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The Effects of Depletion, Need for Cognitive Closure, and Attribute Accessibility on Choice Deferral

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Abstract

Consumers often face a choice among options described by differing amounts of information. In such situations, consumers may defer choice to avoid the uncertainty induced by missing information. In our study, we investigated the boundary conditions under which the tendency to defer choice can be reduced. In particular, we identified depletion, need for cognitive closure, and attribute accessibility as key situational factors related to the role of missing attribute information on choice deferral. We conducted three experiments that show that when the need for cognitive closure is high, depleted (vs. non-depleted) individuals are more likely to defer choice when attribute-accessibility is high. However, when the need for cognitive closure is low, depleted (vs. non-depleted) individuals are more likely to defer choice when attribute-accessibility is low. Furthermore, spontaneous inference and perceived uncertainty mediate the depletion effect, such that spontaneous inference reduces perceived uncertainty and this decreases the likelihood of choice deferral. Finally, depleted individuals are more sensitive to the status quo when the need for cognitive closure is low, while non-depleted individuals are more sensitive to the status quo when the need for cognitive closure is high. Implications of the results for understanding choice deferral are discussed.
Dedication

This dissertation is dedicated to my parents, my husband, my parents in laws, and my son.
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Table of Contents

Abstract ................................................................................................................................................. i
Dedication .............................................................................................................................................. iii
Acknowledgements ................................................................................................................................... iv
List of Figures ........................................................................................................................................ vi
Chapter 1 Introduction .......................................................................................................................... 1
Chapter 2 Literature Review ................................................................................................................ 4
  2.1. Choice Deferral ......................................................................................................................... 4
  2.2. Depletion ....................................................................................................................................... 8
  2.3. Need for Cognitive Closure ....................................................................................................... 14
  2.4. Attribute Accessibility ............................................................................................................... 16
Chapter 3 Hypothesis Development .................................................................................................. 19
Chapter 4 Experiment 1 ...................................................................................................................... 23
  4.1. Methods ....................................................................................................................................... 23
  4.2. Results and Discussion ............................................................................................................. 25
Chapter 5 Experiment 2 ...................................................................................................................... 28
  5.1. Methods ....................................................................................................................................... 28
  5.2. Results and Discussion ............................................................................................................. 31
Chapter 6 Experiment 3 ...................................................................................................................... 35
  6.1. Methods ....................................................................................................................................... 36
  6.2. Results and Discussion ............................................................................................................. 39
Chapter 7 General Discussion .......................................................................................................... 43
  7.1. Contributions ........................................................................................................................... 43
  7.2. Limitation and Future Research ............................................................................................. 45
References ............................................................................................................................................. 48
Appendix A Manipulations and Measures for Experiment 1 ................................................................. 66
Appendix B Manipulations and Measures for Experiment 2 ................................................................. 80
Appendix C Manipulations and Measures for Experiment 3 ................................................................. 92
List of Figures

Figure 1. The effects of depletion and attribute accessibility on the probability of choice deferral for high and low NFCC conditions.......................................................... 105

Figure 2. The effects of depletion and attribute accessibility on the probability of choice deferral for high and low NFCC conditions.......................................................... 106

Figure 3. Mediation analysis...................................................................................................... 107

Figure 4. The effects of depletion and status quo on the probability of choice deferral for high and low NFCC conditions.......................................................... 108
Chapter 1 Introduction

Each year, companies invest their marketing efforts hoping to capture new customers or a larger share of wallet of their existing customer base. In the US market, eMarketer projects a total media expenditure of roughly $170 billion. Oftentimes, however, this investment, taking the form of new products, advertising and sponsorships, falls on deaf ears as consumers defer purchases for a product category altogether. Consumers who decide not to choose a product amount to wasted marketing efforts not only at the company level but also at the industry level. The problem of choice deferral, whether it is caused by economic hardship or lack of information regarding some of the options in the marketplace, creates a large drag on the effectiveness of marketing efforts.

Missing information about product attribute(s)/benefit(s) is one of the key reasons for choice deferral (Corbin 1980; Dhar 1997; Greenleaf and Lehmann 1995; Kivetz and Simonson 2000). For example, consider a scenario where you need to purchase a new car. You have two cars to choose from, car A and car B. One of the attributes that you consider when evaluating a car is its reliability. Suppose that all the information you need is available for both car A and car B, except that the reliability information for car A is not known because car A was just recently introduced in the marketplace. In this situation, a consumer is more likely to defer choice because of the missing information regarding car A. Recently, Gunasti and Ross (2009) investigated how inference making influences choice deferral. They found that making inferences about the missing attribute can reduce choice deferral and increase the likelihood of making a choice, and further identified perceived uncertainty as a mediator of this effect.
Following Gunasti and Ross (2009), we investigated additional boundary conditions under which the probability of choice deferral can be reduced.

On the basis of past research on choice deferral, depletion, need for cognitive closure, and attribute accessibility, we propose that, when the need for cognitive closure is high, depleted (vs. non-depleted) individuals are more likely to defer choice in the high attribute-accessibility condition and that, when the need for cognitive closure is low, depleted (vs. non-depleted) individuals are more likely to defer choice in the low attribute-accessibility condition. Furthermore, we hypothesize that this effect is mediated by spontaneous inference and perceived uncertainty, such that spontaneous inference reduces perceived uncertainty and reduced perceived uncertainty then decreases the likelihood of choice deferral.

Three experiments examined our hypotheses regarding choice deferral when some alternatives have missing information. In experiment 1, we tested the joint effect of depletion, need for cognitive closure, and attribute accessibility on the probability of choice deferral. In experiment 2, we investigated the underlying mechanism of the effect observed in experiment 1 and showed that spontaneous inference and perceived uncertainty are mediators of this effect. In experiment 3, since the status quo is another form of decision avoidance and is related to choice deferral (Anderson 2003), we further tested the interaction effect of depletion, need for cognitive closure, and status quo on the tendency of choice deferral.

This dissertation proposal is organized into seven chapters. A brief description of each chapter is as follows. Chapter 2 presents the literature review about choice deferral, depletion research, need for cognitive closure research and attribute accessibility research. Chapter 3 proposes the main hypotheses and gives corresponding explanations for each hypothesis. Chapter
4, 5 and 6 discuss experimental designs for three studies, including the operationalizations and manipulations of variables, data collection methods, and data analysis and results. Chapter 7 provides general conclusions, discusses theoretical implications and practical implications, and addresses the limitations for the research.
Chapter 2 Literature Review

2.1. Choice Deferral

Consumers make choices every day. Most of the extant literature on decision making focuses on forced choice, where consumers are given a set of options and need to choose one of those alternatives. In this case the choice set does not contain the option not to choose. However, we often observe cases in which consumers do not select anything at all, but rather continue looking for other alternatives. This situation “in which an individual chooses not to choose for the time being” is referred to as choice deferral (Anderson 2003, p. 144).

In recent studies, decision-making researchers have identified some situational factors and individual factors that influence the likelihood that choice deferral will be observed. These studies identify different factors depending on whether the actors have full or partial information regarding the choices. For the full information contexts, decision strategy, time pressure, depletion, feature type, preference fluency, choice for others, age and group size have been identified as factors that impact the likelihood of choice deferral (Chernev 2005; Kim, Khan and Dhar 2007; Dhar 1996; Dhar and Nowlis 1999; Poschecktsova, Amir, Dhar and Baumeister 2009; Chen, Ma and Pethel 2011; Novemsky, Dhar, Schwarz and Simonson 2007; White, Hafenbradl, Hoffrage, Reisen and Woike 2011). Specifically, when two options are relatively equally attractive, then people are more likely to defer choice when asked to use the additive difference rule than when asked to use the lexicographic rule, under time pressure, in the depleted state, the options have complementary features, when subjective experience of difficulty is high, when making a choice for oneself vs. for others, when they are older adults, and when making the decision in a small group. Furthermore, the interaction between need for cognitive closure and
type of judgment task is also related to choice deferral (Kardes, Sanbonmatsu, Cronley and Houghton 2002). In Experiment 3 of their study, Kardes and colleagues showed that participants low in need for cognitive closure are more likely to defer choice when they are assigned to a comparative task condition vis-a-vis a singular task condition, while there is no significant effect of type of judgment task on choice deferral for participants that are high in need for cognitive closure.

For the missing information contexts, making inferences about missing attributes is a key factor for choice deferral. For example, Gunasti and Ross (2009) examined the effects of prompted and unprompted inferences on choice deferral. In five studies, they manipulated the different types of inference making and asked the participants to choose one option or choose none. They demonstrated that prompting consumers to make inferences significantly reduces choice deferral and revealed that prompting inferences decreases the perceived uncertainty, which in turn reduces the probability of choice deferral. Furthermore, they showed that the reduction of choice deferral is positively related to the choice of incomplete options.

Previous research also suggests that perceived uncertainty increases the need to search for information (Crawford 1974; Lanzetta and Driscoll 1968; Ozanne, Brucks and Grewal 1992). Similarly, research in choice deferral has demonstrated that the decision to defer choice and continue searching is affected by the uncertainty of choosing the most preferable option from the given set of alternatives; delaying a decision is taken as a sign of doubt (uncertainty) about which option is best (Dhar 1997; Huber and Pinnell 1994; Tversky and Shafir 1992; Ven, Gilovich and Zeelenberg 2010). Therefore, this perceived uncertainty is the reason for choice deferral (Dhar 1997; Gunasti and Ross 2009; Ven, Gilovich and Zeelenberg 2010).
For example, Dhar (1997) empirically investigated the relationship between consumers’ perceived uncertainty and the likelihood of choice deferral. By offering a no-choice option to examine the effect of perceived uncertainty on choice deferral, he found that the preference construction process resulting in small attractiveness differences among the alternatives increases the choice of the no-choice option. He also identified the two factors affecting choice deferral, namely adding a new alternative or changing the nature of the decision task for the same alternatives. Furthermore, he also determined that perceived uncertainty plays a key role in choice deferral.

Consumer information processing is a critical aspect of decision making and judgment (Newell and Broder 2008; Wyer 2005). We use this rich area to guide our selection of boundary conditions regarding choice deferral. According to the information processing literature, there are four information processing stages: attention, encoding and comprehension, inference, and response processes (Wyer 2008). Motivation, prior knowledge, and cognitive resources are related to all the stages (Chaiken 1980; Petty and Cacioppo 1979; 1981; 1986). In terms of prior knowledge, at the attention stage, consumers pay more attention to the information that is accessible from memory (Wyer 2008). At the comprehension stage, accessible information can be easily retrieved to interpret the given information (Wyer 2008). At the inference stage, consumers’ inference about product information (e.g., quality or price) is influenced by the knowledge accessible at the time of judgment (Wyer 2008). At the responses stage, accessible information from memory combined with situational features determines consumer behavior, for example, individuals primed with thirst-related words drank more water when they did not drink for several hours (Strahan, Spencer and Zanna 2002). In terms of motivation, at the attention stage, motivation makes consumers devote more attention to product information and increases
their information search (Celsi and Olson 1988). At the comprehension stage, motivation makes consumers exert greater cognitive effort and engage in more elaboration of product information (Celsi and Olson 1988). At the inference stage, motivation encourages consumers to make spontaneous inferences about missing product attributes or missing conclusions (Kardes 1988). At the response stage, motivation determines the way that consumers process information, such as in the heuristic mode or the systematic mode (Petty & Cacioppo 1986; Chaiken 1992). In terms of cognitive resources, at the attention stage, cognitive resources increase attention and the limited cognitive resources narrow attention (Erika, Traci and Andrew 2006). At the comprehension stage, an amount of available cognitive resources is required for comprehension and analysis of the message (Coulter and Punj 2004). At the inference stage, cognitive resources can help consumers in making inferences (Wentzel, Tomczak and Herrmann 2010). At the response stage, cognitive resources determine the type of information processing such that more cognitive resources lead to systematic information processing and less cognitive resources lead to heuristic information processing (Petty and Cacioppo 1986; Chaiken 1992). Therefore, need for cognitive closure as a motivational factor, attribute accessibility as a prior knowledge factor, and depletion as a cognitive-resource related factor affect how consumers process information at all the stages.

Although previous studies have identified some situational factors related to choice deferral, most of the studies examined the effect of a single factor on choice deferral and the joint effect of these factors are yet to be understood, especially in the choice condition with missing attribute information. In our study, we provided a more comprehensive framework for the effect of situational factors on the tendency of choice deferral by integrating depletion, need for cognitive closure and attribute accessibility.
2.2. Depletion

Self-control is defined as “the overriding or inhibiting of automatic, habitual, or innate behaviors, urges, emotions, or desires that would otherwise interfere with goal-directed behavior” (Muraven, Shmueli and Burkley 2006, p.524). After exerting self-control, people would experience a “temporary reduction in the self’s capacity or willingness to engage in volitional action” (Baumeister, Bratslavsky, Muraven and Tice 1998, p.1253). This phenomenon is called the depletion effect. For example, dieters ate more food when depleted than they would otherwise (Vohs and Heatherton 2000); depleted people preferred candy over healthful granola bar snacks and selected relatively lowbrow fare instead of highbrow fare such as intellectual or artistic movies (Novemsky, Wang, Dhar and Baumeister 2007); people in the depletion status were more likely to make impulsive purchases (Vohs and Faber 2007).

The depletion effect has been observed in diverse domains, such as organizational research, persuasion research, social influence research, and decision making research. In terms of organizational research, Grandey, Fisk, and Steiner (2005) examined the depletion effect on emotional labor and indicated that employees who engage in emotional labor have poorer performance during subsequent self-control tasks. Furthermore, they suggested that this effect happens very often both for jobs involving emotional regulation and for those requiring complex cognitive processes. In a persuasion study, Burkley (2008) showed that people require self-control resources to resist persuasion and therefore persuasion attempts can deplete the resources, especially when a person is highly engaged by a particular message. Social influence researchers found that taking the perspective of someone using self-control leads participants to spend more money on products, perform worse on a lexical generation task, and have less self-reported self-control abilities; however, merely perceiving someone’s use of self-control
improves one’s willpower (Ackerman, Goldstein, Shapiro and Bargh 2009). Fennis, Janssen and Vohs (2009) developed and tested a two-stage model to account for the role of depletion in the effectiveness of social influence techniques often used to foster compliance with charitable requests. They found that responding to an initial request reduces the use of self-control, thus fostering compliance with the charitable request.

Depletion also plays a vital role in consumer decision making and judgment. Poscheptsova, Amir, Dhar, and Baumeister (2009) investigated the effect of depletion on making a choice and demonstrated that depletion has a systematic influence on decision making. Specifically, depletion makes people rely on intuitive reasoning rather than deliberative information processing. In five studies, participants were first given a self-control task and then were asked to make a choice. The first self-control task involved either an attention regulation task directing participants’ attention away from some sentences shown in a paragraph or a color identification task requiring participants to identify the font color of the words. They found that depletion enhances the choice of the reference-dependent option, weakens the compromise effect, and increases the attraction effect.

In a later study, Wang, Novemsky, Dhar, and Baumeister (2010) examined why making choices depletes self-control resources, thus influencing subsequent choices between a vice (e.g., lowbrow movie) and a virtue (e.g., highbrow movie). Results from four studies showed that making tradeoffs between choices can cause the depletion effect. Furthermore, larger tradeoffs in a choice make the depletion effect in the subsequent choice more pronounced. The results also showed that choice difficulty, which was not related to the tradeoffs, does not account for the depletion effect.
Research has shown that individuals who have fewer self-control resources caused by previous self-control exertions perform worse on the subsequent self-control tasks. Recent work related to depletion has focused on the impact of motivation on the depletion effect (Muraven and Slessareva 2003; Muraven et al. 2006; Baumeister and Vohs 2007). Muraven and Slessareva (2003) first examined the moderating role of motivation in this effect. In particular, depleted participants who believed the task could help others (Study 1) persisted working on a frustrating task longer than depleted participants who did not think so. Depleted participants who believed their efforts could benefit them (Study 2) were less likely to keep persistence on the frustrating task than both non-depleted participants and depleted participants who believed their efforts could. Therefore, the research indicated that the motivation may help depleted individuals compensate for their lack of self-control resources. If depleted participants were not given a sufficient incentive to exert self-control, they performed worse on a subsequent self-control task than non-depleted participants did. In contrast, when motivated, depleted participants performed as well as non-depleted participants.

There are many external motivation methods used to show the same effect. The depletion effect was eliminated when participants were provided with the explanation that performing an initial depletion task would lead to greater performance on the subsequent self-control task, were informed that persistence would improve their skill in an important game, were offered a monetary incentive for greater performance, or were asked to perform the persistence task in front of a mirror (Martijn, Tenbult, Merckelbach, Dreekens and DeVries 2002; Muraven and Slessareva 2003; Baumeister 2005).

Not only can externally-determined motivation affect the degree of depletion, but self-driven motivation can also reduce the depletion effect (Muraven and Baumeister 2000). First of
all, autonomy is one of self-driven motivation factors. Based on self-determination theory, Moller, Deci, and Ryan (2006) examined the moderating role of autonomy in the depletion effect. In the first self-control task, participants were randomly assigned to different choice conditions (autonomous vs. controlled). The results from three studies supported the hypothesis that, while participants in the controlled choice condition are depleted, those in the autonomous choice condition are not. Furthermore, they found that the perceived self-determination is a significant mediator for the relation between the choice conditions and depletion.

Similarly, Muraven, Gagne, and Rosman (2008) investigated the impact of support for autonomy of choice on the depletion effect. In three studies, they observed that depleted participants whose autonomy is supported perform better on a subsequent self-control task than did depleted participants who are pressured. They also showed that subjective vitality mediates this effect: that is, feelings of autonomy support lead to enhanced feelings of subjective vitality, which in turn results in greater self-control performance.

Second, self-monitoring, as an individual self-driven motivation factor, plays an important role in the depletion effect and it can be both situationally induced and directly measured. Wan and Sternthal (2008) examined the depletion effect in terms of a monitoring process and proposed that depleted individuals focus on the resources available for a subsequent self-control task but neglect to monitor their task performance. In four studies, they observed that depleted participants persist for a shorter time on a subsequent self-control task than did non-depleted participants and demonstrated that the depletion effect could be eliminated when participants are informed of time spent on the persistence task. In addition, the depletion effect was observed among those having low, not high, self-monitoring.
Other individual self-driven motivational factors have also been examined in depletion studies. Depletion is positively associated with other orientations (Seeley and Gardner 2003), fluid intelligence (Shamosh and Gray 2007), and immediate consideration of future consequences (Joireman, Balliet, Sprott, Spangenberg and Schultz 2008). The reason for this positive relationship is that people with high levels of these traits have greater motivation to allocate self-control resources in the depletion task; therefore, the depletion effect is observed for them. For example, individuals high in other orientations have high motivation to meet the expectations of others and comply with normative standards, which leads to strong performance in the depletion task, thus these people perform worse on a subsequent self-control task than do their counterparts (Seeley and Gardner 2003).

Baumeister and colleagues developed a strength model of self-control to explain the depletion effect (Baumeister et al., 1998; Baumeister and Heatherton 1996; Baumeister, Vohs and Tice 2007; Muraven and Baumeister 2000; Vohs and Heatherton 2000). The major assumption of this model is that the amount of self-control is limited such that any initial act of self-control depletes the resources used for the subsequent self-control behaviors. In this model, self-control is similar to muscle use. Just as a muscle needs energy to exert force and becomes fatigued after exertion, self-control requires strength and energy to perform as well and becomes depleted after use for a period of time. Because of limited self-control resources, people’s self-control resources become exhausted after an initial self-control behavior, leading to decreased performance on a subsequent self-control task.

On the basis of this strength model, Baumeister et al. (1998) showed that an initial act of self-control, such as resisting temptation or making a choice, decreases performance in a subsequent self-control task (i.e., persistence at a difficult task). Then, they verified that the
effect of depletion indeed affects subsequent self-control performance. Similarly, Muraven et al. (1998) showed that consecutive exertions of self-control lead to poor performance, even in the unrelated domains. In one of their studies, they showed that not thinking about a white bear leads participants to give up more quickly on a subsequent anagram task. In another study, an affect-regulation exercise caused participants to have decreased persistence at squeezing a handgrip. These findings suggest that exertions of self-control deplete the limited resources.

Extending the limited-resource hypothesis supported by the strength model, Muraven et al. (2006) proposed the conservation hypothesis. They argued that individuals actively engaged in resource conservation on subsequent self-control tasks when their resources were depleted. For example, after engaging in an initial depletion task, participants performed a second task and some of them were informed that there was a third task requiring self-control resources. The depletion effect on the second task was most obvious among those who expected the third task, because they conserved some self-control resources for that task. Furthermore, the performance on the third task was related to that of the second task: the fewer self-control resources used on the second task, the better the participants did on the third task. Similarly, studies by Tyler and Burns (2009) have supported this hypothesis, showing that depleted participants expecting another task have impaired performance on the subsequent task. If the second task were more important, the people would have exerted more self-control on it, thereby expending even more of their depleted resources for the second task and retaining even fewer resources for the third task.

The reason why motivation can overcome depletion is that being depleted does not mean a complete loss of self-control resources but only a temporary deficit. Engaging in self-control tasks reduces the self-control resources, leading to increased motivation to conserve resources.
for future needs. In contrast, the motivations and incentives can encourage people to exert their remaining resources for the current task because the goal for the current task is perceived to deserve the effort. Thus, the depletion effect indicates a conservation of a partly depleted resource, rather than a complete incapacity. When the motivation is high, depleted individuals are still willing to exert the cognitive resources for the subsequent self-control task.

2.3. Need for Cognitive Closure

Need for cognitive closure (NFCC) refers to “individuals’ desire for a firm answer to a question and an aversion toward ambiguity” (Kruglanski and Webster 1996, p.264). Due to the nature of NFCC, individuals low in NFCC are more sensitive to information that is difficult to process, such as missing information, because such individuals are more concerned about accuracy than speed. In contrast, individuals high in NFCC are more likely to focus on information that is easy to process, such as heuristic information, and avoid information that is difficult to process, such as missing information.

NFCC not only can be measured as an individual difference variable (Webster and Kruglanski 1994; Kardes, Fennis, Hirt, Tormala and Bullington 2007; Houghton and Grewal 2000) but also can be manipulated situationally (Kardes, Fennis, Hirt, Tormala and Bullington 2007; Webster 1993; Deval 2009). For example, Webster (1993) manipulated NFCC through the expectations. In two studies, participants in the high NFCC condition were told that there would be a second, unrelated task after the first task, but the second task was expected as more attractive than the first task, therefore increasing the motivation to go through the first task quickly. In contrast, participants in the low NFCC condition were told that there would be a
second, unrelated task after the first task, but the second task was expected as less attractive than the first task, leading to high motivation to stay longer on the first task.

This pattern of information processing is consistent, regardless of whether NFCC is manipulated (e.g., time pressure or accountability concerns) or measured (Webster and Kruglanski 1994). As a consequence, as NFCC increases, a wide variety of important judgmental effects increase, such as the primacy effect (Kruglanski Freund 1983, study 1), the stereotyping effect (Kruglanski and Freund 1983, study 2), the anchoring effect (Kruglanski and Freund 1983, study 3), the correspondence bias (Webster 1993), the resistance to persuasion effect (Kruglanski, Webster and Klem 1993), the construct accessibility effect (Ford and Kruglanski 1995), the in-group bias (Shah, Kruglanski and Thompson 1998), the noncomplementarity effect (Houghton and Kardes 1998), the selective hypothesis testing (Kardes, Cronley, Kellaris and Posavac 2004), and the Disrupt-Then-Reframe effect (Kardes, Fennis, Hirt, Tormala and Bullington 2007).

There are two stages of NFCC: seizing and freezing. In the seizing phase, individuals high in NFCC are more likely to seize upon early information and use less information so as to reach closure as quickly as possible (Kruglanski and Freund 1983). After they make a decision, in the freezing phase, they are less willing to spend time and energy processing a large amount of new information. Rather, they base their judgments more on pre-existing attitudes (Ford and Kruglanski 1995; Houghton and Grewal 2000; Kruglanski, Atash, DeGrada, Mannetti, and Webster 1997; Kruglanski, Webster, and Klem 1993; Webster, Richter, and Kruglanski 1995). For example, Hiel and Mervielde (2003) explored the relationship between NFCC and the spontaneous use of complex and simple cognitive structures. In particular, they gave the participants a cue that called for either a complex or a simple solution on a cognitive complexity
task and then used time pressure to manipulate NFCC. They found that participants only
generate complex solutions in the complex cue-no time pressure condition because time
pressure, representing a high NFCC, makes participants use a simple solution to solve the
problem, while no time pressure, inducing a low NFCC, leads to using a complex solution to do
so.

However, for individuals high in NFCC, the desire for simple structures and processing
less information depends on the information given to them in the seizing phase. If the available
information is complete and unambiguous, individuals process less information. However, if the
given information is ambiguous because of missing information, more information processing is
observed because individuals high in NFCC have a strong desire for definite knowledge held
without confusion or discomfort from ambiguity (Kruglanski and Webster 1996; Webster and
Kruglanski 1994). Therefore, for a choice context with missing information, individuals high in
NFCC are more likely to search for additional information to help them achieve closure,
especially for a choice context with missing information. However, individuals low in NFCC are
more likely to spend time learning the structure of a choice context and use different information
processing strategies to make spontaneous inferences.

2.4. Attribute Accessibility

Attribute accessibility, which refers to the ease to which an attribute can be retrieved
from memory, plays an important role in consumer judgment and choice, especially for a mixed
choice task (Baker and Lutz, 1988; Biehal and Chakravarti 1983; Feldman and Lynch, 1988;
Kisielius and Sternthal 1984; Lynch and Srull 1982; Tybout, Sternthal, Malaviya, Bakamitsos
and Park 2005). Lynch and Srull (1982) first pointed out the role of memory-based choice and
later, for example, Biehal and Chakravarti (1983) showed that attribute accessibility is a moderator of consumer choice: the brands with accessible information are more likely to be chosen and those with inaccessible information are less likely to be chosen.

The accessibility-diagnosticity model developed by Feldman and Lynch (1988) provides a useful framework for explaining the effect of attribute accessibility on choice. In this model, there are three components to determine the likelihood of any information used for a subsequent decision making: (1) the accessibility of an input in memory; (2) the accessibility of alternatives; (3) the diagnosticities of the input and alternatives. Based on this framework, Lynch, Marmorstein and Weigold (1988) investigated the use of recalled attributes vs. the use of prior overall evaluations on the choice between a remembered brand and a new stimulus brand. They conducted two studies: the first one for accessibility effect, the second one for diagnosticity effect. In study 1, participants were asked to complete a three-stage task. At time 1, participants were given attribute information about several brands of color televisions from Consumer Reports and were asked to evaluate each of them. At time 2, participants were randomly assigned to conditions with different levels of accessibility, which was manipulated by retroactive interference, and then were asked to make a choice between one of the previously evaluated brands and a new brand. At time 3, participants were measured about their recalls about the original brand evaluation and its attribute information from Consumer Reports at Time 1. The results from study 1 showed that recalled attribute information is used to make a choice when that it is accessible, but not when it is inaccessible.

In study 2, participants were also asked to complete a three-stage task. At time 1, participants received attribute information about home electronics products with three categories: microwave ovens, color televisions, and AM/FM radio/cassette type players, four brands for
each category. They were instructed to examine carefully the four brands in each category because they would be asked to choose one from two brands later, and also were asked to rate the brands on quality and value for money. At time 2, some of participants were asked to make a choice between two brands from one of the three categories and then were asked to complete a recall task for a different product category about their ratings and their thoughts about brands. At time 3, participants were asked to provide their recalls about attribute information and ratings and to complete a recognition task about different brands. Results from study 2 showed that overall evaluations are used as inputs to choice when they are diagnostic, not when they are non-diagnostic.

Gardial, Schumann, Smith and Petkus (1993) examined the effect of memory set accessibility and relevance on the product choice. The difference is their research emphasized the relative accessibility across memory brands, rather than accessibility about an individual brand. Replicating the previous results, they demonstrated that when the memory brands are accessible, their perceived relevance determines their retrieval and processing. More interestingly, they found that when the compared brand in memory is not accessible, the processing of all the brands including the accessible and relevant ones is decreased.
Chapter 3 Hypothesis Development

NFCC is likely to be important for depleted and non-depleted individuals to make decision. It is even more important for depleted individuals to exert themselves on the subsequent self-control task, such as making a choice in the context with missing information, because being depleted leads to less willingness to complete such a self-control task (Muraven and Slessareva 2003).

High NFCC individuals tend to seize on the most accessible information to form opinions on an unknown issue as quickly as possible and freeze that opinion once it is made (Zavala and Bergh 2007). For example, Kruglanski, Webster, and Klem (1993) investigated the interaction between NFCC and presence versus absence of an informational base on persuasion and they showed that with the information base, high NFCC individuals were more resistant to persuasion, however, without it, they were less resistant to persuasion. The underlying reason for that is the information base can help high NFCC individuals reach their closure quickly and they seize on such base, rather continue search other information, to make judgment; Without such base, they are open to any closure-related information, including the one offered by the persuader. Similarly, in our study, attribute accessibility is an information basis for high NFCC individuals to make a choice. When the attribute accessibility is high, high NFCC individuals have a solid information base for their judgments and decisions, and thus they are more likely to freeze. When the attribute accessibility is low, high NFCC individuals do not have a solid information base to make judgments and thus they are more likely to seize. However, missing attribute information makes high NFCC individuals difficult to reach closure, thus they are more likely to deferral choice and search for more attribute information. Consequently, in the high
NFCC condition, the likelihood of choice deferral for both depleted and non-depleted individuals depends on attribute accessibility.

Depletion leads to less willingness to exert effort to a subsequent self-control task, such as making a choice, and this lower involvement in the choice task decreases the likelihood of using attribute information to make judgment, thus the effect of attribute accessibility on choice deferral is much stronger for non-depleted individuals than depleted individuals. That is, non-depleted individuals are more sensitive to the attribute accessibility than depleted individuals are. Specifically, with accessible attribute information, non-depleted individuals are less likely to defer choice than depleted individuals are. In contrast, without accessible attribute information, both depleted and non-depleted individuals tend to defer choice and there is no significant difference in choice deferral between them. Therefore, we expect to observe the depletion effect in the high attribute-accessibility condition. However, there is no difference in choice deferral between depleted and non-depleted individuals in the low attribute-accessibility condition.

**H1a (Depletion Effect):** When NFCC is high, depleted (vs. non-depleted) individuals are more likely to defer choice in the high attribute-accessibility condition. However, there is no difference in choice deferral between them in the low attribute-accessibility condition.

A low NFCC makes both depleted and non-depleted individuals involved in the choice task and tend to carefully examine all available attribute information to make judgments. Non-depleted individuals are more likely to base on both accessible and inaccessible attribute information to make a choice among options with the missing attribute information. However, because depletion leads to fewer cognitive resources and making a choice consumes such resources, when highly involved in the choice task, depleted individuals might experience greater
difficulty making comparison among the options (DeWall, Baumeister, and Masicamp 2008). Such difficulty leads to low-effort decision (Danziger, Levav, and Avnaim-Pesso 2011; Gallagher, Fleeson, and Hoyle 2011): depleted individuals are more likely to rely on the accessible attribute information, rather than on both accessible and inaccessible attribute information. Thus the effect of attribute accessibility on choice deferral is much stronger for depleted individuals than non-depleted individuals. That is, depleted individuals are more sensitive to attribute accessibility than non-depleted individuals. Specifically, with accessible attribute information, both depleted and non-depleted individuals tend to make a choice, rather than defer choice, and there is no significant difference in choice deferral between them. In contrast, without accessible attribute information, depleted individuals are more likely to defer choice and look for more attribute information than non-depleted individuals are. Therefore, we expect to observe the depletion effect in the low attribute-accessibility condition. However, there is no difference in choice deferral between depleted and non-depleted individuals in the high attribute-accessibility condition.

**H1b (Depletion Effect):** When NFCC is low, depleted (vs. non-depleted) individuals are more likely to defer choice in the low attribute-accessibility condition. However, there is no difference in choice deferral between them in the high attribute-accessibility condition.

The degree of cognitive effort determines making inferences about missing attribute information in a choice context (Creyer and Ross 1993), thus depletion as a factor affecting effort-laden cognitive processing is related to spontaneous inference. Because motivation and prior knowledge have been identified as key antecedents of making spontaneous inferences about the missing attribute information (Broniarczyk and Alba 1994; Kardes 1988; Lee and Olshavsky
1995; Stayman and Kardes 1992), the need for cognitive closure as a motivation factor and attribute accessibility as a prior knowledge factor are related to spontaneous inference. Specifically, compared with low depletion, high depletion makes individuals feel like they do not have enough resources to complete the subsequent decision making task and thus are less likely to exert themselves to infer the missing value (Baumeister, Bratslavsky, Muraven and Tice 1998). A low NFCC makes individuals tend to examine all the information, including missing information, to make a decision; thus individuals with a low NFCC are more likely to make a spontaneous inference about missing attribute information. In contrast, because individuals high in NFCC treat ambiguous information (e.g., missing information) as aversive, such individuals avoid considering such information and search for more information to make a decision, therefore leading to then being less likely to make a spontaneous inference about missing attribute information (Webster and Kruglanski 1994). Accessible attribute information provides individuals an opportunity to consider a choice context more carefully, thus boosting a spontaneous inference about missing attribute information. In contrast, inaccessible attribute information makes individuals less able to make a spontaneous inference about missing attribute information (Dick, Chakravarti, and Biehal 1990). Therefore, the joint effect of depletion, NFCC and attribute accessibility on spontaneous inference should be observed, and if a spontaneous inference is made, the perceived uncertainty may be reduced and this reduced perceived uncertainty may decrease the likelihood of choice deferral (Gunasti and Ross 2009).

**H2 (Mediation Effect):** The effects in H1a and H1b are mediated by spontaneous inference and perceived uncertainty, such that spontaneous inference reduces perceived uncertainty and that the reduced perceived uncertainty then decreases the likelihood of choice deferral.
Chapter 4 Experiment 1

Experiment 1 was designed to investigate the interaction effect of depletion, NFCC and attribute accessibility on choice deferral in the choice context with missing information. We expect that depletion effect occurs under the conditions of low NFCC/low attribute accessibility and high NFCC/high attribute accessibility such that depleted (vs. non-depleted) individuals are more likely to defer choice in such conditions.

4.1.Methods

Participants and Design. The study employed a 2 (depletion: low vs. high) × 2 (NFCC: low vs. high) × 2 (attribute accessibility: low vs. high) between-subject design. One hundred and twenty undergraduate students at a northwestern university participated in the study for extra course credit and were randomly assigned to one of eight conditions.

Procedure and Materials. A group of 6 to10 participants were seated in a conference room and were told that the purpose of the study is to investigate consumer perceptions of different products. They received a package with two tasks: a depletion task and a choice task. The package contained instructions for manipulating depletion, NFCC and attribute accessibility.

After completing attribute accessibility manipulation, all participants were asked to write down their ideas and thoughts about the laptops when they were reading the product attribute information about them. Then participants were asked to imagine going to the website of the retailer and provided choice sets consisting of two available laptops, one of which had an important missing attribute. After reading the information on the product attributes, participants were asked to choose either one of the options or none of them, hence deferring choice.
Next, participants filled out the dependent variables and the NFCC scale (Kardes, Fennis, Hirt, Tormala and Bullington 2007). Finally, participants were asked to provide basic demographic information, such as educational status, age and gender.

**Independent Variables.** Participants first completed a depletion task previously used in self-regulation research (Baumeister, Bratslavsky, Muraven and Tice 1998). Participants were given a packet labeled “Perceptual Accuracy Task, “consisting of two unrelated pages of text from a statistics textbook. One page was labeled Task 1 and the other was labeled Task 2. In Task 1, all the participants were instructed to cross out every letter “e” in the text within 5 minutes. Task 2 included the depletion manipulation. Participants in the low depletion condition were instructed to cross out the letter “e” again as they did in Task 1. Participants in the high depletion condition, however, were instructed to cross out each “e” in the text, except when another vowel follows the “e” in the same word (e.g., “read”) or when a vowel is one letter removed from the “e” in either direction (e.g., “vowel”). Both groups of participants also had 5 minutes to complete the Task 2.

The NFCC was manipulated through expectations for the joint task (Webster 1993; Deval 2009). That is, participants in the high NFCC condition were informed that, after a choice task, there was a joint study with the Electronic Media Division of the College-Conservatory of Music (CCM) at the University of Cincinnati (UC) to investigate the role of humor in new media. Participants in the low NFCC condition were informed that, after a choice task, there was a joint study with the Mathematics Department at UC to investigate student awareness of advanced mathematical notions.
Following the NFCC manipulation, all participants were asked to read a catalog from an electronics retailer consisting of eight products, each carried by three different brands, and were asked to imagine that they were considering buying a laptop as their best friend’s birthday gift. Based on the attribute accessibility manipulation by Gunasti and Ross (2009), we modified the attribute accessibility manipulation in our study. Participants in the high attribute-accessibility condition were asked to memorize attribute information on the catalog as much as possible within 2 minutes. However, participants in the low attribute-accessibility condition were asked to read the attribute information on the catalog within 2 minutes but did not have memorization instructions.

**Dependent Measures.** The main dependent variable was whether or not participants made a choice and was coded as 1 for deferring a choice and 0 for making a choice. The inferred value of the missing attribute was checked as well and coded as 1 for making a spontaneous inference and 0 for not making a spontaneous inference.

**Additional Measures.** Product knowledge was measured on a 7-point scale (1 = not knowledgeable at all; 7 = extremely knowledgeable). Additional items for checking manipulation of depletion measured how much participants enjoyed the depletion task, how difficult they found the task, how tired they felt after completing the task, how interesting the task was, and how much effort they put into the task on a 7-point scale anchored by 1= not at all (e.g., not at all enjoyable) and 7=very much (e.g., very much enjoyable).

**4.2. Results and Discussion**

**Manipulation checks and checks for confounding.** After being reversely coded, five items (α = 0.72) used to check the manipulation for depletion were averaged to form a depletion score
and showed that participants in the high depletion condition had a higher depletion score $(M = 5.10, SD = 1.45)$ than those in the low depletion condition did $(M = 4.61, SD = 1.1)$, $t(118) = 2.103$, $p < 0.05$. Six items ($\alpha = 0.78$) used to check the manipulation for NFCC were averaged to form a NFCC score and showed that participants in the high NFCC condition reported higher NFCC score $(M = 3.97, SD = 0.73)$ than those in the low NFCC condition did $(M = 3.68, SD = 0.67)$, $t(118) = -2.24$, $p < 0.05$. One item to capture product knowledge was used as a product knowledge score and an ANOVA using the product knowledge score showed that there was no significant difference across eight experimental conditions ($F(7, 120) = 0.605, NS$). Therefore, the manipulations for depletion and NFCC were successful and product knowledge did not confound the results.

*Choice Deferral.* A logistic regression was performed, where the dependent variable was whether or not participants make a choice (1 = no choice; 0 = choice of any available option) and independent variables were depletion (1 = high; 0 = low), NFCC (1 = high; 0 = low) and attribute accessibility (1 = high; 0 = low). The overall model was significant ($x^2(7) = 46.3, p < 0.01$). There were a significant effect of depletion ($\beta = 1.37, Wald x^2 = 5.88, p < 0.05$) and two marginal effects of NFCC ($\beta = 1.08, Wald x^2 = 3.53, p = 0.06$) and attribute accessibility ($\beta = -1.23, Wald x^2 = 3.84, p = 0.05$). In addition, there was a significant two-way interaction effect of depletion and NFCC ($\beta = 1.68, Wald x^2 = 4.50, p < 0.05$). More importantly, there was a significant three-way interaction effect of depletion, NFCC and attribute accessibility ($\beta = -3.26, Wald x^2 = 4.382, p < 0.05$). The result pattern is represented in Figure 1.

According to our predictions, there was a significant difference in the probability of choice deferral between depleted and non-depleted individuals under the high attribute
accessibility/high NFCC condition and under the low attribute accessibility/low NFCC condition. As expected, the depletion effect was observed in those conditions. In particular, under the high NFCC/high attribute accessibility condition, depleted participants were more likely to defer choice than were non-depleted participants ($M = 30.8\%$ vs. $11.1\%$, $t (29) = 4.26$, $p<0.01$). However, there was no significant difference in choice deferral between them in the low attribute-accessibility condition ($M = 45.4\%$ vs. $38.9\%$, $t (29) = 0.98$, $ns.$). Under the low NFCC/low attribute accessibility condition, depleted participants were more likely to defer choice than were non-depleted participants ($M = 52.7\%$ vs. $24.6\%$, $t (26) = 5.361$, $p<0.01$). However, there was no significant difference in choice deferral between them in the high attribute-accessibility condition ($M = 6.9\%$ vs. $5.9\%$, $t (28) = 0.88$, $ns.$). Therefore, the results support hypothesis H1a and H1b.

The results in experiment 1 supported our hypothesis H1a and H1b. Specifically, when NFCC was high, the depletion effect was observed in the high attribute accessibility condition. When NFCC was low, the depletion effect was observed in the low attribute-accessibility condition. Furthermore, participants’ product knowledge had no effects on deferral.
Chapter 5 Experiment 2

The main purpose of experiment 2 was to examine the mediating roles of spontaneous inference and perceived uncertainty on the depletion effect, such that the interaction of depletion, NFCC and attribute accessibility can induce spontaneous inference, and the spontaneous inference reduces perceived uncertainty, which in turn decreases the probability of choice deferral. We also attempted to increase the generalizability of the results in the experiment 1 by making the following changes. First, we adopted a different manipulations and operationalizations for depletion and measured rather than manipulated NFCC. Second, we used a different target product in this experiment: here, we used a digital camera as a target product.

5.1.Methods

Participants and Design. The study employed a 2 (depletion: low vs. high) × 2 (NFCC: low vs. high) × 2 (attribute accessibility: low vs. high) between-subject design. One hundred and seventy-eight undergraduate students at a northwestern university participated in the study for extra course credit and were randomly assigned to one of eight conditions.

Procedure and Materials. A group of 6 to 10 participants were seated in a conference room and were told that the purpose of the study was to investigate consumer perceptions of different products. They received a package with two tasks: a depletion task and a choice task. The package contained instructions for manipulating depletion and attribute accessibility.

After completing attribute accessibility manipulation, all participants were asked to write down their ideas and thoughts about the digital camera when they were reading the product attribute information about them. Then participants were asked to imagine going to the website
of the retailer and provided choice sets consisting of two available digital cameras, one of which had an important missing attribute. After reading the information on the product attributes, participants were asked to choose either one of the options or none of them, hence deferring choice.

Next, participants filled out the dependent variables and the brief NFCC scale (Kardes, Fennis, Hirt, Tormala and Bullington 2007). Finally, participants were asked to provide basic demographic information, such as educational status, age and gender.

**Independent Variables.** The depletion task has been adapted from Webb and Sheeran (2003), based on the Stroop (1935) self-regulation task. Participants were presented with a spelled-out color name on a computer screen (e.g., “yellow”, “red”, “green”, “blue”) and that was displayed in a mismatching font color. For instance, the word “green” might be written out in a red font. On the keyboard were six buttons that corresponded to six colors used in the study. The names of the colors on the buttons were written in a black font.

Participants in the low depletion condition were instructed to click the button that corresponded to the literal meaning of the written word, not its font color. Participants in the high depletion condition were instructed to click the button matching the color of the font and not the word’s literal meaning. Thus, when the word “green” was presented in red, participants in the low depletion condition were supposed to choose “green”; however, participants in the high depletion condition were supposed to choose “red” as their response. The Stroop (1935) test relies on the fact that, for the latter task, one has to override one’s initial tendency to read the literal meaning of the word and say its color instead. Hence, the participants must self-regulate themselves and say the font color, to override the first response of naming the word itself. All
participants must click the appropriate button as fast as they can for 40 words; afterward, they received feedback on the speed and the correctness of their responses.

Following the depletion manipulation, all participants were asked to read a catalog from an electronics retailer consisting of eight products, each carried by three different brands, and were asked to imagine that they were considering buying a digital camera as their best friend’s birthday gift. Like experiment 1, participants in the high attribute-accessibility condition were asked to memorize attribute information on the catalog as much as possible within 2 minutes. However, participants in the low attribute-accessibility condition were asked to read the attribute information on the catalog within 2 minutes but did not have memorization instructions.

**Dependent Measures.** The main dependent variable was whether or not participants make a choice and was coded as 1 for deferring a choice and 0 for making a choice. The perceived uncertainty on a 10-point scale (1 = extremely certain; 10 = extremely uncertain) before making a choice among the available options and no-choice option was measured. The inferred value of the missing attribute was checked as well and coded as 1 for making a spontaneous inference and 0 for not making a spontaneous inference Gunasti and Ross (2009).

**Additional Measures.** Product knowledge was measured on a 7-point scale (1 = not knowledgeable at all; 7 = extremely knowledgeable). According to Wheeler, Brinol and Hermann (2007), additional items for checking manipulation of depletion measured how much participants enjoyed the depletion task, how difficult they found the task, how tired they felt after completing the task, how interesting the task was, and how much effort they put into the task on a 7-point scale anchored by 1= not at all (e.g., not at all enjoyable) and 7=very much (e.g., very
much enjoyable). In addition, the time and the error rate for each screen of the Stroop task were measured.

5.2. Results and Discussion

*Manipulation checks and checks for confounding.* After being reversely coded, five items ($\alpha = 0.69$) used to check the manipulation for depletion were averaged to form a depletion score and showed that participants in the high depletion condition had a higher depletion score ($M = 4.08, SD = 1.11$) than those in the low depletion condition did ($M = 3.25, SD = 1.20$), $t(174) = 4.71, p < 0.05$. In addition to check manipulation for depletion, time and the error rate for each screen of the Stroop task were measured and showed that participants in the high depletion condition responded slower than those in the low depletion condition did (2.80 vs. 2.62 seconds; $t(175) = 2.55, p < 0.05$) and they also made more errors about the color (2.3% vs. 1.9%), though there was no significant difference between two conditions. Evidence of a successful manipulation for attribute accessibility was examined by checking the number of attribute-related thoughts generated after reading the product catalog. A t test showed that the average number of attribute-related comments was higher in the high attribute accessibility condition than in the low attribute accessibility condition (3.73 vs. 2.02, $t(174) = 14.163, p<0.01$). One item to capture product knowledge about digital camera was used as a product knowledge score and an ANOVA using the product knowledge score showed that there was no significant difference across eight experimental conditions ($F(7, 176) = 0.078, n.s.$). Therefore, the manipulations for depletion and attribute accessibility were successful and product knowledge was not an alternative explanation for the results.
**Choice Deferral.** A logistic regression was performed, where the dependent variable was whether or not participants make a choice (1 = no choice; 0 = choice of any available option) and independent variables were depletion (1 = high; 0 = low), attribute accessibility (1 = high; 0 = low) and a continuous NFCC index. The overall model was significant ($x^2(7) = 45.6, p < 0.01$). There were two significant main effects of depletion ($\beta = 1.69, Wald x^2 = 4.45, p < 0.05$) and NFCC ($\beta = 2.30, Wald x^2 = 4.55, p < 0.05$). In addition, there were two significant two-way interaction effects of depletion and NFCC ($\beta = 3.31, Wald x^2 = 5.59, p < 0.05$) and of NFCC and attribute accessibility ($\beta = -3.13, Wald x^2 = 4.87, p < 0.05$). More importantly, there was a significant three-way interaction effect of depletion, NFCC and attribute accessibility ($\beta = -4.36, Wald x^2 = 3.90, p < 0.05$). The result pattern is represented in Figure 2.

To decompose the three-way interaction of depletion, attribute accessibility, and NFCC, a median split was performed on NFCC index (1 = high; 0 = low). According to our predictions, there was significant difference in the probability of choice deferral under the high attribute accessibility/high NFCC condition and under the low attribute accessibility/low NFCC condition. As expected, the depletion effect was observed in those conditions. In particular, under the high NFCC condition, depleted participants were more likely to defer choice than were non-depleted participants in the high attribute-accessibility condition ($M = 8.8\%$ vs. $6.3\%, t (43) = 3.04, p<0.05$). However, there was no significant difference in choice deferral between them in the low attribute-accessibility condition ($M = 10.1\%$ vs. $11.2\%, t (40) = -0.35, ns.$). Under the low NFCC condition, depleted participants were more likely to defer choice than were non-depleted participants in the low attribute-accessibility condition ($M = 25.9\%$ vs. $10.6\%, t (42) = 19.89, p<0.01$). However, there was no significant difference in choice deferral between them in
the high attribute-accessibility condition ($M = 4.6\%$ vs. $4.9\%, t(43) = -1.26, ns.$). Therefore, the results support hypothesis H1a and H1b.

Mediators. The main purpose of this study was to investigate the mediating roles of spontaneous inferences and perceived uncertainty. We conducted a path analysis by using AMOS to test the mediation effect of spontaneous inference and perceived uncertainty for the joint effect of depletion, NFCC and attribute accessibility on the likelihood of choice deferral. In this model, the independent variables were depletion (1 = high; 0 = low), NFCC (1 = high; 0 = low) and attribute accessibility (1 = high; 0 = low), the mediators were spontaneous inferences (0 = not making a spontaneous inference; 1 = making a spontaneous inference) and perceived uncertainty (1 = extremely certain; 10 = extremely uncertain), and the dependent variable was the probability of choice deferral. The Chi-Square Statistic, the Normed Fit Index (NFI), and Steigers Root Square Error of Approximation (RMSEA) were used to estimate the model fit. The larger p value associated with Chi-Square Statistic indicates the better fit of the model to the data (Bollen 1989, Loehlin 1998). NFI of greater than 0.9 indicates the good fit of the model to the data. A RMSEA of less than 0.1 indicates the good fit of model (Loehlin 1998). There are three models: the first model with two mediators of spontaneous inference and uncertainty; the second model with spontaneous inference only as a mediator; the third model with uncertainty only as a mediator. For the first model, the Chi-Square is 2.93 ($p = 0.134$), NFI is 0.96, and RMSEA is 0.052. For the second model, the Chi-Square is 4.19 ($p = 0.04$), NFI is 0.67, and RMSEA is 0.135. For the third model, the Chi-Square is 2.59 ($p = 0.108$), NFI is 0.85, and RMSEA is 0.095. Therefore, the first model with two mediators is the best model.

The results for the first path model showed that the direct effect of interaction between depletion, NFCC and attribute accessibility on the probability of choice deferral was not
significant when the spontaneous inference and perceived uncertainty were included in the model (see Figure 3). Therefore, the findings, which illustrated the mediating roles of spontaneous inference and perceived uncertainty, supported hypothesis 2.

The results in experiment 2 replicated the results in experiment 1. Specifically, depleted individuals were more likely to defer choice in the high NFCC/high attribute-accessibility condition and in the low NFCC/low attribute accessibility condition. In experiment 2, we also revealed the underlying mechanism of the effect observed in experiment 1 by conducting a mediation analysis for testing the effect of spontaneous inference and perceived uncertainty. The results showed that spontaneous inference and perceived uncertainty were the mediators: when the joint effect of depletion, NFCC and attribute accessibility increased the spontaneous inference, the perceived uncertainty was reduced and then the reduced uncertainty decreased the probability of choice deferral; when this joint effect decreased the spontaneous inference, perceived uncertainty increased and then this uncertainty increased the probability of choice deferral.
Chapter 6 Experiment 3

In experiment 3, we adopted a different manipulation for depletion and used a different measure for NFCC. In addition, we selected a new variable: status quo. It is related to choice deferral because the preference for the status quo could be a reason for choice deferral (Anderson 2003; Dhar 1997). Thus, the purpose of experiment 3 was to examine the joint effect of depletion, NFCC, and the status quo on choice deferral. High NFCC appears to motivate individuals to preserve the status quo (Calgoero, Bardi, and Sutton 2008; Golec 2001, 2002a, 2002b), because high NFCC tends to make them freeze on any firm knowledge from the status quo and choosing the alternatives could induce the risk or uncertainty they try to avoid (Mannetti, Pierro, and Kruglanski 2007). However, because depletion leads to low involvement in the decision making task (Muraven and Slessareva 2003), depleted individuals tend to spend less time and effort comparing the options to make a decision, regardless of the status quo. Thus, the effect of the status quo on choice deferral is stronger for non-depleted individuals than depleted individuals. Specifically, if the status quo increases the tendency to make a choice, non-depleted individuals are less likely to defer choice than are depleted individuals. If the status quo increases the tendency to defer choice, an increase in the probability of choice deferral is greater for non-depleted individuals than depleted individuals, leading to small difference in choice deferral between them. Therefore, we expect to observe the depletion effect in the former condition.

In contrast, low NFCC makes individuals relatively open to change and thus comfortable with changing the status quo (Mannetti, Pierro, and Kruglanski 2007). Thus, low NFCC tends to make individuals carefully process information to make decisions, which increases the
probability of comparing different choice options. Compared with non-depleted individuals, depleted individuals have fewer cognitive resources and therefore are more likely to make low-effort decision (Danziger, Levav, and Avnaim-Pesso 2011; Gallagher, Fleeson, and Hoyle 2011). In addition, it does not take much effort to choose the status quo option and departure from the status quo requires much effort, thus depleted individuals are more sensitive to status quo effect and are more likely to prefer the status quo option (Anthony, Dillon, Goldin, and Krueger 2011). Therefore, the effect of the status quo on choice deferral is stronger for depleted individuals than for non-depleted individuals. Specifically, if the status quo increases the tendency to make a choice, the decrease in the probability of choice deferral is greater for depleted individuals than for non-depleted individuals, leading to a minute difference in choice deferral between them. However, if the status quo increases the tendency to defer choice, depleted individuals are more likely to defer choice than are non-depleted individuals, leading to a significant difference in choice deferral between them. Therefore, we expect to observe the depletion effect in the latter condition.

6.1.Methods

Participants and Design. The study employed a 2 (depletion: low vs. high) × 2 (NFCC: low vs. high) ×2 (status quo: replace vs. keep) between-subject design. One hundred and fifty-six undergraduate students at a northwestern university participated in the study for extra course credit and were randomly assigned to one of eight conditions.

Procedure and Materials. A group of 6 to10 participants were seated in a conference room and were told that the purpose of the study was to investigate consumer perceptions of
different products. They received a package with two tasks: a depletion task and a choice task. The package contained instructions for manipulating depletion and status quo.

After completing the depletion manipulation, participants were asked to rate their current feelings. Following the mood measures, there was a status quo manipulation. Participants were then exposed to choice sets consisting of two disparate tablet computers, with three attributes each, which had been recently introduced into the market. However, only one of the options had one missing attribute. The other option had complete attribute information. After reading the information on the product attributes, participants were asked to choose either one or none of the options.

Next, participants were asked to respond to the measures about NFCC (Houghton and Grewal 2000), implicit theories about willpower (Job, Dweck and Walton 2010) and dispositional self-control (Ein-Gar and Steinhart 2011). Finally, participants were asked to provide basic demographic information, such as educational status, age and gender.

**Independent Variables.** Following the depletion manipulation previously used by Schmeichel (2007) and Pocheptsova et al. (2009), participants were asked to write a one-page essay describing their daily activities. Participants in the low depletion condition were instructed not to use words containing the letters “x” or “z”. However, participants in the high depletion condition were instructed not to use words containing the letters “n” or “a”. This depletion manipulation requires participants to use substitute words for the words that contain very common English letters.

Based on the status-quo manipulation in the previous study (Tetlock and Boettger 1994), manipulation for the status quo was modified in this study. Half of the participants were asked to
imagine that their laptop is working fine and they must decide whether or not they should keep their current brand of laptop (in the keep condition) and the other half of participants were asked to imagine that their laptop is not working properly and they must decide whether or not they should replace their current brand of laptop (in the replace condition).

The individual difference characteristic in NFCC was measured by using 20 items developed by Houghton and Grewal (2000) on a six-point scale (1 = strongly disagree to 6 = strongly agree). Sample items include: “I usually make important decisions quickly and confidently,” “I feel uncomfortable when I don’t understand the reason why an event occurred in my life,” and “I like to have a place for everything and everything in its place.”

Dependent Measures. The main dependent variable was whether or not participants made a choice and was coded as 1 for deferring a choice and as 0 for making a choice.

Additional Measures. After the depletion manipulation, participants’ current mood was measured on 7-point bipolar scales: sad-happy, unpleasant-pleasant, bored-excited, and drowsy-alert (Carnevale and Isen 1986). Dispositional self-control was measured by using a short version of the Dispositional Self-Control scale (Ein-Gar, Goldenberg and Sagiv 2008; Ein-Gar and Steinhart 2011), which contains two items: “I am able to work effectively toward long-term goals while resisting temptations along the way,” and “Usually, when something tempts me, I manage to resist the temptation,” on a 6-point scale (1 = strongly disagree and 6 = strongly agree). Individual differences in implicit theories about willpower were measured by using 12 items developed by Job, Dweck and Walton (2010) on a 6-point scale (1= strongly disagree to 6 = strongly agree). Sample items include: “After a strenuous mental activity, you feel energized for further challenging activities,” “Resisting temptations makes you feel more vulnerable to the
next temptations that come along,” and “When situations accumulate that challenge you with
temptations, it gets more and more difficult to resist the temptations.” Product knowledge was
measured on three YES/NO questions by asking “Do you have a smart phone?”, “Do you have a
tablet computer?” and “Do you have a laptop?” According to Wheeler, Brinol and Hermann
(2007), additional measures included the items for checking manipulation of depletion: how
much participants enjoyed the depletion task, how difficult they found the task, how tired they
felt after completing the task, how interesting the task was, and how much effort they put into the
task on a 7-point scale anchored by 1 = not at all (e.g., not at all enjoyable) and 7 = very much
(e.g., very much enjoyable).

6.2. Results and Discussion

Manipulation checks and checks for confounding. Five items (α = 0.70) used to check
the manipulation for depletion were reversely coded, and then averaged to form a depletion
index and this index was submitted to two depletion conditions, showing that participants in the
high depletion condition had a higher depletion score (M = 5.95, SD = 1.10) than those in the
low depletion condition did (M = 3.95, SD = 1.40), t(154) = 9.912, p < 0.01). Since mood,
dispositional self-control, and implicit theories about willpower are related to the depletion effect
respectively, we measured these variables to exclude the alternative explanations for the
observed effect. After being reversely coded, four items (α = 0.69) used to measure the
participants’ current mood were averaged to form a mood index. We submitted the mood index
to a regression analysis with depletion, NFCC index and status quo as the independent variables.
The result revealed that there were no effects of the independent variables (all ps > 0.1). Two
items (α = 0.73) used to measure the dispositional self-control were averaged to form a self-
control index and the index was submitted to a regression analysis with three independent
variables. The results revealed that there were no effects of independent variables (all ps > 0.1). After being reversely coded, twelve items (α = 0.77) used to measure individuals’ implicit theories about willpower were averaged to form a willpower index. We submitted this index to a regression analysis with three independent variables. The result revealed that there were no effects of the independent variables (all ps > 0.1). Three items to capture product knowledge about tablet computers were used as a product knowledge score (1 = Yes; 0 = No) and a logistic regression with three independent variables was conducted. The results showed there were no effects of the independent variables (all ps > 0.1). Therefore, the manipulation for depletion was successful, and mood, self-control, implicit theories about willpower and product knowledge did not have impact on the results.

Choice Deferral. In this study, NFCC was measured by 20 items with reliability of 0.74 and after reverse coding was made on NFCC items, the average score of NFCC was used to form a NFCC index for all the analyses. A full-factorial logistic regression was performed, where the dependent variable was whether or not participants make a choice (1 = no choice; 0 = choice of any available option) and independent variables were depletion (1= high; 0 = low), status quo (0= replace; 1= keep) and NFCC index. The overall model was significant ($\chi^2(7) = 37.9, p < 0.01$). There were two significant main effects of depletion ($\beta = 2.36, Wald x^2 = 6.30, p < 0.01$) and NFCC ($\beta = 3.17, Wald x^2 = 12.37, p < 0.01$). In addition, there were two significant two-way interaction effects of depletion and NFCC ($\beta = 3.14, Wald x^2 = 6.86, p < 0.01$) and of status quo and NFCC ($\beta = 3.136, Wald x^2 = 7.67, p < 0.01$). More importantly, there was a significant three-way interaction effect of depletion, status quo, and NFCC ($\beta = 2.96, Wald x^2 = 3.94, p < 0.05$).
To decompose the three-way interaction of depletion, status quo, and NFCC, a standardized-deviation based split was performed on NFCC index. That is, participants were classified into the high NFCC condition (+1 SD or more) or the low NFCC condition (-1 SD or more). In the low NFCC condition, there was a significant interaction effect between depletion and status quo on choice deferral ($F(1,29) = 7.011, p < 0.05$). Specifically, for the depleted participants, there was a significant difference in the choice deferral between the keep condition and the replace condition ($M = 59.5\%$ vs. $39.8\%, t(9) = 2.502, p<0.05$); however, there is no significant difference in the choice deferral between the two conditions for the non-depleted participants ($M = 38.9\%$ vs. $37.8\%, t(19) = 0.244, ns.$). That means depleted individuals were more sensitive to the status quo effect. In addition, depleted participants were more likely to defer choice than were non-depleted participants in the keep condition ($M = 59.5\%$ vs. $38.9\%, t(9) = 2.994, p<0.05$). However, there was no significant difference in choice deferral between them in the replace condition ($M = 39.8\%$ vs. $37.9\%, t(16) = 0.399, ns.$). Therefore, as expected, in the low NFCC condition, participants in the replace condition were prone to make a choice, while those in the keep condition were prone to defer a choice. Such tendencies were much stronger for depleted participants than non-depleted ones.

In contrast, in the high NFCC condition, there was no significant interaction effect between depletion and status quo ($F(1,25) = 4.62, p < 0.05$). As expected, for the non-depleted participants, there was a marginally significant difference in the choice deferral between the keep condition and the replace condition ($M = 36\%$ vs. $28.1\%, t(10) = 1.772, p<0.1$); however, there is no significant difference in choice deferral between the two conditions for the depleted participants ($M = 40.7\%$ vs. $37.2\%, t(11) = 0.828 ns.$). That means non-depleted individuals were more sensitive to the status quo effect. In addition, there was a marginally significant
difference between depleted individuals and non-depleted individuals in the replace condition ($M = 37.2\%$ vs. $28.1\%$, $t(10) = 2.175$, $p = 0.055$), but not in the keep condition ($M = 40.7\%$ vs. $36\%$, $t(11) = 1.045$, $ns.$). Therefore, depletion effect was observed in the replace condition. The result patterns are represented in Figure 4. Hence, the results of Experiment 3 extend the results of the previous studies using the status quo paradigm.

In experiment 3, we examined the joint effect of depletion, NFCC, and status quo on choice deferral. The results showed that when NFCC was high, depleted individuals were more likely to defer choice than non-depleted individuals were in the replace condition and that when NFCC was low, depleted individuals were more likely to defer choice than non-depleted individuals were in the keep condition. In other words, the depletion effect was observed in the high NFCC/replace condition and in the low NFCC/keep condition.
Chapter 7 General Discussion

7.1. Contributions

The results of three experiments suggest that any variable that increases judgmental uncertainty is also likely to increase choice deferral. Experienced uncertainty depends on several important variables, including the need for cognitive closure, depletion, attribute accessibility, and the status quo. Experiments 1, 2, and 3 used different operations of the need for cognitive closure (the need for cognitive closure was manipulated in Experiment 1 and 2 and treated as a stable, individual difference variable in Experiment 3), and different operations of depletion (depletion was manipulated via a proofreading task in Experiment 1 and via a Stroop task in Experiment 2). Nevertheless, a similar need for cognitive closure by depletion by attribute accessibility interaction emerged in both experiments. When the need for cognitive closure was high and when a compelling informational basis for decision making was unavailable due to low attribute accessibility, high levels of choice deferral were observed regardless of depletion. However, when a compelling informational basis for decision making was available, greater levels of choice deferral were observed in high depletion than in low depletion conditions. By contrast, when the need for cognitive closure was low, very low levels of choice deferral were observed when a strong informational basis for decision making was available regardless of depletion. When a strong informational basis for decision making was unavailable, however, greater levels of choice deferral were observed in high depletion than in low depletion conditions.

Experiment 3 extended these findings to a completely different paradigm. The preference to maintain the status quo is another important form of decision avoidance (Anderson
In Experiment 3, the status quo was manipulated by asking half of the participants whether or not they should keep their current brand, and by asking the remaining participants whether or not they should replace their current brand because it ceased working properly. Hence, for the former participants, keeping their current brand was the status quo or default position, whereas for the latter participants, replacing their current brand was the status quo or default position. Keeping the current brand is analogous to the high attribute accessibility conditions of Experiments 1 and 2, because participants are highly knowledgeable about the products that they use currently. Replacing the current brand is analogous to the low attribute accessibility conditions of Experiments 1 and 2, because participants are less knowledgeable and less certain about products that they do not currently use. Similar to the results of Experiments 1 and 2, in Experiment 3, high levels of choice deferral were observed in keep conditions when the need for cognitive closure was high regardless of depletion. However, in replace conditions, high need for cognitive closure participants exhibited higher levels of choice deferral in high depletion than in low depletion conditions. Conversely, when the need for cognitive closure was low, relatively low levels of choice deferral were observed in replace conditions regardless of depletion. However, greater levels of choice deferral were observed in high depletion than in low depletion conditions when keeping the currently used product was the status quo position.

Prior research on choice deferral demonstrated that choice deferral increases as the number of attributes presented increases (Greenleaf and Lehmann 1995), as attribute tradeoff difficulty increases (Dhar 1997), as time pressure increases (Dhar and Nowlis 1999), as product assortment size increases (Chernev 2003; Sela, Berger, and Liu 2009), and as sensitivity to missing information increases (Gunasti and Ross 2009). Our research extends these findings to additional variables that influence decision difficulty, including the need for cognitive closure,
depletion, attribute accessibility, and the status quo. More importantly, our research shows that complex interactions among these variables occur and that spontaneous inference formation and perceived uncertainty mediate the effects of decision difficulty on decision avoidance.

Our research also extends prior research on the status quo bias by demonstrating that consumers think about keep versus replace decisions differently, and that depletion produces different effects on consumers who are high versus low in the need for cognitive closure. When the need for cognitive closure is high, depletion increases choice deferral for replace decisions, but not for keep decisions. By contrast, when the need for cognitive closure is low, depletion increases choice deferral for keep decisions, but not for replace decisions.

Marketers have been using increasingly sophisticated procedures to encourage consumers purchase their brands rather than competitors’ offerings. Ironically, as the marketplace becomes more complex due to an ever-increasing set of attributes and benefits, and a wider array of product assortments, choice deferral becomes more likely. That is, consumers become more likely to reject their brands and to reject competitors’ brands. Hence, a clearer understanding of the variables that initiate, mediate, and moderate choice deferral is needed. Our research suggests that the need for cognitive closure, depletion, attribute accessibility, and the status quo are important moderators of choice deferral, and spontaneous inference formation and perceived uncertainty are important mediators of the effect of decision difficulty on decision avoidance. Furthermore, our results suggest that any variable that increases decision difficulty should also increase decision avoidance, even when attractive alternatives are available for choice.

7.2. Limitation and Future Research
There are some limitations of our work. The first limitation is the absence of direct measure of spontaneous inference. In our study, we used inferred value as a measure of spontaneous inference. Future research might test the spontaneous inference directly by using the thought aloud technique to validate the results.

Secondly, mood is one of alternative explanations for depletion effect (e.g., Balliet and Joireman 2010; Clarkson, Hirt, Chapman and Jia 2010), because the manipulation of depletion might induce negative mood. We did not include the measure of mood in the experiment 1 and 2 to rule out its effect. However, the convergent results from two experiments provide indirect evidence that depletion leads to the results.

Thirdly, there was only one choice set for participants to choose from and the order of alternatives was the same to them. More choice sets with different combinations of attribute levels and a different order of alternatives would be better. Future research might use discrete choice modeling to test the results.

Finally, we used only one type of product categories: high-tech products. Specifically, the products used for the three experiments are laptops, digital cameras, and tablet computers, respectively. Future research might adopt sustainable products to test our propositions and may also test the sustainability liability effect (Luchs, Walker, Irwin and Raghunathan 2010).

Future research also should investigate whether the interactive effects of the need for cognitive closure, depletion, and attribute accessibility extend to other forms of decision avoidance, such as inaction inertia (Tykocinski and Pittman 1998; Tykocinski, Pittman, and Tuttle 1995). After rejecting an attractive alternative, consumers continue to reject similar but less attractive alternatives even when these alternatives represent a gain from the current
reference point. Our results suggest that inaction inertia should increase as the need for cognitive closure increases and as depletion increases, provided that a sound informational basis for decision making is available.
References


Appendix A Manipulations and Measures for Experiment 1
INSTRUCTION SETS

(High Depletion Condition)

Task 1:

You have been provided a packet. Inside that packet is a sheet of paper labeled ‘TASK 1.’ Starting at the beginning, your task is to cross out every ‘e’ you can locate in the text on the sheet. When you come across an ‘e’, simply draw a line through it. You will have five minutes to work on this task, and you will be judged on accuracy and completeness.

Task 2:

Inside the provided packet is another sheet of paper labeled ‘TASK 2.’ Starting at the beginning, your task is to cross out every ‘e’ you can locate in the passage, except when another vowel follows the ‘e’ in the same word (e.g., ‘read’) or when a vowel is one letter removed from the ‘e’ in either direction (e.g., ‘vowel’). When you come across an ‘e’ that does not fit these exceptions, simply draw a line through it. You will have five minutes to work on this task, and you will be judged on accuracy and completeness.
INSTRUCTION SETS

(Low Depletion Condition)

Task 1:

You have been provided a packet. Inside that packet is a sheet of paper labeled ‘TASK 1.’ Starting at the beginning, your task is to cross out every ‘e’ you can locate in the text on the sheet. When you come across an ‘e’, simply draw a line through it. You will have five minutes to work on this task, and you will be judged on accuracy and completeness.

Task 2:

Inside the provided packet is another sheet of paper labeled ‘TASK 2.’ Like TASK 1, your task is to cross out every ‘e’ you can locate in the text on the sheet. You will have five minutes to work on this task, and you will be judged on accuracy and completeness.
INSTRUCTION SETS

(High Attribute Accessibility Condition)

Please read the following information about eight products extracted from a catalog of an electronics retailer. Please imagine that you are planning to buy a laptop for your best friend’s birthday.

Please read all the product information below. You have two minutes to remember as much as you possibly can.
INSTRUCTION SETS

(Low Attribute Accessibility Condition)

Please read the following information about eight products extracted from a catalog of an electronics retailer. Please imagine that you are planning to buy a laptop for your best friend’s birthday.

Please read all the product information below within 2 minutes.
An Example of Irrelevant Information (Gunasti and Ross 2009)

(All Conditions)

**Digital Camera**

<table>
<thead>
<tr>
<th>DIGITAL CAMERA BRANDS</th>
<th>Cam X</th>
<th>Cam Y</th>
<th>Cam Z</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Zoom (× 3 - × 12)</strong></td>
<td>× 12</td>
<td>× 5</td>
<td>× 12</td>
</tr>
<tr>
<td><strong>Megapixels (5-10 MPs)</strong></td>
<td>6.8MPs</td>
<td>8.3 MPs</td>
<td>5.5 MPs</td>
</tr>
<tr>
<td><strong>Screen Size (2.0” – 3.5”)</strong></td>
<td>2.3”</td>
<td>2.8”</td>
<td>3.1”</td>
</tr>
</tbody>
</table>
INSTRUCTION SETS

(High NFCC Condition)

After this study, there is a joint study with the Electronic Media Division of CCM to investigate the role of humor in new media.
INSTRUCTION SETS

(Low NFCC Condition)

After this study, there is a joint study with the Mathematics department at UC to investigate students’ awareness of advanced mathematical notions.
Imagine that you go to the website of the retailer and you come across two different brands. Laptop M has a 1.5 GHz processor speed and 2 GB RAM, but battery information is not provided. Laptop C has a 2.1 GHz processor speed, 1 GB RAM and 3.5 hours of battery life.

<table>
<thead>
<tr>
<th>LAPTOP COMPUTER BRANDS</th>
<th>Laptop M</th>
<th>Laptop C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed (Intel Duo Core Processor: 1.0-2.9 GHz)</td>
<td>1.5 GHz</td>
<td>2.1 GHz</td>
</tr>
<tr>
<td>Memory (RAM: 512 MB-4GB)</td>
<td>2 GB</td>
<td>1 GB</td>
</tr>
<tr>
<td>Battery life (1-8 hours)</td>
<td></td>
<td>3.5 hrs</td>
</tr>
</tbody>
</table>

I would choose (please mark only one):

Laptop M______ Laptop C______ None of the two______
Depletion Manipulation Check

(All Conditions)

1. How easy or difficult was this task?

1          2          3          4          5          6          7          8          9
Very easy                                           Very difficult

2. How much effort did you put into this task?

1          2          3          4          5          6          7          8          9
Very little                                         Very much

3. How much did you enjoy this task?

1          2          3          4          5          6          7          8          9
Not at all enjoyable                                 Very enjoyable

4. How interesting did you find this task to be?

1          2          3          4          5          6          7          8          9
Not at all interesting                               Very interesting

5. How tired did you feel after this task?

1          2          3          4          5          6          7          8          9
Not at all tired                                      Very tired
NFCC Manipulation Check
(All Conditions)

Read each of the following statements and decide how much you agree with each according to how you feel right now rather than how you usually feel. Please respond according to the following scale.

1 = Strongly disagree  4 = Slightly agree
2 = Moderately disagree  5 = Moderately agree
3 = Slightly disagree  6 = Strongly agree

_____ 1. I find that a well ordered life with regular hours suits my temperament.
_____ 2. I don’t like to be with people who are capable of unexpected actions.
_____ 3. I find that establishing a consistent routine enables me to enjoy life more.
_____ 4. I enjoy having a clear and structured mode of life.
_____ 5. I like to have a place for everything and everything in its place.
_____ 6. I dislike unpredictable situations.
Product Knowledge Check

(All Conditions)

How knowledgeable are you about laptops?

Not knowledgeable at all  1  2  3  4  5  6  7  Very knowledgeable
The Joint Study

(High NFCC Condition)

Please describe your favorite advisement using humor as much as you can (e.g., brand, product, etc).

Have you ever looked for this specific advisement on the Internet (using youtube.com or equivalent)?

☐ Yes

☐ No

Have you ever searched for funny advertisements on the Internet (using youtube.com or equivalent)?

☐ Yes

☐ No
The Joint Study

(Low NFCC Condition)

You are going to see some equations, try to recognize them!

\[ \pi = \frac{c}{d} \]

Have you ever seen this equation? If yes, do you know what it represents?

\[ \lim_{n \to \infty} \left( 1 + \frac{1}{n} \right)^n \]

Have you ever seen this equation? If yes, do you know what it represents?

\[ i\hbar \frac{\partial}{\partial t}\Psi(r, t) = \hat{H}\Psi(r, t) \]

Have you ever seen this equation? If yes, do you know what it represents?
Appendix B Manipulations and Measures for Experiment 2
INSTRUCTION SETS

(High Depletion Condition)

In this task you will see a series of words with different colors. That is, you might see a word “Green” presented in red type. We would like you to write down the color of the font but not the word’s lexical meaning. For example, if you saw this:

GREEN

The correct response would be “Red”.

You will have no time limitation for this task but try to do it as fast as possible. If you are ready, please start stopwatch to calculate your total response time. You will be judged on accuracy of this task.
INSTRUCTION SETS

(Low Depletion Condition)

In this task you will see a series of words with different colors. That is, you might see a word “Green” presented in red type. We would like you to write down the meaning of each word but not its color. For example, if you saw this:

GREEN

The correct response would be “Green”.

You will have no time limitation for this task but try to do it as fast as possible. If you are ready, please start stopwatch to calculate your total response time. You will be judged on accuracy of this task.
INSTRUCTION SETS

(High Attribute Accessibility Condition)

Please read the following information about eight products extracted from a catalog of an electronics retailer. Please imagine that you are planning to buy a digital camera for your best friend’s birthday.

Please read all the product information below. You have two minutes to remember as much as you possibly can.
INSTRUCTION SETS

(Low Attribute Accessibility Condition)

Please read the following information about eight products extracted from a catalog of an electronics retailer. Please imagine that you are planning to buy a digital camera for your best friend’s birthday.

Please read all the product information below within 2 minutes.
An Example of Irrelevant Information (Gunasti and Ross 2009)

(All Conditions)

**Portable PC**

<table>
<thead>
<tr>
<th>Laptop Computer Brands</th>
<th>Laptop X</th>
<th>Laptop Y</th>
<th>Laptop Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed (Intel Duo Core Processor: 1.0-2.9 GHz)</td>
<td>1.5 GHz</td>
<td>2.1 GHz</td>
<td>2.7 GHz</td>
</tr>
<tr>
<td>Battery (Li-power Durability: 1-8 hrs)</td>
<td>6 hrs</td>
<td>3.5 hrs</td>
<td>1 hrs</td>
</tr>
<tr>
<td>Memory (RAM: 512 MB-4 GB)</td>
<td>2 GB</td>
<td>1 GB</td>
<td>1 GB</td>
</tr>
</tbody>
</table>
Imagine that you go to the website of the retailer and you come across two different brands of digital camera. Camera M has a × 12 Zoom and 6.8 MPs Megapixels, but screen size information is not available in the website. Camera C has a × 5 Zoom, 8.3 MPs Megapixels, and 2.8” screen size.

<table>
<thead>
<tr>
<th>DIGITAL CAMERA BRANDS</th>
<th>Cam M</th>
<th>Cam C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zoom (× 3 - × 12)</td>
<td>× 12</td>
<td>× 5</td>
</tr>
<tr>
<td>Megapixels (5-10 MPs)</td>
<td>6.8MPs</td>
<td>8.3MPs</td>
</tr>
<tr>
<td>Screen Size (2.0” – 3.5”)</td>
<td></td>
<td>2.8”</td>
</tr>
</tbody>
</table>

I would choose (please mark only one):

Cam M_____  Cam C_____  None of the two_____
NFCC Measures

(All Conditions)

Read each of the following statements and decide how much you agree with each according to your beliefs and experiences. Please respond according to the following scale.

1 = Strongly disagree 4 = Slightly agree
2 = Moderately disagree 5 = Moderately agree
3 = Slightly disagree 6 = Strongly agree

_____ 1. I find that a well ordered life with regular hours suits my temperament.

_____ 2. I don’t like to be with people who are capable of unexpected actions.

_____ 3. I find that establishing a consistent routine enables me to enjoy life more.

_____ 4. I enjoy having a clear and structured mode of life.

_____ 5. I like to have a place for everything and everything in its place.

_____ 6. I dislike unpredictable situations.
Perceived Uncertainty Measure

(All Conditions)

Please indicate your perceived uncertainty about making a decision between both brands on the following 10-point scale:

Extremely certain 1  2  3  4  5  6  7  8  9  10  Extremely uncertain
Attribute Accessibility Manipulation Check

(All Conditions)

Please write down your ideas and thoughts about digital camera when you were reading the product attribute information about them.
Depletion Manipulation Check

(All Conditions)

1. How easy or difficult was this task?

1 2 3 4 5 6 7 8 9

Very easy  Very difficult

2. How much effort did you put into this task?

1 2 3 4 5 6 7 8 9

Very little  Very much

3. How much did you enjoy this task?

1 2 3 4 5 6 7 8 9

Not at all enjoyable  Very enjoyable

4. How interesting did you find this task to be?

1 2 3 4 5 6 7 8 9

Not at all interesting  Very interesting

5. How tired did you feel after this task?

1 2 3 4 5 6 7 8 9

Not at all tired  Very tired
Product Knowledge Check

(All Conditions)

How knowledgeable are you about digital camera?

Not knowledgeable at all  1  2  3  4  5  6  7  Very knowledgeable
Appendix C Manipulations and Measures for Experiment 3
INSTRUCTION SETS

(High Depletion Condition)

Please write an essay about your daily activities without using words containing the letter “a” and “n” within 2 minutes.
Please write an essay about your daily activities without using words containing the letter “x” and “z” within 2 minutes.
Status Quo Manipulation

(Keep Condition)

Imagine that your laptop is working fine and you must decide whether or not you should keep your current brand of laptop.
Status Quo Manipulation

(Replace Condition)

Imagine that your laptop is not working properly and you must decide whether or not you should replace your current brand of laptop.
NFCC Measures

(All Conditions)

Read each of the following statements and decide how much you agree with each of the following statements. Please respond according to the following scale.

<table>
<thead>
<tr>
<th>1 = Strongly disagree</th>
<th>4 = Slightly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 = Moderately disagree</td>
<td>5 = Moderately agree</td>
</tr>
<tr>
<td>3 = Slightly disagree</td>
<td>6 = Strongly agree</td>
</tr>
</tbody>
</table>

1. I find that a well ordered life with regular hours suits my temperament.
2. I don’t like to be with people who are capable of unexpected actions.
3. I find that establishing a consistent routine enables me to enjoy life more.
4. I enjoy having a clear and structured mode of life.
5. I like to have a place for everything and everything in its place.
6. I dislike unpredictable situations.
7. I prefer to socialize with familiar friends because I know what to expect from them.
8. I enjoy the uncertainty of going into a situation without knowing what might happen.
9. I tend to put off important decisions until the last moment.
10. I usually make important decisions quickly and confidently.
____ 11. I would describe myself as indecisive.

____ 12. I tend to struggle with most decisions.

____ 13. I dislike it when a person’s statement could mean many different things.

____ 14. I feel uncomfortable when I don’t understand the reason why an event occurred in my life.

____ 15. I feel uncomfortable when someone’s meaning or intentions are unclear to me.

____ 16. When I am confused about an important issue, I feel very upset.

____ 17. Even after I have made up my mind about something, I am always eager to consider a different option.

____ 18. When considering most conflict situations, I usually see how much both sides could be right.

____ 19. When thinking about a problem, I consider as many different opinions on the issue as possible.

____ 20. I always see many possible solutions to problems I face.
Implicit Theory about Willpower Measures

(All Conditions)

Read each of the following statements and decide how much you agree with each of the following statements. Please respond according to the following scale.

1 = Strongly disagree  4 = Slightly agree
2 = Moderately disagree  5 = Moderately agree
3 = Slightly disagree  6 = Strongly agree

_____ 1. Strenuous mental activity exhausts your resources, which you need to refuel afterwards (e.g., through taking breaks, doing nothing, watching television, eating snacks).

_____ 2. After a strenuous mental activity, your energy is depleted and you must rest to get it refueled again.

_____ 3. When you have been working on a strenuous mental task, you feel energized and you are able to immediately start with another demanding activity.

_____ 4. Your mental stamina fuels itself. Even after strenuous mental exertion, you can continue doing more of it.

_____ 5. When you have completed a strenuous mental activity, you cannot start another activity immediately with the same concentration because you have to recover your mental energy again.

_____ 6. After a strenuous mental activity, you feel energized for further challenging activities.
7. Resisting temptations makes you feel more vulnerable to the next temptations that come along.

8. When situations accumulate that challenge you with temptations, it gets more and more difficult to resist the temptations.

9. If you have just resisted a strong temptation, you feel strengthened and you can withstand any new temptations.

10. It is particularly difficult to resist a temptation after resisting another temptation right before.

11. Resisting temptations activates your willpower and you become even better able to face new upcoming temptations.

12. Your capacity to resist temptations is not limited. Even after you have resisted a strong temptation, you can control yourself right afterwards.
Dispositional Self-Control Measures

(All Conditions)

1 = Strongly disagree   4 = Slightly agree
2 = Moderately disagree 5 = Moderately agree
3 = Slightly disagree   6 = Strongly agree

1. I am able to work effectively toward long-term goals while resisting temptations along the way.

2. Usually, when something tempts me, I manage to resist the temptation.
### Mood Measures

**(All Conditions)**

Please indicate your current feelings on each of the following scales:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sad</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Happy</td>
</tr>
<tr>
<td>Unpleasant</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Pleasant</td>
</tr>
<tr>
<td>Bored</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Excited</td>
</tr>
<tr>
<td>Drowsy</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Alert</td>
</tr>
</tbody>
</table>
Product Knowledge Measures

(All Conditions)

Do you have a smart phone?

____ Yes

____ No

Do you have a tablet?

____ Yes

____ No

Do you have a laptop?

____ Yes

____ No
Choice Sets

(All Conditions)

While browsing the website of a retailer, you come across two different brands of tablet computers and their features. Brand A costs $730 with 64 GB of memory, however screen size information for this model is not available on the website. Brand B costs $600 with the memory of 32 GB, and has 7.0” screen size.

<table>
<thead>
<tr>
<th>TABLET COMPUTERS</th>
<th>Brand A</th>
<th>Brand B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price ($270 - $800)</td>
<td>$730</td>
<td>$600</td>
</tr>
<tr>
<td>Memory (8 GB - 64 GB)</td>
<td>64 GB</td>
<td>32 GB</td>
</tr>
<tr>
<td>Screen Size (7.0” – 10.1”)</td>
<td></td>
<td>7.0”</td>
</tr>
</tbody>
</table>

I would choose (please mark only one):

Brand A _____  Brand B _____  None of the two _____
Figure 1. The effects of depletion and attribute accessibility on the probability of choice deferral for high and low NFCC conditions.
Figure 2. The effects of depletion and attribute accessibility on the probability of choice deferral for high and low NFCC conditions.
NOTE: * p < 0.01.

Figure 3. Mediation analysis.
Figure 4. The effects of depletion and status quo on the probability of choice deferral for high and low NFCC conditions.