University of Alberta

Losing the Battle to Win the War: Strategic Use of Information Delay and Search Cost

by

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ABSTRACT

Many purchase decisions by consumers involve multiple decision stages. This thesis investigates the dynamics of consumer preferences in the context of two-stage decision processes.

The first essay examines the influence of inter-stage availability of product information on consumer choice. Since purchase decisions are often made based on a multi-stage process, consumers may obtain information about the available alternatives at different stages of this process. I propose that the inter-temporal pattern of information presentation can systematically influence consumers' preferences among alternatives. In particular, I hypothesize that the delayed presentation of some desirable information about an alternative can increase consumer preference for that alternative relative to when there is no such delay. The results of seven experiments demonstrate the proposed positive effect of a delay in the presentation of desirable information on preference, as well as the preference dynamics across decision stages associated with it, and they shed light on the mental mechanisms underlying this effect.

The second essay examines the effect of differential search costs for a number of competing alternatives on consumer preference for these alternatives. A common belief is that a firm should make it as easy as possible for consumers to obtain information about its products or services. I challenge this view and argue that a firm may be able to boost demand for its offering by increasing consumer search cost in connection with it. I propose two psychological

mechanisms as drivers of this effect – one in line with a sunk cost fallacy, whereby incurring a higher search cost increases consumers' commitment to an offering, and one based on self-perception theory, whereby consumers make inferences about their preferences by observing their own search behavior. The findings of four experiments show that making it more difficult for consumers to find out about an alternative, relative to competing offerings, can indeed increase the probability of that alternative being chosen. Moreover, the results provide support for both proposed mechanisms, suggesting that they jointly underlie the influence of differential search costs on consumer choice.

Dedication

To my whole family in Canada and China.

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Table of Contents

Chapter	Title	Page
1.	Introduction	1
Bibliography		5
2.	Essay 1: What to Say When: Delayed Presentation of Persuasive Information and Consumer Choice	6
2.1	Introduction	6
2.2	Information Integration and Order effects	9
2.3	Multi-Stage Decision Processes	12
2.4	Effects of Delayed Presentation of Persuasive Information	15
2.5	Candidate Mental Mechanisms	17
2.5.1	Recency Effect	18
2.5.2	Weight Shift	18
2.5.3	Alternative Boosting	19
2.6	General Method	21
2.7	Experiment 1: The Basic Effect	25
2.7.1	Method	26
2.7.2	Results	27
2.7.3	Discussion	29
2.8	Experiment 2: Even Inferior Alternatives Can Benefit From Delay	31
2.8.1	Method	31
2.8.2	Results	32
2.8.3	Discussion	33

2.9	Experiment 3: Inter-Stage Preference Dynamics	34
2.9.1	Method	34
2.9.2	Results and Discussion	35
2.10	Experiment 4: Irrecoverable Damage at the Screening Stage	38
2.10.1	Method	39
2.10.2	Results and Discussion	40
2.11	Experiment 5: Alternative Boosting	42
2.11.1	Method	43
2.11.2	Results	44
2.11.3	Discussion	45
2.12	Experiment 6: Recency Effect	46
2.12.1	Method	47
2.12.2	Results and Discussion	48
2.13	Experiment 7: Weight Shift vs. Recency Effect	50
2.13.1	Method	51
2.13.2	Results and Discussion	54
2.14	General Discussion	57
2.14.1	Summary of Research	57
2.14.2	Theoretical Implications	58
2.14.3	Managerial Implications	60
Bibliography		62
Appendix 2.1	Computer Interfaces for Two-Stage Decision Paradigm in Experiments 1 - 7	66
3	Essay 2: Differential Search Costs and Consumer Choice	68

3.1	Introduction	68
3.2	The Sunk Cost Fallacy	73
3.3	Inferring Preferences from One's Own Actions	76
3.4	Experiment 1	81
3.4.1	Method	82
3.4.2	Results and Discussion	83
3.5	Experiment 2	85
3.5.1	Method	85
3.5.2	Results and Discussion	87
3.5.3	A Possible Alternative Explanation	89
3.6	Experiment 3	90
3.6.1	Method	92
3.6.2	Results and Discussion	94
3.7	Experiment 4	98
3.7.1	Method	99
3.7.2	Results and Discussion	101
3.8	General Discussion	104
3.8.1	Summary of Research	104
3.8.2	Theoretical Implications	105
3.8.3	Practical Implications	107
Bibliography		110
Appendix 3.1	Stimulus Set Used in Experiments 2, 3, and 4	113
Appendix 3.2	Computer Interfaces for Experiment 2	116
Appendix 3.3	Computer Interfaces for Experiment 3	118
Appendix 3.4	Computer Interfaces for Experiment 4	121

4	General Discussion and Conclusions	123
4.1	Contributions	124
4.2	Limitations and Opportunities for Future Research	125
Bibliography		129

List of Tables

Table	Title	Page
2.1	Candidate Mechanisms	17
2.2	Overview of Experiments	59

List of Figures

Figure	Title	Page
2.1	Exp. 1: Choice Shares of A vs. B at Stage 2	29
2.2	Exp. 2: Choice Shares of A vs. B at Stage 2	33
2.3	Exp. 3: Choice Shares of A vs. B at Stage 1 & Stage 2	36
2.4	Exp. 4: Choice Shares of A vs. B at Stage 1 & Stage 2	41
2.5	Exp. 5: Choice Shares of A vs. B at Stage 2	45
2.6	Exp. 6: Choice Shares of A vs. B at Stage 2	50
2.7	Exp. 7: Choice Shares of A vs. B at Stage 2	56
3.1	Exp. 1: Choice Shares of T vs. C	85
3.2	Exp. 2: Choice Shares of T vs. C	89
3.3	Exp. 3: Choice Shares of T vs. C	96
3.4	Exp. 4: Choice Shares of T vs. C	103

Chapter 1

Introduction

One fundamental objective of research in the domain of consumer behavior is to understand how consumers make purchase decisions – i.e., how they choose among a number of competing consumption alternatives. The standard microeconomic theory assumes that consumers are rational decision makers with unconditional, well-defined preferences and adequate ability to process information, that they choose the alternative that maximizes their utility, and that the methods used to elicit consumers' preferences do not have any impact on their choices.

The notion of bounded rationality (Simon 1955) has inspired a large body of research focusing on the interaction between the human cognitive system and decision contexts. This research has demonstrated that, rather than having a definitive preference ranking for the available alternatives, consumers often construct their preferences on the spot contingent on a variety of contextual factors (Bettman, Luce, and Payne 1998). This materialistic perspective of constructive consumer preferences acknowledges that human beings, who change the environment, are also the product of the environment, using different choice strategies as the decision environment varies and adapting to different decision contexts and tasks. By highlighting the interplay of environmental variation and human decision making, this research has greatly enhanced what we know about consumer choice.

I find it exciting to investigate the nature of constructive choice processes. I believe that the more we learn about the ramifications of environmental influences, which could be numerous and could operate either with or without the conscious awareness of decision makers, the deeper an understanding we have of how we make a purchase decision and why we chose what we chose. The notion of constructive consumer preferences sets the stage for this thesis, in which I examine two contextual factors that exert significant influence on consumers' preferential choices – (1) the inter-temporal allocation of product information across the stages of consumer decision processes and (2) differential search costs for competing products.

More specifically, this thesis investigates dynamic consumer preferences in the context of two-stage decision processes. Consumers frequently use multi-stage processes to form utility judgments and make purchase decisions (Payne 1982). In a typical two-stage decision process, consumers first screen out the less promising candidates and subsequently make their final choice from a subset of the available alternatives (Hauser and Wernerfelt 1990). In the first essay, I investigate how the delayed presentation of persuasive information at the final choice stage influences consumers' choices. In particular, when decision processes are partitioned into two such stages, which are typically separated in time, consumers' acquisition of information about products may also be partitioned between stages. In fact, it is rarely the case that complete information about all alternatives is available to consumers at the initial screening stage, and

new information about some of the considered products may become available at the final decision stage. In such circumstances, it is important to understand the effect of the delayed presentation of information on consumers' choices. The results of a series of seven experiments demonstrate that the delayed presentation of persuasive information tends to cause a disadvantage at the initial screening stage, but that it is possible for this to be reversed at the final choice stage, resulting in an eventual advantage for the product about which some information arrives with a delay. This finding challenges the common intuition that firms might want to withhold negative, rather than positive (persuasive) information, at the screening stage to encourage consumers to further consider their products. The results also shed light on the mental mechanisms underlying the positive effect of the delayed presentation of persuasive information.

Another important factor in the context of multi-stage decision process is the search cost that consumers must incur to obtain information about available alternatives. At the initial screening stage, consumers are often confronted with a number of competing alternatives, and this can vary in terms of information search costs – i.e., consumers might need to exert greater effort to find out about some alternatives than others. In this case, differential search costs become a factor that may determine whether an alternative enters a consumer's consideration set. In the second essay, I investigate the influence of differential search costs on consumers' preferences for competing alternatives. The results of four experiments show that, whereas requiring a higher information search cost

relative to its competitors decreases the probability that an alternative survives the screening stage, this also tends to lead to an enhanced preference for that alternative at the final choice stage. This finding flies in the face of the widely held intuition that it is in a firm's best interest to minimize consumer search cost for its offerings. The experiments also shed light on the psychological mechanisms that drive this effect.

In sum, this thesis identifies two important environmental factors in the context of multi-stage decision processes and examines how each of these influences consumers' purchase decisions. The remainder of the thesis consists of Essays 1 and 2, followed by a general discussion of both the implications of the findings presented in this thesis and several promising areas for future research.

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Chapter 2

Essay 1: What to Say When: Delayed Presentation of Persuasive Information and Consumer Choice

2.1 Introduction

Consider the following two scenarios: (1) Mary is a PhD candidate who is currently on the market for a junior faculty position. After an initial round of interviews with a number of universities, some of these institutions have invited her for campus interviews. With her first trip only a week away, Mary learns that one of her papers has been accepted for publication in a top-tier journal in her field. She immediately updates her CV and lets the decision makers – each of the universities she is about to visit – know the good news. (2) George is planning to buy a new car. He visits a number of automobile dealerships in his area. After digesting all the information he has gathered, George focuses his attention on the two car models that, all things considered, appear most attractive to him. He decides to go back to the two dealerships where he has seen the models he is now considering, with the intention of gathering more information about these two cars. As he visits the first of these dealerships again, the salesperson gets the impression that George is now seriously considering making a purchase, and he offers George a bicycle rack for the car as a complimentary accessory in the hope that this might help close the deal.

In both of these scenarios, decision makers are presented with an additional piece of favorable ("persuasive") information about one of the choice alternatives at an advanced stage of their decision process. Might the *delay* in the arrival or presentation of this persuasive information have any influence on the decision makers' eventual choices? That is, will their relative preference among the considered alternatives differ from what it would have been if all the information that is now known had been available all along? In this paper, we argue that the delayed presentation of some favorable information about a particular alternative (product, service, brand, company, etc.) can indeed enhance consumer preference for that alternative, and we propose three distinct mental mechanisms that might underlie this effect.

When consumers face a large number of choice alternatives, they often use a multi-stage process to make a purchase or consumption decision (see, e.g., Bettman and Park 1980; Nedungadi 1990; Roberts and Lattin 1991). A prototypical form of such a decision process is one involving two stages – an initial *screening stage* where unpromising alternatives are eliminated, followed by a *choice stage* during which the final selection is made based on an in-depth examination of the remaining alternatives (Beach 1998; Payne 1976). When consumers use a multi-stage process to make their consumption choices, some pieces of information about the alternatives may not become available to the decision maker until s/he has reached an advanced stage of the process (see Chakravarti, Janiszewski, and Ülkümen 2006). Such an inter-temporal pattern of

information availability can either occur naturally (e.g., the emergence of a new fact that was previously unknown to all parties involved) or be the result of a deliberate delay imposed by an interested party (e.g., a seller strategically withholding a key selling point until a consumer has revealed a clear interest in a product). In the first example above, Mary happens to receive the acceptance letter from the journal before her campus visits. In the second example, the car dealership chooses to delay the offer of the free bicycle rack until George's second visit.

Normatively, as long as an alternative remains a candidate through the final choice stage, the pattern of information availability across the stages should have no influence on decision makers' preference for it. Behavioral decision research, on the other hand, has demonstrated that systematic violations of normative principles in everyday decisions are ubiquitous (e.g., Shafir and LeBoeuf 2002). In particular, there is considerable evidence suggesting that consumers tend to construct their preferences based on contextual properties of a decision environment (Bettman, Luce, and Payne 1998; Tversky, Sattath, and Slovic 1988). In line with this, we propose that the temporal pattern of information presentation across the stages of the decision process can influence consumer preferences among choice alternatives in a systematic fashion.

The remainder of this paper is organized as follows. We begin by reviewing relevant prior work on information integration and order effects, and on multi-stage decision making. After that, we develop our key hypothesis – that

delaying the presentation of some persuasive information about an alternative can have a positive influence on consumer preference for that alternative – and characterize three candidate mental mechanisms that might underlie the preference formation process under delayed presentation of persuasive information. We then present the results of seven experiments involving consequential choices that provide clear support for the basic effect, illustrate the underlying preference dynamics across decision stages, identify an important boundary condition for the effect, and allow us to examine each of the candidate mechanisms in terms of their ability to account for the observed choice behavior. The paper concludes with a discussion of the theoretical and practical implications of our findings.

2.2 Information Integration and Order Effects

In order to understand the effects of the delayed presentation of persuasive information on consumer choice, it is worth considering what is known about how humans integrate multiple pieces of evidence about a person, an object, or a course of action. Early work on information integration examined how people form impressions about others' personalities. In this type of research, participants are typically presented with sets of adjectives or personality traits and asked to form an overall impression of the individual that these pertain to (Asch 1946; Anderson and Norman 1964; Anderson 1967). The primary focus of the work on information integration is on the integration rules (e.g., adding vs. averaging) that decision makers use to combine multiple pieces of evidence about an object into

an overall assessment of that object (see Lynch 1985 for a review). Much of the research in this area suggests that decision makers tend to use an averaging rule (Anderson 1981; Lopes 1985; Shanteau 1975), which implies that the weights given to the individual pieces of information sum to one and, consequently, that an increase in the weight given to one piece of information implies a reduction in the weights of other pieces.

An important body of research in the area of information integration has focused on *order effects* in information processing. As decision makers are presented with information about an object one piece at a time and integrate this stream of information into an evolving overall impression, the order in which the different pieces of information are received (and processed) can influence their ultimate evaluation of, and preference for, the object. Research in this domain has produced evidence of both primacy and recency effects. For instance, Johar, Jedidi, and Jacoby (1997) modeled evolving brand evaluations as an anchoring-and-adjustment process in which the current evaluation is adjusted by the impact of succeeding pieces of information. These authors found evidence of recency effects, such that information seen later tended to be weighted more heavily than information seen earlier. By contrast, work on the pre-decisional distortion of information (e.g., Carlson, Meloy, and Russo 2006; Russo, Meloy, and Medvec 1998) has provided evidence of primacy effects, with initially presented information having undue influence on the eventual assessment of alternatives.

Much effort has been directed towards understanding what might determine the direction of order effects in information integration. One factor that has received much attention is the timing of response solicitation – the evaluation of an object can (1) occur only once at the end of the information sequence or (2) be revised each time a new piece of information is received. The first studies of personality traits in psychology overwhelmingly supported primacy effects (see Anderson 1981 for a review). One procedural commonality in these early studies was that a single-step evaluation scenario was used – subjects' impressions were measured only at the end of the information sequence. Later research suggested that using a multi-step evaluation procedure can lead to the opposite conclusion. By asking subjects to update their evaluations incrementally every time a new piece of information is received, researchers have tended to find evidence of recency effects. Based on an extensive survey of prior research, Hogarth and Einhorn (1992) concluded that the "end-of-sequence" response mode tends to result in a primary effect, whereas the "step-by-step" mode tends to result in a recency effect. Other possible moderating variables include the complexity and the length of the information (Hogarth and Einhorn 1992), the extent of message elaboration (Haugtvedt and Wegener 1994), the nature of the evaluation task (Zauberman, Diehl, and Ariely 2006), the valence of the information (Anderson and Maletta 1999), the risk level involved in the task (Anderson and Maletta 1999), and the modality of communication (Unnava, Burnkrant, and Erevelles 1994).

From a decision making perspective, a limitation of the work on information integration to date is that it has failed to consider the role of multi-stage decision making in information processing. While an abundance of work has been directed towards exploring the sequential nature of information integration, the interim steps are typically viewed as serving a single end – determining the overall attractiveness of an object. This is different from decisions that are partitioned into multiple stages, each of which has a distinctive goal. Specifically, the following question still remains unanswered: How do decision makers integrate the flow of information across multiple stages of the decision process? The lack of attention to this question is due to the fact that research in information integration has generally focused on the processes by which the evaluation of a single alternative is formed and, therefore, the decision to choose among competing alternatives falls outside the traditional scope of this body of research. In this article, we investigate the cognitive process by which decision makers consolidate the stream of information across multiple decision stages.

2.3 Multi-Stage Decision Processes

Another relevant stream of literature has examined multi-stage decision processes. Examples of this are work on consideration sets as an intermediate step towards making purchase decisions (Nedungadi 1990; Roberts and Lattin 1991) and combined strategies, i.e., multiple decision rules are used together to reach a final purchase decision (Bettman, Luce, Payne 1998). The former

examines the economic and psychological reasons for breaking the task of making a purchase decision up into smaller subtasks that involve different styles of information processing; and the latter proposes that consumers often use non-compensatory heuristics, e.g. elimination-by-aspect, at an initial stage to reduce the size of the consideration set, and they tend to adopt compensatory decision rules, e.g., an averaging rule, at a later stage where the remaining options are analyzed in greater detail.

This research investigates the decision strategies that are peculiar to the different decision stages. For example, research on the screening of alternatives in multi-stage decision making conceptualizes the screening stage and the final choice stage as two different processes (Beach 1998; Richmond, Bissell and Beach 1998). At the screening stage, decision makers focus on the negative dimensions of the alternatives. If any of the attribute values fails to meet a pre-specified minimum standard, it is considered to be a "violation." An alternative is rejected when the sum of the violations associated with it exceeds some threshold value. At the choice stage, by contrast, people tend to pay more attention to the positive dimensions of the alternatives when their task is to choose the best from the remaining options. This research has shown pervasive recency effects such that information obtained at the screening stage had virtually no impact on evaluations made at the choice stage, and that the information received at the choice stage played a dominant role in determining the final evaluations (Van Zee, Paluchowski, and Beach 1992). In their recent studies, Chakravarti,

Janiszewski, and Ülkümen (2006) examined the cause of such a recency effect. They showed that screening encourages decision makers to perceive the surviving alternatives as more similar on prescreening information, and therefore this information becomes less diagnostic at the final choice stage.

One commonality between the studies by Van Zee et al. (1992) and Chakravarti et al. (2006) is that new post-screening information was provided (before participants made their final choice) for *all* alternatives that had survived the screening stage. By contrast, the present focuses on the situations where the presentation of persuasive information is delayed only for *some* alternatives in the consideration set. For other alternatives, all information is presented before screening. This difference is important for two reasons. First, the *selective* delay of information for certain products at the choice stage is common in the real world – consumers are more likely to obtain additional information for some rather than all products they are willing to consider. More importantly, the *selective* delay of information enables us to investigate the underlying cognitive mechanisms of information processing in two-stage decision making in a more systematic way. In particular, the selective delay of information for some but not all alternatives makes it possible to examine the influence of the presentation of additional information at the choice stage from three different perspectives. First, the presentation of additional information can create an alternative-specific effect by attracting more attention to the alternative for which new information has become available; second, the presentation of additional information can create an

attribute-specific effect such that the attribute on which additional information is presented becomes more important (for all alternatives) in preference construction; and finally, only the newly obtained information can become more important. In sum, the selective delay of information offers an opportunity to significantly enrich our understanding of the information integration process across multiple decision stages.

2.4 Effects of Delayed Presentation of Persuasive Information

All else being equal, when persuasive information is obtained sequentially across the screening stage and the choice stage, what influence does this have on consumers' preferential choice compared to when all the persuasive information is obtained at once at the screening stage? The prior discussion suggests that when the overall evaluation is reached via an intermediate screening stage, the partitioning of the task into multiple steps tends to trigger a recency effect such that information obtained later in the sequence plays a more important role than that obtained earlier in the sequence (Hogarth and Einhorn 1992). Consistent with this, research on screening as a partitioning step reported a "screening effect," whereby early information had virtually no impact upon evaluation at the choice stage, and this tendency was stronger when the partitioning step consisted of screening than when it consisted of other events (Van Zee et al. 1992). Following this line of reasoning, we expect that the persuasive information received at the choice stage has a greater impact on the post-screening product evaluation than if it is received at the screening stage. Furthermore, research has

shown that the advantages of the available alternatives have a greater impact when people choose the best, while the disadvantages become more prominent when people reject the worst from the available alternatives (Shafir 2003); or alternatively, the positive features are more compatible with a selection task, while the negative features are more compatible with a rejection task (Meloy and Russo 2004). If we conceptualize the screening task as more consistent with rejecting the worst of the available alternatives while the choice task is more consistent with selecting the best from the remaining ones, we expect that withholding part of the persuasive information about an alternative until a later stage increases the latter's perceived attractiveness at the choice stage. Therefore, we hypothesize that the delayed presentation of some persuasive information about a product enhances consumers' eventual preference for that alternative.

This hypothesis pertains to the overall impact of the delayed presentation of persuasive information on the final evaluation. This effect can be decomposed into two forces that work in opposite directions at the screening and the choice stage. The delay of some persuasive information about a product tends to decrease the evaluation of the product, causing a disadvantage, at the initial screening stage. However, it is possible for this to be reversed at the final choice stage upon presentation of additional persuasive information, resulting in an eventual advantage for the product. Thus, we expect to observe preference dynamics across the stages of the choice process such that the delayed presentation of some persuasive information reduces preference at the screening

stage, but increases preference at the final choice stage. These inter-stage preference dynamics suggest an important boundary condition of the hypothesized positive effect of the delayed presentation of persuasive information. In particular, when the presentation of too much persuasive information about a product is delayed initially, the product has only a slim chance of surviving the screening and the initial disadvantage may turn out to be irrecoverable at the final choice stage. We expect that the delayed presentation of a substantial amount of persuasive information generates a negative overall effect on consumer preference.

2.5 Candidate Mental Mechanisms

We propose three competing mechanisms that might underlie the preference-enhancing effect of the delayed presentation of persuasive information (see Table 2.1 for an overview). We discuss each of these in turn.

Table 2.1: Candidate Mechanisms

Recency Effect

	Brand A	Brand B
Attribute 1	+	+
Attribute 2	(+)	–
Attribute 3	–	–
Attribute 4	–	+
…		

Weight Shift

	Brand A	Brand B
Attribute 1	+	+
Attribute 2	(+)	–
Attribute 3	–	–
Attribute 4	–	+
…		

Alternative Boosting

	Brand A	Brand B
Attribute 1	+	+
Attribute 2	(+)	–
Attribute 3	–	–
Attribute 4	–	+
…		

2.5.1 Recency Effect

In line with the previous research that has demonstrated recency effects (Van Zee et al. 1992; Chakravarti et al. 2006), we propose that any piece of information that becomes available after a screening stage has a greater impact on decisions than it would have if it were available initially. Any information that is presented only at the second stage becomes more important as it is "proximate in a sensory, temporal or spatial way" (Nisbett and Ross 1980, p.45). A recency effect is a local effect. As additional information on one attribute for one alternative is presented at the second stage, only *that* piece of information becomes more prominent, relative to other evidence, and attracts greater attention by the decision maker. As a result, the positive value of the newly obtained piece of information becomes more pronounced and consumer preference for that alternative increases relative to the case where that information was obtained at the initial screening stage.

2.5.2 Weight Shift

We propose that the importance (or decision weight) of an *attribute* increases as a result of information on that attribute becoming available, for any alternative, after a screening stage. Unlike a recency effect, a weight shift is a global effect. The information on the attribute becomes more important for all alternatives that have survived the screening stage, even if this information was already available at the screening stage for some alternatives. The provision of

additional information on a particular attribute at the second stage makes that attribute distinct from others. Consumers thus allocate more attention to that attribute for all alternatives. Previous research has suggested that the importance of an attribute in forming the evaluation of an object is proportional to the amount of attention it receives. For example, attention decrement, whereby subjects' attention to successive pieces of information decreases over time, was proposed to explain the primacy effect, according to which the evidence items at the beginning of the series played a more important role in attitude formation than the items presented later in the series (McGuire 1957; Anderson 1981). In the same vein, we propose that consumers' increased attention to an attribute with supplemented information enhances the decision weight of that attribute. When the value of the newly presented information about an alternative is desirable, this has two implications for consumer preference. First, as the decision weight of the attribute increases, the margin between the alternative and its competitors on this attribute becomes more substantial. Second, choosing the alternative superior on the attribute that is perceived to be more important is a tie-breaking strategy that is easy to justify (Slovic 1975). As a result, consumers are more likely to choose the alternative for which the presentation of some persuasive information is delayed.

2.5.3 Alternative Boosting

We propose that the presentation of additional information about an alternative at the choice stage makes that alternative more prominent and

distinguishes it from competing alternatives. The delayed presentation of some information about an alternative therefore causes consumers to devote more attention to it than to its static competitors. As a result, preference for an alternative increases merely as a result of additional information (regardless of its valence) about it becoming available after a screening stage. Previous research has extensively examined the relationship between the level of attention and evaluation of alternatives. One central idea in the study of human information processing is that the human is not just a receiver of information, but also a transmitter of information. Shannon and Weaver (1949) described the human as an information channel, and it is possible to talk about the efficiency of transmitting information. In this sense, attention plays a vital role in information processing. Specifically, attention might act as a sort of amplifier, making processing of stimulus information in an attended region more efficient by enhancing the attended information or by filtering out distracting information (Johnson and Proctor, 2004). In accordance with this proposition, Taylor and Thompson (1982) suggested that the persuasive power of vivid information will be increased only under conditions where vivid information is attended to more than non-vivid information. McGill and Anand (1989) provided empirical support of differential attention as an explanation of the enhanced persuasiveness of vividness. In light of the above discussion, we propose that the presentation of additional information on an alternative at the choice stage tends to attract more attention to that alternative than to its competitors, and as a result the preference for the alternative increases. In addition, previous research pertaining to decision

heuristics has suggested that when consumers are indifferent between competing alternatives based on an assessment of their utility, they tend to rely on various peripheral cues to make their purchase decisions (Brown and Carpenter, 2000). Merely being more prominent than competing alternatives can act as such a cue.

2.6 General Method

We report evidence from a series of seven laboratory experiments designed to examine the proposed influence of delaying the presentation of persuasive information on consumer choice, as well as the mental mechanisms that underlie this effect. Experiments 1 and 2 demonstrate that it is possible to increase consumer preference for a particular alternative by delaying the presentation of some desirable information about it until the choice stage. Experiment 3 examines the predicted preference dynamics across the stages of the decision process resulting from such a delay – i.e., a reduction in preference for the focal alternative at the screening stage, but an increase at the choice stage. Experiment 4 illustrates an important boundary condition for the proposed effect by showing that delaying the presentation of a substantial amount of desirable information can result in a negative overall effect on preference for the focal alternative due to an irrecoverable negative effect on alternative's chances of surviving the screening stage. Experiments 5 through 7 test the three candidate mechanisms that might underlie the positive effect of the delayed presentation of persuasive information on consumers' preference – i.e., recency, weight-shift, and alternative-boosting effects.

Our empirical evidence is based on seven computer-based laboratory experiments. In this section, we discuss those general aspects of the research method – in terms of the tasks completed by participants, the stimuli presented, and the randomization scheme used – that were common across (most or) all of the experiments.

Each of the seven experiments involved a series of principal-agent choice tasks. Participants were instructed to assume the role of an agent responsible for selecting apartments for a number of incoming university exchange students according to the latter's preferences. A principal-agent paradigm was used to control for otherwise heterogeneous preferences for the various attributes of an apartment and in order to be able to assess the quality of participants' choices. To add consequentiality, participants were provided with a monetary reward for making good choices (see below for details).

On each round of the task, participants were to choose one of four available apartments on behalf of a student. A two-stage decision paradigm was used. At the first (screening) stage, participants were presented with descriptions of four apartments – resembling typical print advertisements in format – and asked to select the two most promising apartments for further consideration in making their choice. For some of these apartments, a portion of their description was not presented at the first stage. At the second (choice) stage, any information about a surviving apartment that had been omitted at the first stage was shown along with all the information that had already been presented at the first stage.

Participants were then asked to make their final choice by indicating which apartment they would rent for the student (see Appendix 2.1). Each experiment involved a series of such choice tasks.

The apartments were described in terms of nine binary attributes: monthly rent (lower vs. higher, with a difference of $30, except in Experiment 2), location (on campus vs. a 10-minute walk from campus), size (around 500 sq. feet vs. around 400 sq. feet), furniture (furnished vs. unfurnished), floor (on or above the 3rd floor vs. below the 3rd floor), TV (satellite vs. cable), parking (indoor and heated vs. outdoor), location of the nearest laundry facility (in the same building vs. in an adjacent building), and balcony (yes vs. no). The exchange students' preference was characterized in terms of which of the two levels of each of these attribute dimensions they deemed more desirable. The first level, as listed above, was always preferred to the second one. In addition, all attributes were independent (i.e., there were no interactions between attributes), and the attractiveness of the more desirable relative to the less desirable attribute level was equal across the seven attribute dimensions. That is, participants were instructed that the exchange students valued each of the more desirable levels of the non-price attributes equally, and that they were indifferent between each of these and a $30 reduction in monthly rent.

Each choice set consisted of two focal and two filler alternatives. The focal alternatives had either five or seven desirable attributes, whereas the filler alternatives had only one or two. The two focal alternatives were designed to be

equally attractive given the exchange students' preference (except in Experiment 2), whereas the filler alternatives were considerably less attractive. Our focus is on participants' relative preference between the two focal alternatives and, in particular, on the impact of the delayed presentation of information on this preference. We refer to the focal alternatives as "A" and "B. (In the stimulus materials, the four alternatives were identified merely as "Apartment 1" to "Apartment 4" in correspondence with their randomized horizontal display position on the computer screen.)

In order to encourage participants to complete the choice tasks thoughtfully, they were informed at the beginning of the experiment that they would receive a monetary reward of 25 cents every time they chose an alternative that was the most attractive one among those available, given the exchange students' preference. Since alternatives A and B were equally attractive by design, participants earned the reward if they chose either of these. At the end of each session, participants were informed how many times they had chosen the most attractive alternative over the course of the experiment, and they then received the cumulative reward they had earned.

In all experiments, several factors were randomized within and/or between subjects. First, the order of the different choice sets for an experiment was determined at random for each participant. Second, a different set of four alternatives, in terms of the more and less desirable levels of the nine attributes, was randomly generated for each choice set for each participant, subject to the

restriction that the alternatives had to have the required numbers of desirable attributes. Third, the horizontal display positions of the four alternatives on the computer screen were randomly determined for each round of the task and for each participant. Fourth, the order in which the apartments' non-price attributes were listed was determined randomly for each participant once, and then held constant throughout the experiment. Finally, the set of delayed attributes was selected randomly from the eight non-price attributes for each round of the task and for each participant. (In the interest of ecological validity, rent was listed first in all apartment descriptions and always presented at the first stage.) These randomizations were performed to rule out the possibility that any factor that is not of substantive interest might influence the results and to increase the generalizability of our findings.

2.7 Experiment 1: The Basic Effect

The first order of business is to show that a delay in the availability of some persuasive information about an alternative can, in fact, increase the latter's probability of being chosen. A clear demonstration of this effect would be to produce a reversal in the relative choice shares of two alternatives by simply manipulating for which of the two the presentation of some desirable attribute levels is delayed until the final choice stage. This is what we aimed to show in Experiment 1. In addition, although this is not the focus of the present research, we also examine the effect of the delayed presentation of some undesirable information about an alternative on its probability of being chosen.

2.7.1 Method

Stimuli. Participants made 16 choices, each from a unique set of four apartments. In all choice sets, each of two focal alternatives, A and B, was described by seven desirable and two undesirable features. In addition, all choice sets included two filler alternatives, each of which was characterized by two desirable and seven undesirable features. For half of these choices, the presentation of some desirable attribute information was delayed until the final stage, and for the other eight choices some undesirable attributes were delayed.

Experimental Design. Eight different choice sets, each consisting of two focal and two filler alternatives, were created randomly for each participant – i.e., in each of the eight choice sets, which of the nine attribute dimensions had a desirable level for the four alternatives was determined at random for each participant. Each of these choice sets was presented to the participant twice – once with two attributes delayed for alternative A (but no delay for B), and once with two attributes delayed for alternative B (but no delay for A). In addition, the delayed attribute information was desirable for half of these eight choice sets and undesirable for the other half. Thus, we used a 2 (delay for A vs. B) x 2 (delay of desirable vs. undesirable information) x 4 (replications) within-subject design. Moreover, to ensure differences across alternatives on the attribute dimensions that were subject to delay, the corresponding attribute levels of the focal alternative for which no information was delayed were always of the opposite valence relative to those that were delayed. Finally, two attribute levels – one desirable and one undesirable – were also delayed for one of the filler alternatives

in each choice set. The order of the 16 choice sets was randomized independently for each participant.

Dependent Measure. The key dependent variable in connection with each of the 16 rounds of the choice task is a participant's eventual choice between the two focal alternatives, A and B.

Participants and Procedure. Fifty-three members of a volunteer research panel maintained by a major North-American university participated in the experiment in exchange for a guaranteed compensation of $10 plus a performance-contingent payment of up to $4. A reward of 25 cents was provided for every choice of apartment such that the selected alternative was no less attractive than any of the three other available alternatives, given the students' preference. Thus, participants earned 25 cents every time they chose one of the two focal alternatives (i.e., A or B). Data were collected in a research lab equipped with networked computers in groups of approximately ten participants.

2.7.2 Results

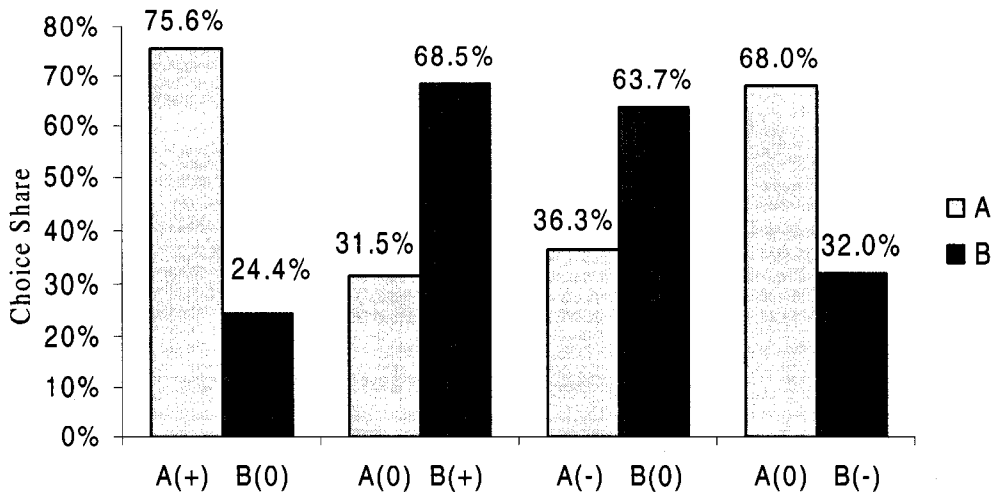
Of the 848 decisions made by participants, 93.3 percent resulted in the choice of one of the two focal alternatives. The remaining 6.7 percent were not informative with respect to our hypothesis and were, thus, excluded from the analysis. The results provide strong support for the prediction that the delayed presentation of some desirable information about one of the focal alternatives at the final choice stage can result in an increase in the probability of that alternative

being selected. When two desirable features of alternative A were delayed (while all information about B was already available at the screening stage), the choice shares of A and B were 75.6 percent and 24.4 percent, respectively. Based on a Generalized Estimating Equations model (GEE allows for correlation among responses from the same individual due to individual-specific intercepts, cf. Liang and Zeger 1986.) – estimated using the R programming environment – for choices observed under a within-subject design, this difference is highly significant ($z = 6.59$, $p < .0001$). When the same amount of desirable information was delayed for alternative B (but not for A), the choice share for B increased to 68.5 percent and that for A dropped to 31.5 percent, and this difference is also highly significant ($z = -4.26$, $p < .0001$). Thus, merely delaying the presentation of some persuasive information about one of the focal alternatives had a dramatic impact on which of them was ultimately chosen (see the left half of Figure 2.1).

When the presentation of *un*desirable information about one of the focal alternatives was delayed until the final choice stage, such a delay was harmful to that alternative. In particular, the delay of two undesirable features of alternative A (while none of the information about B was delayed) resulted in choice shares of 36.3 percent and 63.7 percent for A and B, respectively ($z = -3.57$, $p < .0001$). When the same amount of undesirable information was delayed for alternative B (with no delay for A), the choice share for B dropped to 32 percent and that for A increased to 68 percent ($z = 4.32$, $p < .0001$; see the right half of Figure 2.1). This suggests that undesirable features of an alternative

have a greater impact on preference for that alternative when they are presented at the final choice stage. However, the effect of delay is not entirely symmetrical – the positive effect of delaying desirable information is somewhat stronger than the negative effect of delaying an equivalent amount of undesirable information ($z = -2.13$, $p = .033$).

Figure 2.1
Exp. 1: Choice Shares of A vs. B at Stage 2



2.7.3 Discussion

The results of Experiment 1 show that, all else being equal, the delayed presentation of some of an alternative's desirable features can indeed render that alternative more likely to be chosen. Moreover, they demonstrate that it is possible to reverse the relative choice shares of two alternatives by merely influencing at what stage of the choice process a desirable piece of information about one of them becomes available.

In addition, whereas the demonstrated negative effect of the delay of undesirable information is not of primary interest here, it does shed light on the underlying mental mechanisms that contribute to the positive effect of the delayed presentation of desirable information. We will revisit this finding in the context of Experiment 5.

Unlike previous research, the choice tasks in Experiment 1 involved a low level of ambiguity – for two reasons. First, the alternatives in the choice set were described on alignable attributes (Zhang and Markman 2001), thus facilitating comparison across alternatives. Second, the choices were made in a principal-agent task context, which removed any ambiguity about decision makers' preferences. Previous research on multi-stage decision making used choice tasks that involved ambiguous information – alternatives were described in terms of unique attributes (Chakravarti et al. 2006; Muthukrishnan 1995), equivocal attributes (Russo et al. 1998), or trivial attributes that were uninformative to the decision maker (Brown and Carpenter 2000). Compared to these studies, the present research involved much less ambiguity with respect to the choice alternatives. As a result, our findings are stronger in the sense that participants in our experiments had little room for making inferences about the true characteristics of the alternatives.

2.8 Experiment 2: Even Inferior Alternatives Can Benefit From Delay

As shown in Experiment 1, the delay of persuasive information can substantially increase the choice share of an alternative relative to that of an equally attractive competitor. The goal of Experiment 2 is to examine the possibility that even an objectively inferior alternative might benefit from such a delay.

2.8.1 Method

Stimuli. Participants made a series of 12 choices from sets of four apartments. For a given choice set, each of the two focal alternatives, A and B, was again described by seven desirable and two undesirable features, and each of the two filler alternatives was characterized by two desirable and seven undesirable features. Unlike in Experiment 1, however, the two focal alternatives now differed in their attractiveness, given the principal's preference. In particular, while the two alternatives were otherwise equally desirable in terms of the number of positive and negative features they possessed, the monthly rent for Apartment A was $10 higher than that for Apartment B. Thus, A was always objectively inferior to B.

Experimental Design. Six different choice sets, each consisting of A, B and two filler alternatives, were created randomly for each participant. Each of these choice sets was presented to the participant twice – once with two desirable features delayed for the inferior alternative A (but no delay for the superior alternative B), and once with no information delayed for either of the two focal

alternatives. Thus, we used a 2 (delay for alternative A vs. control) x 6 (replications) within-subject design. To ensure differences across alternatives on the attribute dimensions that were subject to delay, the corresponding attribute levels of the focal alternative for which no information was delayed were always undesirable. In addition, information about two attributes – one desirable and one undesirable level – was also delayed for one of the filler alternatives in each choice set. The order of the 12 choice sets was randomized independently for each participant.

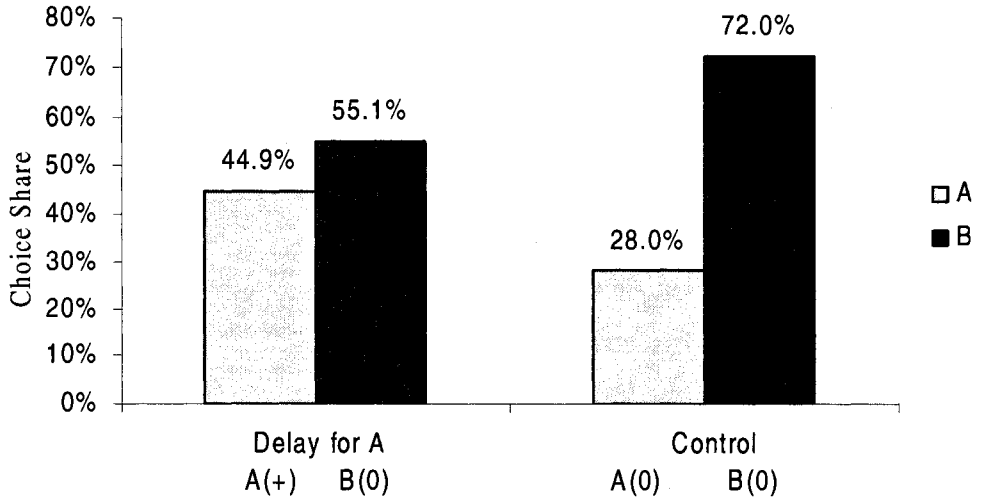
Participants and Procedure. Sixty-five members of a volunteer participant panel completed the experiment for a fixed payment of $10. In addition, a monetary incentive was provided to encourage thoughtful choices. Participants were told that each time they made a good decision on behalf of the principals, they would get a reward of 25 cents. They received this reward every time they selected alternative B, the objectively most attractive alternative in the choice set.

2.8.2 Results

Of the 780 decisions made by participants, 93.1 percent resulted in the choice of one of the two focal alternatives. The remaining 6.9 percent were not informative with respect to our hypothesis and were, thus, excluded from the analysis.

Participants' choices were again analyzed by estimating a GEE model. Across the 12 rounds of the task, the choice share of alternative A was 28 percent when all information about it was already available at the screening stage. Consistent with our prediction, alternative A's choice share increased to 44.9 percent ($z = 5.89$, $p < .0001$) when some desirable information about it was delayed until the final choice stage (see Figure 2.2). Thus, participants were more likely to choose an alternative that was objectively inferior when some persuasive information about it was delayed until the final choice stage than when all such information was already provided at the screening stage.

Figure 2.2
Exp. 2: Choice Shares of A vs. B at Stage 2



2.8.3 Discussion

The results of Experiment 2 provide further support for our key prediction that the delayed presentation of desirable information about an alternative can

increase preference for the latter. In particular, they demonstrate that such a delay can increase the choice share of an alternative even in the presence of an objectively superior competitor.

Thus far, we have focused on the (positive) overall effect of the delayed presentation of persuasive information – i.e., we have considered the *eventual* preference for a focal alternative at the final choice stage as the key dependent variable. In the next experiment, we examine the dynamics of the influence of such a delay across the stages of the decision process.

2.9 Experiment 3: Inter-Stage Preference Dynamics

It was expected that the delayed presentation of some persuasive information tends to decrease the evaluation of a product at the screening stage. However, the presentation of additional persuasive information at the final choice stage is likely to counteract this initial disadvantage and result in an eventual advantage by enhancing preference for the product. The objective of Experiment 3 is to demonstrate these inter-stage preference dynamics by examining preferences among the alternatives both at the screening stage and at the choice stage.

2.9.1 Method

Stimuli. Each choice set again consisted of four alternatives. The focal alternatives A and B were each characterized by five desirable attributes and four

undesirable attributes. The two filler alternatives were described by one desirable attribute and eight undesirable attributes.

Experimental Design. Participants made 12 choices in a 2 (amount of delay of desirable information about the focal alternative: two vs. three attributes) x 6 (replications) within-subject design. Thus, on each round of the task, either two or three desirable pieces of information about alternative A were delayed until the final choice stage, while all information about alternative B was already available at the screening stage. In addition, two attribute levels – one desirable and one undesirable – were also delayed for one of the filler alternatives in each choice set.

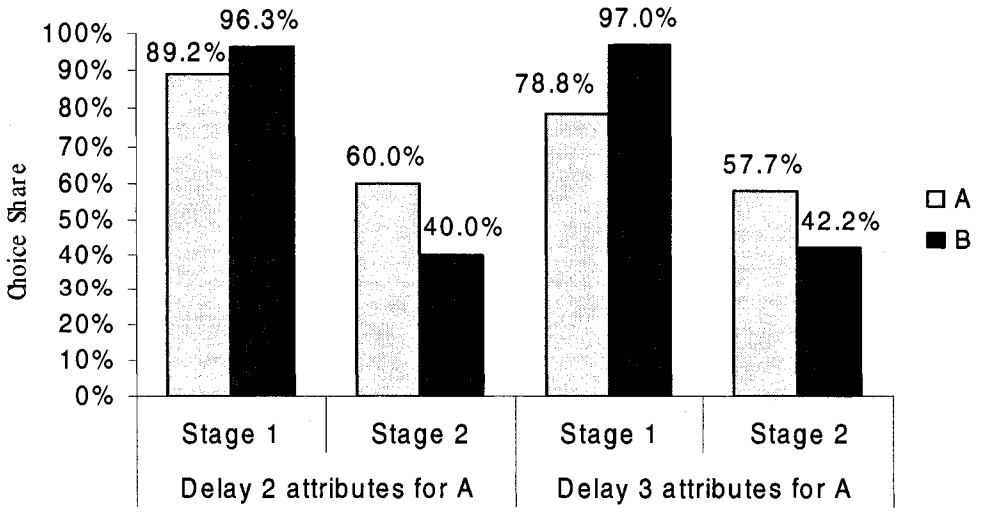
Participants and Procedure. Seventy-five undergraduate students participated in the experiment for extra credit in their introductory marketing course. A monetary incentive was provided to encourage thoughtful choices. In particular, participants were told that each time they made a good decision on behalf of the principals, they would get a reward of $0.25. They received this reward every time they chose either alternative A or alternative B.

2.9.2 Results and Discussion

To analyze the separate impact of the delay of persuasive information at the screening stage and at the choice stage, we examined the probability of each alternative surviving the screening stage, as well as the eventual choice shares of A and B at the final choice stage.

Participants' choices were analyzed by estimating a GEE model. The results are presented in Figure 2.3. We first consider the choice sets in which two desirable pieces of information about alternative A were delayed. Across all of these rounds of the choice task, alternative A survived the screening stage 89.2 percent of the time whereas alternative B survived 96.3 percent of the time. Alternative A had a lower probability of being included in the consideration set than did alternative B as a result of the delay of some of the former's desirable information ($z = -4.02$, $p < .0001$). However, the (eventual) choice share of alternative A based on its complete description (60 percent) was significantly greater than that of alternative B (40 percent; $z = 4.84$, $p < .0001$). Thus, while the delay of desirable information tended to decrease an alternative's chance of surviving the screening stage, it actually increased the alternative's (unconditional) probability of eventually being chosen.

Figure 2.3
Exp. 3: Choice Shares of A vs. B at Stage 1 & Stage 2



The above results are corroborated by those for the choice sets in which three desirable pieces of information about alternative A were delayed. Across these 6 rounds of the task, alternative A survived the screening stage only 78.8 percent of the time whereas alternative B survived 97 percent of the time. Alternative A had a lower chance of surviving the screening stage than alternative B ($z = -6.70$, $p < .0001$). However, even in this case, alternative A more than overcame the disadvantage it suffered at the screening stage once its complete description was presented – alternative A's eventual choice share was 57.7 percent, whereas that of alternative B was only 42.2 percent ($z = 3.85$, $p < .0001$). Again, the delay of persuasive information about an alternative put that alternative in a disadvantageous position at the first stage and then in an advantageous position at the second stage compared to its competitor.

Finally, there was a significant difference in the probability of alternative A surviving the screening stage between the two treatment levels of the amount of delay of desirable information ($z = -4.81$, $p < .0001$), indicating that alternative A had a lower chance of entering consumers' consideration set when three, rather than two, desirable pieces of information were delayed. The difference in the eventual choice share of A between these two treatments was not significant ($z = 0.71$, $p = .478$).

These findings demonstrate that delaying the presentation of persuasive information until the final choice stage tends to (1) reduce an alternative's chance of surviving the screening stage and (2) increase its chance of eventually being

chosen. In the present experiment, the positive effect of the delayed arrival of the additional desirable information about alternative A turned out to be sufficient to more than offset the negative effect of the initial unavailability of this information. However, the dynamics of the influence of such a delay across the stages of the decision process will not always result in an increased eventual preference for an alternative. In particular, the negative effect of the delay of desirable information on the chance of surviving the screening stage may be severe enough to prevent an alternative from reaping the benefits of this delay at the final choice stage. The next experiment was designed to examine the case in which delaying too much persuasive information leads to damage that cannot be recovered at the final choice stage.

2.10 Experiment 4: Irrecoverable Damage at the Screening Stage

The goal of Experiment 4 was to test a predicted boundary condition of the positive effect of the delayed presentation of persuasive information. The first-stage-loss followed by the second-stage-gain as illustrated in Experiment 3 suggested a risk associated with the delay of persuasive information: if the delay of persuasive information leads to a severe disadvantage at the first stage, it might not be able to recover at the second stage. In this case, the delay of persuasive information is no longer a blessing; rather, it can even produce a negative effect. In this experiment we demonstrated that when a significant proportion of persuasive information was delayed, it could lead to an irrecoverable drawback at the first stage and a negative overall effect on preference.

2.10.1 Method

Stimuli. Each choice set consisted of four alternatives. The focal alternatives A and B were described by five desirable attributes and four undesirable attributes. The two filler alternatives were described by two desirable attributes and seven undesirable attributes. This was slightly different from Experiment 3, in which the two filler alternatives were described by one desirable attribute and eight undesirable attributes. By increasing the attractiveness of the filler alternatives, we introduced a higher degree of competition between the focal alternatives and the filler alternatives.

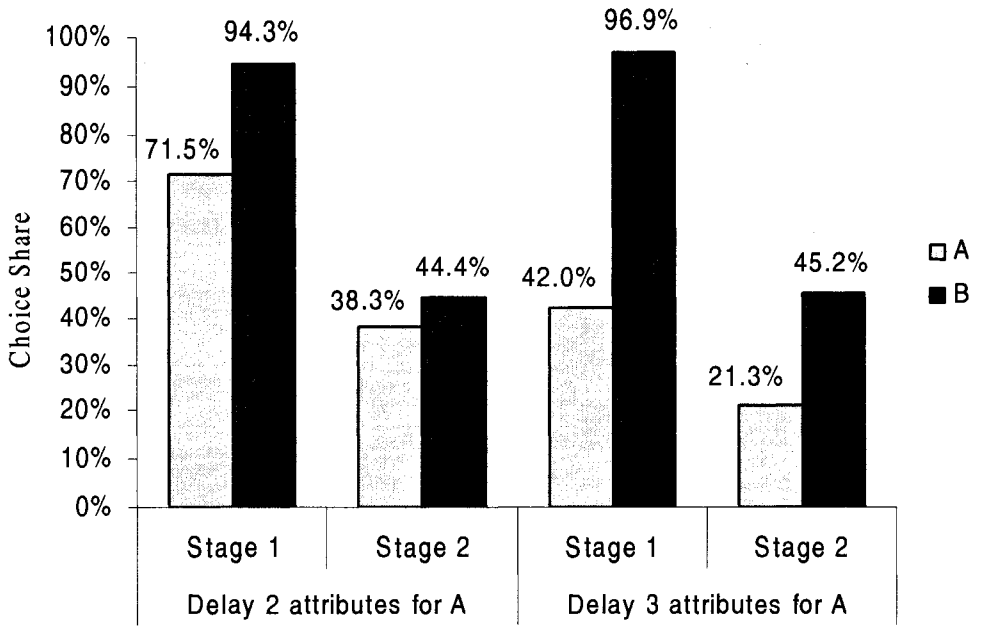
Experimental Design. The procedure used in this experiment was the same as that in Experiment 3. Participants made 12 choices in a 2 (amount of delay of desirable information about the focal alternative: two vs. three attributes) x 6 (replications) within-subject design. Two or three desirable pieces of information about alternative A were delayed 50 percent of the time each, while all information about alternative B was already available at the screening stage. In addition, two attribute levels – one desirable and one undesirable – were also delayed for one of the filler alternatives in each choice set. As the difference in attractiveness between the focal alternatives and the filler alternatives decreased in this study (relative to Experiment 3), the filler alternatives became more serious challenges to A at the first stage, especially when part of the desirable information about A was delayed.

Participants and Procedure. Eighty-seven undergraduate students participated in the experiment for extra credit in their introductory marketing course. A monetary incentive was provided to encourage thoughtful choices. In particular, participants were told that each time they made a good decision on behalf of the principals, they would get a reward of $0.25. They received this reward every time they chose alternative A or alternative B.

2.10.2 Results and Discussion

We compared the probability of A vs. B surviving the initial screening stage, ass well as the final choice shares of A and B. Participants' choices were analyzed by estimating a GEE model. The results are presented in Figure 2.4. We first consider the choice sets in which two desirable pieces of information about alternative A were delayed. Across the 6 rounds of the task, alternative A survived the screening stage 71.5 percent of the time whereas alternative B survived 94.3 percent of the time. Thus, alternative A had a lower chance of surviving the screening than did alternative B as a result the delay in the presentation of some desirable information about the former ($z = -8.03$, $p < .0001$). The eventual choice share of alternative A based on its complete description (38.3 percent) was not significantly different from that of alternative B (44.4 percent; $z = -0.19$, $p = .849$). Thus, the delay of persuasive information caused such a severe disadvantage for A at the first stage that the overall effect was no longer positive.

Figure 2. 4
Exp. 4: Choice Shares of A vs. B at Stage 1 & Stage 2



The irrecoverable damage caused by the delay of desirable information is demonstrated even further by the results for the choice sets in which three desirable pieces of information about alternative A were delayed. Across these 6 rounds of the task, alternative A survived the screening stage only 42 percent of the time whereas alternative B survived 96.9 percent of the time. Alternative A had a lower chance of surviving the screening stage than alternative B ($z = -11.28$, $p < .0001$). In this case, alternative A failed to overcome the severe disadvantage it suffered at the screening stage when its complete description was presented – alternative A's eventual choice share was only 21.3 percent, which was significantly lower than that of alternative B (45.2 percent; $z = 3.85$, $p < .0001$). Again, the delayed presentation of persuasive information about an alternative put

that alternative in a severely disadvantaged position at the first stage such that the alternative failed to recover at the second stage.

In addition, there was a significant difference in the probability of alternative A surviving the screening stage ($z = -2.64$, $p = .001$), and in the choice share of A at the final choice stage ($z = -4.41$, $p < .0001$) between the two treatment levels of the amount of delay of desirable information, indicating that alternative A had a lower chance of entering the consideration set, and also a lower eventual choice share at the final choice stage when three, rather than two, desirable pieces of information were delayed.

These findings demonstrate that, when a relatively large proportion of persuasive information is delayed, this significantly reduces an alternative's chance of surviving the screening stage. In fact, the damage at the screening stage may be so severe that it can never be recovered, thus leading to a negative overall effect on the alternative's eventual choice share. This illustrates an important boundary condition of the positive effect of the delayed presentation of persuasive information.

Next, we report the results of Experiments 5 through 7, which were designed to systematically examine the three candidate mechanisms.

2.11 Experiment 5: Alternative Boosting

The primary objective of Experiment 5 was to examine whether the demonstrated positive effect of the delayed presentation of persuasive information

is driven, at least in part, by what we refer to as "alternative boosting." This candidate mechanism suggests that when new information about an alternative is presented at the second stage, it draws more attention to the alternative, and consumers' preference for it increases as a result. To isolate the alternative boosting mechanism and disentangle it from both a weight shift mechanism and one in line with a recency effect, we used an experimental condition in which the presentation of one desirable and one undesirable attribute level was delayed simultaneously for an alternative. The rationale behind this is that, as both the desirable and the undesirable piece of delayed information become more salient at the final choice stage, their opposing effects on preference for the alternative will offset each other. However, to the extent that an alternative boosting mechanism contributes to the effect, consumers' preference for the alternative associated with the presentation of the delayed information at the second stage should increase.

2.11.1 Method

Stimuli. Each choice set consisted of four apartments. The focal alternatives A and B were each characterized by seven desirable and two undesirable attributes. The two filler alternatives were described by two desirable and seven undesirable attributes.

Experimental Design. A single experimental condition was used in this experiment, under which one desirable and one undesirable piece of information about A were delayed until the final choice stage, while all information about alternative B was already available at the screening stage. The corresponding

attribute levels of alternative B were counterbalanced across choice sets – i.e., they were either of the opposite valence or of the same valence relative to those that were delayed (see Table 2.2). In addition, two attribute levels – one desirable and one undesirable – were also delayed for one of the filler alternatives in each choice set. Each participant made eight choices.

Participants and Procedure. Fifty-two members of a volunteer participant panel completed the experiment for a fixed payment of $10. In addition, a monetary incentive was provided to encourage thoughtful choices. Participants were told that each time they made a good decision, they would get a reward of 25 cents. They received this reward every time they chose either alternative A or alternative B.

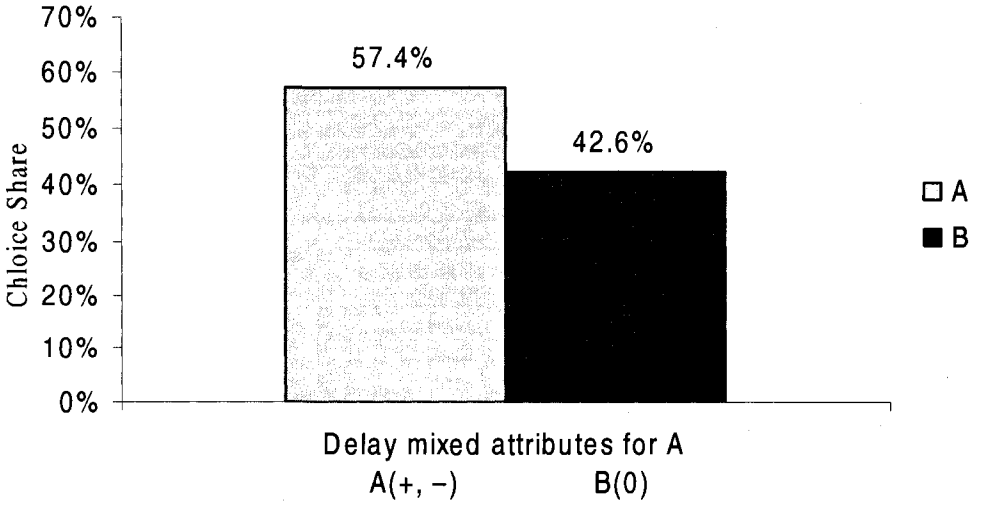
2.11.2 Results

Of the total of 416 decisions made by participants, 92.5 percent resulted in the choice of one of the two focal alternatives. The remaining 7.5 percent were not informative with respect to our hypothesis and were, thus, excluded from the analysis.

The key prediction implied by an alternative highlighting mechanism is that participants should prefer A to B as the result of the delayed presentation of mixed-valence information about alternative A. The observed choices of alternative A vs. alternative B were analyzed by estimating a GEE model. Across the eight rounds of the task, the choice share of alternative A was 57.4 percent

and that of alternative B was 42.6 percent, indicating a significant preference for alternative A over alternative B ($z = 2.59$, $p = .005$; see Figure 2.5). Thus, while the effects of the desirable and undesirable pieces of delayed information about alternative A should have canceled out at the second stage, the delayed arrival of the mixed values of information nevertheless increased participants' preference for this alternative. These results provide evidence that an alternative boosting mechanism underlies the positive effect of delayed presentation of persuasive information.

Figure 2.5
Exp. 5: Choice Shares of A vs. B at Stage 2



2.11.3 Discussion

In addition to the above analysis, a revisit of the results of Experiment 1 renders a second set of evidence for an alternative boosting mechanism. The results of Experiment 1 demonstrated that the positive effect of delaying desirable

information was stronger than the negative effect of delaying an equivalent amount of undesirable information ($z = -2.13$, $p = .033$). In particular, when desirable information about alternative A was delayed (with no delay for B), this increased preference for alternative A more than when an equivalent amount of undesirable information about alternative B was delayed (with no delay for A). This asymmetry in the effects of delaying desirable and undesirable information is consistent with the notion of an alternative boosting mechanism. Alternative boosting suggests that the delayed arrival of additional information about an alternative (regardless of the valence of that information) at the final choice stage attracts more attention to, and increases preference for, that alternative. While the delay of undesirable information about alternative B in Experiment 1 made the negative nature of the information more salient, thus increasing the relative preference for alternative A, it also drew more attention to alternative B, providing a "boost" for the latter. Therefore, the increase in preference for alternative A as a result of the delay of undesirable information about B was smaller than that caused by an equivalent delay of desirable information about A.

2.12 Experiment 6: Recency Effect

The objective of Experiment 6 was to examine whether a mechanism in line with a recency effect contributes to the demonstrated positive effect of the delayed presentation of persuasive information. A recency effect suggests that any piece of information that is provided at the final choice stage becomes more prominent and, thus, has a greater influence on which alternative is chosen. It

implies that the positive effect of the delay of desirable information about an alternative should be stronger when the competitor simultaneously delays undesirable information than when the competitor delays no information. This is because the delayed undesirable information about the competitor also becomes more prominent at the final choice stage, thus reducing preference for the competitor. Consequently, we predict that if a mechanism in line with a recency effect underlies the influence of the delayed presentation of persuasive information, the delay of part of the desirable information about an alternative should have a stronger effect when the competitor simultaneously delays undesirable information than when no information about the competitor is delayed.

2.12.1 Method

Stimuli. Each choice set consisted of four alternatives. The focal alternatives A and B were described by seven desirable and two undesirable attributes. The two filler alternatives were described by two desirable and seven undesirable attributes.

Experimental Design. Participants made eight choices in a 2 (delay for A only vs. delay for both A and B) x 4 (replications) within-subject design. In the "delay for A only" condition, two desirable pieces of information about alternative A were delayed until the final choice stage, while all information about alternative B was already available at the screening stage. The corresponding attribute levels of alternative B were of the opposite valence relative to those that

were delayed. In the "delay for both A and B" condition, in addition to two desirable pieces of information about alternative A being delayed, the corresponding undesirable information about alternative B was also delayed until the final choice stage (see Table 2.2). In each of the eight choice sets, two attribute levels – one desirable and one undesirable – were also delayed for one of the filler alternatives.

Participants and Procedure. One hundred and eighty-one undergraduate students participated in the experiment for extra credit in their introductory marketing course. A monetary incentive was provided to encourage thoughtful choices. In particular, participants were told that each time they made a good decision on behalf of the principals, they would get a reward of $0.25. They received this reward every time they chose either alternative A or alternative B.

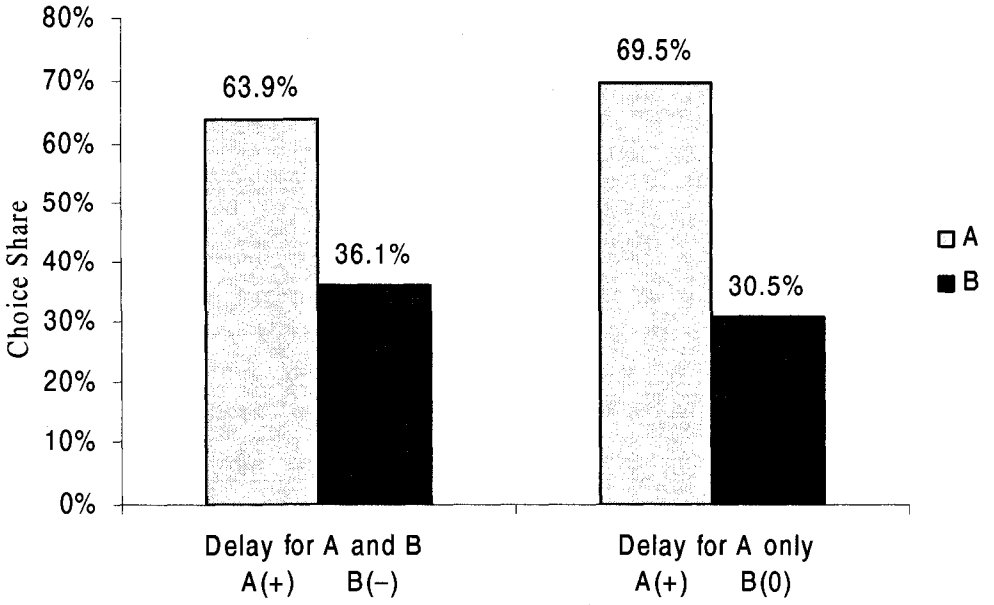
2.12.2 Results and Discussion

Of the total of 1448 decisions made by participants, 92.7 percent resulted in the choice of one of the two focal alternatives. The remaining 7.3 percent were not informative with respect to our hypothesis and were, thus, excluded from the analysis.

The key prediction implied by a recency effect is that participants should prefer A to B in the "delay for A only" condition more strongly than in the "delay for both A and B" condition. A GEE model was used to compare the choice shares of alternative A in the two experimental conditions. In the "delay for A

only" condition, the choice share of alternative A was 69.5 percent, compared with that of 63.9 percent in the "delay for both A and B" condition ($z = 2.37$, $p = .018$; see Figure 2.6). While participants in both conditions preferred alternative A to alternative B ($z = 9.02$, $p < .0001$ in the "delay for A only" condition; $z = 6.38$, $p < .0001$ in the "delay for both A and B" condition), again corroborating the positive effect of the delayed presentation of persuasive information, the difference in the choice share of alternative A between the two conditions was *opposite* in direction to what is implied by a recency effect. That is, the positive influence of a delay of some desirable information about alternative A on preference for A was actually stronger when all information about B was already available at the screening stage than when undesirable information about alternative B was delayed simultaneously. Thus, the results of Experiment 6 do not support a mechanism in line with a recency effect.

Figure 2.6
Exp. 6: Choice Shares of A vs. B at Stage 2



2.13 Experiment 7: Weight Shift vs. Recency Effect

The objective of Experiment 7 was to examine the weight shift mechanism, while also revisiting the possibility of a recency effect. The main conceptual difference between a weight shift and a recency effect is that the former is a global effect while the latter is a local effect. A weight shift mechanism suggests that information on an attribute dimension becomes more important for *all* surviving alternatives upon the delayed arrival of information (about one alternative) on that attribute dimension. By contrast, a recency effect suggests that *only* the delayed pieces of information become more important. Our aim in this experiment was disentangle these two candidate mechanisms. To that end,

we created conditions under which the two mechanisms imply mutually exclusive predictions.

Consider the following situation. Two alternatives have identical (either positive or negative) values on an attribute. This attribute information is delayed until the final choice stage for one of the alternatives, whereas it is already available at the screening stage for the other alternative. Under a weight shift mechanism, the relative preference among the two alternatives should not change since the two alternatives are equally attractive on the attribute dimension that will gain in importance. By contrast, according to a recency effect, preference for the alternative with delayed information should increase if the attribute value is positive and decreases if it is negative, since the increased influence on choice is limited to the delayed pieces of information.

2.13.1 Method

Stimuli. Each choice set consisted of four alternatives. The focal alternatives A and B were described by five desirable and four undesirable attributes. The two filler alternatives were described by two desirable and seven undesirable attributes.

Experimental Design. Participants made 24 choices in a 3 (delay of desirable information for both A and B, delay of undesirable information for both A and B, and delay of desirable information for A and undesirable information for B) x 8 (replications) within-subject design. In the "delay of desirable information

for both A and B" condition, two desirable pieces of information about alternative A were delayed until the final choice stage. The corresponding levels of the same attribute dimensions for alternative B, which were already available at the screening stage, were of the *opposite* valence (i.e., undesirable). In addition, two desirable pieces of information on two different attribute dimensions were delayed for alternative B, with the corresponding (non-delayed) levels of these attribute dimensions for alternative A being of the *same* valence (i.e., desirable). In the "delay of undesirable information for both A and B" condition, two undesirable pieces of information about A were delayed until the final choice stage, with the corresponding attribute levels of B being of the *opposite* valence (i.e., desirable). Furthermore, two undesirable pieces of information on two different attributes were delayed for B, with the corresponding attribute levels of A being the *same* valence (i.e., undesirable). Finally, in the "delay of desirable information for A and undesirable information for B" condition, two desirable pieces of information about A were delayed, and the corresponding attribute levels of B were of the *same* valence (i.e., desirable). In addition, two undesirable pieces of information on two different attribute dimensions were delayed for B, with the corresponding attribute levels of A also being of the *same* valence (i.e., undesirable). (See Table 2.2 for an overview.) Finally, in each of the 24 choice sets, two attribute levels – one desirable and one undesirable – were also delayed for one of the filler alternatives.

Predictions. A weight shift mechanism and a mechanism in line with a recency effect imply two sets of mutually exclusive predictions in the three experimental conditions.

First, a *recency effect* suggests that any delayed piece of information should have a greater influence on eventual choice than it would otherwise. Therefore, in the "delay of desirable information for both A and B" condition, this simultaneous delay should not affect decision makers' relative preference among the two alternatives since both A and B should benefit equally from the delay. Similarly, in the "delay of undesirable information for both A and B" condition, the delay should also not have any effect on relative preference between A and B as, in this case, both alternatives suffer equally as a result of the delay. Finally, in the "delay desirable information for A and undesirable information for B" condition, a recency effect would lead to an increase in preference for alternative A but a decrease in preference for alternative B, with the net result of a tendency for participants to prefer A relative to B.

By contrast, a *weight shift* mechanism implies that the delay of information about B in all three experimental conditions should *not* change participants' relative preferences between the focal alternatives A and B, given that the corresponding (non-delayed) attribute levels of A are of the same valence as the delayed information for B and the importance of the attributes affected by the delay should increase for both alternatives. However, in the "delay of desirable information for A and B" condition, the delay of desirable information

about alternative A should increase preference for A, given that the corresponding (non-delayed) attribute levels of B are of the opposite valence as the delayed information for A, and attribute importance should increase for both alternatives. Thus, participants should prefer A relative to B in this condition. By the same token, in the "delay of undesirable information for A and B" condition, the delay of negative information about alternative A should decrease preference for A relative to B. Participants should prefer alternative B to alternative A in this condition. Finally, in the "delay of desirable information for A and undesirable information for B" condition, a weight shift would not affect the relative preference among the two alternatives, since all delayed pieces of information are of the same valence as the corresponding (non-delayed) attribute levels of the other alternative. Thus, participants should be equally likely to choose A and B in this condition.

Participants and Procedure. Night-six members of a volunteer research panel participated in the experiment for a fixed payment of $10. In addition, a monetary incentive was provided to encourage thoughtful choices. Participants were told that each time they made a good decision on behalf of the principals, they would get a reward of 25 cents. They received this reward every time they selected either alternative A or alternative B.

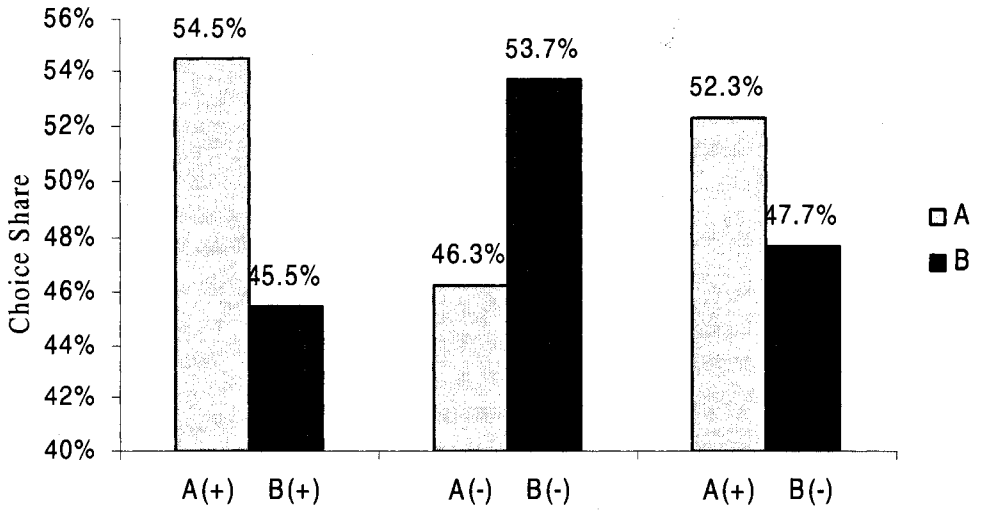
2.13.2 Results and Discussion

Of the 2304 decisions made by participants, 85.7 percent resulted in the choice of one of the two focal alternatives. The remaining 14.3 percent were not

informative with respect to our hypotheses and were, thus, excluded from the analysis.

Participants' final choices were analyzed by estimating a GEE model. In the "delay of desirable information for A and B" condition, the choice share of alternative A (54.5 percent) was significantly greater than that of alternative B (45.5 percent; $z = 2.24$, $p = .025$). In the "delay of undesirable information for A and B" condition, the choice share of A (46.3 percent) was significantly smaller than that of alternative B (53.7 percent; $z = -1.98$, $p = .047$). And finally, in the "delay of desirable information for A and undesirable information for B" condition, the choice share of A (52.3 percent) was not statistically different from that of B (47.7 percent; $z = 1.12$, $p = .263$; see Figure 2.7). These results provide clear evidence of a weight shift mechanism, and they do not support a recency effect as a mechanism underlying the positive effect of the delayed presentation of persuasive information.

Figure 2.7
Exp. 7: Choice Shares of A vs. B at Stage 2



Taken together, Experiments 5 through 7 show that both the alternative boosting and weight shift mechanisms contribute to the positive influence of the delayed presentation of persuasive information on preference. Specifically, as additional information about an alternative on a particular attribute dimension is provided at the final choice stage, that alternative becomes more prominent and, as a result, preference for it is boosted. In addition to this alternative boosting effect, the decision weight of an attribute dimension on which information is delayed until the choice stage increases and, consequently, preference for those alternatives that have a desirable level of that attribute – including the alternative for which persuasive information was delayed – is enhanced.

2.14 General Discussion

2.14.1 Summary of Research

The main thesis of this article is that the delayed presentation of persuasive information has a systematic influence on consumer choice. The results of Experiments 1 and 2 show that the delayed presentation of persuasive information about a product until the final choice stage can increase consumers' preference for that product, even in the presence of an objectively superior competitor. Experiment 3 demonstrates the preference dynamics between decision stages such that, while the delay of persuasive information reduces an alternative's probability of surviving an initial screening stage, this can actually increase the overall probability of that alternative ultimately being chosen. Experiment 4 identifies a boundary condition under which the delayed presentation of too much persuasive information results in a negative effect at the screening stage that is so strong that it cannot be recovered at the final choice stage. Finally, Experiments 5 through 7 demonstrate both an alternative-specific mechanism and an attribute-specific mechanism, such that the delay of desirable information about a product on an attribute dimension leads to both enhanced attention to, and preference for, that product (alternative boosting) and an increase in the relative decision weight of the attribute dimension on which the delay has occurred (weight shift). Table 2.2 provides an overview of the seven experiments and a brief summary of their key results.

2.14.2 Theoretical Implications

These findings significantly enrich the existing literature by enhancing our understanding of how consumers process and integrate product information in the context of two-stage decision processes. Traditionally, research on information integration has focused on the evaluation of a single object and examined how individuals combine multiple pieces of evidence to form an overall impression or assessment of that object (Asch 1946; Anderson and Norman 1964; Anderson 1967; Anderson 1981). The present research has extended the information integration literature into the area of purchase decisions in which consumers choose among multiple competing alternatives. Moreover, previous research on multi-stage decision making has reported a pervasive recency effect, whereby decision makers tend to ignore pre-screening information and instead focus on post-screening information at the final choice stage (Van Zee et al. 1992; Chakravarti et al. 2006). However, because post-screening information was provided for *all* alternatives that had survived the screening stage in these studies, it was impossible to distinguish between a "classic" recency effect that pertains to all those pieces of information presented after screening, an alternative-specific effect (alternative boosting), and an attribute-specific effect (weight shift). In the present research, by selectively delaying information for only one of the competing alternatives, we were able to tease these candidate mechanisms apart.

Table 2.2: Overview of Experiments

	Manipulation of Delayed Information	*Stimuli*	*Key Results*
Exp. 1	Delay of + for A: A =[2] B; (+)[3] –[3]; (+) – Delay of + for B: A = B; – (+); – (+) Delay of – for B: A = B; + (–); + (–) Delay of – for A: A = B; (–) +; (–) +	| | A[1] | B | F1 | F2 | | + | 7 | 7 | 2 | 2 | | – | 2 | 2 | 7 | 7 |	• Delayed presentation of some of an alternative's desirable features increases preference for that alternative. • Delayed presentation of some of an alternative's undesirable features reduces preference for that alternative. • Preference reversal among identical alternatives due to delayed presentation.
Exp. 2	Experimental: A <[2] B; (+) –; (+) – Control: A < B	| | A | B | F1 | F2 | | + | 7 | 7 | 2 | 2 | | – | 2 | 2 | 7 | 7 |	• Delayed presentation of some of an alternative's desirable features increases preference for it even in the presence of an objectively superior competitor.
Exp. 3	2 delayed: A = B; (+) –; (+) – 3 delayed: A = B; (+) –; (+) –; (+) –	| | A | B | F1 | F2 | | + | 5 | 5 | 1 | 1 | | – | 4 | 4 | 8 | 8 |	• Inter-stage preference dynamics: Delayed presentation of some of an alternative's desirable features (1) reduces its chance of surviving the screening stage but (2) increases ultimate preference for it.
Exp. 4	2 delayed: A = B; (+) –; (+) – 3 delayed: A = B; (+) –; (+) –; (+) –	| | A | B | F1 | F2 | | + | 5 | 5 | 2 | 2 | | – | 4 | 4 | 7 | 7 |	• Boundary condition: Delayed presentation of too many of an alternative's desirable features can result in irrecoverable damage at the screening stage.
Exp. 5	Mixed information delayed for A: A = B; (+) +/–; (–) –/+	| | A | B | F1 | F2 | | + | 7 | 7 | 2 | 2 | | – | 2 | 2 | 7 | 7 |	• Delayed presentation of mixed-valence information about an alternative increases preference for that alternative ("alternative boosting" supported).
Exp. 6	Delay for A and B: A = B; (+) (–); (+) (–) Delay for A only: A = B; (+) –; (+) –	| | A | B | F1 | F2 | | + | 7 | 7 | 2 | 2 | | – | 2 | 2 | 7 | 7 |	• Delayed presentation does not increase the impact of all pieces of information that are delayed ("recency effect" not supported).
Exp. 7	Delay of + for both A and B: A = B; (+) –; (+) –; + (+); + (+) Delay of – for both A and B: A = B; (–) +; (–) +; – (–); – (–) Delay of + for A and – for B: A = B; (+) +; (+) +; – (–); – (–)	| | A | B | F1 | F2 | | + | 5 | 5 | 2 | 2 | | – | 4 | 4 | 7 | 7 |	• Delayed presentation of information on an attribute dimension increases the decision weight of that attribute – for all surviving alternatives – at the final choice ("weight shift" supported). • Delayed presentation does not increase the impact of all pieces of information that are delayed ("recency effect" not supported).

Notes:

[1] A and B are the focal alternatives, F1 and F2 are filler alternatives.

[2] "=" denotes that the two alternatives are equally attractive; "<" denotes that the first alternative is inferior.

[3] Signs in parentheses denote the valence of information delayed until the final choice stage. Signs without parentheses denote the valence of information about the competing alternative on the same attribute dimension.

2.14.3 Managerial Implications

This article provides a novel perspective on persuasion. Given a certain set of information, we have demonstrated that it is possible to obtain greater persuasiveness by merely altering the timing of information presentation. Our findings have wide applications not only for advertisers and marketers, but more generally for all those whose goal it is to persuade or influence others. For example, persuaders such as a job candidate applying for a position, a researcher trying to convince a colleague to become a coauthor on a project, an entrepreneur seeking to raise venture capital, a politician competing for votes prior to an election, or someone trying to persuade someone else to go out on a date may find the results of this research to be of interest.

When the communication process between persuaders and the targets of persuasion attempts involves multiple stages, should persuaders "use up" all persuasive information at their disposal at the initial stage, or should they delay the presentation of some of this information until a later stage? A common intuition is that persuaders might want to communicate all of the "good news" right away, and perhaps hold off on some of the "bad news," to create a favorable initial impression. However, the present research demonstrates that it can actually be beneficial to the persuader to deliberately delay some of the good news until the final choice stage. While doing so does make it less likely that a target individual will give serious consideration to the object (i.e., product, service, behavior, cause, etc.), it is possible for the delayed presentation of the additional

persuasive information to more than compensate for this initial disadvantage, thus resulting in a positive overall effect. The findings of this research suggest that, even when persuaders have a fixed set of information that they can communicate, it is possible for them to enhance the effectiveness of their persuasion attempts by deliberately delaying the presentation of some of this persuasive information.

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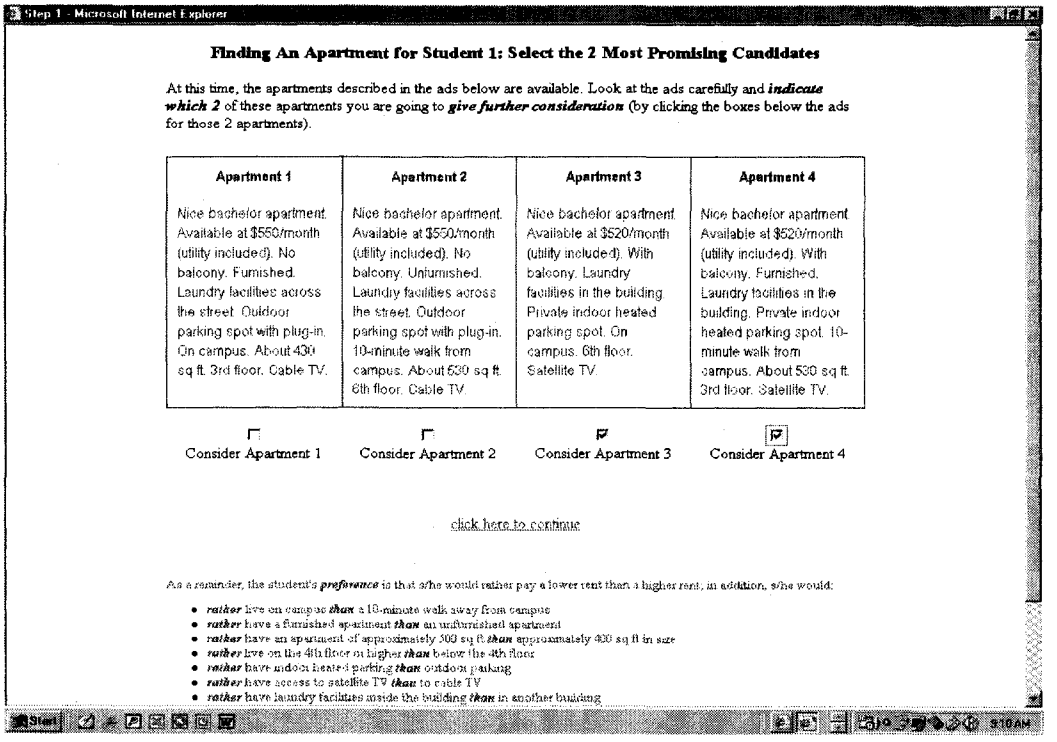
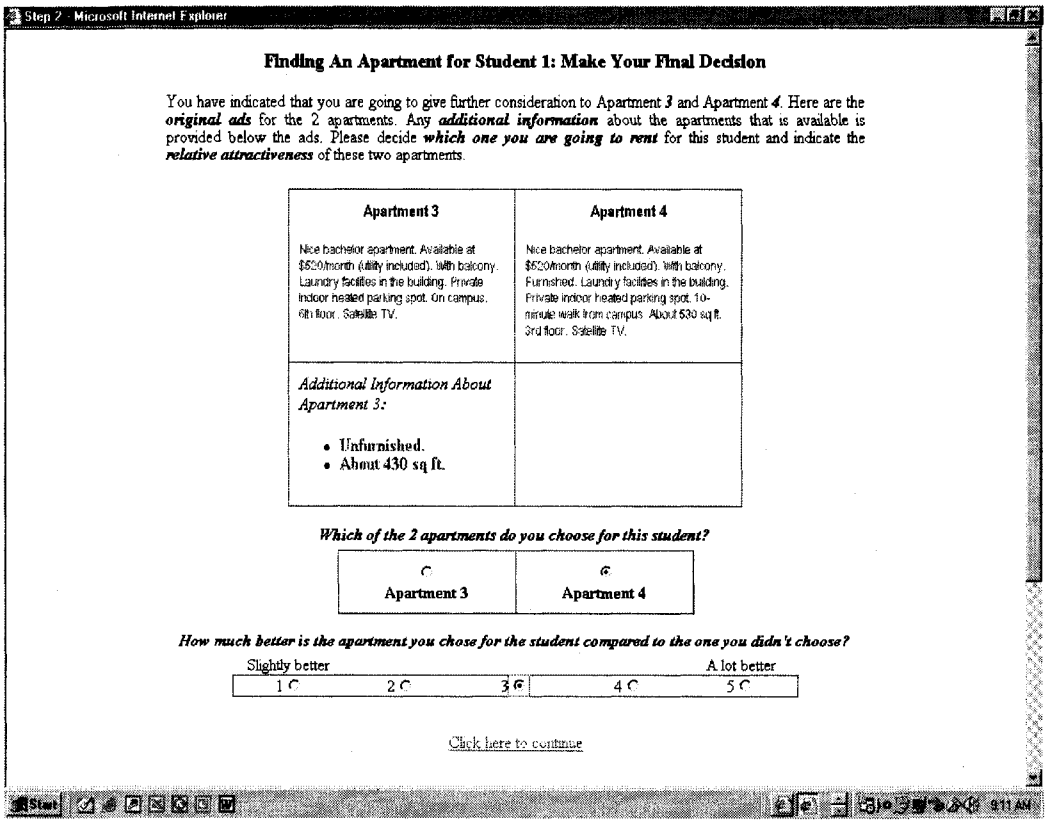
Appendix 2.1

Computer Interfaces for Two-Stage Decision Paradigm in Experiments 1 – 7

(1) Screening stage: participants select two apartments from a set of four for further consideration



(2) Choice stage: participants choose one apartment from the consideration set



Chapter 3

Essay 2: Differential Search Costs and Consumer Choice

3.1 Introduction

When consumers make purchase decisions, they often find themselves confronted with a number of alternatives that demand different levels of search costs. They need to invest different amounts of time, effort, money, or combination of these currencies to acquire information about the competing alternatives that is necessary to make the decision. Consider the following example. Mary is planning a safari vacation in Egypt. As she reads through the tourism section of the newspaper, advertisements for two vacation packages attract her attention. While ad A provides all relevant information about the trip, ad B contains only very limited information. Mary decides to visit the website mentioned in ad B to find out more about the second package. After she views information about package B on the web, she finds both packages highly attractive.

In this scenario, the two competing vacation packages represent alternatives with differential search costs as they differ in the amount of effort consumers are required to exert in order to learn about the nature of the offering. Might the differential search costs of the competing alternatives have an influence on consumers' choice between them? That is, will consumers' relative preference for the competing alternatives be different from what it would have been if the

search cost associated with the two had been equal? In the above example, will Mary's preference for package A and package B be different if both A and B are fully described in the advertisements?

Despite the prevalence of differential search costs in consumer decision situations, the phenomenon has largely escaped the attention of the existing literature. Much of the previous research has approached the topic of information search cost from the perspective of economic analysis. The economic theories of consumer information search behavior suggest that search cost is a key determinant of the extent of consumer search activity. When the marginal cost of acquiring product information is lower than the marginal benefit of using the information, consumers should continue searching for product information (Ratchford 1982). In addition, research has examined the implications for firms and the aggregate market of reduced or increased search costs. This work has revealed that lower buyer search costs increase the efficiency of markets (Bakos 1997), and that lowering search costs for quality information decreases price sensitivity (Lynch and Ariely 2000). However, this body of prior research has overlooked the presence of *differential* search costs across competing alternatives and the resulting influences on consumer choice. To the best of our knowledge, the only exception to this is work by Zettelmeyer (2000), which suggests that firms can soften price competition by differentiating themselves on the basis of consumer search cost. While that piece of research develops an analytical model of the relationship between the different levels of search costs used by a number

of companies and the extent of price competition among these companies, the current research provides empirical evidence that differential search costs have a systematic influence on consumers' preferences among competing alternatives.

Derived from a pervasive customer orientation such that firms should treat customers as partners and adopt efficient communication plans, a common intuition is that firms should make product information as accessible to consumers as possible (Wernerfelt 1996). One practical constraint is that it is costly to facilitate consumer search. However, as the Internet makes it very cheap for firms to allow interested consumers to find out more about their products, firms have more discretion to lower search cost for consumers. However, in contrast to the common intuition that a firm should minimize consumers' information search cost for its offerings, we propose that firms may actually benefit, in term of consumer preference and demand for their offerings, from making it more costly for consumers to acquire information about these offerings? In other words, we argue that increasing information search cost for a product or brand, relative to its competitors, may have a positive effect on consumer preference for it.

In this article, we suggest that the differential search costs that consumers incur to obtain information about various products play an important role in the construction of their relative preference for these competing products. Prior research has produced abundant evidence that the effort, time, or cost invested into a task tend to lead decision makers to make conclusions that they would not otherwise have made were it not for the effort involved. Specifically, research

has demonstrated that non-instrumental information that would have no impact on choices were it simply available can influence choices if decision makers have to actively acquire it (Bastardi and Shafir 1998). In addition, it has been demonstrated that individuals tend to use the amount of time and effort they think it took to produce a piece of work as a heuristic of judging the quality of that work (Kruger, Wirtz, Van Boven, and Altermatt 2004). Moreover, it has been shown that the amount of effort required in memory retrieval and thought generation appears to provide information to decision makers that goes beyond the implications of what is retrieved or generated per se (Schwarz 2004).

The key hypothesis of this research is that it is possible to increase preference for an alternative by making it more costly, relative to competing alternatives, for consumers to acquire information about it. We consider two candidate psychological mechanisms to account for this proposed effect: (a) the pursuit of information about a product at a relatively high information search cost may make consumers more committed to that product than to the competing products, thus introducing a sunk-cost bias into the choice process; and (b) choices may be influenced by a self-perception process whereby consumers use their own search behavior, and the effort they have expended to acquire information about a product of high search cost in particular, as a basis for making inferences about their preference for that alternative.

The differential search costs of competing products imply a two-stage decision process: (1) an information acquisition stage at which consumers decide

whether they are willing to incur the required search costs to obtain the necessary information about the products and (2) a choice stage at which consumers make their purchase decision on the basis of the information they have collected. Naturally, the higher the information search cost for a product, the greater the probability that a consumer rejects the product at the information acquisition stage. Thus, an extremely high search cost for an alternative relative to that for its competitors constitutes an obvious boundary condition in which a (potentially implicit) decision is made against the high-search-cost alternative at an early stage.

The remainder of this paper is organized as follows. We begin by reviewing the literature on the sunk cost fallacy and on inference-making through self-perception, the two psychological mechanisms that we propose to explain the influence of differential search costs on consumers' preferences. After that, we report the results of four studies. In Experiments 1 and 2, we demonstrate, in different choice scenarios, the predicted positive effect of differential search costs on consumers' preferences such that consumers tend to choose the alternative that requires a higher level of information search cost over a competitor whose information is available at a lower cost. Experiments 3 and 4 were designed to examine the two candidate psychological mechanisms that might underlie this effect. The results of Experiment 3 provide support for the sunk cost fallacy as one mechanism that contributes to the effect of differential search costs. In addition, the results suggest that the sunk cost fallacy by itself is not sufficient to

account for the observed effect. Experiment 4 shows that differential search costs also influence consumer choice via a self-perception mechanism. We conclude with a discussion of the theoretical and managerial implications of the results.

3.2 The Sunk Cost Fallacy

Once consumers have devoted time, effort, or money to obtain information about a specific product, to the extent that the search costs are irrecoverable and non-transferable, the resources spent become sunk. From a normative perspective, subsequent decisions should *not* be influenced by search costs incurrent in the past; rather, decisions should be affected solely by the prospective future consequence of the options. In the same vein, the economic theory of sequential search predicts that decision makers should continue search if the expected gain from further search is greater than the marginal cost of such search (Ratchford 1982). Kogut (1990) conducted a series of experiments to determine whether search behavior was influenced by sunk costs. The results of these experiments revealed that individuals consider previously borne costs in making their search decisions. Specifically, the higher the search costs they have incurred in the past, the sooner they tend to stop searching. Thus, in the context of deciding whether or not to continue searching, decision makers failed to treat the cost of search as sunk. In the present research, we are interested in whether the subsequent evaluations of products are influenced by the differential search costs incurred to obtain information about these alternatives.

Behavioral research has documented the phenomenon of the "sunk cost fallacy," which is defined as "a strong tendency for decision makers to continue an activity once an investment in money, effort, or time has been made" (Arkes and Blumer 1985). Previous research has demonstrated that people are reluctant to abandon options in which they have made prior investment, and that the more resources decision makers have invested in a project, the more committed they are to it, and the more inclined they are to "throw good money after bad" (Garland and Newport 1991; Brockner 1992). Thus, the sunk cost fallacy might lead decision makers to take a suboptimal action, representing an important source of individual and organizational irrationality. The research on sunk cost fallacy has been advanced in recent work by Nunes and Drèze (2006), who demonstrated that even endowing people with artificial advancement toward a goal can still increase their commitment and future effort toward completing a task.

In determining the psychological justification for the sunk cost fallacy, a number of explanations have been proposed. These include a desire "not to seem wasteful" and the attitude of risk-seeking. The former states that people fail to ignore sunk costs and continue investing because they have a desire to avoid wasting previous investments (Arkes and Blumer 1985). The latter argues that, in accordance with the logic of prospect theory, as previous investments reflect losses, decision makers tend to be risk-seeking in the domain of losses, and tend to commit additional funds to some actions (Garland and Newport 1991). In the context of differential search costs, since information search costs can be viewed

as investments consumers make in evaluating products, higher search cost for a particular product can lead to a higher level of commitment to that product relative to competing products.

Several studies have demonstrated the sunk cost fallacy in forced-choice contexts. For example, Arkes and Blumer (1985, Experiment 6) had decision makers imagine that they had first bought a TV dinner on sale for $3. They then spent $5 for an identical TV dinner at a regular price for a friend. The decision makers were then informed that the friend could not come, and they were asked to choose one dinner to eat and one dinner to discard. Since benefits of choosing either option were identical, according to economic theory, everyone would be indifferent in choosing between the two options. However, only 76 percent of the participants chose the "no preference" option, and the remaining 24 percent of the participants chose the regular-priced dinner, which reflected sunk cost considerations. Dick (1995) investigated the role of membership fees in promoting consumer loyalty. In a simulated shopping experiment, participants were asked to make purchase decisions between two stores, A and B. Half of the participants were asked to pay a membership fee before they were able to shop in Store A. These participants subsequently held a more positive attitude toward Store A than those who were not required to pay a membership fee.

These studies revealed a bias that sunk costs introduce into different choice situations in favor of the alternative in which decision makers have made a greater investment. One commonality among these studies is that sunk costs were

externally imposed on decision makers. That is, these studies investigated decision makers' response *given* that sunk costs had already been incurred.

In the present research, while the relatively higher search cost for a particular product might increase a consumer's commitment to that product *after* the search has taken place, a dimension not captured by prior research on the sunk cost fallacy is that decision makers have the freedom to choose whether to make the investment in search or not. In fact, the imposition of differential search costs on products actually decomposes the purchase decision into two steps. First, consumers decide whether or not to search for more information about the products, and second, they decide which product to buy. As consumers realize that one product requires a higher search cost than its competitors, they can choose to pursue further information about the product and then make a purchase decision, or they might decide that it is not worth investing resources in information search for the product and choose a competing product instead. The discretion to search for information is an important factor that should not be neglected, not only because it reflects a more complete decision process, but also because the motivational state to search is informative in its own right. We will discuss this latter point in the next section.

3.3 Inferring Preferences from One's Own Actions

When consumers are uncertain about their preferences, they might perceive their decision to incur a relatively high information search cost for a

particular alternative as informative and use it to make inferences about their own preferences among a set of alternatives. Abundant research suggests that consumers do not always have well-defined and articulated preferences when making purchase decisions, and that they tend to construct their preferences using a variety of environment-contingent strategies (Bettman, Luce, and Payne 1998). The source of decision uncertainty can be attributed either to the decision maker or to the situation. The former includes a lack of consumer experience, imperfect memory, and insufficient cognitive resources devoted to the decision processes. The latter involves conflicting, unreliable, or scarce information, non-overlapping attributes, and difficult tradeoffs (Muthukrishnan 1995). When consumers face decision uncertainty or ambiguity, observing their revealed behavior of engaging in information search can help them construct and better understand their own preferences. For example, consumers might interpret their behavior to bear a relatively high information search cost for a product as their being highly interested in that product, or as being dissatisfied with the alternatives that they have encountered thus far.

The notion that people make inferences about their own attitudes, emotions, and other internal states by observing their own overt behavior is postulated by self-perception theory. In his seminal work, Bem (1965, 1972) extended attribution theory from the person-perception domain into the self-perception domain, arguing that people not only attempt to validate their perceptions of others, but also of themselves. Specifically, when internal attitudes

are ambiguous, individuals construct or infer their attitudes by observing their own behavior. Previous research has indicated that for a behavior to be indicative of, and thus be used as the basis of making inferences about, one's internal attitudes, the behavior needs to be perceived as relevant and salient (Salancik and Conway 1975). Consistent with this finding, Bem (1972) demonstrated that subjects' attitudes changed significantly more when they were instructed to give truthful verbal reports than false reports, and when they voluntarily chose to perform certain actions than when they were instructed to do so. This is because the behavior of false reports and forced actions were perceived as irrelevant to decision makers' internal states, and the inferential value of the behavior was lost. In the case of differential search costs, the pursuit of information about a product at a relatively high search cost is relevant to the subsequent purchase decision, and thus consumers might use it as a cue to construct their preferences among the available products.

One application of self-perception theory is in the area of compliance techniques. For example, the "foot-in-the-door" technique, which suggests that compliance with a relatively large request is significantly more likely to occur if preceded by compliance with a small request of the same genre, demonstrates the rationale of self-perception (Reingen and Kernan 1977; Hansen 1980). To illustrate, Freedman and Fraser (1966) showed that people are more likely to put up a large "Drive Carefully" sign if they have already given consent to a request to put up a smaller one or to sign a petition regarding careful driving. In the

domains of marketing, it has been shown that the "foot-in-the-door" technique can be used to increase survey response rates (Reingen and Kernan 1977). People were found to be more willing to participate in a long telephone marketing survey when it was preceded by a short survey than when the long survey was administered alone (participation rates of 74 vs. 58 percent). Self-perception theory can account for the "foot-in-the-door" phenomenon. The idea is that decision makers who observe themselves complying with a small request without any obvious pressure might infer that they have a positive attitude toward that cause, which disposes them to subsequently comply with a larger request.

The literature on self perception also seeks to understand the conditions under which individuals use their own behavior as cues to make inferences about their internal states. Kelly (1973) differentiates between two conditions that may lead to the occurrence of a behavior – an attribution process and a discounting process. When a behavior is perceived to be elicited by the person's internal motivations or reactions to the stimulus, i.e., when the behavior is self attributed, individuals tend to use it as a basis for inferring their true beliefs. On the other hand, contextual forces or external cues tend to discount the internal motivation as the cause of the individual's behavior and no belief inferences should be made. In this vein, when a monetary incentive was provided together with an initial short survey, the compliance rate to participate in a second long survey dropped significantly compared to when no such incentive was offered (Reingen and Kernan 1977). Other studies also showed that, when external cues were

presented, participants provided lower quality response (Hansen 1980). The logic is that when a behavior is perceived to be elicited by plausible external cues, internal motivations will be discounted as causes, and the link between the behavior and belief inferences will be weakened.

These studies illustrate the importance of self-attribution of a behavior for it to be used as a cue to infer one's internal belief. In the case of differential search costs, as consumers make voluntary decisions as to whether or not to spend a relatively high level of resources to obtain information about a product at the information search stage, the decision should be self-attributed and the resulting search behavior might be interpreted as reflecting consumers' preferences for the products.

In sum, a self-perception process and the sunk cost fallacy are two candidate mechanisms that might operate, possibly in parallel, to influence consumers' preferences for products in the presence of differential search costs. First, the act of engaging in costly search for information about a product can serve as a basis for making inferences about, or constructing, one's own preference. In addition, once the search has been completed, consumers may become more committed to that product and, ultimately, prefer it relative to competing alternatives. While these two mechanisms are not mutually exclusive, a key difference between them is that the discretion to search is necessary for a self-perception process to occur. If the search is an externally imposed requirement, the act of searching is no longer informative and, as a result, does

not provide a basis for making inferences about one's own preference. By contrast, discretion to search is not a necessary prerequisite for the sunk cost fallacy – consumers may demonstrate an enhanced commitment to the product in connection with which they have incurred a higher search cost, irrespective of whether they performed the search voluntarily or as a coerced action.

In what follows, we present evidence from four experiments that were designed to (1) demonstrate the predicted positive effect of greater differential search cost for a product on consumer preference for that product and (2) shed light on the psychological mechanisms underlying this effect.

3.4 Experiment 1

The objective of Experiment 1 was to show that it is possible to increase the choice probability of a product by making it more costly for consumers to acquire information about it, relative to a competing product. In this study, the cost of search was operationalized as the physical distance that had to be traveled in order to obtain information about an alternative. Participants were asked to choose one of two snack bars of different flavors. These choices were consequential in that participants actually received the snack bar they chose for their own consumption. While one of the flavors was displayed prominently, participants had to walk a short distance to find out about the other flavor. Our prediction was that merely making it more costly to find out about one of the flavors increased the probability of that flavor being chosen.

3.4.1 Method

Subjects. One hundred and sixty-one undergraduate students in an introductory marketing class participated for course credit.

Materials. Two granola bars of the same brand, one apple- and the other raspberry-flavored, were used in this study. In a pretest, a separate group of 45 participants rated each of six different granola bars in terms of their attractiveness on a seven-point scale. The pair of apple and raspberry was selected because the difference in the mean ratings of these two flavors was the smallest among all possible pairs (a mean of 4.78 for apple with a standard deviation of 1.64, and a mean of 4.76 for raspberry with a standard deviation of 1.32). A pair-wise *t*-test shows that there is no significant difference between the mean ratings of these two alternatives ($t(44) = 0.084$, $p = .93$). We denote one bar in the pair as the target (T), and the other as the competitor (C). While information about the competitor was readily available to participants, they had to walk about 50 feet to obtain information about the target. The assignment of flavors to serve either as the target or the competitor was counterbalanced – both the apple- and the raspberry-flavored bar were used as the target 50 percent of the time.

Design and procedure. Participants arrived at the laboratory one person at a time, in intervals of about 10 minutes. The administrator greeted participants at the door as they entered the room, and told them that they were to receive a granola bar that would be theirs to keep. Participants were also told that they had a choice between two different flavors. Only one flavor (C) was displayed in a

box on a table near the entrance. The administrator first showed participants what that flavor was, and then told them that there was another flavor (T) available at another table located at the back of the room that was not visible from their current position – the room was divided by partitions. Next, participants were asked whether they wished to find out what the other flavor (T) was before making their choice. If they decided not to do so, they received C at the first table and were dismissed. By contrast, if they decided to find out about T, the administrator walked them to the second table at the back of the room, where both T and C were displayed side by side in two separate boxes. After participants learned the flavor of T, they were asked to choose one of the two alternatives before being dismissed. Choosing C involved no additional transaction cost as participants did not have to walk back to the first table in order to receive it.

3.4.2 Results and Discussion

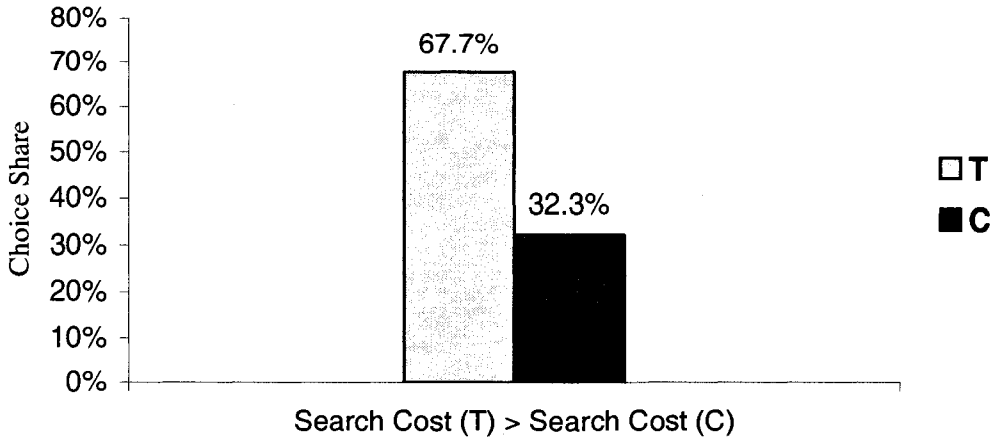
All participants chose one of the two flavors of the granola bar. The overall choice shares (ignoring our manipulation of search cost) of the apple- and raspberry-flavored granola bars were 48.5 percent and 51.5 percent, respectively. The choice share of the apple-flavored bar is statistically indistinguishable from 50 percent (binomial test: $p = .75$, two-tailed), indicating that the two flavors were equally likely to be chosen a priori, thus confirming the results of the pretest.

To test our key prediction, we examine the influence of our manipulation of search cost on choice. Of the 161 participants, 151 decided to walk to the back of the room to find out what the flavor of the target alternative (T) was, while 10

selected the alternative with lower search cost (C) directly without learning about T. Of those who decided to incur the differential search cost associated with T, 72.2 percent chose that alternative, which represents the choice share of T conditional on T being inspected. More importantly, the *unconditional* choice share of T (among all participants, including those who did not even look at T) was 67.7 percent, which is significantly greater than 50 percent (binomial test: $p < .0001$, one-tailed; see Figure 3.1). This shows that it is indeed possible to increase preference for an alternative by making it more difficult for consumers to find out about it, relative to competing offerings.

The results of Experiment 1 provide a first demonstration of the predicted impact of differential search cost on consumer choice. The next three experiments, all of which involved computer-based tasks, were designed to further examine this effect and shed light on its underlying psychological mechanisms.

Figure 3.1
Exp. 1: Choice Shares of T vs. C



3.5 Experiment 2

In Experiment 2, participants were asked to choose, in each of six product categories, their preferred alternative from a set of two. The experimental task was computer-based and roughly resembled what consumers might do when shopping on the Internet. The cost of search associated with the two products in a category was manipulated so that (1) it was equal for both brands or (2) more effort was required to learn about one of the brands.

3.5.1 Method

Subjects. Seventy-three members of a volunteer research participation panel consisting of university students and staff participated in the study. Each received a payment of $3.

Materials. Six product categories (cordless phones, binoculars, clock radios, MP3 players, backpacks, and flash drives) were used in this study to enhance the generalizability of the results. The order of the product categories was determined at random independently for each subject. In each product category, two competing brands, described in terms of two alignable attributes involving a trade-off between them, were presented (see Appendix 3.1). In each pair, we denote one brand as the target (T) and the other as the competitor (C). While the description of C was always presented immediately on the computer screen, participants in one of the experimental conditions were required to enter a 4-digit product code if they wished to inspect the description of T. The display position of the two product descriptions on the screen (left vs. right) was counterbalanced, with the alternatives on the left (right) always being labeled "A" ("B"). Moreover, to control for possible differences in the attractiveness of the product descriptions, which of the two served as T and C was also counterbalanced (independently) within each category. Therefore, the null hypothesis – i.e., no influence of differential search cost on preference – implies a choice share of 50 percent for both T and C.

Design and procedure. Each participant made a series of six choices in a 2 (between-subjects factor: identical vs. differential search cost) x 6 (within-subject factor: product category) mixed design, with participants being randomly assigned to one of the two between-subjects conditions. In the *identical search cost* condition, the description of T was always presented immediately along with

that of C. The descriptions of C and T were displayed side by side on the computer screen. After reading the product descriptions, participants were asked to choose their preferred alternative from the set. In the *differential search cost* condition, only the description of C was displayed immediately, and it was up to participants to decide whether or not they would view the description of T before making their choice. That is, they were able to choose C without obtaining information about T. If participants did wish to learn about T, they were required to enter (using a keyboard) a four-digit product code, which was displayed on the computer screen. Once the code had been entered, the description of T appeared beside that of C – yielding the same screen that those in the identical search cost condition were presented with immediately. After that, participants were asked to choose their preferred alternative from the set (see Appendix 3.2). They completed this procedure for each of the six product categories in sequence.

3.5.2 Results and Discussion

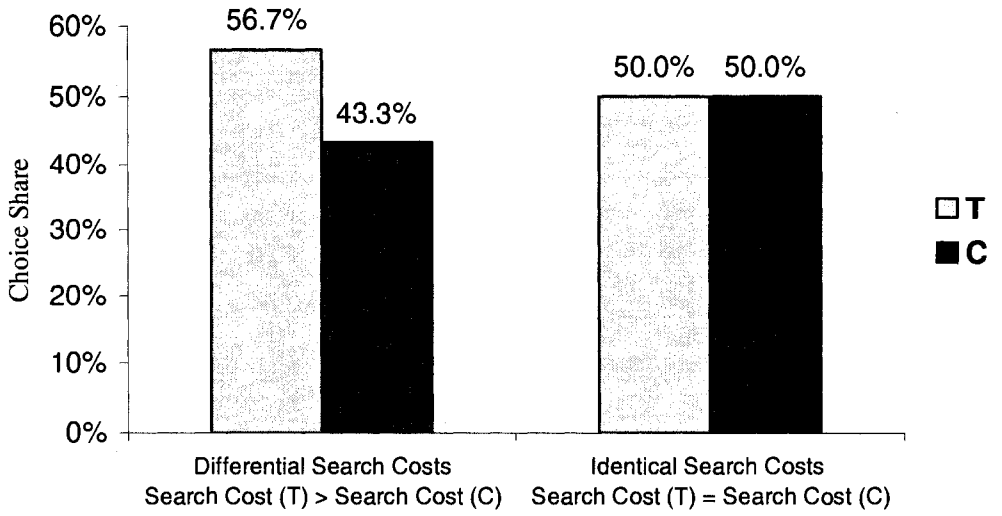
Since the binomial test does not apply to the repeated-measures choice data, we estimated generalized estimation equation (GEE) models using the R statistical software to analyze the choices observed in this experiment. (GEE allows for correlation among responses from the same individual due to individual-specific intercepts.) First, there were no systematic differences in participants' preferences between the two alternatives in each category. Across the six product categories, the choice shares of Brands 1 and 2 were 52.2 percent and 47.8 percent, respectively. The choice share of Brand 1 is statistically

indistinguishable from 50 percent ($z = 0.91$, $p = .36$, two-tailed). Thus, overall, the two alternatives in a product category were equally likely to be chosen a priori.

Our key hypothesis for this experiment was that, while T and C would be equally likely to be chosen in the identical search cost condition, the choice probability of T would be greater than that of C in the differential search cost condition. A GEE model was estimated to examine whether the choice share of T differed from 50 percent in the two experimental conditions. As predicted, in the identical search cost condition, the choice share of T was no different from 50 percent – indeed, it happened to be exactly that in our sample ($z = 1$, $p < .0001$, two-tailed). In the differential search cost condition, 4.8 percent of the choices were made by selecting C without acquiring information about T. When participants did decide to find out about T, thus incurring the differential search cost associated with it, that alternative was chosen 60.5 percent of the time, which represents the choice share of T conditional on T being inspected. More importantly, the *unconditional* choice share of T (across all choices, including those for which participants did not even look at T) was 56.7 percent, which is significantly greater than 50 percent ($z = 2.18$, $p = .01$, one-tailed; see Figure 3.2). Finally, neither the main effects of product category ($|z| < 1.34$, $p > .18$) nor any interactions between product category and identical vs. differential search cost ($|z| < 1.39$, $p > .16$) are significant. These results further illustrate the positive

effect of differential search cost such that preference for an alternative can be increased by making it more costly for consumers to learn about it.

Figure 3.2
Exp. 2: Choice Shares of T vs. C



3.5.3 A Possible Alternative Explanation

In the differential search cost condition of Experiment 2, the description of T appeared on the screen after that of C (if participants decided to find out about T). This confound suggests the possibility that participants might have preferred T not as a result of the differential search cost associated with it, but merely because its description was presented closer to the time at which the choice was made than did that of C – in line with a recency effect (see, e.g., Hastie and Park 1986). To examine this possible alternative explanation, we ran an additional "condition" of Experiment 2, with an independent sample of 30 members from the same research panel participating in exchange for a payment of $3. The same

stimuli and general procedure were used. In each of the six product categories, the description of C appeared on the screen first, and it remained visible for 15 seconds. Once it had vanished, the description of T appeared, and it remained on the screen for 15 seconds. After that, the descriptions of both C and T were shown side by side, and participants were asked to choose their preferred alternative. Thus, participants were exposed to T after C (and closer than C to the time at which they made their choice), but without having to decide whether or not to look at T or incurring a comparatively higher search cost for it. If the more recent exposure to T caused an increase in preference for it in this setting, this would be reflected in a greater choice share for T than C in the current condition. However, the results revealed no such effect – the choice share of T was 48.3 percent, which is statistically indistinguishable from 50 percent ($z = 0.32$, $p = .75$, two-tailed). Thus, the timing of exposure to the alternatives can be ruled out as an alternative explanation of the effect of differential search costs on choice.

3.6 Experiment 3

The primary goal of Experiment 3 was to examine whether the demonstrated influence of differential search costs on consumer choice is driven, at least in part, by a psychological mechanism that resembles a sunk cost fallacy. To isolate this candidate mechanism and disentangle it from a self-perception mechanism, we included an experimental condition in which decision makers' information search activity could not possibly provide any information to them

about their own preferences. Specifically, we examine whether differential search costs affect choice behavior when individuals are required to incur them.

The rationale behind this is that, in order for a behavior to serve as basis for making inferences about one's own beliefs or preferences, it must be self-attributed – i.e., perceived to have been driven by one's own motivations (Kelly 1973; Hansen 1980; Reingen and Kernan 1977). Thus, if participants are required or instructed to search for information about a particular alternative, the act of doing so does not reveal anything to them about their own preference with respect to that alternative. In this case, consumers should not use the search effort they expend to find out about an alternative as a basis for making inferences about how much they like that alterative. However, incurring the search cost for an alternative might still increase consumers' commitment to that alternative. Therefore, to the extent that a sunk cost fallacy contributes to the effect, consumer preference for the alternative associated with a higher information search cost should increase even when consumers were required to find out about that alternative.

A secondary objective of Experiment 3 was to examine whether the effect of differential search costs on product choice would persist at a lower level of search cost than that in Experiment 2 – i.e., when the differential effort associated with learning about the target alternative is minimal.

The overall experimental paradigm was similar to that of Experiment 2. In a computer-based environment, participants were asked to choose, in each of

several product categories, their preferred alternative from a set of two. The cost of search associated with the two products in a category was manipulated so that (1) it was equal for both brands, (2) more effort was required to learn about one of the alternatives and participants were free to either inspect the one with higher search cost or not, or (3) more effort was required to learn about one of the alternatives and inspection of the one with higher search cost was mandatory.

3.6.1 Method

Subjects. Two hundred and fifteen undergraduate students in an introductory marketing course participated for course credit.

Materials. Four product categories (backpacks, flash drives, camping tents, and digital watches) were used in this study. The order of the product categories was determined at random independently for each subject. In each product category, two competing brands, described in terms of two alignable attributes involving a trade-off between them, were presented (see Appendix 3.1). Each choice set consisted of a target brand (T) and a competitor brand (C). While the description of C was always presented immediately on the computer screen, participants in some of the experimental conditions had to click a button on the screen to uncover the description of T. As in Experiment 2, both the display position of the two product descriptions on the screen (left vs. right) and which of the two alternatives served as T and C were counterbalanced independently. Thus, the null hypothesis – i.e., no influence of differential search cost on preference – again implies a choice share of 50 percent for both T and C.

Design and procedure. Each participant made a series of four choices in a 3 (between-subjects factor: identical search cost, differential search cost with voluntary inspection of T, and differential search cost with mandatory inspection of T) x 4 (within-subject factor: product category) mixed design. Participants were randomly assigned to one of the three conditions. In the *identical search cost* condition, the description of T was always presented immediately along with that of C. The descriptions of C and T were displayed side by side on the computer screen. After reading the product descriptions, participants were asked to choose their preferred alternative. In the *differential search cost - voluntary* condition, only the description of C was displayed immediately, and participants could decide whether or not they would inspect the description of T before making their choice. That is, they were able to choose C without obtaining information about T. If participants did wish to find out about T, they were required to click a button on the screen (using a computer mouse). Once that button had been clicked, the description of T appeared beside that of C – yielding the same screen that those in the identical search cost condition were presented with immediately. Participants were then asked to choose their preferred alternative from the set. Finally, the *differential search cost - mandatory* condition was the same as the differential search cost - voluntary condition with the sole exception that, after the description of C had appeared, participants were informed that they were required to also look at the description of T, and that they were to obtain it by clicking the appropriate button on the screen. Once this had occurred, C and T were displayed side by side, and participants were asked to

choose their preferred alternative (see Appendix 3.3). This procedure was repeated for each of the four product categories in sequence.

3.6.2 Results and Discussion

The observed choices were analyzed by estimating GEE models using R. First, there were no systematic preference differences between the two alternatives in each category. Across the four product categories, the choice shares of Brands 1 and 2 were 49.8 percent and 50.2 percent, respectively. The choice share of Brand 1 is statistically indistinguishable from 50 percent ($z = 0.10$, $p = .92$, two-tailed). Thus, overall, the two alternatives in a product category were equally likely to be chosen a priori.

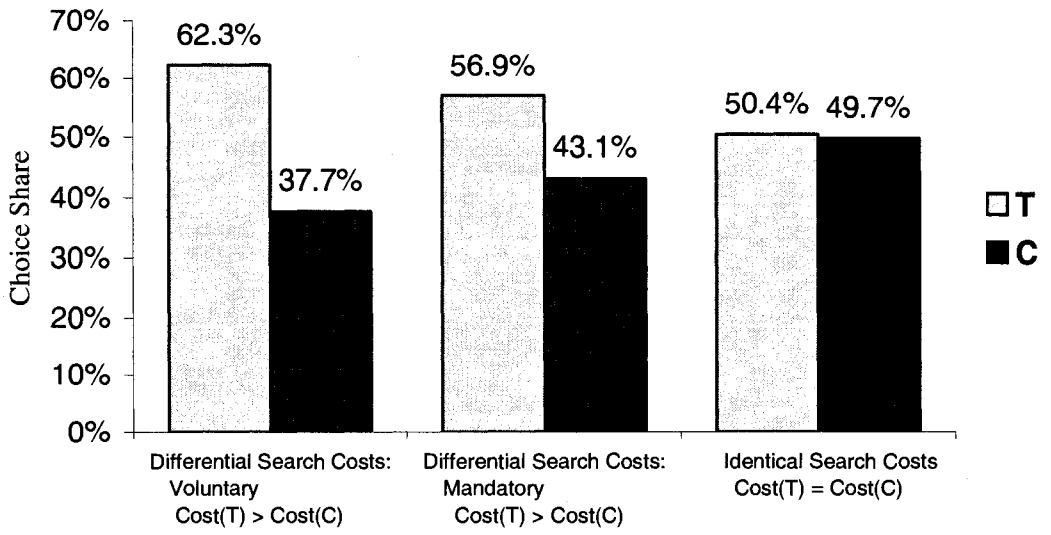
To assess the influence of differential search costs on consumer choice, we compare the choice shares of T and C. As expected, in the identical search cost condition, the choice share of T (50.4 percent) was no different from 50 percent ($z = 0.13$, $p = .90$, two-tailed). In the differential search cost - voluntary condition, 3.9 percent of the choices were made by selecting C without acquiring information about T. When participants did decide to find out about T in that condition, thus incurring the differential search cost associated with it, that alternative was chosen 64.8 percent of the time, which represents the choice share of T conditional on T being inspected. The unconditional choice share of T (across all choices, including those for which participants did not even look at T) was 62.3 percent, which is significantly greater than 50 percent ($z = 3.17$, $p = .001$, one-tailed). Moreover, in the differential search cost - mandatory

condition, the choice share of T was 56.9 percent, which is also significantly greater than 50 percent ($z = 2.73$, $p = .003$, one-tailed; see Figure 3.3). Finally, neither the main effects of product category ($|z| < 1.20$, $p > .23$) nor any interactions between product category and differential search cost ($|z| < 1.45$, $p > .15$) are significant. In addition to corroborating the key finding of Experiments 1 and 2 – i.e., that merely increasing the search cost associated with a target brand can increase preference for that brand, relative to competing offerings – these results show that the effect persists even when search is mandatory.

The increase in the target alternative's choice share as a consequence of higher search cost associated with it in the voluntary condition replicates the finding of Experiment 2, but it does so at a lower level of search cost. This indicates that even a very small incremental search cost (e.g., a single mouse click) can increase preference for an alternative. More importantly, the positive influence of higher search cost on preference for the target alternative in the mandatory search condition suggests that the psychological mechanism underlying this effect is, at least in part, related to consumers' failure to ignore costs that are irrecoverable – i.e., a sunk cost fallacy. Because participants in that condition were required to obtain information about T (and to incur the differential search cost associated with it), this action could not have been attributed to their own relative preference among the alternatives. This suggests that, once consumers have incurred a higher search cost to obtain information

about an alternative, and given that the effort made in the search process is irrecoverable, they tend to demonstrate an increased commitment to that alternative by choosing it over its competitor.

Figure 3.3
Exp. 3: Choice Shares of T vs. C



The above analysis provides evidence that a mechanism in line with a sunk cost fallacy underlies the influence of differential search costs on consumer choice. However, it remains unclear whether, in addition to that, a self-perception process – which would affect preference among the alternatives in the same direction – contributes to this effect. One testable prediction in connection with this is that, if both mechanisms are at work, their composite effect on consumer preference should be stronger than the impact of only one of them in isolation. In

Experiment 3, participants inspected T either out of their free will (voluntary search) or because they were required to do so (mandatory search).

In the case of voluntary search, the effort expended to obtain information about T may have increased participants' commitment to that alternative. In addition, it was possible for participants to make inferences about their preference among the alternatives by observing their own search behavior. By contrast, while acquiring information about T in the mandatory search condition may also have increased their commitment to T, participants could not have made any inferences about their preference based on their acquiring information about T in that condition – i.e., there was no basis for self-perception process to play a role.

If, in addition to a sunk cost fallacy, the influence of differential search costs on choice is also driven by a self-perception process, this might be reflected in a greater preference for the target alternative when participants were free to decide whether or not to inspect it than when they were required to do so. Indeed, the choice share of T in the voluntary search condition (62.3 percent) was greater than that in the mandatory search condition (56.9 percent; $z = 1.35$, $p = .09$, one-tailed). This provides preliminary, indirect evidence that consumers might make inferences about their preferences based on their own search activity and this can, in turn, influence their product choices in the presence of differential search costs. Experiment 4 provides a direct test of this self-perception process as a candidate mechanism underlying the influence of incremental search costs on consumer choice.

3.7 Experiment 4

The objective of Experiment 4 was to examine whether a self-perception mechanism contributes to the demonstrated positive effect of higher search costs on consumer preference for an alternative, relative to competing offerings. Our aim was to isolate this mechanism by ruling out the possibility of a sunk cost fallacy. A cost is "sunk" when it is irrecoverable. Therefore, if a cost can be recovered after it has been incurred, it is not sunk. In this experiment, we employed a search task in which the cost of search associated with the target alternative was recoverable. To that end, money (rather than effort) was used as the currency of information search cost. The key idea in this paradigm is that, while participants were charged a search cost to see the description of the target, they received a refund for this if they did not ultimately choose that alternative. This way, the incremental search cost for the target alternative was fully recoverable – i.e., not sunk. Any remaining effect of the higher search cost associated with the target on its probability of being chosen should, therefore, reflect a self-perception process whereby participants make inferences about their preferences based on their own actions in connection with the acquisition of information.

3.7.1 Method

Subjects. Fifty-two members of a volunteer research participation panel consisting of university students and staff participated in the study. Each received a fixed payment of $5 plus a variable payment that was contingent on the choices s/he made during the experiment.

Materials. Participants were presented with ten sets of monetary gambles, each consisting of two gambles with different payoffs and probabilities of winning, but with the same expected value (see Appendix 3.1). For example, Gamble 1 might involve a 10-percent probability of getting $3.00 and a 90-percent probability of getting $0.50, whereas Gamble 2 might entail a 20-percent probability of getting $1.75 and an 80-percent probability of getting $0.50. For each set, participants were asked to choose their preferred gamble. The order of the ten sets was determined at random independently for each subject. The gambles chosen by a participant were actually played out for her/him at the end of the experiment and s/he received the realized payoffs in addition to the $5 base payment. In each set, we denote one gamble as the target (T) and the other as the competitor (C). While the description of C was always presented immediately on the computer screen, participants in one of the experimental conditions were required to pay 5 cents if they wished to inspect the description of T (see below for details). The display position of the two gambles on the screen (left vs. right) was counterbalanced, with the gambles on the left (right) always being labeled "A" ("B"). Moreover, to control for possible differences in the attractiveness of

the gambles, which of the two served as T and C was also counterbalanced (independently) within each set. Therefore, the null hypothesis – i.e., no influence of differential search cost on preference – implies a choice share of 50 percent for both T and C.

Design and Procedure. Each participant made a series of ten choices in a 2 (between-subjects factor: identical search cost vs. recoverable differential search cost) x 10 (within-subject factor: set of gambles) mixed design, with participants being randomly assigned to one of the two conditions. In the *identical search cost* condition, the description of T was always presented immediately along with that of C, and both were displayed side by side on the computer screen. After reading the descriptions of the two gambles, participants were asked to choose their preferred one. By contrast, in the *recoverable differential search cost* condition, only the description of C was displayed immediately, and it was up to participants to decide whether or not they would view the description of T before making their choice. That is, they were able to choose C without obtaining information about T. If participants did wish to find out about T, they were charged a search cost of 5 cents, which was recoverable in that it was refunded (in full) if they did not select T as their preferred gamble. That is, the search cost for T was incurred only if participants ultimately chose T. (In that case, the amount was deducted from their "account" for the study, thus reducing their eventual payment.) If participants decided to inspect T, its description appeared beside that of C – yielding the same screen that those in the

identical search cost condition were presented with immediately. After that, participants were asked to choose one of the two gambles (see Appendix 3.4). Importantly, the amount of effort required to complete the task was identical for all participants in the recoverable differential search cost condition, whether they decided to learn about T or not – i.e., the same number of actions (mouse clicks) was required in both cases. Participants completed this procedure for each of the ten sets of gambles in sequence. At the end of the experiment, the ten gambles that a participant had chosen were played out, and s/he received the realized payoffs, minus any non-refunded search costs, in addition to the $5 base payment. On average, the total amount a participant received was $10.80.

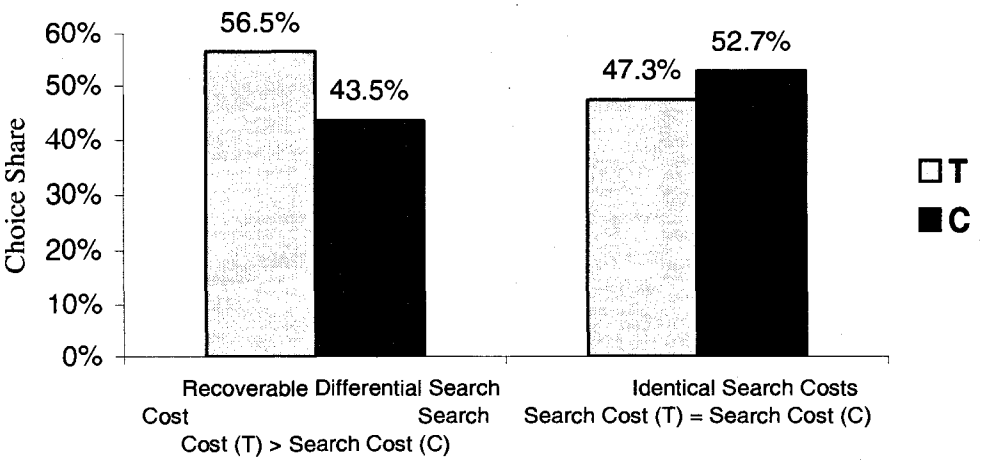
3.7.2 Results and Discussion

Participants' choices were again analyzed by estimating GEE models. First, there were no systematic preference differences between the two gambles in each set. Across the ten sets, the choice shares of Gambles 1 and 2 were 47.9 percent and 52.1 percent, respectively, and the share of Gamble 1 is statistically indistinguishable from 50 percent ($z = 0.92$, $p = .36$, two-tailed). Thus, overall, the two alternatives in a set were equally likely to be chosen a priori.

We expected that T and C would be equally likely to be chosen in the identical search cost condition. Indeed, the choice share of T (47.3 percent) was no different from 50 percent ($z = -0.88$, $p = .38$, two-tailed). More importantly, the recoverable differential search cost condition was designed to examine the self-perception mechanism directly by ruling out the possibility of a sunk cost

effect. In particular, if the incremental (yet recoverable) search cost associated with T in that condition resulted in an increased choice share for T, this would provide evidence that participants used their own search behavior – i.e., their acquisition of information about T – as a basis for making inferences about their preference for that alternative. In the recoverable differential search cost condition, 8.5 percent of the choices were made by selecting C without acquiring information about T. When participants did decide to learn about T in that condition, thus incurring the (recoverable) incremental search cost, T was chosen 61.7 percent of the time, which represents that gamble's choice share of T conditional on it actually being inspected. The unconditional choice share of T (across all choices, including those for which participants did not even look at T) was 56.5 percent, which is significantly greater than 50 percent ($z = 2.14$, $p = .02$, one-tailed; see Figure 3.4). Finally, neither the main effects of particular sets of gambles nor the interactions between these sets and identical vs. differential search cost are statistically significant with the exception of one main effect of the 5^{th} set of the gambles ($z = 2.72$, $p = .01$) and the interaction effect between that set and differential search cost ($z = 2.02$, $p = .04$).

Figure 3.4
Exp. 4: Choice Shares of T vs. C



These results demonstrate that, even when the incremental search cost associated with a target alternative is not sunk – i.e., when it can be recovered in case the alternative is ultimately not chosen – it can increase that alternative's choice probability. This suggests that, in addition to affecting choices via a type of sunk cost fallacy, the mere act of incurring an incremental search cost in order to obtain information about a particular alternative can serve as a basis for making inferences about one's own preference for that alternative relative to competing offerings. Thus, taken together, the findings of Experiments 3 and 4 show that (1) a sunk cost fallacy and (2) a self-perception process, whereby consumers observe their own search behavior and see it as informative with respect to their preferences, are two parallel psychological mechanisms that underlie the influence of differential search costs on consumer choice.

3.8 General Discussion

3.8.1 Summary of Research

A commonly held belief is that it is in a firm's best interest to make information about itself easily available to consumers and that a seller should, therefore, facilitate consumers' search for its offerings (Wernerfelt 1996). However, the findings reported here counter this intuition. The present research examines the impact of differential search costs – i.e., of a higher level of effort or monetary cost being required to acquire information about some alternatives than others – on consumers' preferences for these alternatives. Our four experiments demonstrate a positive effect of incremental search costs such that incurring a higher search cost, in terms of time, effort, or money, for an alternative relative to its competitors tends to increase consumers' preference for that alternative.

The findings of Experiment 1 show that it is possible to increase the choice probability of a product by requiring individuals to travel a longer physical distance in order to acquire information about it, relative to a competing offering. Experiments 2 and 3 corroborate this positive effect of higher search costs on product preference in a computer-based shopping environment. These two experiments demonstrate that, when consumers must expend greater effort – e.g., by entering a product code or clicking button – in order to view information about a particular product, they can become more likely to choose that product relative to a competitor that requires a lower level of search cost. Moreover, the results of

Experiment 3 reveal that this effect persists even when inspection of the alternative with the higher search cost is mandatory, although the positive influence on preference in that case is weaker than when people acquire information about the alternative out of their free will. Finally, Experiment 4 shows that, even when the differential search cost associated with an alternative is recoverable, it still increases preference for that alternative relative to a competing offering. This finding suggests that, in addition to the effect of differential search costs that are sunk (i.e., irrecoverable) on subsequent choices, the mere act of acquiring information about an alternative has a favorable influence on preference for that alternative, in line with self-perception theory.

3.8.2 Theoretical Implications

The present research extends the literature on information search cost in two ways. First, while a large body of research has focused on important issues such as the relationship between search cost and the extent of information search and the implications of changes in the level of information search cost for individual firms or markets as a whole (e.g., Ratchford 1982; Kogut 1990; Bakos 1997; Moorthy et al 1997; Lynch and Ariely 2000), the question of how information search cost might influence consumers' product preferences and choices has been overlooked to date. The findings of this research demonstrate that differential search costs for competing alternatives can play an important role in consumers' construction of their own preferences. In particular, different levels of information search costs associated with competing products can turn

otherwise equally attractive products into differentiated products and, counter to common intuition, this can result in a increased preference for the product that requires a comparatively higher level of search cost.

Second, while most prior research on information search cost has focused on economic theories (e.g., Ratchford 1982; Ratchford and Srinivasan 1993; Bakos 1997; Zettelmeyer 2000), the present research provides insights into the psychological influences of search cost, particularly of differences in search cost among competing alternatives, on consumer choice. We have advanced the argument that a firm might benefit from making it more costly or effortful for consumers to learn about its offerings, and we have proposed two psychological mechanisms to account for such an effect of differential search costs – one in line with a sunk cost fallacy and the other based on a self-perception process.

In terms of a sunk cost fallacy, our findings demonstrate that after consumers incur a relatively higher search cost to obtain information about an alternative, they tend to increase their commitment toward that alternative and become more reluctant to abandon it. This is consistent with prior research showing that the prior investment of time or effort tends to lead decision makers to make judgments that they would not otherwise make were it not for that investment (Bastardi and Shafir 1998; Kruger et al. 2004; Schwarz 2004). However, such a subjective commitment does not help consumers obtain a better understanding of the competing alternatives and it may, in fact, result in suboptimal choice outcomes (Garland and Newport 1991; Brockner 1992). Thus,

the felt commitment to a product as a result of the higher search cost that had to be incurred in connection with it may result in a decision bias that is undesirable from a consumer welfare standpoint.

With respect to the second psychological mechanism, based on self-perception theory, our findings suggest that consumers tend to make inferences about their relative preferences among competing alternatives by observing their own search behavior in connection with alternatives of different levels of search cost. In a manner similar to when consumers interpret equivocal or trivial information to resolve decision uncertainty or ambiguity (Russo et al. 1998; Brown and Carpenter 2000), the present research shows that consumers also interpret their own search activity, for alternatives with differential search costs, as an external cue, which they then use in constructing their preferences in the face of decision uncertainty. Thus, the present research establishes an important connection between the literature on search costs and that on preference construction.

3.8.3 Practical Implications

A common intuition is that firms should adopt efficient communication plans and make information about their offerings as easily accessible to consumers as possible. In addition, advances in information technology and the wide-spread adoption of the Internet for information search have made it less costly to provide information to interested consumers. Thus, the cost associated with facilitating consumer information search has become less of a constraint for

firms. However, the key practical implication of the findings reported here is that consumer search costs associated with a particular firm or its offerings can be a powerful competitive tool. In particular, our results show that it is possible for a firm to increase demand for its offerings by deliberately making it more difficult for consumers to find out about these offerings. Thus, even when it would be possible for a firm to reduce the cost of consumer information search in connection with its offerings, inflating this cost might provide a strategic advantage for the firm in a competitive setting. The findings of this research suggest that, in addition to the obvious effect of providing a barrier for consumers to learn about (and eventually choose) an alternative, a relatively higher search cost can actually increase consumer preference for that alternative, and we have demonstrated that the latter effect can outweigh the former.

In practice, there are multiple ways in which a firm can deliberately increase consumers' information search cost to differentiate itself from its competitors. For example, instead of providing all relevant information about an offering in an advertisement, firms frequently require consumers to engage in some follow-up information search (e.g., by visiting the firm's web site or a store). In addition, to increase consumers' level of commitment, online stores can make it effortful for consumers to enter (e.g., by asking them to create a customer account and/or complete a short survey). Moreover, our findings suggest that, when making decisions about where to locate a physical store, it may actually be

beneficial to choose a location farther from where consumers reside and/or from competing stores, thus deliberately inflating consumer search cost.

While we have demonstrated the counterintuitive possibility that making it more costly for consumers to find out about an offering can actually increase demand for that offering, there is an obvious boundary to this effect – once the differential search cost associated with the offering becomes prohibitive for a sufficiently large number of consumers, demand for it will drop because too few consumers will find out about it in the first place. Thus, there exists a "window" of differential search cost within which a firm might benefit from making it more costly for consumers to learn about its offerings without making it too costly. While determining the demand-maximizing level of search cost for a firm or offering in practice is a complex problem that can only be solved on a case-by-case basis in light of the specific market circumstances, the present research provides some guidance in this regard by (1) demonstrating that firms can indeed benefit from imposing inflated consumer search costs and (2) shedding light on the mechanics that drive this effect.

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Appendix 3.1

Stimulus Sets Used in Experiments 2, 3, and 4

Experiment 2		
Product Category	*Brand 1*	*Brand 2*
Cordless Phones	• Voice enhancer technology and spread spectrum technology for optimum sound quality • 30-station redial and 20-station phonebook	• Crystal clear sound with noise reduction technology for minimal interference • 20-station redial and 30-station phonebook
Binoculars	• Magnification: 7 x • Apparent angle of view: 60°	• Magnification: 8 x • Apparent angle of view: 50°
Clock Radios	• Triple alarm for three different alarm times waking to CD, radio, buzzer • Nap timer feature: set 10 to 120 minutes for quick cat naps without resetting the alarm	• Triple alarm for three different alarm times waking to any of four nature sounds, radio, buzzer • Weekend sleeper feature: automatically turns your alarm off for the weekend
MP3 Players	• 128 MB of embedded flash memory with easy USB 2.0 connection • Compact design: 60 x 46.2 x 19.2 mm; weight of ~ 26g	• 128 MB of embedded flash memory with USB 2.0 / USB 1.1 connection • Compact design: 80 x 52.1 x 13.8 mm; weight of ~ 40g
Backpacks	• Made of Cross-Lock Ballistic rain shield nylon • Has a rust-proof metal zipper, coated with a thin layer of black plastic for smoother operation	• Made of hi-duty Cross-Lock Oxford Nylon • Has heavy-weight, reinforced, stainless steel zipper treated with lubricant for smoother operation
128 MB Flash Drives	• Data security by password protection: prevent undesignated individuals from using the device • Read 28 MB/sec, Write 22 MB/sec	• Data security by fingerprint identification technology: restrict access to only the designated user • Read 24 MB/sec, Write 24 MB/sec

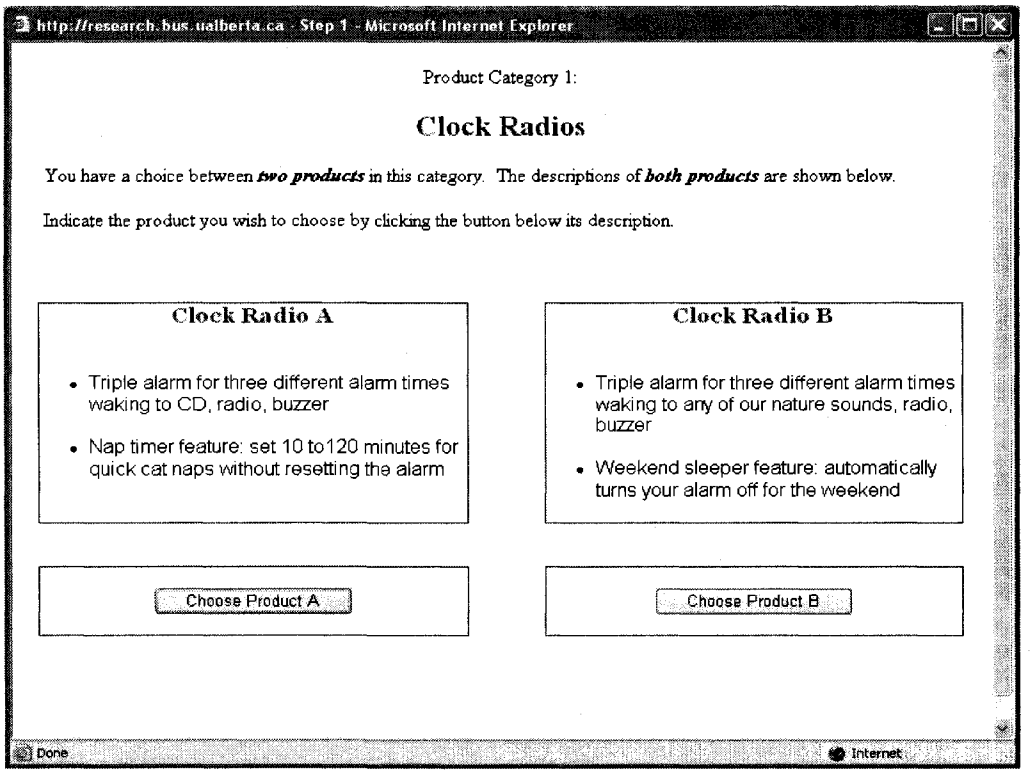
Experiment 3		
Product Category	*Brand 1*	*Brand 2*
Backpacks	• Made of Cross-Lock Ballistic rain shield nylon • Has a rust-proof metal zipper, coated with a thin layer of black plastic for smoother operation	• Made of hi-duty Cross-Lock Oxford Nylon • Has heavy-weight, reinforced, stainless steel zipper treated with lubricant for smoother operation
128 MB Flash Drives	• Data security by password protection: prevent undesignated individuals from using the device • Read 28 MB/sec, Write 22 MB/sec	• Data security by fingerprint identification technology: restrict access to only the designated user • Read 24 MB/sec, Write 24 MB/sec
Camping Tents	• Base size: 9'1 x 8', Center Height : 56" • Packed Weight: 12 lbs.	• Base size: 9' x 8'5, Center Height: 59" • Packaged Wt: 12 lbs., 8 oz.
Digital Watches	• Hour, minute, second, month, date, and weekday display • Simultaneously shows times of two regions to facilitate travel	• Double LCD display shows time and calendar separately • Travel assist function—Select time zones using world map

Experiment 4		
Set	*Gamble 1*	*Gamble 2*
1	• a 10% probability of getting $3.00, and • a 90% probability of getting $0.50	• a 20% probability of getting $1.75, and • a 80% probability of getting $0.50
2	• a 15% probability of getting $2.30, and • a 85% probability of getting $1.00	• a 5% probability of getting $4.90, and • a 95% probability of getting $1.00
3	• a 30% probability of getting $3.60, and • a 70% probability of getting $0.50	• a 20% probability of getting $5.55, and • a 80% probability of getting $0.40
4	• a 35% probability of getting $2.00, and • a 65% probability of getting $1.00	• a 25% probability of getting $2.40, and • a 75% probability of getting $1.00
5	• a 45% probability of getting $2.20, and • a 55% probability of getting $1.00	• a 35% probability of getting $2.00, and • a 65% probability of getting $1.30
6	• a 36% probability of getting $4.40, and • a 64% probability of getting $1.00	• a 27% probability of getting $5.50, and • a 73% probability of getting $1.00
7	• a 10% probability of getting $8.10, and • a 90% probability of getting $0.70	• a 40% probability of getting $2, and • a 60% probability of getting $1.05
8	• a 75% probability of getting $0.40, and • a 25% probability of getting $4.80	• a 45% probability of getting $2.35, and • a 55% probability of getting $0.80
9	• a 68% probability of getting $1.00, and • a 32% probability of getting $2.40	• a 38% probability of getting $3.00, and • a 62% probability of getting $0.50
10	• a 84% probability of getting $0.50, and • a 16% probability of getting $6.60	• a 28% probability of getting $4.00, and • a 72% probability of getting $0.50

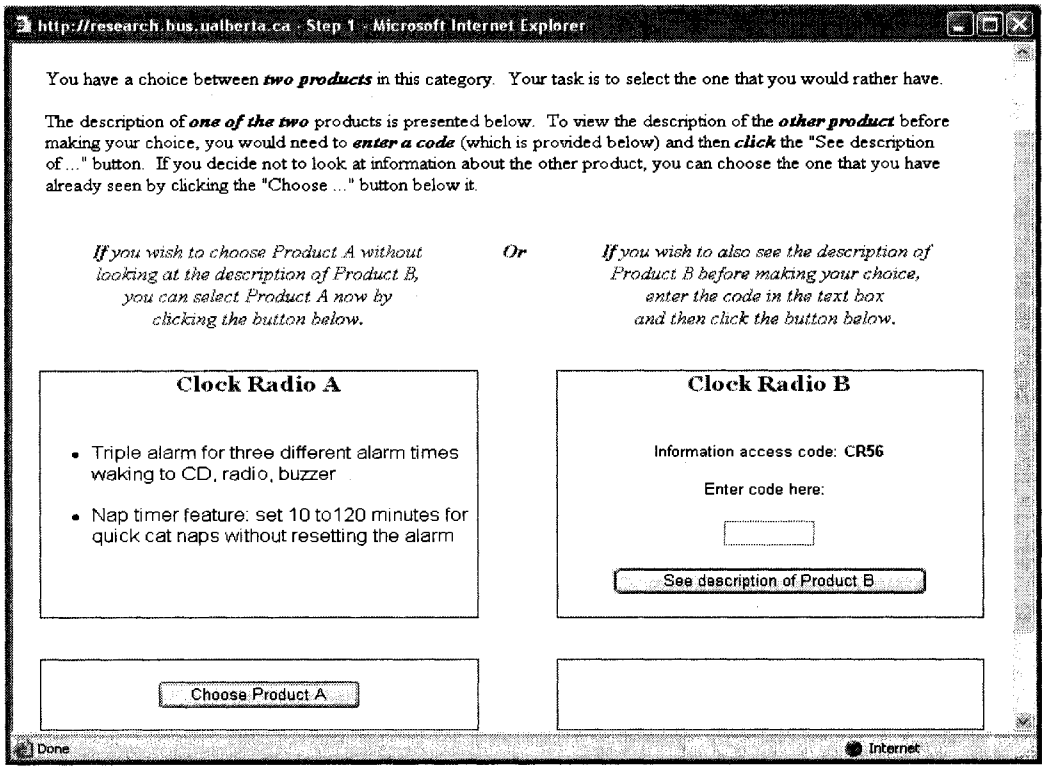
Appendix 3.2

Computer Interfaces for Experiment 2

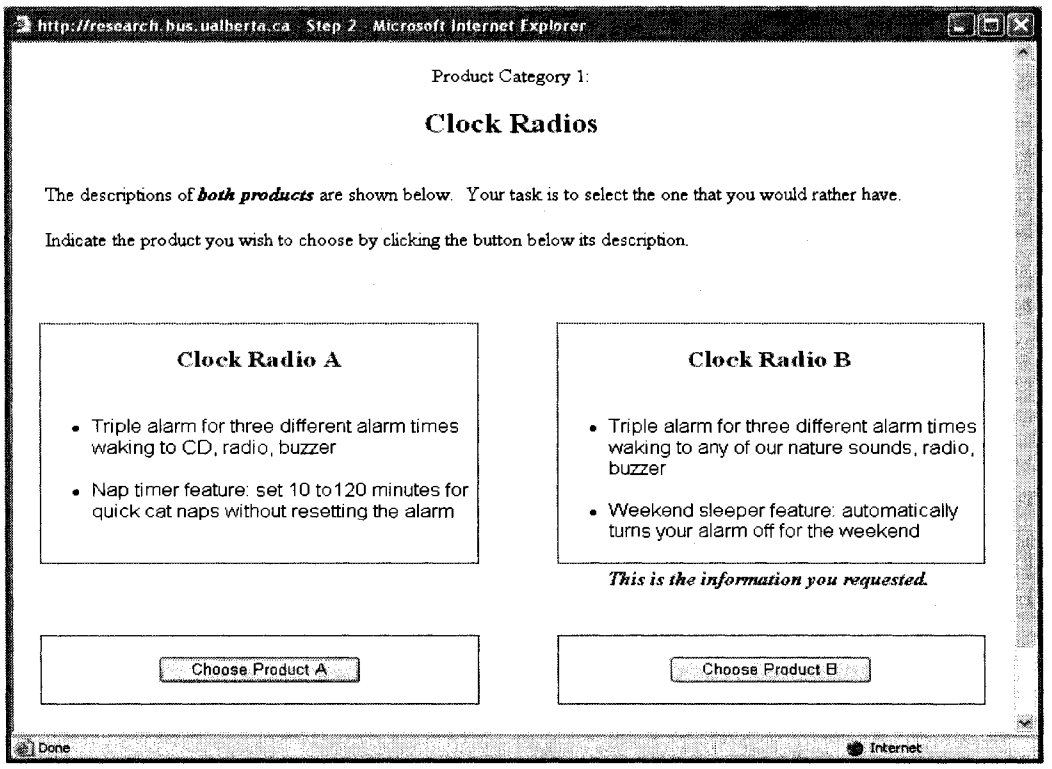
(1) "Identical search cost" condition



(2) "Differential search cost" condition



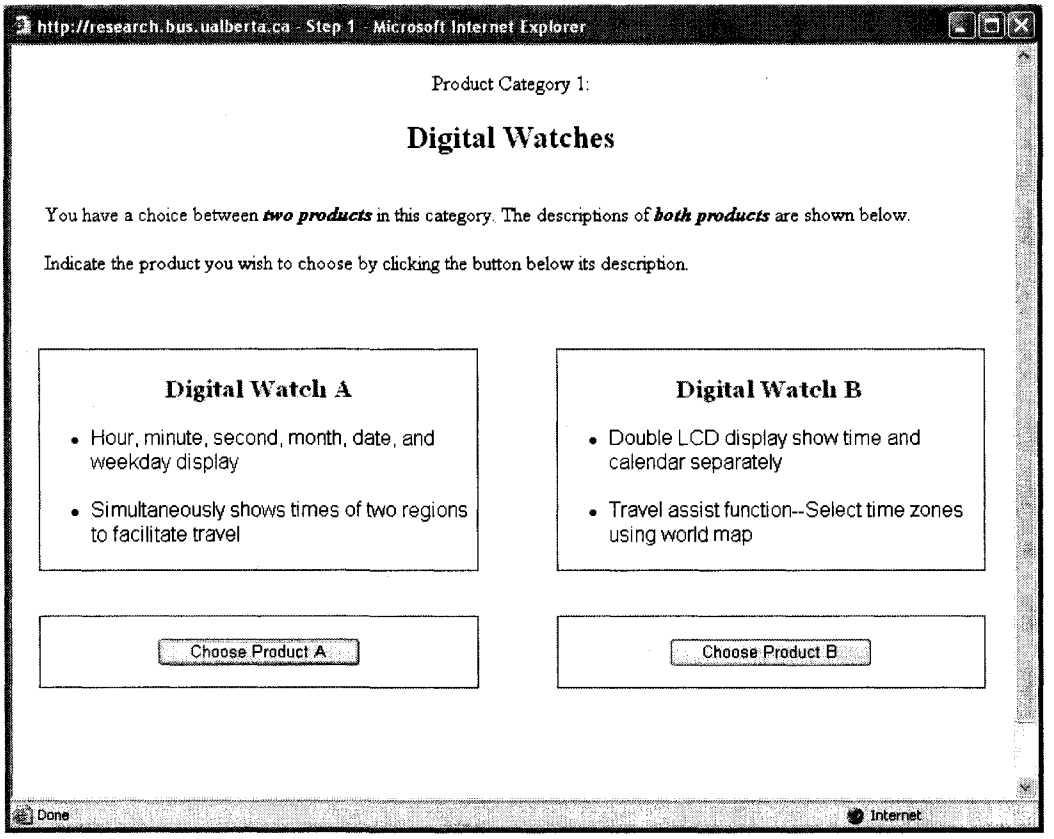
Description of the competitor (C) is presented upon request



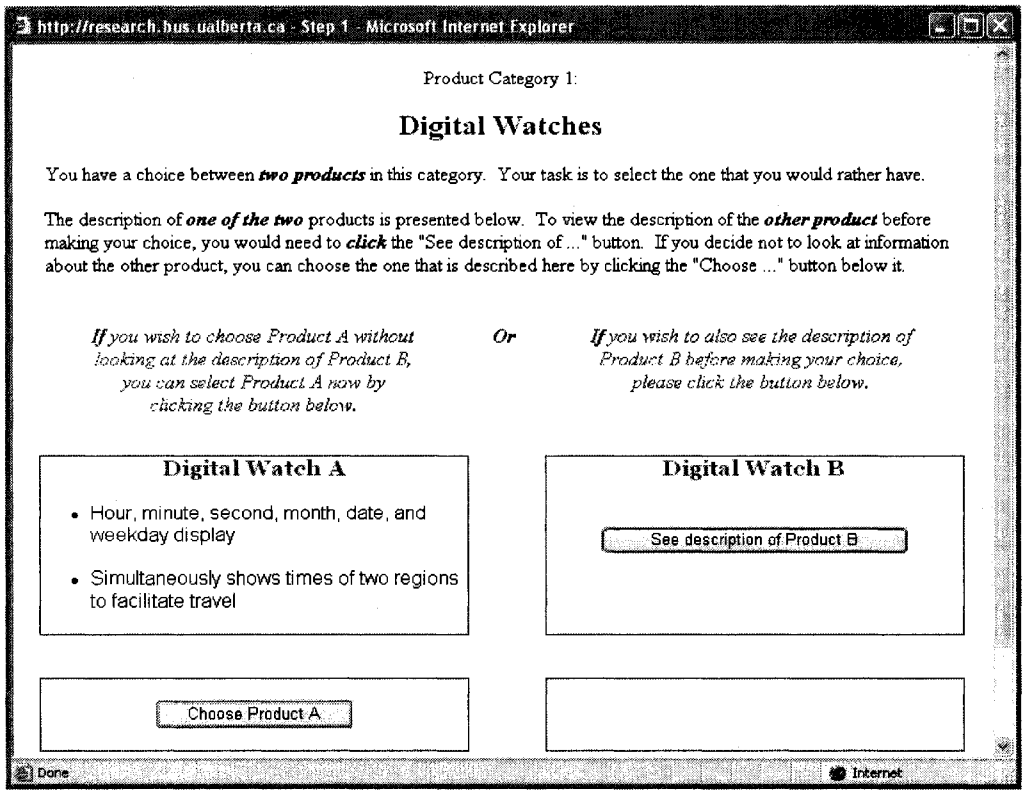
Appendix 3.3

Computer Interfaces for Experiment 3

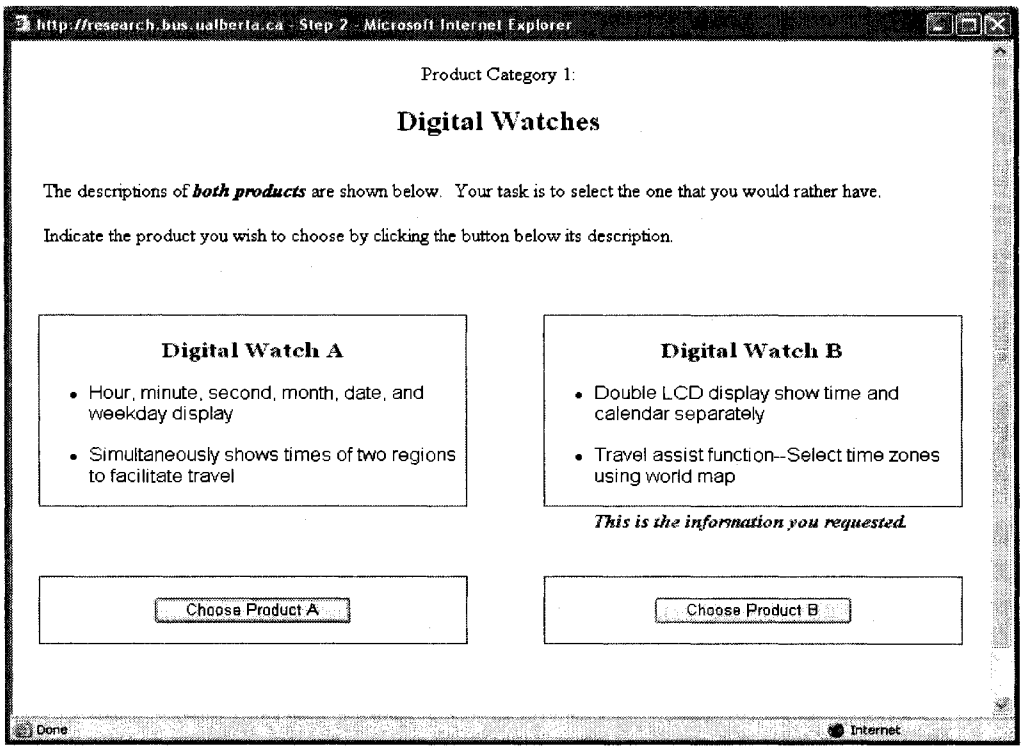
(1) "Identical search cost" condition



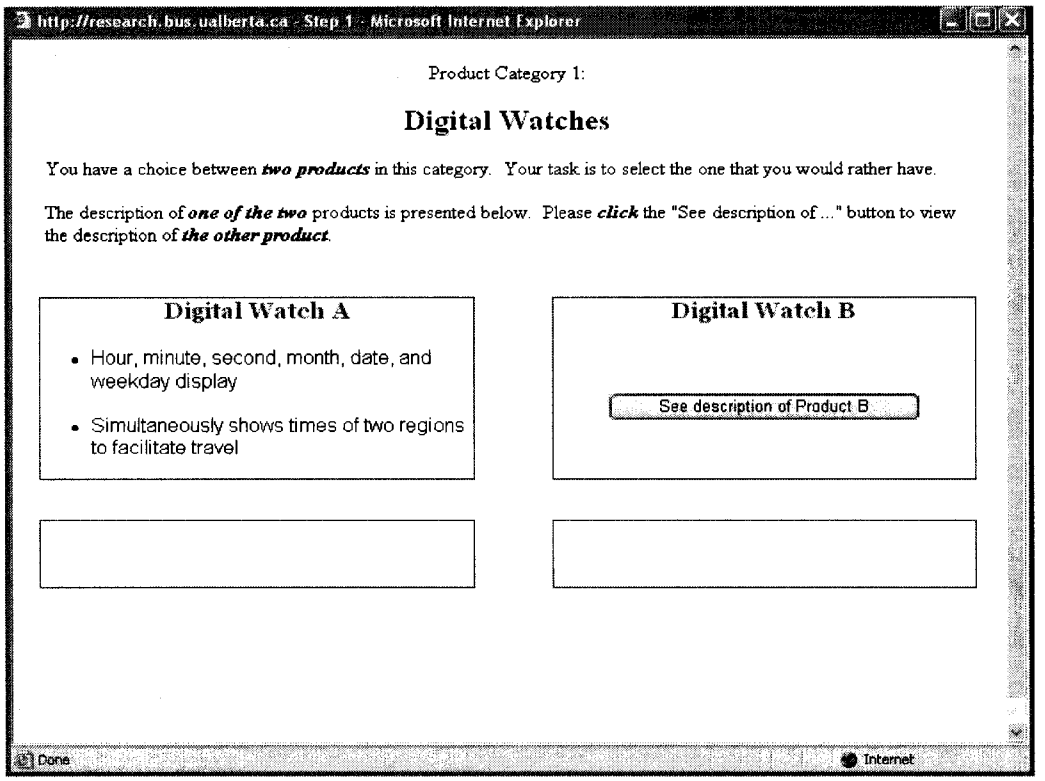
(2) "Differential search cost with voluntary inspection of T" condition



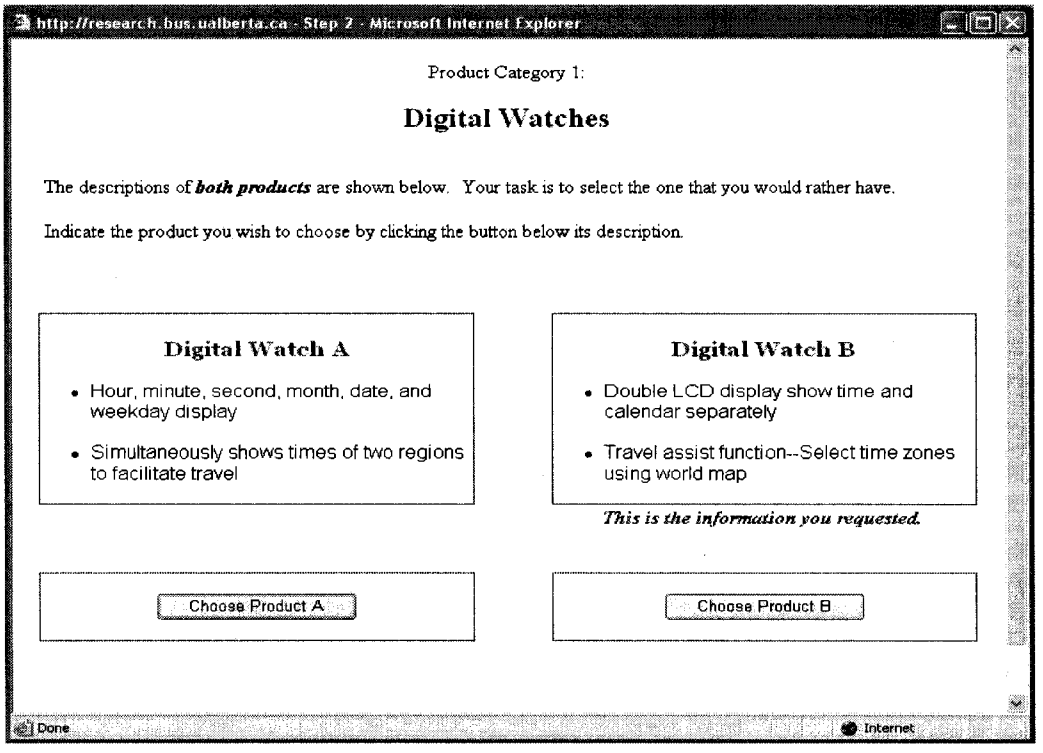
Description of the competitor (C) is presented upon request



(2) "Differential search cost with mandatory inspection of T" condition



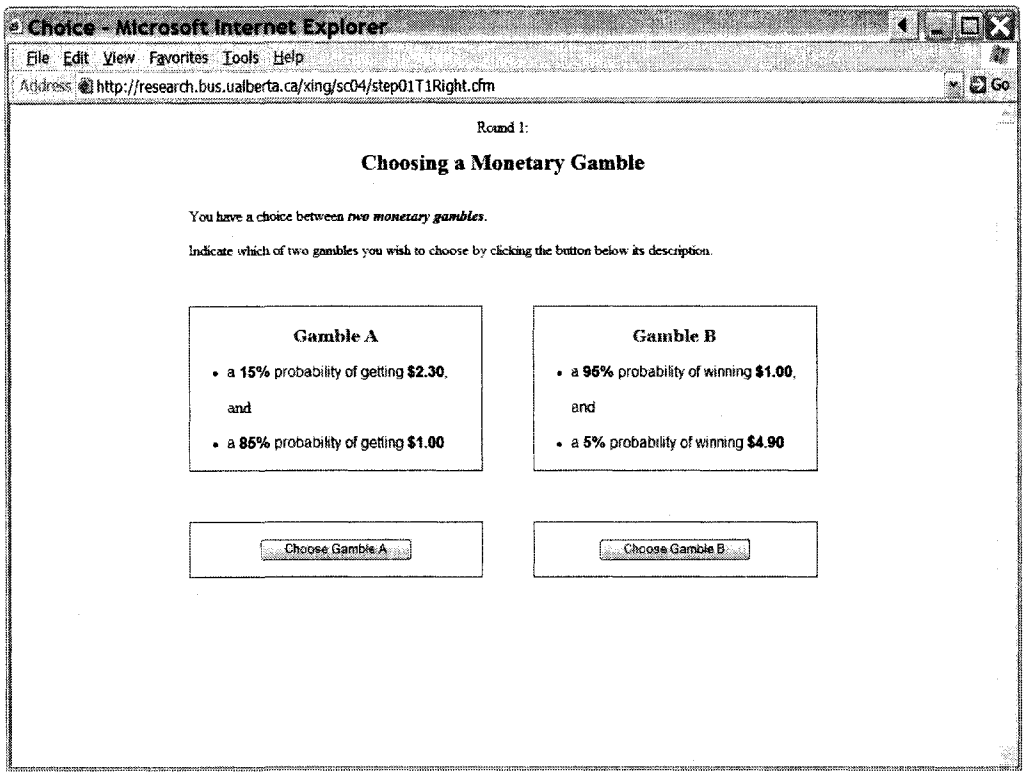
Description of the competitor (C) is presented upon request



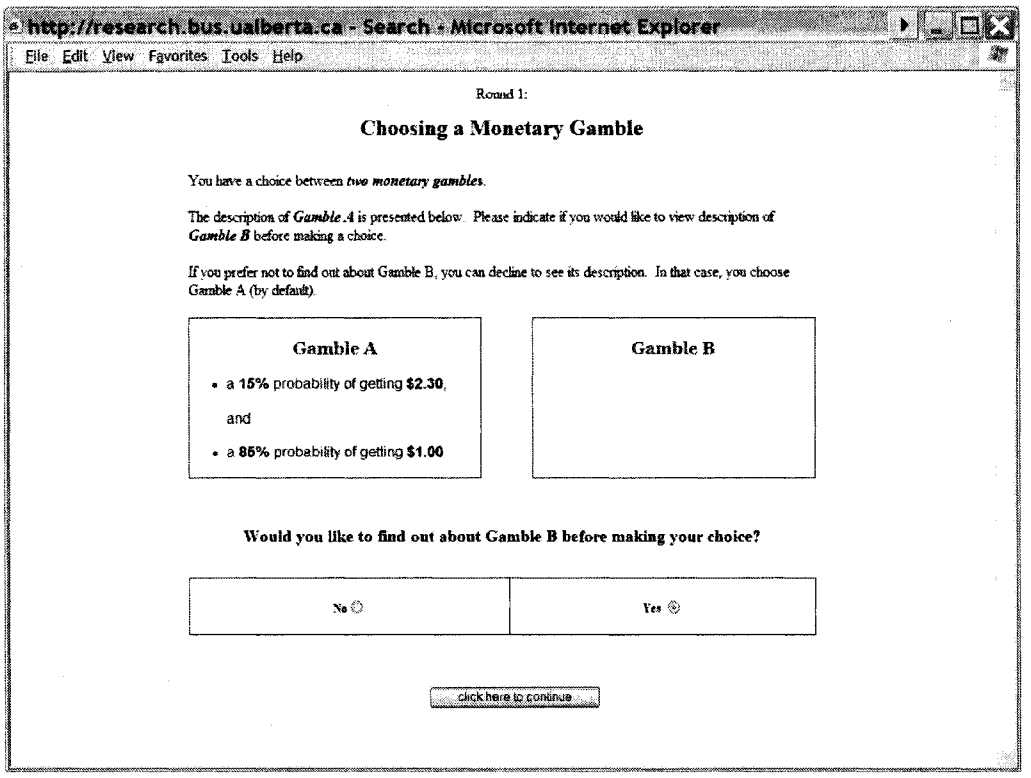
Appendix 3.4

Computer Interfaces for Experiment 4

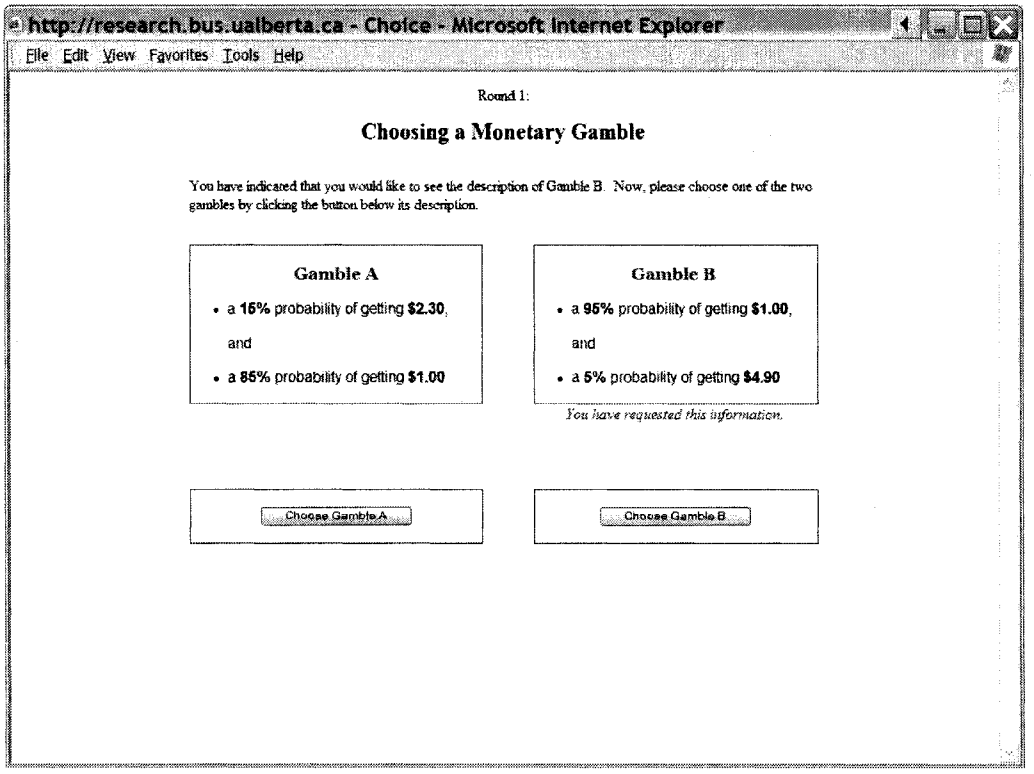
(1) "Identical search cost" condition



(2) "Recoverable differential search cost" Condition



Description of the competitor (C) is presented upon request



Chapter 4

General Discussion and Conclusions

From rational choice theory to constructive consumer choices, the latter complements the former by addressing the question of how people actually *do* make choices in the face of various contextual factors rather than how they *should* make these choices. A growing body of behavioral research that has emerged over the past few decades has greatly broadened our understanding of consumer decision making by investigating the interaction between human information processing and decision contexts. This thesis examines two important contextual factors in two-stage decision processes – i.e., the temporal allocation of information across the two stages and differential search costs at the screening stage – that exert significant influence on consumers' preferential choices. While a limited amount of prior work has examined how consumers' preferences evolve over the multiple stages of the decision process, this thesis focuses on the preference dynamics between the screening stage and the final choice stage. The findings of this thesis suggest that while both the delay of persuasive information and a higher differential search cost decrease the probability of an alternative surviving the screening stage, both factors tend to increase consumer preference for that alternative at the final choice stage.

4.1 Contributions

The first essay of the thesis contributes to the literature on information integration by extending it to two-stage decision processes. While an abundance of work in this area has focused on exploring the sequential nature of information integration and belief updating (see, e.g. Hogarth and Einhorn 1992), the interim steps are typically viewed as serving a common purpose – determining the overall attractiveness of a single object. This is different from multi-stage decisions in which each decision stage serves a distinct purpose.

In particular, the findings of the first essay suggest that consumers tend to integrate, rather than segregate, the information obtained at the two stages when making a purchase decision. Interestingly, prior research has suggested that, making the final choice, consumers tend to ignore pre-screening information and focus only on the post-screening information (Van Zee et al. 1992; Chakravarti et al. 2005). In contrast to that work, the present research uses a *selective* delay – i.e., information is delayed for only one of the competing products – rather than an *overall* delay pattern where information is delayed for all products. The former enables us to decompose the influence of the delayed presentation of persuasive information into an attribute-specific effect (weight shift) and an alternative-specific effect (alternative boosting). The key difference between a weight shift effect and a recency effect is that the former is a global effect – i.e., the delay of information on an attribute for an alternative increases the decision weight of that attribute (across all products), even if information on that attribute

for the competitors was already available at the first stage – whereas the latter is a local effect – i.e., the delay of information on an attribute for an alternative only makes that piece of information more important.

The second essay of this thesis contributes to the body of research on information search cost by examining the psychological influence of differential search costs in a competitive setting on consumers' preferential choices. While much research has approached the topic of information search cost from an economic perspective, few attempts have been made to better understand the psychological impact of information search cost. In particular, I have examined the escalation of commitment aspect and the inference making aspect of differential search costs. The results demonstrate that consumers tend to be more committed to an alternative than to its competitor after incurring a higher information search cost for it (in line with a sunk cost fallacy). In addition, however, consumers tend to also interpret their own behavior to incur a higher information search cost in connection with an alternative as providing information about their preference for that alternative (a self-perception process). Neither of these two aspects of differential search costs has been examined in prior research.

4.2 Limitations and Opportunities for Future Research

A principal-agent choice paradigm was used in the first essay. Participants (the agents) were asked to make choices on behalf of other consumers (the principals) according to the latter's preferences. The advantage of this method is that is that it allows us to control for preference heterogeneity – rather

than choosing based on their preferences, participants are instructed to choose based on someone else's (explicitly stated) preference. However, the principal-agent choice paradigm also has weaknesses. While it produces clean empirical evidence in the sense that it enables us to exclude plausible alternative explanations of the results, it also raises a concern about the extent to which the results are stimulus dependent – i.e., whether the findings generalize to a less controlled settings in which consumers choose for their own consumption. In essence, this possible criticism of the principal-agent paradigm relates to the trade-off between internal validity and external validity. To increase the external validity of the findings reported here, it would be desirable for future research to examine the influence of the delayed presentation of persuasive information in a more naturalistic context where consumers make consumption choices according to their own preferences.

In the second essay, before participants incurred a (differential) search cost to obtain information about an alternative, they were only aware of the existence of that alternative. However, in many real-world situations, consumers already have some information that enables them to form an initial evaluation of a product before they search for more information about it. In principle, the amount of the additional information that requires additional search effort can vary dramatically. A promising avenue for future research would be to systematically manipulate the proportion of the total set of information about a product that is subject to (costly) follow-up search, which might be an important moderator of

the influence of differential search costs on choice. Prior research suggests that consumers consistently engage in very limited pre-purchase information search, even for high-value durable goods (Newman 1977; Beatty and Smith 1987). Therefore, if consumers have a certain amount of information that allows them to form a crude evaluation of a product, they might not be willing to incur a relatively high cost to search for additional information about that alternative. In addition, research also suggests that consumers tend to devalue alternatives with incomplete information (Johnson and Levin 1985) and to interpret incomplete information as violating one's decision criteria (Beach 1998). As a result, a failure to search for additional information about a product, coupled with negative inferences about its attractiveness, should reduce the probability of that product being chosen. Thus, it would be worth examining the hypothesis that the direction of the impact of higher search cost for a particular alternative on choice reverses (i.e., becomes negative) as the amount of the initially available information about that alternative increases.

In conclusion, I believe that the study of how consumers construct their preferences in the context of multi-stage decision making is a promising area for future research. While a large body of work has documented how different contextual factors can have an effect on consumer choice in single-stage decisions, very little is known about such influences in multi-stage decision making. Therefore, more research is required to further enhance our understanding of how consumer preferences for competing alternatives evolve

from one decision stage to another and how these preferences are influenced by different contextual variables.

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