aspects of such products impelling the individual to consume; self-control impelling the individual to refrain from consuming (see, e.g., Loewenstein 1996; Wertenbroch 1998). It is quite possible that, in the case of vice products, hypothetical questions cause a breakdown in self-control, resulting in impulsive or compulsive choices. Therefore, it is also possible that if experiment 2 had been carried out with a nonvice product category (e.g., choosing between two computers), the pattern of results may have been dampened. Future research needs to examine the moderating role of the context (e.g., voting, choices involving vices as well as virtues) and of the focus of hypothetical questions (consistent vs. inconsistent with prior beliefs).

As indicated earlier, future research also needs to examine moderating factors that will diminish the effects of hypothetical questions on behavior. Knowledge of such factors is important from a public policy standpoint, given the non-conscious nature of these effects. One issue ripe for exploration is that of educating decision makers on the potentially biasing effects of answering hypothetical questions. It is possible that with a growing awareness of the biasing effects, individuals will be more motivated and able to correct for these biases, resulting in a decrease in the effectiveness of hypothetical questions.

Finally, we contributed to recent work on constructive mental processes that suggests that mental contamination can occur in unconscious and uncontrollable ways leading to errors and biases in judgments and behavior. Beyond exploring a new form of mental contamination, we focused on the effects of hypothetical questions on choice rather than restricting our focus to memory or judgment effects, as has most previous research. Future research needs to delve deeper into the processes, and, into factors other than asking hypothetical questions, that give rise to mental contamination. Examining these issues will provide researchers, as well as marketers, with rich insights into the unconscious side of the human brain and its effects on judgment and decision making.

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