

Focusing on Desirability:

The Effect of Decision Interruption and Suspension on Preferences

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## **ABSTRACT**

This research examines the phenomenon of interruptions and suspensions in decision making. It is proposed that an interruption may lead to a more top-down goal-directed mode of information processing, resulting in greater attention to the desirability rather than feasibility of options. Four studies found that when a decision is interrupted and later resumed, people are more likely to favor a highly desirable but less feasible product (study 1) and to choose a high-risk high-winning option in financial decisions (study 2). Further, in price-quality tradeoffs, interruption increases the choice of high-desirability high-price options and decreases price sensitivity (studies 3 and 4).

Consumers' decisions are often interrupted or suspended during the course of their making. For example, consider a consumer shopping at an online store—as she ponders a particular purchase, she might be interrupted by a pop-up ad informing her of the special events at various departments of the store; alternatively, she may be interrupted by a prompt on her computer to check an incoming email. Similarly, a consumer spending her lunch break at the mall may leave a purchase decision in suspension because she needs to go back to work. Later she may return to the store to resume this decision. Thus an intriguing question that arises is whether such interruptions and suspensions in decision making can impact the ensuing choices—when people discontinue their decisions and later come back, do they tend to make different decisions compared to if they had not been interrupted?

Interruptions have long been of interest in psychological research. Perhaps the best known effect of interruption in existing literature is the Zeigarnik Effect (1927) demonstrating that interrupted or uncompleted actions engender a strong motivation to complete the action and lead to better memory for the task. Related, recent consumer research shows that framing a task, such as earning a number of frequency reward points as half-completed, increased consumers' motivation to earn those rewards (Kivetz, Urminsky, and Zheng 2006; Nunes and Dreze 2006). In addition to task motivation, the broader impact of interruptions on shopping behavior has also been investigated. For example, Xia and Sudharshan (2002) investigated how different types of interruption configurations influenced consumers' online shopping time and satisfaction, showing that moderate frequencies of interruptions and interruptions that occur early in the shopping process tend to be better accepted. However, while existing works have focused on the

effects of interruptions on people's response to the task, they do not address people's preferences and decisions made within the task. This latter question, namely the effect of interruption in a decision making task on preferences, is the focus of the current research.

Drawing on the information processing view of decision making (Bettman 1979), this research proposes that an interruption in decision making can influence preferences by changing the person's mode of information processing—information processing switches from a relatively bottom-up data-driven process during the initial consideration to a more top-down goal-directed process when the decision is resumed from interruption. The goal-directed process in turn leads to increased attention to attribute dimensions that are primary to the person's goals, but decreased attention to attribute dimensions that are secondary to one's goals. In particular, this research contrasts the attribute dimensions of desirability and feasibility (Lieberman and Trope 1998) and shows that in decisions involving desirability and feasibility tradeoffs, an interruption leads to greater preferences for options of greater desirability rather than feasibility. The next section reviews the relevant literature and develops the theory of the decision interruption effect, followed by four empirical studies that support this conjecture.

## **THEORETICAL BACKGROUND**

Extensive research in consumer behavior suggests that decision making is often a process of information processing and preferences are constructed as a result of this process (Bettman, Luce, and Payne 1998). In a comprehensive model of consumer decision making, Bettman (1979) identified information acquisition and evaluation as key

components of decision making, with the individual's motivation and attention systems playing antecedent roles. Notably, this model allowed for the course of decision making to be interrupted and further suggested that changes to the nature of one's information processing may occur after an interruption. Consistent with this dynamic constructive view of decision making, this research examines the effect of interruption on decision outcomes by looking at its impact on the mode of information processing. Specifically, it is proposed that an interruption may cause systematic changes in preferences by changing information processing from a relatively bottom-up data-driven process to a more top-down goal-directed process in which primary values to one's goals are emphasized over secondary values.

*Bottom-Up versus Top-Down Processing* Theories of information processing and decision making generally differentiate between two types of cognitive processes, namely, bottom-up and top-down processes (Johnson 1984; Hauser 1986; Park and Smith 1989). Bottom-up processes refer to cognitions that are not guided by an individual's pre-existing mental structures such as one's theories, expectancies or goals. In contrast, top-down processes are guided by the person's existing theories and goals. Therefore, bottom-up processes can be characterized as externally driven, while top-down processes are internally driven. A related distinction exists in theories of attention, contrasting involuntary and voluntary attention (Kahneman 1973; Payne and Bettman 2004). Involuntary attention refers to attention being captured by aspects of the environment that are novel, unexpected, potentially threatening, as well as simply perceptually salient. Voluntary attention on the other hand refers to selectively devoting attention to

information according to its relationship to one's goals. Thus involuntary attention is driven by external stimuli while voluntary attention is goal-directed (even though the person may not be consciously controlling how attention is allocated). Building on the notion of bottom-up versus top-down processing and voluntary versus involuntary attention, this research proposes that a key effect of an interruption in decision making is to cause the consideration of the decision problem to change from a relatively bottom-up data-driven process to a more top-down goal-directed process.

To illustrate, consider a consumer who is contemplating a product choice. The person gathers the available information regarding the purchase, learns and understands the information, and is evaluating his/her options. At this point the person is interrupted to attend to another business. After he/she is done with the intervening task, he/she returns to the purchase decision. The central proposition of this research is that when the person returns from the interruption, his/her mindset and hence the mode of information processing may become different from what it was prior to/sans interruption.

Specifically, when the individual begins to consider a decision problem, the focus of one's mindset is to learn about and comprehend the situation. Under this focus, the person's attention is directed by the available information whereby the person considers all data that appears to be relevant to the situation. Thus the information processing mode can be characterized as relatively bottom-up and data-driven. In particular, consistent with the nature of involuntary attention, the person's attention may be captured by information that is salient, unexpected, or potentially threatening. However, this focus of attention is likely to change when the consideration of the decision is interrupted and later resumed. When resuming a decision after an interruption, because the person has already

acquired a piecemeal understanding of the situation, he/she is unlikely to reprocess the decision problem with a focus on information learning. Instead, the person's attention is likely to be guided by his/her internal goals, and in particular, his/her goals for the decision—what he/she would like to achieve through pursuing the actions in the decision. As a result, consistent with the nature of top-down processing and voluntary attention, the person is likely to allocate greater attention to attribute dimensions that are central and primary to one's goals, and give less attention to attribute dimensions that are secondary to these goals. In particular, this research posits that after an interruption, greater attention will be given to the desirability values of options rather than their feasibility values.

*Desirability and Feasibility Values* Theories of goals and goal-directed behavior generally distinguish between two dimensions of value to goal achievement, namely, desirability and feasibility values (Kruglanski 1996; Liberman and Trope 1998; Trope and Liberman 2003). Desirability refers to the value of a state to the person (with respect to his/her goals, motivations, drives, needs), whereas feasibility refers to the difficulty and probability of achieving the desired state. Thus in decision making, options can be characterized by their desirability and feasibility values for one's goals. For example, in choosing a theme park, the number of fun activities one can do at the location is a desirability dimension indicating the value of the trip towards the goal to have fun, while the degree of crowdedness is a feasibility dimension indicating the ease or likelihood of realizing so much fun—long lines at the rides may hamper one's ability to enjoy the park. Similarly, in a financial gamble, the potential amount of winning is the desirability dimension indicating what one can gain from the action whereas the probability of

winning is a feasibility dimension (Sagristano, Trope, and Liberman 2002). Importantly however, even though from an expected utility point of view desirability and feasibility contribute equally to determine the expected outcome of an option, recent research has demonstrated the differences in people's psychological response to the two dimensions. In particular, it is found that in people's goal pursuit and evaluation of goal-directed action, desirability and feasibility values have a hierarchical relationship such that desirability is construed as a primary dimension while feasibility is a secondary dimension (Trope and Liberman 2003).

Theories of cognitive representations posit that people organize their knowledge around concepts in a hierarchical structure—certain information is construed as central and primary features, while others are construed as peripheral, secondary details (Medin 1989; Trope and Liberman 2003). Primary attributes are generally of essence in defining the values and meaning of the concept, while secondary dimensions are incidental and do not affect the core meaning of the concept. Thus in the construal of goal-directed actions, the dimension of desirability, that is, the value of an action to the person's goals, is the primary and defining feature of the action, whereas the feasibility, that is, the possibility or ease of achieving the goals, is a secondary feature. This hierarchical relationship is evidenced in people's conditional motivation to attend to feasibility information (Sagristano et al. 2002)—when the desirability of an action is high, people are interested in learning about its feasibility; but when the desirability of the action is low, people are not interested in information about its feasibility. In contrast, if people learned about feasibility first, regardless whether feasibility is low or high people are always interested in the desirability information.

One of the most important findings concerning the hierarchical relationship between desirability and feasibility is that in judgment and decision making, the relative focus on each dimension may change depending on the person's mindset. When the person is under the mindset to form detailed comprehensive views of a situation, they tend to emphasize the feasibility dimensions of options; on the other hand, when the person is under the mindset to form high-level views of a situation, that is, views that concentrate on the essential and primary features of a problem, they tend to emphasize desirability over feasibility dimensions. For example, one determinant of people's mindset is the temporal distance between the person and the event being considered (Trope and Liberman 2003). When an event is occurring in the immediate future, people tend to focus on the low-level details and emphasize the feasibility of actions; however, when the event is in the distant future, people form high-level representations that focus on the primary dimension of desirability. For example, in deciding whether to take on a challenging project, when the project's inception is immediate, people tend to focus on the feasibility attributes such as the workload and difficulty of the job, but when the timeframe is distant in the future, people tend to focus on the desirability dimensions such as the project's rewards. Consequently, people are more likely to commit to the project if it is far away in the future than if it were more immediate.

In this research, I propose that similar to temporal distance, another determinant of people's detail-oriented versus high-level mindset in decision making is the dynamic stages in decision making. Specifically, when a decision is first considered, the person's mindset is detail-oriented because he/she is focused on learning about all of the available information, and in particular, the details that may jeopardize the success of the action.

However, if the decision making process based on this detail-oriented processing is interrupted, when people return to the decision, the focus of their mindset will no longer be on a thorough learning of the situation; instead, they are likely to focus on their goals for the decision and attend to information according to its relationship to their goals. In particular, more attention will be allocated to the primary dimension of desirability of options, and less attention will be allocated to the secondary dimension of feasibility of options. Therefore, it is as if an interruption in decision making has led to a more “distant” view of the decision situation.

Based on the above theorizing, this research thus proposes the following hypotheses:

- H1:** In a decision with desirability-feasibility tradeoff, interruption will increase preference for the high-desirability low-feasibility option, compared to if the decision is made without interruption.
- H2:** In financial decisions defined by amount of winning and probability of winning, decision interruption will increase preferences for the high-risk option.
- H3:** In price-quality tradeoffs, decision interruption decreases the person’s price sensitivity for the high-quality option.
- H4:** In price-quality tradeoffs, decision interruption increases preference for the high-quality option, but only if the high-quality option increases the desirability (rather than feasibility) of the consumption.

These hypotheses are tested in four studies.

## STUDY 1: CHOOSING A RESTAURANT

### Overview and Design

Study 1 tests the premise that interrupting a decision making process may lead to greater emphasis on the desirability rather than feasibility of options (H1). This hypothesis is tested using a restaurant choice context. Specifically, participants are asked to make a hypothetical restaurant decision involving two options described by a desirability dimension and a feasibility dimension. Quality of food is chosen as the desirability dimension because it directly provides value to the goal of going to a restaurant (to enjoy good food). Cleanliness is chosen as the feasibility dimension because it merely enables the achievement of good dining, but does not provide meaning to the dining goal in and of itself. Both dimensions were described using attribute ratings with option A receiving 4.5 stars for food quality and 3.0 stars for cleanliness, and option B receiving 3.5 stars for food quality and 4.5 stars for cleanliness. Therefore a person emphasizing desirability would be more likely to choose option A. Consistent with the above analysis, compared to making the decision without interruption, if the restaurant decision is interrupted, the person is likely to switch to a more top-down goal-directed mode of processing after the decision is resumed. Consequently he/she is more likely to focus on the desirability values of options and choose option A. Therefore, study 1 has a one-factor design, with the presence (vs. absence) of interruption manipulated between subjects.

## Procedure

Participants ( $N = 172$ , mean age = 34, 33% male) were ordinary consumers recruited from all over the country through a web survey service to take part in online studies for academic purposes. The 10-minute session consisted of the current restaurant study, as well as several other unrelated studies. Because an interruption manipulation is rather unconventional in such studies, to reduce the possibility of any negative affect and confusion engendered by such manipulation, at the beginning of the session participants were told that the researchers were interested in people's responses to products in multi-tasking environments. Therefore, during the session they might be asked to switch between making purchase decisions and other tasks—when they see such instructions, they should simply switch tasks as instructed.

Nested in other unrelated studies, the decision interruption paradigm consisted of two components: the restaurant decision, and a filler task. The key manipulation was that for half of the participants, they were asked to switch to the filler task *during* the restaurant decision (thus the restaurant decision was interrupted), and were later told to resume the restaurant decision after they completed the interrupting filler task. In contrast, the other half of the participants encountered the filler task *before* they started the restaurant decision and were instructed to switch to the restaurant decision after completing the filler task—hence the restaurant decision was not interrupted (see figure 1 for an illustration of the procedures.) Therefore both groups performed the same tasks, but in one case the decision was interrupted by the filler task while in the other case it was preceded by the filler task.

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The filler task was a “count backwards” procedure used in previous research to keep individuals cognitively occupied (Carlyon et al. 2003). In this study, participants were told to count backwards by 6 from 108 to 72, typing down each step as they go. This task was chosen because it was easy to perform yet required concentration and therefore kept participants from thinking about any other issues. The interruption took place in the following manner: the restaurant decision was presented on the screen using a matrix describing Food Quality and Cleanliness. At the end of the descriptions, participants in the uninterrupted condition read “Which option would you choose?” while participants in the interruption condition read (unexpectedly) “Now please switch to a different task. You will be able to comeback to this decision after completing the following task.” Participants were then given the count backwards task, and after they finished counting, they were presented again with the description of the restaurants with the headline, “Now please go back to making the restaurant decision”, followed by “Which option would you choose?” In both interrupted and uninterrupted conditions, after participants indicated their choices, they went on to other parts of the study session.

## Results

A logistic regression with restaurant choice as the dependent variable, decision interruption as the independent factor, and gender and age as covariates revealed a

significant effect for interruption ( $B = .67, p = .04$ ). Among the group that was not interrupted, 28% chose restaurant A which had higher food quality but lower cleanliness. However, among those who were interrupted while making the restaurant decision, 45% chose the restaurant with higher food quality but lower cleanliness.

## Discussion

In the interruption condition, participants set out to make a decision between two restaurants. However, as they had learned about the options and were contemplating their preference, they were interrupted and directed to a different task. When they returned to reprise the restaurant decision however, they became more likely to choose the restaurant with greater desirability (better food) but less feasibility (less clean). This result supports the theorizing that an interruption leads to greater focus on the primary dimension of desirability over the secondary concern of feasibility towards one's goals.

However, despite this initial evidence, it is also possible that the effect in this study is due to specific characteristics of the restaurant situation. For example, there may be ambiguity in people's understanding of the attributes (e.g., "4 stars in food quality") such that they are interpreted differently before and after an interruption. Further, instead of a distinction of desirability versus feasibility, the effect may be driven by other types of relationships between food quality and cleanliness specific to the situation. Thus to provide converging evidence and increase the generalizability of the results, study 2 is conducted to examine the effect of interruption in another context with inherent desirability-feasibility conflict, namely, the decisions of financial gambles.

## STUDY 2: WINNING VERSUS PROBABILITY

### Overview and Design

Study 2 examines the effect of decision interruption on another type of desirability-feasibility conflict, namely, financial decisions described by the level of potential winnings and the probability of winning. Sagristano et al. (2002) showed that in such decisions, the level of winning defines the desirability of an option and is primary in people's pursuit of financial goals, while the chance of winning indicates the feasibility of the option and is construed as a secondary attribute to one's financial goals. Thus when people are forming a high-level (versus detail-oriented) view of a financial situation, such as when the payoff is far away in the future, greater attention is given to the amount of winning over the probability of winning.

Building on this hierarchical relationship between winnings and probability in goal pursuit, I predict that if a financial decision is interrupted, the ensuing top-down goal-directed processing would lead to greater attention to the desirability dimension of amount of winning and less attention to the feasibility dimension of probability of winning. Consequently, an interruption in decision making will shift preferences towards the high-risk option.

In study 2, participants are presented with financial decisions involving one option with a low probability of receiving a high level of winning and another with a high probability of receiving a low level of winning. For example, in one problem, option A

has a 70% chance of winning \$40, while option B has a 40% chance of winning \$120; in another problem, option A provides \$60 for sure, while option B has a 20% chance of winning \$500. Each participant will make eight such financial decisions. The order of appearance for the eight problems, as well as the order of appearance of options within each decision, are both randomized between subjects.

The study is again masked as a study on “multitasking” behavior. Half of the participants are assigned to the interruption condition in which they always switched tasks between the financial decision and the filler task during the financial decision. On the other hand, the other half of the participants are assigned to the uninterrupted condition in which they switched between the financial decisions and the filler tasks upon completion of each task. Thus study 2 has a one-factor (interruption: absent, present) design with eight within-subject repetitions.

## Procedure

Participants ( $N = 90$ , mean age = 33, 23% male) were ordinary consumers recruited from all over the country through a web survey service to take part in online studies for academic purposes. The session consisted of the eight financial decisions along with the filler tasks. The interruption procedure is similar to the one in study 1. Specifically, participants were told to follow instructions to switch tasks during the study. For half of the participants, they were instructed to switch to the filler task right after they have finished reading the information about the options, while the other half of the participants completed the corresponding filler task before they started a financial

decision. Thus both groups switched between filler tasks and financial decisions throughout the session; one group always switched during the decision task while the other group switched at the completion of the decision task. The filler tasks again involved counting backwards.

## Results

The percentage of participants choosing the high-risk option for each financial decision is presented in table 1. The results showed that in all eight decisions, the interruption group had a higher rate of choosing the high-risk option. The increases due to interruption ranged from 2% to 14%, with an average increase of 7%. In four of the eight problems, the difference between the interruption and non-interruption group was significant based on chi-squared tests ( $\chi^2$  s  $> 4.22$ ,  $p < .05$ ). For example, in one decision, 22% of the participants chose the high-risk option when the decision went uninterrupted; however, 36% of the participants chose the high-risk option when the decision was interrupted. A sign test over the eight risk decisions showed that the effect of interruption is statistically significant ( $p < .008$ ).

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## Discussion

Study 2 demonstrates that when making financial decisions, an interruption in the decision making process can lead to increased focus on the amount of winning over the probability of winning, resulting in greater likelihood to choose a high-risk option. Thus studies 2 provides converging evidence for the hypothesis that interrupting a decision process tends to lead to greater focus on the options' desirability rather than feasibility. The proposed mechanism behind this effect is a shift in attention from feasibility to desirability due to a more top-down goal-directed mode of information processing upon resuming a decision after an interruption.

However, while the interruption effect found is consistent with the above goal-directed processing mechanism, an alternative explanation may be applied to the observed results. Specifically, instead of changing the attention allocated to desirability versus feasibility dimensions under goal-directed processing, the greater preference for options of higher desirability may be due to an increase in the person's goal reference level after interruption. Psychometric theories suggest that people use reference points to judge values, and further, they adapt to newly achieved states and use them as the reference levels to measure gains or losses for future events (Allport 1955; Kahneman and Tversky 1979). Therefore, it is possible that in making decisions, an initial consideration of a desirable option in the choice set has lead to an adaptation to a higher reference point for the subsequent phase when the decision is resumed. Related, recent research shows that a previous positive experience of goal attainment can cause an increase in one's goal target level in a subsequent decision (Novemsky and Dhar 2006).

In the case of decision interruption, perhaps the initial consideration of achieving a desirable outcome also leads the person to increase his/her goal target in the next phase. Such increases in people's goal reference or goal target would in turn lead to greater preference for the option of higher desirability.

Thus, both the reference-update and the proposed goal-directed processing accounts can predict the interruption effect of increased preference for the more desirable option. Nevertheless one important difference exists between the two mechanisms. Specifically, while the goal reference-update mechanism changes the response to different levels of desirability in options, it does not speak to the person's response to feasibility values as compared to the uninterrupted condition. On the other hand, the goal-directed processing account predicts a shift in processing attention which may affect the person's responses to both the desirability and feasibility dimensions. In particular, after an interruption, people will pay greater attention to information relating to the desirability of options, and less attention to information relating to their feasibility. Consequently, one may observe not only increased preference for the high-desirability option, but also a decrease in sensitivity for feasibility information.

Thus the next study seeks to test the goal-directed processing account for the interruption effect by looking at people's sensitivity to feasibility information—after an interruption, people should become less sensitive to changes in the levels of feasibility in the options. This conjecture is tested in the context of price-quality tradeoffs in consumer purchase decisions, showing that after an interruption, people become less sensitive to differences in price between the options.

### **STUDY 3: PRICE-QUALITY TRADEOFF AND PRICE SENSITIVITY**

#### Overview and Design

In making purchase decisions, people often have to face tradeoffs between the level of consumption and the price they have to pay. For example, in choosing a hotel while on vacation, one could pay more to stay at a five-star hotel, or pay less to stay at an economy inn. The five-star hotel offers greater desirability but its high price tag makes it less feasible. The objective of this study is to test hypothesis 3 and 4, namely, whether an interruption in such price-quality decisions would lead to greater preference for the high-quality high-price (HQHP) option over the low-quality low-price (LQLP) option, and further, whether after an interruption people exhibit less price sensitivity. Such findings will provide greater evidence for the shift in attention towards desirability over feasibility under goal-directed processing.

To test these propositions, participants in this study are asked to consider a rental car decision when they are on vacation in Florida. Specifically, they can either rent a regular midsize sedan for \$50 per day, or upgrade to a convertible for a higher price. In one condition, the upgrade costs \$10 extra per day, while in a second condition, the upgrade costs \$20 extra per day. Further, half of the participants are interrupted when making the decision, while the other half are not. It is predicted that because of the greater attention to desirability relative to feasibility due to interruption, those in the interrupted condition will become less sensitive to the level of extra cost, compared to those who are not interrupted. Therefore, in the interruption condition, I expect there to

be relatively little change in the likelihood of renting the upgraded car when the surcharge for the upgrade is \$10 versus \$20; in contrast, in the uninterrupted control condition, because people are more focused on the feasibility dimension of price, there will be a large difference in the likelihood of upgrade between the high and low price conditions.

Further, the change in price sensitivity would predict a moderating effect of price level on the interruption effect on choice. Specifically, because of increased attention to the options' desirability, in general an interruption in the decision will shift preferences towards choosing the high-quality option. However, this effect should be particularly pronounced when the price for higher quality is high (because uninterrupted individuals will be more focused on this very high price); on the other hand, the interruption effect may be muted (or even reversed) when the price for high-quality is "not bad" (uninterrupted individuals focusing on price will find the price attractive, while interrupted individuals will be oblivious to whether the price is high or low.) Consequently, I predict that an interruption will lead to more choices of the upgrade compared to the uninterrupted condition, however, only when the price of the upgrade is high at \$20, but not necessarily when the price is low at \$10. In fact, when the price of the upgrade is low, it is possible that the uninterrupted group may be more likely to upgrade.

Therefore, study 3 has a 2 (interruption: present vs. absent) x 2 (price: high vs. low) design. I predict an interaction effect between interruption and price level such that the interruption effect (i.e., increased preference for upgrade) will be strong when price is

high, but the effect may be eliminated or reversed when the price is low. Further, price sensitivity will be lower when the decision is interrupted.

## Procedure

Participants ( $N = 262$ , mean age = 32, 27% male) were ordinary consumers recruited from all over the country through a web survey service to take part in online studies for academic purposes. The 10-minute session consisted of the current study, as well as several other unrelated studies. The interruption procedure was similar to that used in study 1. Specifically, in the introduction participants were told that the study examines multitasking behavior, and therefore during the session they may be instructed to switch between different types of tasks. When they encounter such instructions, they should simply follow them. Half of the participants were assigned to the interruption condition in which they were asked to switch to the filler task during the rental car decision, while the other half of the participants (the uninterrupted condition) completed the corresponding filler task before they switched to the rental car decision. For greater generalizability, the filler task in this study used a different exercise, namely, word generation. Specifically, participants were asked to generate five words starting with the letter N, five words starting with D, and five words starting with K. After participants completed the filler and car choices, they went on to other unrelated portions of the study session.

## Results

A logistic regression with choice of the HQHP option as the dependent variable, the factors of price and interruption and their interaction term as the independent variables, and gender and age as covariates revealed no significant main effects for interruption ( $p = .11$ ) or price level ( $p = .97$ ). However, as predicted, there was a significant interaction effect for price and interruption ( $B = 1.00, p = .05$ ). The likelihood of purchasing the HQHP option in each condition is graphed in figure 2. To understand the interaction effect, two contrasts—one at each price level—were conducted comparing uninterrupted and interruption conditions. It is found that when the price for the rental car upgrade was high at \$20, those in the interruption condition were significantly more likely to purchase the upgrade than those in the uninterrupted condition ( $M_{\text{uninterrupted}} = .29, M_{\text{interruption}} = .42, \chi^2(1) = 5.42, p < .025$ ). However, when the price of the upgrade was low at \$10, interrupted participants were actually directionally less likely to purchase the upgrade compared to the uninterrupted group ( $M_{\text{uninterrupted}} = .53, M_{\text{interruption}} = .43, \chi^2(1) = 2.66, p < .15$ ). Therefore, as predicted, compared to uninterrupted decisions, interrupted decisions were more likely to result in purchase of the high-quality high-price option only when the price differential is large, but the effect could be reversed when the price to pay for the upgrade is small.

Further, to provide direct evidence for price sensitivity, a second pair of contrasts were conducted. Specifically, in the uninterrupted condition, price had a significant effect on the likelihood of choosing the HQHP option—when its price was low, people were very willing to choose it; when its price was high, people were not willing to upgrade

( $M_{\$10} = .53$ ,  $M_{\$20} = .29$ ,  $\chi^2(1) = 16.29$ ,  $p < .005$ ). In contrast, when the decision was made after it had been interrupted, people's choices were not significantly influenced by whether price was high versus low ( $M_{\$10} = .43$ ,  $M_{\$20} = .42$ ,  $\chi^2(1) < 1$ ). This suggests that when resuming a decision from an interruption, people become focused on the desirability dimension of the purchase and pay less attention to the feasibility dimension of price.

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## Discussion

Study 3 found that in a consumer decision involving price-quality tradeoffs, interruption increased preference for the high-quality high-price option only when the price differential is relatively large, but not when the price differential is small. This pattern is due to decreased sensitivity to the feasibility dimension of price when decision is interrupted. These results help to shed light into the mechanism of the interruption effect. On the one hand, the results provide evidence for a shift in attention towards desirability and away from feasibility due to decision interruption. On the other hand, the results in this study cannot be supported by the alternative account of goal-reference increase. Specifically, if there is increased goal reference, then one should observe a main effect for interruption such that regardless of whether the price for high quality is high or low, those in the interruption condition will be more likely to choose to upgrade. In

particular, it will certainly not be the case that in the low price condition, the interrupted group may be *less* likely to upgrade than the uninterrupted group. Therefore, evidence from study 3 supports the theorizing that because an interruption leads people to engage in a top-down goal-directed processing of the decision, people become more focused on the products' desirability values which are primary to one's consumption goals, and less focused on feasibility values which are secondary to one's goals.

In study 4, I wish to further investigate the relationship between interruption and price-quality tradeoff decisions, and in addition, address a remaining alternative account for the interruption effect. Specifically, instead of a goal-directed shift in attention from feasibility to desirability, perhaps an interruption has simply lead to a less careful mode of decision making in which the person neglects price information and haphazardly chooses the better-quality product. Study 4 addresses this concern by demonstrating that in fact people become more—rather than less—discerning about the options after an interruption. In particular, they respond differentially to two types of quality improvements, namely, those that improve the consumption's desirability (e.g., increasing the enjoyment or meaningfulness of the consumption), and those that improve the consumption's feasibility (e.g., increasing the speed or reliability of the consumption). It is predicted that under goal-directed processing after an interruption, people will become more inclined to purchase the high-quality high-price option only when the option improves the desirability of consumption; however, the effect can be reversed if the option merely improves the feasibility of consumption. In other words, people focus on the quality dimension only when it corresponds to the consumption's desirability rather than feasibility.

## **STUDY 4: HIGH-DESIRABILITY HIGH-PRICE VERSUS HIGH-FEASIBILITY HIGH-PRICE OPTIONS**

### Overview and Design

The objective of study 4 is to test the conjecture that price-quality tradeoff decisions may be affected differently by decision interruption for different types of quality dimensions. Specifically, if a high-quality high-price option increases the desirability of the consumption, that is, creates greater level of meaning or value to the consumption, a goal-directed processing after an interruption will increase the attention to this quality dimension, resulting in greater preference for the high-quality high-price option. However, if a high-quality high-price option does not affect the value of the consumption, but only increases the feasibility of the consumption, people may in fact pay less attention to this quality dimension after an interruption, and hence are less likely to choose the high-quality high-price option (H4).

This hypothesis is tested in a study involving decisions in four product categories. In two product categories, namely, bed linen and restaurants, the HQHP option significantly increases the level of consumption (see table 2 for a description of the four decisions). For example, in the bed linen category, participants are asked to imagine that they are choosing between two sheet sets: a set with 350-count premium cotton for \$79, or a set with 250-count standard cotton for \$49. And for the restaurants, participants choose between options that have received 4.5 stars versus 4 stars in restaurant reviews.

Thus in both categories, the HQHP option provides higher level of consumption goal achievement in the form of more luxury and more enjoyment. In contrast, in the other two product categories, the HQHP options only increase the products' performance in terms of efficiency and reliability, but do not improve the desirability (i.e., value and meaning) of the consumption. Specifically, participants choose between two laptops in which the HQHP option has a faster CPU, and between two cordless phones in which the HQHP option has a higher frequency that enables larger range for talking. Thus both features facilitate the success of consumption, but do not make the consumption more valuable. In this study, each participant will make all four decisions, the order of which is randomized; therefore the type of high-quality dimension (desirable versus feasible) is manipulated within subjects. Further, as in previous studies, half of the participants are assigned to the interruption condition in which they are told to switch to a filler task during each of the four decisions; the other half are told to switch between the filler tasks and the purchase decisions upon completion of each decision.

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Insert table 2 about here

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Thus study 4 has a 2 (interruption: present, absent; between-subjects) x 2 (type of high quality: desirable, feasible; within-subject) mixed design, with two decisions in each cell. The dependent variable for the analysis is the overall number of HQHP products bought (min = 0, max = 2) in each cell, and I predict an interaction effect whereby the interruption group will purchase a larger number of desirable HQHP products than the

uninterrupted group, but will purchase fewer number of the HQHP products that only improve the feasible of consumption.

## Procedure

Participants ( $N = 126$ , mean age = 33.5, 24% male) were ordinary consumers recruited from all over the country through a web survey service to take part in online studies for academic purposes. The online session consisted of the four price-quality decisions of the current study, as well as several other unrelated studies. The interruption procedure was similar to that used in study 1. Specifically, in the introduction participants were told that the study examines multitasking behavior, and therefore during the session they may be instructed to switch between different types of tasks. When they encounter such instructions, they should simply do so. Half of the participants were assigned to the interruption condition in which they were asked to switch to the filler task during their four product decisions, while the other half of the participants completed the corresponding filler tasks before the product decisions. The filler tasks in this study were again counting backwards.

## Results

First, I examined preferences within each product category. As predicted, in choosing between a desirable HQHP and a less desirable LQLP option, people in the interruption condition were more likely to choose the HQHP option than those in the

uninterrupted condition (bed linen:  $M_{\text{uninterrupted}} = .32$ ,  $M_{\text{interruption}} = .47$ ; restaurants:  $M_{\text{uninterrupted}} = .19$ ,  $M_{\text{interruption}} = .26$ ). In contrast, when the HQHP option improves the feasibility of the consumption, people in the interruption condition were less likely to choose the HQHP option than those in the uninterrupted condition (laptop:  $M_{\text{uninterrupted}} = .78$ ,  $M_{\text{interruption}} = .61$ ; cordless phone:  $M_{\text{uninterrupted}} = .72$ ,  $M_{\text{interruption}} = .63$ ). The changes in preferences due to interruption are presented in figure 3.

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 Insert figure 3 about here  
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Next, the effect of interruption and type of high quality on overall purchase was analyzed by examining the number of times a person chose the HQHP options (for a minimum of 0 times and a maximum of 2 times) within each condition. A mixed-design ANOVA with interruption as a between-subjects factor, and type of high quality as a within-subjects factor revealed no main effect for interruption ( $F < 1$ ), but a significant main effect for type of high quality ( $F(1, 125) = 84.52$ ,  $p < .0005$ ), the latter may be reflecting the difference in base-rates among the product categories. Importantly however, as predicted, there was a significant interaction effect between interruption and type of high quality ( $F(1, 125) = 8.96$ ,  $p = .003$ ). Specifically, when a person was not interrupted, he chose on average .51 high-price high-desirability products and 1.51 high-price high-feasibility products; however, when the person is interrupted, he chose on average .74 high-price high-desirability products, and 1.25 high-price high-feasibility products. A contrast was computed between the interruption and uninterrupted conditions for choices of high-price high-desirability products ( $M = .74$  versus .51), showing that the

increase due to interruption is marginally significant ( $t(125) = -1.78, p = .08$ ). In parallel, a contrast for choices of high-price high-feasibility products between interruption and uninterrupted conditions showed a significant decrease due to interruption ( $M = 1.51$  versus 1.29,  $t(125) = 2.14, p = .03$ ).

## Discussion

Results in study 4 suggest that the effect of decision interruption on price-quality tradeoff decisions depends on the nature of the quality dimension. When the high-quality option is of greater desirability, that is, when it increases the level of consumption goal achieved, an interruption increases the preference for the HQHP option. In contrast, when the high-quality option only increases the feasibility, that is, the efficacy and reliability of the consumption, an interruption resulted in a decrease in preference for the HQHP option. Thus study 4 provides further evidence for the differential responses given to desirability and feasibility values as a result of decision interruption—because desirability is a primary dimension to goal pursuit while feasibility is a secondary dimension, when people turn to a top-down goal-directed mode of processing they are more likely to focus on improvements along desirability dimensions, but are less likely to focus on improvements along feasibility dimensions. This result also suggests that people do not simply become brash and go after better products of any kind after an interruption; instead they attend to the quality attributes differently depending on their goal implications.

## GENERAL DISCUSSION

This research examines the effect of an interruption in decision making on people's preferences. It is proposed that after an interruption, people tend to engage in a more top-down goal-directed mode of information processing, which leads to greater focus on the options' desirability rather than feasibility dimensions. Consequently, people are more likely to choose a highly desirable but less feasible option if their decision has been interrupted. Evidence for this effect is found in several decision contexts involving desirability and feasibility tradeoffs. For example, in choosing a restaurant, an interruption in thinking about the choice increased choice of a venue with better food—a desirability dimension, but poorer cleanliness—a feasibility dimension. Similarly, in choosing financial deals, interruption resulted in more choices of the high-risk option offering higher amount of winning but lower probability of winning. Two more studies on price-quality tradeoff show that the effect of interruption is not due to increased reference level, but rather is due to a shift in one's focus of attention from feasibility to desirability of options. In particular, decision interruption reduced people's sensitivity to price in a price-quality decision. Further, people responded differently to high-quality high-price options depending on whether the option increased the desirability or feasibility of the consumption.

By focusing on the phenomenon of decision interruption, this research has several important theoretical implications. First, this research highlights the dynamic changes that may occur in people's processing mindset and focus of attention during extended decision making processes. The present studies show that a discontinuous process may be

different in nature from a continuous one in that a discontinuation may become an impetus for change in the person's mental processes—compared to the relatively bottom-up and data-driven mode during an initial processing of a decision, when people review a decision after an interruption, their processing attention becomes more goal-directed. This research thus joins other recent studies showing that the outcomes of decisions may be changed when decisions are broken into multiple stages. For example, research on the “screening effect” (Chakravarti, Janiszewski, and Ülkümen 2006) shows that asking people to first screen a set of options using a certain criteria (e.g., must meet a minimum level of picture resolution in digital cameras) can lead to reduced weighting of this attribute in the subsequent stage of choosing among the options that have passed the initial screening. In another line of research by Maimaran and Simonson (2006), it is found that first asking people to choose a category and then choose within the category can lead to bolder choices (e.g., choosing an extreme option). However, unlike these studies and the literature on sequential choice (Dhar and Simonson 1999; Drolet 2002), this research makes a novel contribution by suggesting that even without a prior choice, the mere separation of a “learning phase” and a “deciding phase” in decision making may affect people's preferences.

In addition to greater insights into the construction of preferences, this research also contributes to the understanding of goal pursuit and evaluation of goal-directed actions. Research on goals and action generally theorize the evaluation of goal-directed action along two dimensions, namely, a desirability dimension (“how much is achieved”) and a feasibility dimension (“how likely is goal achieved”); Trope 1986; Kruglanski 1996; Bagozzi and Dholakia 1999). Further, research on motivation and affect suggests two

types of responses to stimuli regulated by different mental systems, namely, an approach response and an inhibitory response (Lewin 1951; Carver and White 1994; Higgins 1998; Kuhnen and Knutson 2005). The evaluations of desirability and feasibility and people's approach versus avoidance tendencies are related because the desirability of an action creates approach tendencies while the feasibility of options often indicate reasons for avoidance. Importantly, recent research in construal level theory has demonstrated fundamental differences in the way desirability and feasibility are represented mentally whereby the desirability is much more closely and centrally linked to one's goals than feasibility (Trope and Liberman 2003). Thus this research provides additional demonstration of the differential responses to these two dimensions, and further, this research suggests there may be temporal sequences by which each dimension is focused on—feasibility maybe attended to during initial processing, but desirability is emphasized in a second stage of re-processing. A similar pattern may exist for approach versus avoidance responses whereby the strength of avoidance responses may be abated upon returning to a previously suspended decision. Moreover, research on phases of goal-directed action shows that often the pursuit of an action includes a deliberative stage and an implemental stage (Gollwitzer 1996). Because the desirability and feasibility of potential actions are evaluated in the deliberative stage, an additional implication of this research might be that because an interruption causes the person to focus on desirability rather than feasibility, an interruption in the deliberative stage may lead to a quicker transition into an implemental mindset in which the person begins to maps out the steps by which he/she will carry out the action.

Finally, this research may contribute to the understanding of construal level theory (Trope and Liberman 2003). Previous research has noted the relationship between psychological distance and construal level (Liberman, Trope, and Stephan 2006). However, the concept of construal level is a more general phenomenon and there might be other circumstances that can lead to a “distant” view. This research suggests that the processing stage and the ensuing processing mode can be another determinant such that an initial stage that focuses on information learning tends to foster a close-up view, whereas a re-representation stage tends to foster a distant, big-picture view. In this light, an interruption in decision making may have broader effects on preferences than the focus on desirability versus feasibility. For example, an interruption may also lead to greater reliance on the chronic and essential features of objects such as their category membership, and in interpersonal judgments, a greater reliance on stereotypes.

#### Limitations and Future Research

This research also has a number of limitations that maybe addressed in the future. First, while the bottom-up data-driven versus the top-down goal-directed mode of processing is proposed as the mechanism underlying the interruption effect and evidence is found for goal-directed shifts in processing attention, it is also possible that other mechanisms are involved in the effect. In particular, one intriguing possibility is that different systems of cognition may be involved pre- versus post-interruption, or even during interruption. For example, research by Dijksterhuis et al. (2006) suggests that people may engage in non-conscious processing even when their (conscious) attention is

diverted to focus on other tasks. Their research shows that after a period of diversion (akin to the period of interruption in this research), the quality of people's decisions are improved in that the decisions conform better to normative standards, and people are more satisfied with their choices. Thus an interesting question is whether non-conscious processing also puts greater weight on desirability rather than feasibility information, and if so, it may also contribute to the decision interruption effect.

Another possibility is that after an interruption, people are more likely to engage in system I processing (Sloman 1996). Research suggests that people may possess two systems for reasoning – system I processing is said to be “intuitive” in that it involves the use of well-rehearsed pattern-matching and associations, while system II is a slower process that relies on reasoning and computations. Thus it is possible that during decision making the initial stage of information learning and comprehension may require more system II cognition and reasoning; however, after an interruption, because the information has already been learned and understood, people may be more likely to rely on their intuitions to make a decision. An important question for future research is to what extent people's intuitions are “big picture” in nature; that is, whether the intuitive patterns that emerge in a decision also emphasize high-level features such as desirability and overlook low-level features such as feasibility.

A second limitation of this research is that the present studies focused on relatively simple decisions involving tradeoffs between two attributes. More research is needed to investigate the boundary conditions for the interruption effects. For example, future research may explore the effect of interruption in more complex decision problems involving more options and richer descriptions of options. It appears two possibilities

exist: the effect of an interruption may be stronger in complex situations because there is potentially a greater difference between a big picture view and a detailed view; however, it is also possible that the interruption effect might be weakened because in such complex situations it is difficult to decide based on a detailed view—thus even without interruption, people may spontaneously try to abstract a summary view of the situation in order to make a decision, thereby forming a view that is similar to one caused by interruption. Indeed previous research shows that under certain circumstances people do spontaneously re-organize information in their mind to facilitate decision making (Coupey 1994). Future research may examine the conditions in which such mental re-organization takes place and whether they result in differential weightings of desirability versus feasibility dimensions.

Further, this research studied the effect of relatively short, simple and neutral types of interruptions (e.g., counting backwards, generating words). Therefore the effect of interruption found in this research can be seen as a “mere interruption effect” that relies on the mental reset that takes place due to a discontinuation of the decision process. However, more research is needed to examine the effect of other types of interruptions and their underlying mechanisms. For example, research may look at interruptions of different durations as well as repeated interruptions, and interruptions that affect people’s cognitive and affective resources (e.g., interruptions that change people’s mood, arousal, and energy). The moderating role of individual differences such as expertise, task involvement, and need for cognition is also worth examining as it may further our insight into the interruption effects.

Finally, future research might look at the effect of interruption on a broader range of behavior. For example, consumer research suggests consumer goals are organized in a hierarchical manner ranging from high-level life goals to low-level projects (Huffman, Ratneshwar, and Glen Mick 2000). Thus it would be interesting to examine whether interruptions may lead to greater preference for pursuing high-level rather than low-level consumption goals. Further, in addition to decision making, research may examine the effect of interruption on other types of cognitive and affective processes such as sensory experiences (Shiv and Nowlis 2004), problem solving, creativity and artistic expressions. Finally, it may be important to consider the effect of interruptions at a more macro level—for example, whether the multitasking lifestyle may affect people’s general level of success and life satisfaction (Kahneman 1999; Schwarz and Strack 1999).

### Managerial Implications

In addition to its theoretical interest, this research also has important managerial implications. The dichotomy of desirability and feasibility is at the center of many decisions. For the consumer, the person often needs to compare products that are attractive but risky against those that are dull but safe. For the manager, business opportunities can often be characterized by their potential payoff and chance of success. This research shows that the decisions of consumers and managers may be influenced by the dynamic course of decision making—in particular, by the occurrence of an interruption or suspension. Therefore, this research has implications for how marketers may design shopping and decision making procedures that promote certain types of

products. For example, the use of interrupters such as pop-up ads, or simply asking a consumer to wait during a decision may have a significant effect on what people eventually purchase and their price sensitivity. Further, breaking a decision into multiple stages, such as an initial stage of learning and a later stage of deciding may lead to different choices compared to if the entire process is completed in a continuous manner.

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**TABLE 1**

## STUDY 2 RESULTS

Choice of Risky Deal*	Deal 1	Deal 2	Deal 3	Deal 4	Deal 5	Deal 6	Deal 7	Deal 8
Uninterrupted	.22	.11	.09	.16	.02	.16	.16	.18
Interrupted	.36**	.18	.16**	.18	.09**	.27**	.27**	.20

\*Problem order was randomized.

\*\*Chi-squared test significant at  $p = .05$ .

**TABLE 2**

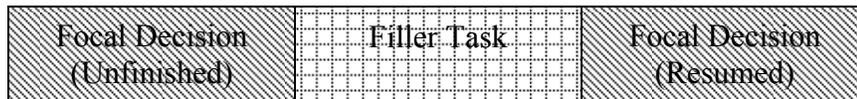
## STUDY 4 DECISION PROBLEMS

	<b>HQHP Option Improves Desirability of Consumption</b>		<b>HQHP Option Improves Feasibility of Consumption</b>	
	Bed Linen	Restaurant	Laptop	Cordless Phone
Quality Dimension	Cotton Grade	Review	CPU Speed	Frequency
HQHP Option	350-Count \$79	4.5 Stars \$17	1.8 GHz \$1399	5.8 GHz \$59
LQLP Option	250-Count \$49	4.0 Stars \$13	1.4 GHz \$1299	2.4 GHz \$45

**FIGURE 1**

## ILLUSTRATION OF THE DECISION INTERRUPTION PROCEDURE

Interruption Condition



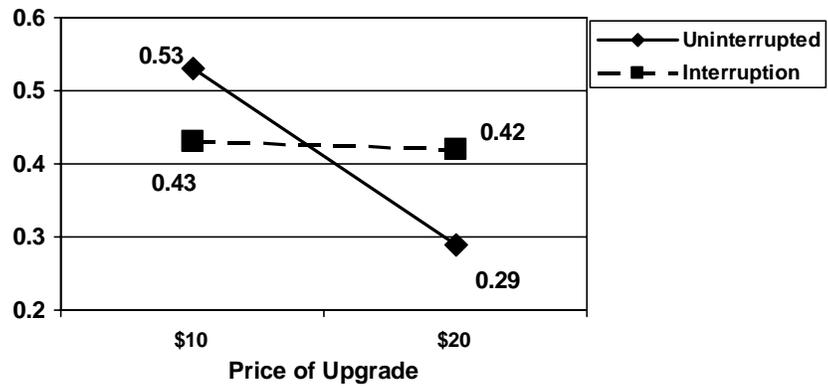
Uninterrupted Condition



FIGURE 2

## STUDY 3 RESULTS

## Choice of Upgrade



**FIGURE 3****STUDY 4 RESULTS**