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Consider the forest or the trees? The effects of mindset abstraction on memory-based consideration set formation

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CONSIDER THE FOREST OR THE TREES? THE EFFECTS OF MINDSET

ABSTRACTION ON MEMORY-BASED CONSIDERATION SET FORMATION

by

Fang-Chi Lu

<u>An Abstract</u>

Of a thesis submitted in partial fulfillment
of the requirements for the Doctor of
Philosophy degree in Business Administration (Marketing)
in the Graduate College of
The University of Iowa

May 2013

Thesis Supervisor: Associate Professor Dhananjay Nayakankuppam

ABSTRACT

Consideration set formation has been suggested as an important decision-making stage prior to choice. The current research focuses on consideration sets in the memory-based choice context and addresses the gaps in the existing literature by investigating the effects of mindset abstraction on memory retrieval and the number of considered choice alternatives retrieved from memory. I propose that individuals in a concrete (vs. abstract) mindset think more contextual and specific details (vs. fewer essences) about a certain decision situation; therefore concrete and fine-grained mental representations, compared to abstract and rough representations, will activate more associated cues in memory and lead to larger memory-based consideration sets. Through a word association task, studies 1a and 1b show that concrete mindsets leads to more proliferative associations and a greater number of conceptual cues than abstract mindsets. In the domain of product consideration (i.e., snack and dinner), studies 2a and 2b directly demonstrate that individuals in concrete mindsets form a larger memory-based consideration set than ones in abstract mindsets. I further propose the Hypothesis of Top-down versus Bottom-up Approach of Memory Retrieval to explain the mechanism that underlies the mindset abstraction effect on size of memory-based consideration sets. Studies 3 and 4, using an episodic memory paradigm, support this hypothesis and reveal that the type of retrieval cues (superordinate vs. subordinate cues) used by individuals in an abstract versus a concrete mindset determines the likelihood that a brand is considered, and that the richer associations located at the subordinate level contribute to a greater number of choice alternatives that people consider in a concrete mindset. The theoretical contributions, practical implications, and future research directions of this research are finally discussed.

Abstract Approved: _____
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Date

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The University of Iowa
Iowa City, Iowa

CERTIFICATE OF APPROVAL

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PH.D. THESIS

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This is to certify that the Ph.D. thesis of

Fang-Chi Lu

has been approved by the Examining Committee
for the thesis requirement for the Doctor of Philosophy
degree in Business Administration (Marketing) at the May 2013 graduation.

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                   Paul D. Windschitl

Dedicated to my parents Hui-Yang Lu and Szu Lu Kuo,
who always expect me to be a happy and healthy person instead of a successful one, who
never have doubts about me, and who have supported me with their unconditional and
endless love on each step of my doctoral degree pursuit.

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The pursuit of Ph.D. degree was a long journey. To me, getting the degree is not the end, but is another new beginning. I expect myself to hold the passion of research continuously, and hope one day in the future I could contribute to the society, even to just a small group of individuals, with my knowledge in the field of consumer research.

ABSTRACT

Consideration set formation has been suggested as an important decision-making stage prior to choice. The current research focuses on consideration sets in the memory-based choice context and addresses the gaps in the existing literature by investigating the effects of mindset abstraction on memory retrieval and the number of considered choice alternatives retrieved from memory. I propose that individuals in a concrete (vs. abstract) mindset think more contextual and specific details (vs. fewer essences) about a certain decision situation; therefore concrete and fine-grained mental representations, compared to abstract and rough representations, will activate more associated cues in memory and lead to larger memory-based consideration sets. Through a word association task, studies 1a and 1b show that concrete mindsets leads to more proliferative associations and a greater number of conceptual cues than abstract mindsets. In the domain of product consideration (i.e., snack and dinner), studies 2a and 2b directly demonstrate that individuals in concrete mindsets form a larger memory-based consideration set than ones in abstract mindsets. I further propose the Hypothesis of Top-down versus Bottom-up Approach of Memory Retrieval to explain the mechanism that underlies the mindset abstraction effect on size of memory-based consideration sets. Studies 3 and 4, using an episodic memory paradigm, support this hypothesis and reveal that the type of retrieval cues (superordinate vs. subordinate cues) used by individuals in an abstract versus a concrete mindset determines the likelihood that a brand is considered, and that the richer associations located at the subordinate level contribute to a greater number of choice alternatives that people consider in a concrete mindset. The theoretical contributions, practical implications, and future research directions of this research are finally discussed.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

One major type of decision individuals make every day is purchasing decision, a process consisting of multiple pre-choice stages including need recognition, information search, and formation of a constrained set of alternatives for choice (Howard and Sheth 1969). Among the pre-choice stages, consideration set formation is suggested to be the most fundamental stage, upon which consumers make their final choice (Alba, Hutchinson, and Lynch 1991; Nedungadi 1990). Formation of consideration sets is characteristic of being developed upon nested sets of alternatives, which are saved from the first and are considered afterward by the decision-makers prior to choice (Shocker et al. 1991). This hierarchical view of the process implies that unless an alternative is included in one's consideration set, it will not be chosen (Nedungadi 1990). In a similar vein, Hauser (1978) uses an information theoretic statistic to show that consideration sets account for 78% of the explainable uncertainty in choice data (Hauser and Wernerfelt 1990). The critical role that consideration sets play in the process of decision-making and its value in models of consumer choice have elicited a number of studies in marketing over the last two decades.

In real life, it is prevalent that consumers make judgments based on existing knowledge or prior experience about a product/service, or they take into account information in memory when making decisions. Therefore, one research stream takes the approach of information processing theory and emphasizes the role of memory-based choice (Alba and Chattopadhyay 1985; Lynch and Srull 1982; Nedungadi 1990). For example, Lynch and Srull (1982) suggest that many memory and attentional factors that

influence people's judgment are beyond the level of consciousness, and it is important to explore the unconscious aspects of information processing, in addition to the conscious decision strategies, in order to provide a more comprehensive picture of the cognitive processes in consumer decision making.

In the regard of memory-basis choice, an important distinction is argued to be made between absolute awareness versus situation-specific awareness (Alba and Chattopadhyay 1985; Nedungadi 1990; Roberts and Nedungadi 1995) in order to better understand the dynamic nature of consideration set formation. A consumer might know a lot of different brands, but only a smaller portion of the known brands that can be recalled at a specific point in time and be further considered for choice (Alba and Chattopadhyay 1985). It follows that when choice is memory-based, brand accessibility or salience on a particular occasion will determine the composition of a consideration set, and the composition of a retrieval set will predict the composition of a consideration set (Nedungadi 1990). Taken together, these studies suggest that memory-based consideration sets (*memory sets* hereafter) depend on brand retrieval and factors influencing memorial retrieval within the choice context.

Different from previous research focusing on factors influencing the likelihood that a certain brand/product is included in a consideration set (i.e., Kardes et al. 1993; Priester et al. 2004; Shapiro, Macinnis, and Heckler 1997), the current research emphasizes the number of alternatives people consider in a memory-based decision context. Understanding size of consideration set is important because it implies different extents of decision difficulty in arriving at the final choice and the likelihood of indecision For instance, previous research has shown that individuals are more likely to

defer their choice or experience higher post-decision dissonance (buyer's remorse) when facing too many choices (Iyengar and Lepper 2000). Previous research has provided evidence showing that size of consideration set varies by individuals and contexts. For example, Hauser and Wernerfelt (1990) summarize the studies regarding size of consideration sets and demonstrate a range in mean from 2 to 8, depending on product categories. Desai and Hoyer (2000) show that memory sets formed in more familiar occasions tend to be larger in their size. However, little is known about how mindsets (i.e., concrete versus abstract mindsets) consumers bear upon beginning the process of decision-making might alter size of consideration sets, more specifically size of memory sets.

A body of research in the mindset literature has proven the importance of mindsets− sets of cognitive processes that produce global orientations and readiness to respond in a particular way (Gollwitzer 1990)− in explaining human judgment and decision making (i.e., Kray and Galinsky 2003; Mandel 2002; Rottenstreich and Kivetz 2006). Importantly, mindsets not only influence the task at hand but also have carryover impact on subsequent, even unrelated tasks because of the mindset stickiness property (Hamilton et al. 2011). One type of mindset, which has drawn great attention recently in the research of social psychology and consumer behavior, is concrete versus abstract mindset (Freitas, Gollwitzer, and Trope 2004; Malkoc, Zauberman, and Bettman 2010). In this research, I explore the effects of mindset abstraction, activated in a prior unrelated task, on the subsequent formation of a memory set. For example, depending on the nature of work one is doing (i.e., strategic planning work which requires a global thinking and an abstract mindset vs. auditing work which necessitates a focus on details and a concrete

mindset), s/he might form a shopping list that is composed of a different number of shopping items.

Given that retrieval is crucial in a memory-based choice context, I propose the *Hypothesis of Top-down versus Bottom-up Approach of Memory Retrieval* by individuals in an abstract versus a concrete mindset and suggest that mindset abstraction will influence the type of retrieval cues in use and thus the ease of memorial retrieval of choice alternatives. More specifically, I predict that individuals in a concrete mindset will adopt a bottom-up approach of information processing and focus on the contextual details of a choice environment (i.e., specific product attributes like calorie, caffeine, and vitamin content in a beverage choice scenario). This fine-grained and vivid mental representation will lead to the activation of various retrieval cues and more associations at the subordinate level and consequently yield a larger memory set. On the other hand, individuals in an abstract mindset will adopt a top-down approach of information processing and form a schematic representation with fewer features that convey the essence of a consumption need. In this case, a shared retrieval cue at superordinate level (i.e., a general product category like soda in a beverage choice scenario) will be more likely to be used by individuals in an abstract mindset, and size of memory set will be further constrained due to the interference effect in the process of memory retrieval.

The rest of the paper is organized as follows. I first review the relevant literature in the topics of consideration set and mindset abstraction, and based upon which I develop the conceptual framework and hypotheses of the current research. Next, I report findings from six complete laboratory studies, which provide evidence supporting the proposed hypotheses. Specifically, studies 1a and 1b, examining the effects of mindset

abstraction in word association tasks, show that concrete mindset leads to richer associations and more conceptual cues than abstract mindsets. Studies 2a and 2b, using alternative manipulations of mindset abstraction in different product categories, directly demonstrate that individuals in a concrete mindset form larger memory-based consideration sets than their counterparts in an abstract mindset. Studies 3 and 4, using an episodic memory paradigm in a controlled setting, examine the *Hypothesis of Top-down versus Bottom-up Approach of Memory Retrieval* regarding the underlying mechanism of the mindset abstraction effect on size of memory set. The findings support the hypothesis by showing that individuals in a concrete (vs. an abstract) mindset rely on subordinate (vs. superordinate) cues in memory retrieval, and the type of retrieval cues determines the likelihood that a brand is considered as well as the number of choice alternatives people consider. Finally, I conclude this paper with the theoretical contributions as well as the practical implications of this research, and a discussion of the future directions of this research.

CHAPTER II

LITERATURE REVIEW

In this section, I will review the literature in consideration sets by starting with the origin and the development of this concept. And then I differentiate two kinds of consideration sets: stimulus-based versus memory-based consideration sets, with the latter as the focus of the current research. Next, I discuss research in mindset abstraction and its relevance to memory retrieval and formation of consideration sets in the memory-based context of decision making.

2.1 The Nested Nature of Consideration Sets

The idea of consideration sets originates from the concept of "evoked set." Howard and Sheth (1969) introduce the notion of "evoked set" to the discipline of marketing and define it as "those brands the buyer considers when he (or she) contemplates purchasing a unit of the product class (p.416)." Later on, Wright and Barbour (1977) use the term, "consideration set," and define it as "brands that a consumer will consider". Although following researchers propose slightly different definitions based on their purpose of research (e.g., Nedungadi 1990; Roberts and Lattin 1991), it is generally believed that a consideration set is a set of brands or products that a consumer considers seriously at a stage prior to choice stage, implying that a consideration set is only a small subset of the total number of brands or products available in the marketplace. Supporting this notion, Hauser and Wernerfelt (1990) summarize the empirical evidence regarding size of consideration sets for a variety of product categories

and show that the mean or median consideration set ranges from 2 to 8, given that the number of available brands is in the range of 6 to 47.

This nested nature of consideration sets has been well-documented in previous literature. For example, Alba and Chattopadhyay (1985) suggest that an important distinction should be made between the following two nesting sets prior to consideration sets. "Knowledge set" is all brands known to the consumer (based on *absolute awareness*), while "retrieval set" stands for a small portion of the knowledge set that a consumer recalls at a particular point in time (which is *situational awareness*). They argue that a brand must be recalled before it can be considered (called "consideration set" in Alba and Chattopadhyay 1985), and that the retrieval set is unstable because brands remembered at one point in time may be forgotten a short time later. In a similar vein, Nedungadi (1990) suggests that when choice is memory-based, brand memory constrains retrieval and membership in the consideration set. On the other hand, Shocker et al. (1991) use a different terminology for this series of nesting sets of alternatives prior to choice. According to them, "universal set," the largest set of alternatives, refers to the totality of all alternatives that could be obtained or purchased by any consumer under any circumstance. The "knowledge/ awareness set," which is at the next lower level in the hierarchy, consists of the subset of alternatives in the universal set of which a given consumer is aware and believes appropriate for his/her goal(s). From this awareness set, the "consideration set" further evolves. Shocker et al.'s model of brand consideration posits that consideration sets are purposefully constructed and include the goal-satisfying alternatives salient or accessible on a particular occasion. Taken together, Shocker et al.'s definition of knowledge/awareness set seems to be a broader concept that incorporates

both the notions of knowledge set and retrieval set in the model of Alba and

Chattopadhyay (1985). In order to understand why different models of consideration sets

are adopted, it is important to differentiate two types of consideration sets, namely

stimulus-based and memory-based consideration sets.

2.2 Stimulus-Based versus Memory-Based Consideration Sets

To understand why there are different terms of a pre-consideration set (i.e.,

awareness set and retrieval set) used interchangeably in the consideration set literature

and why there is no single and united hierarchical model of consideration set, a

distinction needs to be made between two types of consideration sets: stimulus-based

versus memory-based.

The distinction of these two types of consideration sets rests on the choice context

in which a consideration set is examined (Lynch et and Srull 1982; Shapiro et al. 1997).

Depending on the choice context in which a consideration set is formed, alternatives in

consideration could come from one of the following two sources: stimulus that are

explicitly provided and in view in external purchase environments, or consumers'

previous experience and knowledge stored in internal memory. If all the available brands

and their corresponding values on different attributes (i.e., a brand by attribute matrix) are

directly presented and from which individuals choose the best alternative to purchase, the

set of brands that individuals consider before arriving at the final choice will be a

stimulus-based consideration set. For example, a consumer makes a purchase from a

mail-order catalogue or decides an order from a restaurant menu. The standard research

paradigm in the stream of stimulus-based consideration sets is to first present participants with a list of alternatives available in a category and then to ask them to form a set of products/brands for further consideration (e.g., Chakravarti and Janiszewski 2003; Pham and Chang 2010). In the stimulus-based choice context, the stage of memory retrieval is not involved in the process in which consideration sets are developed. Therefore, there is no so-called retrieval set because individuals form a set of considered products/brands from an awareness set consisting of alternatives that are explicitly presented in the choice environment.

In contrast, memory-based consideration sets are developed based on stored knowledge or previous experience in memory. In this situation, products/brands for choice are not directly presented and consumers need to rely on their stored knowledge and retrieve choice alternatives from memory in order to form consideration sets. Examples of this choice context include making a shopping list while at work, and thinking about foods for dinner when in a late afternoon class. Previous studies that examine memory-based consideration sets usually provide people with a choice scenario, which induces a certain purchase need, and then ask them to free recall choice alternatives in consideration. Desai and Hoyer (2000), for example, presented participants with a choice scenario, which was made up of an occasion and a location, and asked them to speak aloud all the products that crossed their mind and they would be willing to consume in that situation.

In the research stream of memory-based consideration sets, the concept of retrieval sets is argued to be different from the one of awareness sets. Awareness sets are aided memory sets, based on absolute awareness, whereas retrieval sets are unaided

memory sets formed in the basis of situational awareness (Alba and Chattopadhyay 1985).

This distinction mainly rests on the difference between availability and accessibility

according to memory theory (Tulving and Pearlstone 1966). Once information is received

and comprehended, it is normally encoded and stored in the long-term memory of a

person (Lewis 1979). However, not all the information stored in long-term memory is

equally accessible and can be as easily recalled from memory. Information that is stored

in memory must be retrieved before it can be considered in making a particular judgment

(Lynch and Srull 1982). It follows that although a consumer might know a large number

of products/ brands that are appropriate for his/her purchasing goal, there is only a

portion of the absolute awareness set (retrieval set), which consumers can access without

aid at a given time or in a particular choice context. From the retrieval set, consumers

further form a subset of products/brands which they will consider purchasing. Figure A-1

depicts the model of Alba and Chattopadhyay and the one of Shocker et al., and presents

the modified hierarchical model of memory-based consideration sets adopted in the

current research.

<u>2.3 Variables Influencing the Properties of Consideration</u>

<u>Sets</u>

Given the fundamental role of consideration sets in determining individuals' final

choice, a rich body of research has examined how the properties (i.e., size, stability,

variety, and preference dispersion) and composition of consideration sets might depend

on some individual or situational variables in the process of decision making. Review of

the literature suggests that stimulus-based and memory-based consideration sets are

influenced by different factors due to the distinct nature of process in which a consideration set is formed. In this section, I summarize the important variables that have been found to influence stimulus-based versus memory-based consideration sets (see table B-1 for the summary of variables influencing consideration sets).

<div align="center">

2.3.1 Individuals' decision rules affecting stimulus-based

consideration set composition

</div>

Because in a stimulus-based choice context consumers' consideration and choice are confined to the alternatives that are immediately presented in choice, the research on stimulus-based consideration sets centers around the decision rules that people use under different circumstances to narrow down their awareness set and to simplify the choice process. Various situational and individual variables have been found to influence the decision rule in consideration set formation.

2.3.1.1 Goal conflict, ambiguity, and activity

Some researchers understand consideration sets from a goal-derived perspective and suggest that the composition of consideration sets depends on features of consumption goals. For example, Ratneshwar et al. (Ratneshwar, Pechmann, and Shocker 1996) examine the antecedents of across-category consideration in the stimulus-based task environment, and find that across-category consideration is high when there is goal conflict or when the consumption goal is ambiguous. They reason that consumers facing goal conflict will activate multiple goal-derived categories in working memory, form a mixed consideration set in the service of multiple salient goals, and postpone conflict

resolution to the final choice stage. On the other hand, when goals are ambiguous and less specific, consumers consider alternatives from different categories because they have difficulty in instantiating goal-derived categories and will be more influenced by extrinsic and incidental cues. In addition to goal conflict and ambiguity, it has been shown that extent of goal activeness/eagerness (e.g., hunger, visual food cues) also affects size of consideration sets (Goukens et al. 2007). Active goals are suggested to increase the perceived value of a certain desired object, therefore enhancing variety seeking within that object class and leading to a larger consideration set.

2.3.1.2 Involvement and concern for Type II error

Chakravarti and Janiszewski (2003) propose a framework demonstrating how macro-level motives influence both screening strategies and in turn the composition of consideration sets. It is shown that highly-involved decision-makers tend to use analytic decision strategies and spend more time and effort creating their consideration sets. Similarly, as individuals' concern for committing a Type II error increases, the likelihood that a diverse pair of alternatives will enter the consideration set increases. A Type II error can be viewed as the error of excessive skepticism. Applied to the consideration set context, a Type II error means the error of being too skeptical and thus excluding some good alternatives from a consideration set. Taken together, when individuals' involvement and concerns about Type II error increase, they will try to include all the potential alternatives, thus leading to a larger and more heterogeneous consideration set.

Involvement and concerns about committing Type II errors are suggested to be further influenced by features of decisions. When the decision is important or novel,

individuals tend be more involved in the decision-making process and be more concerned about decision errors. Supporting this notion, Heller et al. (2002) find that tasks perceived as difficult are more apt to elicit an exclusion prescreening strategy, by which individuals start with a full set of options as the decision frame and require good evidence for eliminating an alternative from the consideration set. Using an exclusion strategy in narrowing down a choice set is shown to result in larger set sizes than using an inclusion strategy.

2.3.1.3 Time pressure

In their 2003 paper, Chakravarti and his colleague also examine the situational influence of time pressure at the choice stage. Time pressure is defined as the extent of restriction on the amount of time available to form a consideration set and to make the choice. Their findings suggest that when consumers anticipate that they will have a lot of time at the choice stage, they create heterogeneous consideration sets and delay the difficult task of resolving which benefits are more important. By contrast, when they anticipate little time at the choice stage, they make decisions about which benefit is more significant prior to forming the consideration set and therefore create a set of more comparable alternatives, which will ease the evaluation process and speed up the decision making.

2.3.1.4 Motivations

It is suggested that the motivation and goals of consideration formation to simplify the choice process (vs. to optimize the choice outcome) determine size and

heterogeneity of consideration sets (Chakravarti and Janiszewski 2003; Wright 1975). The simplifying motive makes individuals to consider about how to reduce cognitive efforts. However, individuals with an optimizing motive consumer are concerned with whether a certain choice strategy allows him to do justice to his personal objective function (Wright 1975). Generally speaking, compared to simplification motivations, optimization motivations lead to a greater extent of across-category consideration (Chakravarti and Janiszewski 2003). Recently, Pham and Chang (2010) investigate the influence of individuals' strategic and motivational orientations, regulatory focus specifically, on the search and consideration of choice alternatives. According to Higgins (1997), there are two types of regulatory focus, namely a promotion focus (emphasizing approach-oriented strategies and focusing on eagerness; attending a tennis camp in order to become a better player) and a prevention focus (emphasizing avoidance-oriented strategies and focusing on vigilance; e.g., refraining from smoking to become a better tennis player) (Pham and Chang 2010). Across three experiments, Pham and his colleague show that promotion-focused (vs. prevention-focused) participants tend to search for alternatives in a more global (vs. local) manner, spending relatively more time and effort at the higher (vs. lower) levels of a decision-information hierarchy. Additionally, they find that compared to prevention-focused people, promotion-focused people are more likely to have larger consideration sets due to their eager concerns for seizing opportunities.

2.3.2 Accessibility and memory retrieval determining the probability that a product/brand is included in a memory-based consideration set

The aforementioned concept of retrieval sets suggests that a product or brand must be firstly recalled from memory before it can be considered. Nedungadi (1990) asserts that the influence of memory will not be confined to the information input used for brand evaluation, but will extend to the retrieval and consideration of brands themselves. Across two experiments, he provides the evidence that changes in a brand's accessibility will affect the probability that it is retrieved and considered at the choice stage.

It follows that the variables influencing the accessibility of a product or brand determine whether it will be included in the consideration set. Given that different pieces of information about a product/brand (called cues or associations) are linked to a product/brand node in memory (Holden and Lutz 1992) and that product/brand retrieval is performed by spreading activation in the interconnected network formed by different cognitive units, with level of activation determining rate and probability of recall (Spreading Activation Theory of Memory, Anderson 1983), Nedungadi (1990) suggests that there are three factors determining the accessibility of a product/brand. First is the strength of activation of the product/brand node, which is dependent on frequency, recency, and salience of product instantiation. Second is the strength of association between the product node and other active nodes; the stronger the association, the higher the likelihood that the product node will be activated concurrently when other active nodes are accessible. Third and the most relevant factor to the current research is the

availability of retrieval cues (i.e., brand, product category, and attribute). It is suggested that retrieval cues, whether they are internally generated or externally provided, can help activate information stored in long-term memory. The following section summarizes the variables that have been revealed to impact the accessibility and retrieval of products/brands in the process of consideration set formation.

2.3.2.1 Pioneering advantage

The research (1993) by Kardes and his colleagues provides supporting evidence for the critical role a retrieval set plays in the process of memory-based consideration set formation. They propose a sequential logic model which includes multiple stages of consumer choice (brand retrieval, brand consideration, and brand choice) and find that compared to followers, pioneering brands are more likely to be included in a retrieval set, and are thus more likely to be considered and chosen. This is because the brand that enters the market first is more salient and attention-drawing, and it is more distinct because only one brand is available in the market. Moreover, a pioneer brand, which is encountered the earliest, is usually the brand being encountered most frequently afterwards, and thus is more likely become the prototype of the product category. Therefore, a pioneering brand is more accessible and more likely to be retrieved from memory, and thus is more likely to be included in consumers' consideration sets.

2.3.2.2 Marketing mix

It has been shown that marketing mix variables (e.g., advertising, promotion) could serve as retrieval cues and make certain brands or products more salient in

consumers' memory. For example, Allenby and Ginter (1995) find that in-store displays and features influence consideration. Shapiro et al. (1997) show that incidental ad exposure increases the likelihood that a product is included in the consideration set and that this effect is robust, occurring no matter whether the consideration set formation context is memory- or stimulus-based, whether the buying situation is familiar or unfamiliar.

2.3.2.3 Usage occasion and location

Desai and Hoyer (2000) investigate the descriptive characteristics of consideration sets under 32 different situations varying on their occasion and location familiarity. They demonstrate that memory-based consideration sets of more familiar occasions have lower stability, larger size, and marginally greater variety. Similarly, sets of more familiar locations have lower stability. They reason that familiar occasions, which are encountered more frequently, have stronger occasion-to-product linkages and thus make products easier to be recalled.

2.3.2.4 Attitude and attitude strength

The better liked alternatives by a consumer are usually chosen more frequently, are more likely on the top of her/his mind, and thus are more likely to be recalled in a choice decision. According to the A^2SC^2 model proposed by Priester et al. (2004), attitude and attitude strength determine whether an alternative is included in the consideration set. Their findings suggest that although liked alternatives have a greater chance of consideration than disliked alternatives, this main effect of attitude valence is

moderated by attitude strength. Specifically, the influence of attitudes on consideration and choice is greater for strongly held attitudes than for weakly held attitudes.

2.3.3 The dynamic nature of consideration sets

Taken together, the literature in consideration sets suggests that consideration sets are dynamic. The composition of consideration sets varies from time to time, from context to context, and from person to person. Consistently, the constructed preference model suggests that preferences are constructed during the choice process and the choice process is influenced by various variables, such as subjective construal, experiential information, and goals, in a lower-level perceptual and non-conscious way (Griffin, Liu, and Khan 2004). Despite the rich literature regarding individual and situational factors that influence the composition of consideration sets, it is fairly unclear whether and how consumers' mindsets might alter the size of a consideration set. Furthermore, except for very few studies (e.g., Desai and Hoyer 2000), most prior studies in the regard of memory-based consideration mainly focus on how retrieval or accessibility determines the likelihood that a certain product/brand is included in the consideration sets, instead of the size of consideration sets. The current research is aimed at addressing this research gap. Given the important implications of consideration set size on consumer choice and decision-making and the critical role of mindset abstraction in determining people's information processing and judgment, I examine the influences of mindset abstraction (i.e., abstract vs. concrete mindsets) on memory retrieval and the size of considered brands in a memory-based choice context. In the following sections, I will review the theory of mindset abstraction and the relevant research regarding the relationship

between mindset abstraction and memory retrieval.

2.4 Abstract versus Concrete Mindsets

2.4.1 Mindset

Mindset is defined as judgmental criteria and cognitive processes that once activated, persists over several tasks and contexts (Luchins 1942). In a similar vein, Gollwitzer (1990) define mindsets as sets of cognitive processes that produce global orientations and readiness to respond in a particular way. Smith (1994) suggests that an accessible process or procedure is more likely to be recruited on subsequent occasions, indicating that a cognitive procedure adopted in the prior task might be elicited automatically and have an impact on later choice tasks. Similarly, research (e.g., Dhar and Simonson 1999; Hamilton et al. 2011) shows that prior tasks people engage in have carryover effects on the following tasks in terms of the activation of a certain goal. Using a certain plan to attain a goal can increase the likelihood to use the same plan for different goals later. Indeed, a body of research in the mindset literature has proven the importance of mindsets in explaining human judgment and decision making (i.e., Kray and Galinsky 2003; Mandel 2003; Rottenstreich and Kivetz 2006). Various types of mindsets have been examined in previous studies; for example, implementation versus deliberation mindsets (Gollwitzer and Bayer 1999), promotion versus prevention mindsets (Higgins 1997), and concrete versus abstract mindsets (Freitas et al. 2004). The current research focuses on the last type of mindset, which is mindset varying in terms of its level of abstraction.

2.4.2 Construal level theory as a framework of mindset

abstraction

One theory in this regard is the construal level theory (CLT) proposed by Liberman and Trope (Liberman, Trope, and Stephan 2007a). CLT is proposed as a framework linking psychological distance (temporal, social, spatial, and hypothetical distance) and abstraction in cognition. CLT suggests that the mental representation of an object/event – the construal − can be constructed at different degrees of abstraction, depending on the level of psychological distance. Greater psychological distances lead to high-level construal and abstract mental representations, which convey the gist of the available information. Mental representations in abstract mindset thus are usually more schematic and decontextualized. On the other hand, when the object/event is at near psychological distance, people form low-level construal and concrete mental representations, which include subordinate and incidental features of the object/event. Therefore, the mental representations in concrete mindsets tend to be relatively unstructured and contextualized. For example, the activity that two kids are playing ball in a backyard could be represented with concrete details about the process of the activity, including the kids' ages, height, and the kind of ball they are playing, and etc., or construed as "having fun," a relatively high-level identification of purpose of the activity (Vallacher and Wegner 1989).

These abstract/high versus concrete/low mental construals could be induced by varying different dimensions of psychological distance, including temporal distance (e.g., Forster, Friedman, and Libeman 2004; Liberman, Sagristano, and Trope 2002), spatial distance (e.g., Fujita et al. 2006; Henderson et al. 2006), hypothetical distance (Todorov,

Goren and Trope 2007; Wakslak et al. 2006), and social distance (Liviatan, Trope, and Liberman 2008; Pronin, Olivola, and Kennedy 2008). The degree of abstract versus concrete thinking could also be activated through perception tasks (i.e., Navon task; Navon 1977) that require a global versus a local visual attention (e.g., Forster, Liberman, and Shapira 2009; Smith, Wigboldus, and Dijksterhuis 2008; Wakslak and Trope 2009), and conceptual tasks that prompt a hierarchical thinking at a superordinate category versus a subordinate exemplar level (Hong and Lee 2010; Fujita, Liberman, and Levin-Sagi 2006; Torelli and Kaikati 2009; Tsai and Thomas 2011), or in terms of superordinate ends versus subordinate means of an action (Freitas et al. 2004; Fujita et al. 2006; Tsai and Thomas 2011).

One stream of research in CLT focuses on examining how mental representations of objects/events at different degrees of psychological distance affect individuals' cognitive perspectives (such as attention to central versus peripheral features, focus on desirability versus feasibility, and searching across alternatives versus attributes) and the consequent effects on predication, evaluation, choice, and behavioral intentions (see Trope and Liberman 2010 for a detailed review of the effects of construal levels). Another stream of research mainly assesses the carryover effects of the distinct abstract versus concrete cognitive operation activated by thinking about high-level versus low-level construals. For example, it has been shown that the high versus low construals (abstract vs. concrete mindset) induced by means of procedural priming in a prior unrelated task have impacts on self-regulation as well as self-control (Freitas et al. 2004; Fujita et al. 2006), on present-bias in intertemporal decisions (Malkoc et al. 2010), and on fluency effects (Tsai and Thomas 2011). A research question more central to the current research is how

mindset abstraction might be relevant to the formation of memory-based consideration sets. The following section discusses the relevance of mindset abstraction to memory retrieval.

2.5 Effects of Mindset Abstraction on Memory

Previous studies provide some evidence regarding effects of construal levels on different aspects of memory, namely ease of retrieval and memory of different types of information. For example, given that pro-arguments (pros) versus counter-arguments (cons) constitute high-level versus low-level construals (Trope and Liberman 2003), Herzog et al. (Herzog, Hansen, and Wanke 2007) predict and support that it is easier for people to generate pros (vs. cons) when an action pertains to the distant rather than the near future. In other words, psychological distance influences ease of retrieval for information characteristic of high-level versus low-level construal. In a similar vein, Kim et al. (Kim, Park, and Wyer 2009) investigate the effect of temporal distance on memory representations of a product in terms of its high level features (i.e., intrinsic desirability) versus low-level features (i.e., situation-specific feasibility). They find that people who have evaluated a product for consumption in the distant future recall more high-level (vs. low level) product information, whereas people who have evaluated the product for immediate consumption recall both types of information equally well. Applying the temporal distance effect on one's memory for another individual in the interpersonal context, Wyer and her colleagues (Wyer, Perfect, and Pahl 2010) reveal that temporal distance induces global processing and thus improves face recognition and increases retrieval of the abstract personality trait information. On the other hand, temporal

proximity elicits detailed processing and thus impairs face recognition and facilitates retrieval of concrete situational and behavioral information.

2.6 Research Gaps in the Existing Literature

Although findings from the existent research in consideration sets and mindset abstraction suggest many implications, they also raise a number of questions about the impact of construal levels on retrieval cues and more relevant to the current research, the mindset abstraction effect on number of considered alternatives retrieved from memory. First of all, a fundamental research question that this work tries to address is whether thinking concretely versus abstractly leads to a different number of choice alternatives being considered. In order to answer this question, it is important to first understand the construal level effect on proliferation of retrieval cues and type of retrieval cues being used in memory retrieval, given that the current research focuses on memory-based consideration sets and that ease of retrieval is crucial in this regard. Previous research focusing on how the retrieval of a certain type of information (i.e., pros versus cons, desirability versus feasibility) depends on temporal distance does not provide a direct answer to this question. Furthermore, it is relatively unclear whether the identified temporal distance effect on memory could be generalized to other situations where abstract versus concrete thinking is stimulated in a prior unrelated task, namely the carryover effect of mindset abstraction on memory. To sum up, the major questions asked by the current research are:

Research Question 1*: Does mindset abstraction (abstract vs. concrete mindsets) influence the number of considered products/brands in the context of memory-based choice?*

Research Question 2*: How might memory retrieval, namely proliferation of retrieval cues and types of retrieval cues, explain the mindset abstraction effect on size of memory-based consideration sets?*

CHAPTER III

CONCEPTUAL FRAMEWORK AND PROPOSED HYPOTHESES

The goal of this research is to investigate the effect of mindset abstraction on memory-based consideration set formation. Specifically, I examine whether and how the concrete (vs. abstract) mindset, activated in a prior unrelated task, has carryover effects on the mental representation of a choice process and the resulting variation of number of considered alternatives retrieved from memory.

3.1 Mindset Abstraction Effect on Proliferation of Associations

According to CLT (Liberman et al. 2007a), abstract mindsets lead to a global mental representation with a few features that convey the essence of an object; whereas concrete mindsets lead to a local mental representation that includes more specific details about the object. Furthermore, dual-coding theory (DCT, Pavio 1986) suggests that compared to abstract words, concrete words (e.g., tree, party) can be represented visually and verbally and thus have more associations and are better remembered. Therefore, I expect that compared to individuals in an abstract mindset, individuals in a concrete mindset will activate more distinct and contextually associated connotations for a certain target object or concept. Formally:

Hypothesis1: *The number of associations in a mental representation will be greater for individuals in a concrete mindset than for individuals in an abstract mindset.*

3.2 Mindset Abstraction Effect on Size of Memory-Based

Consideration Sets

How would the mindset abstraction effect on proliferation of association set transform into a downstream influence on product retrieval and consequently on product consideration? Given that each association represents a possible retrieval cue, I expect that rich associations in concrete mindsets will consequently lead to a larger memory-based consideration set. More specifically, I suggest that concrete thinking will contribute to enhanced product retrieval for two reasons. First, compared to abstract mental representations, concrete representations are more vivid and contain more distinct details. According to the distinctiveness hypothesis (Eysenck 1979), memory is enhanced when individuals focus on unique connotations of concepts during processing because the concepts are distinctly encoded. Therefore, I suggest that the relatively more sophisticated and differentiated representation of knowledge structure possessed by individuals in a concrete mindset will provide more distinct associations, which in turn enhance the retrieval of different instances under a certain product class. The underlying logic is that the abundant and distinct associations provide a rich network with intertwined pathways, facilitating the retrieval of different product instances stored in memory.

Second, in the section of literature review I have introduced an important factor that determines the accessibility of a product, namely availability of retrieval cues, and it is suggested that the higher the availability of retrieval cues, the more accessible a product will be (Anderson 1983; Nedungadi 1990). I posit that there will be more available retrieval cues in concrete mindsets than in abstract mindsets. At least, the detailed and

specific contextual features in a concrete mental representation provide individuals more internally generated retrieval cues, which will facilitate the retrieval of more choice alternatives stored in memory. In the knowledge structure of a certain product class, each product instance is linked to multiple related conceptual nodes (i.e., the belonging product category, other products in the same category, product attributes). It follows that the more retrieval cues are provided, the more conceptual nodes could be activated, and thus the higher the likelihood more alternative product instances are brought to mind. For example, facing a snack choice decision, individuals in a concrete mindset will pay more attention to the details regarding the consumption context (i.e., when, where, and how of the consumption) according to CLT. Therefore, it is possible that not only typical snack products, but also atypical products will be activated through the incidental details implied by the situational-specific context (i.e., the consumption timing between two afternoon classes might remind a student such relevant attributes as "quickness/ease to get," "caffeine to help alertness in class," and "food portion for the concern of being too full"). On the other hand, when facing the snack choice decision, individuals in an abstract mindset will tend to think in a holistic way. In this situation, the need question is set up as "I need a snack," and therefore people will be more likely to retrieve only the typical choice alternatives in a snack category, which are usually the ones on the top of mind, or the snack instances that have been frequently chosen in prior snack choice occasions.

The mindset abstraction effect on memory retrieval eventually has its downstream effects on the variation of number of alternatives in a memory-based consideration context. Given that product retrieval is a crucial factor determining product consideration

in a memory-based choice task and that alternatives easier to be retrieved from memory are also more likely to be included in consideration sets (Nedungadi 1990), I expect that when more choice alternatives are retrieved from memory in concrete mindsets, there should be also more alternatives that individuals in concrete mindsets will include in the consideration sets. More specifically, I predict:

Hypothesis2: Compared to individuals in an abstract mindset, ones in a concrete mindset will form a larger size of memory-based consideration sets.

3.3 Top-down versus Bottom-up Approach of Memory Retrieval

Previous research in CLT has shown that perceptually attending to global versus local stimuli, or thinking at superordinate versus subordinate levels of categorization, could prompt abstract versus concrete thinking (i.e., Wakslak and Trope 2009). This hierarchical perspective of mental representations in CLT implies two different directions of information processing when retrieving information from a hierarchical knowledge structure in memory. Individuals in an abstract mindset tend to adopt a top-down information processing strategy by starting with broader and higher-level aspects of a concept and then working their way down to the finer details of that concept. On the other hand, individuals in a concrete mindset process information in the opposite manner of the top-down processing, namely bottom-up processing. These individuals tend to start from low-level details and build upward toward more abstract representations in their mind. I assume that these two approaches of information processing will result in the use of different types of retrieval cues (superordinate vs. subordinate cues), which affect how

individuals construct their memory-based consideration sets. Then, a critical question is, why will the different activations of retrieval cues by mindset abstraction lead to the variation of memory set size? In the following section, I elaborate on the underlying mechanism of the mindset abstraction effect.

3.3.1 Top-down processing in abstract mindsets leading to
a greater likelihood of interference effects due to the use of
shared and common retrieval cues

I suggest that superordinate retrieval cues (e.g., product category) will be more salient and thus more likely to be adopted by individuals in an abstract mindset, who perform memory retrieval in a top-down approach. The use of superordinate retrieval cues will consequently lead to memorial interference effects and will constrain the size of memory sets.

For example, take the consideration for a beverage choice task. When people are in an abstract mindset, they tend to form a schematic representation organized at a superordinate level and as a result, the superordinate product class, "beverage," is more likely to be activated and used as a retrieval cue. They then retrieve product instances from the pool of the beverage class stored in memory to form the considered brands. In the marketing context, a product class (i.e., beverage) usually consists of several subcategories in the form of different market positions, and the categorized cognitive representations, or relative strength of associations in this mental map, are sometimes fuzzy and might vary from consumer to consumer. Consequently, when all product instances under this class share the same retrieval cue, "beverage," first recalling the subcategory instance (i.e., soda) that has a relatively stronger association to the common

product class cue might inhibit other subcategory instances (i.e., fruit juice, energy drink, diet drink) that have weaker associations. Similarly, recalling the most representative exemplar (i.e., Coca-Cola) from a certain subcategory (i.e., soda) might inhibit the recall of other soda instances (i.e., Dr. Pepper).

The interference effects could be explained by the existing memory research. Interference refers to the impaired ability to remember an item when it is similar to other items stored in memory (Anderson and Neely 1996). Furthermore, according to the *competition assumption* (Anderson, Bjork, and Bjork 1994), when a cue is linked to more than one item in memory, those items are assumed to compete with the target item for access to conscious awareness. It follows that when category instances for recall share the same and common retrieval cue (e.g., the superordinate category to which the instances belong), interference effects are more likely to happen due to the competition among the instances for a shared retrieval cue (McGeoch 1936). The interference effect due to a shared retrieval cue becomes more severe when instances possess different extents of association strength to the retrieval cue. Retrieval of the more salient instances (ones with stronger associations to the cue) may further inhibit the recall of the remaining items from the same category. This effect is known as the *Part-Set Cuing Inhibition Effect* (Rundus 1973). The explanation for the inhibition effects is developed based on four major assumptions:

(1) There are direct associations between a category name (e.g., beverage) and instances of the category (i.e., soda, fruit juice, and energy drinks), with each association having a specified strength.

(2) There is strength-dependent competition in the retrieval process. If the category name is provided as a retrieval cue, the probability of retrieving any particular instance is determined by the strength of association between that instance and the category, divided by the sum of association strengths of all individual instances emanating from that same category cue (as known as ratio-rule equation)

(3) The sampling of instances from the pool is with replacement.

(4) Sampling an instance increases the strength of association between the cue and instance.

In the example of beverage product recall, it is very likely that the most accessible beverage instance (i.e., the beverage product being purchased most frequently), which has the strongest association to the superordinate category cue, will be retrieved first. As sampling is with replacement, the part-set cuing inhibition effect is compounded each time the product instance is resampled since sampling increases the probability of resampling that instance and decreases the probability of sampling other instances (Rundus 1973). Therefore, when thinking abstractly and relying on superordinate retrieval cues, people come to recycle certain representative beverage instances, to neglect competing ones, and thus to generate a smaller memory set. In contrast, I surmise that this interference effect will be relatively less likely to occur for individuals in concrete mindsets. Why is this case? I suggest that the inhibitory effects of shared superordinate retrieval cues might have been offset to a smaller degree because of the facilitating effects of more detailed subordinate retrieval cues in concrete mindsets.

3.3.2 Bottom-up processing in concrete mindsets enhancing
product retrieval and consideration due to the rich and
distinct retrieval cues

Differently from individuals in an abstract mindset, individuals in a concrete mindset form contextualized representations that include many specific and distinct subordinate and incidental features. Building on this, I propose that these contextual details will elicit numerous specific product attributes, which thus are salient as a retrieval cue for retrieving considered brands. Furthermore, I suggest that the contextualized and vivid mental representations not only provide more retrieval cues that might facilitate memory retrieval, but more importantly, the more differentiated knowledge structure in concrete mindsets will mitigate the inhibitory effect of part-set cues through the facilitating effects of intercategory cuing (Alba and Chattopadhyay 1985).

Considering again the beverage choice example, thinking about the details about the consumption context might activate multiple situational-specific needs and the corresponding product attributes. For instance, for an undergraduate student, thinking concretely about a beverage in a point of time between two afternoon classes might activate the attributes of caffeine and feasibility in terms of ease to purchase. It is a hot and sweaty spring afternoon might also remind the person of the attributes, such as "coldness" and "being refreshing," for the need of cooling down, and "electrolytes" for quick rehydration. In this example, each beverage instance is usually associated with multiple product attributes and each product attribute will elicit its corresponding instances featured in that attribute. Therefore, for individuals in concrete mindsets the

more sophisticated and rich intertwined associations between subordinate attributes and product instances should be more likely to offset the interference effect and even facilitate the retrieval of considered alternatives. When forming consideration sets in a concrete mindset wherein distinct attributes serve as retrieval cues, each product instance could be retrieved through multiple routes by specific product attributes, instead of a single route through general product category, as in an abstract mindset.

Following the assumptions and arguments in the previous paragraphs, I expect that considered brands that are included in a memory set will depend on types of retrieval cues. More specifically, when forming a set of considered brands based on a developed product knowledge structure that is organized in terms of three hierarchical levels (superordinate categories, middle level brands, and subordinate attributes), individuals in an abstract mindset will tend to rely on superordinate categories as the retrieval cues and thus are more likely to consider brands that have a stronger association to the category cues. On the other hand, individuals in a concrete mindset will use the subordinate attributes as retrieval cues and thus are more likely to retrieve and consider brands that have a stronger association to the corresponding attributes. More formally:

> **Hypothesis 3a**: *Individuals in an abstract mindset will be more likely to consider brands that have a stronger association to the superordinate retrieval cues than brands that have a stronger association to the subordinate retrieval cues.*

> **Hypothesis 3b**: *Individuals in a concrete mindset will be more likely to consider brands that have a stronger association to the subordinate retrieval cues than brands that have a stronger association to the superordinate retrieval cues.*

CHAPTER IV

EMPIRICAL FINDINGS

The purpose of studies 1a and 1b was to examine the proposed hypothesis 1 that concrete mindsets lead to more associations with a target concept presented. Memory research suggests that exposure to a target word automatically activates its related concepts, or association set, stored in memory (Meyers-Levy 1989; Nelson 1979). If compared to general and abstract mental representations, detailed and concrete representations facilitate the derivation of associations, we should expect that when asked to list meaningfully related associated concepts that come to mind upon the exposure of certain target words, individuals in a concrete mindset would list a greater number of associated concepts than ones in an abstract mindset. In these studies, I employed target words with known association set sizes (Meyers-Levy 1989; Nelson, Bajo, and Casanueva 1985).

4.1 Study 1a

4.1.1 Method

4.1.1.1 Participants

A total of 50 (17 female; M_{age} = 21.4) marketing undergraduate students at a university in the Midwest participated in the study in partial fulfillment of a class requirement. One participant reported that she didn't know the meaning of a certain target word, and thus was excluded from the following analysis.

4.1.1.2 Materials and procedure

     This study was conducted using a university web-based survey software. As a cover story, participants were told that this study contained several unrelated tasks about visual perception and language use preference. I first manipulated mindset abstraction through a visual perception task (Navon task; Navon 1977) that drew people's attention to either the local or global information. Specifically, participants were asked to identify either "the small letter that the figure is made up of" or "the large letter formed by the overall shape of the figure" for each of 26 figures (e.g., a large A made up of small Ss) (see Appendix C for a complete set of Navon task stimuli). Based on previous research (Smith et al. 2008; Wakslak and Trope 2009), I assumed that identifying small letters would elicit a concrete perspective; while identifying the global letters would make people think in an abstract perspective. After the Navon perceptual task, participants were presented with a series of different target word stimuli. They were asked to list as many associated words as possible that came to their minds upon seeing a target word. To reduce the potential confounding effects of unique connotations possessed by a particular word, in this research the target word stimuli were selected from previous studies (Meyers-Levy 1989) in terms of their association set size and the frequency of word occurrence in the English language. Two frequently used target words ("yard" and "cloud") were finally selected, with each one standing for large-set-size versus small-set-size respectively. Association set size was manipulated between-participants. In other words, after the mindset manipulation, participants were randomly assigned to either the large-set-size word ("yard") or the small-set-size word ("cloud"). Participants' ethnicity

and first language used were measured at the end, and then participants were thanked and dismissed.

4.1.2 Results

The number of associated words listed was analyzed using a 2 (mindset: concrete vs. abstract) × 2 (set-size of a target word: small vs. large) between-participants ANOVA. I surmised that the participants whose first languages are not English might generate fewer associated words than the ones with English as their first language; therefore participants' first language was included as a covariate in the analysis. The results showed a significant main effect of mindset abstraction ($F_{mindset}$ (1, 44) = 4.38, *p = .04*). Consistent with our hypothesis, participants in the concrete mindset condition generated more associated words ($M_{concrete}$ = 10.65, SD = 5.76) than the ones in the abstract mindset condition ($M_{abstract}$ = 7.79, SD = 3.93). Follow-up simple effect analyses revealed that mindset abstraction exerted its influence mainly on the large-set-size target word ($M_{concrete}$=11.78 vs. $M_{abstract}$=7.06), F (1, 44) = 5.68, *p = .02*. The associated words listed for the small-set-size target word did not significantly differ between the concrete and abstract mindset conditions ($M_{concrete}$ = 9.73 vs. $M_{abstract}$ = 9, F <1) (figure A-2).

4.1.3 Control condition

A separate study was conducted to understand how concrete versus abstract mindsets impact the extent of word association, compared to a control condition without mindset manipulation. Given that the target words were adopted from previous research conducted over 20 years ago, and it is very likely that the usage of those words and their

default association set sizes have been changed over time, this study also served as a manipulation check for the variable of default association-set-size.

4.1.3.1 Participants, materials, and procedure

A separate group of 70 (41 females; M_{age} = 21.5) undergraduate participants was recruited. The study was conducted on computers using an alternative web-based survey software (Qualtrics). Half of the participants were asked to list associated words that came to their mind when seeing the large-set-size word (yard), and the other half of participants were asked to list associated words for the small-set-size word (cloud).

Results. Comparison of the number of associated words generated for the two target words revealed that there were significantly more associated words listed for the large-set-size word (M = 10.34) than the small-set-size word (M = 7.49), $F(1, 68)$ = 4.59, $p < .04$. Consistent with previous research, this finding suggested that people have a larger association set size for the target word "yard" than the word "cloud."

I further compared the sizes of associated words in the control condition to the ones in the concrete versus abstract mindset condition from the earlier study. The results showed that compared to the control condition, in the concrete mindset condition the association set sizes for both the small-set-size ($M_{concrete}$ = 9.73 vs. $M_{control}$ = 7.49) and large-set-size word ($M_{concrete}$ = 11.78 vs. $M_{control}$ = 10.34) were further enlarged. Interestingly, when abstract mindsets were elicited, the word association for the large-set-size word was actually inhibited. For the large-set-size word, there were fewer associated words generated in the abstract mindset condition (M = 7.06) than the ones in the control condition (M = 10.34) (figure A-3).

4.1.4 Discussion

In Study 1a, I directly examined the effects of mindset abstraction on associations retrieved from memory and found that individuals in a concrete mindset had a larger association set size for different types, regardless of its default association set size, supporting my hypothesis that concrete mindsets lead to more associations. Interestingly, the mindset abstraction exerted a greater impact for the large set-size word (yard) rather than the small set-size word (cloud). Some people might argue that it is due to the nature of the target words in terms of their abstractness versus concreteness. The large-set-size word "yard" is more concrete while the small-set-size word "cloud" is relatively more abstract. Therefore, compared to thinking concretely, thinking abstractly for a concrete word (e.g., yard) makes people to extract only the gist about the target word, and thus generate fewer associations. To address this issue and to attest the generalizability of the mindset abstraction on different types of target words, study 1b was conducted, in which I used different types of target words and manipulated type of target word as a within-participants factor.

4.2 Study 1b

4.2.1 Method

4.2.1.1 Participants, materials, and procedure

A total of 35 (10 female; M_{age} = 20.9) marketing undergraduate students at a university in the Midwest participated in the study in partial fulfillment of a class requirement.

Study 1b was executed using Qualtrics. The procedure of study 1b was similar to study 1a, except that four different target words were used and manipulated at a within-participants basis. Participants first perform a Navon task, in which they were asked to identify either the global (abstract mindset condition) or the local (concrete mindset condition) information for each of the 52 figures displayed (Appendix C). Next, they were presented with four target words serially (yard, cork, cloud, and crisp) (adopted from Meyers-Levy 1989), and for each target word they listed the associations that came to their mind. After the word association task, participants responded to questions about demographic information and then were thanked and dismissed.

4.2.2 Results

The number of associated words listed was analyzed using a 2 (mindset: concrete vs. abstract) $\times$ 4 (order that a target word was presented) repeated measure analysis, with mindset as a between-participants factor and order as a within-participants factor. The results of analyses revealed significant main effects of mindset abstraction and order. As predicted, participants in the concrete mindset condition generated more associations than the ones in the abstract mindset condition ($M_{concrete} = 6.54$; $M_{abstract} = 4$) ($F(1, 33) = 4.27$, $p < .05$). The order main effect ($F(1, 33) = 19.00$, $p = .00$) suggested that participants generated more associations for the target word presented earlier, with the most associations appeared for the target word "yard," followed by the words "cork," "cloud," and "crisp." Additionally, the interaction effect between mindset abstraction and order reached marginal significant level ($F(1, 33) = 3.55$, $p = .07$); the mindset abstraction

effect on number of associations was the strongest for the target word presented earlier (figure 4).

A separate analysis was conducted by including the variable of first language as a covariate. The results demonstrated similar patterns as what were shown when first language was not considered. The mindset abstraction effect almost reached a significant level (F (1, 32) = 3.94, p = .056); participants in the concrete mindset condition generated more associations than the ones in the abstract mindset condition. The order effect remained significant (F (1, 32) = 6.24, p < .02), with the earlier-presented target word resulted in a larger set of associations.

4.2.3 Discussion

Consistently with study 1a, study 1b supported the proposed hypothesis 1 by showing that a concrete mindset would elicit more associations than an abstract mindset. Importantly, this mindset abstraction effect was observed across different target words, in spite of the order effect and mindset-order interaction effect suggesting that earlier words had more associations and mindset abstraction had a stronger effect for target words presented earlier. The order effects might be explained by individuals' tediousness for the later-presented target words, given the within-participants design, or by the weaker carryover effect of the mindset manipulation over time.

In the earlier section, I have suggested that compared to abstract mindsets, concrete mindsets lead to more associations, which could serve as retrieval cues and facilitate the retrieval of alternatives stored in memory. Therefore, in the following studies I directly tested the mindset abstraction effect on memory-based consideration set.

4.3 Study 2a

Study 2a was designed to test the proposed hypothesis 2, suggesting that concrete mindsets lead to larger memory sets. Participants were first randomly assigned to a manipulation of concrete versus abstract mindset. After that, they were given a choice task in which they listed the considered brands before making the final decision.

4.3.1 Method

4.3.1.1 Participants

A total of 51 marketing undergraduate students at a university in the Midwest participated in the study in partial fulfillment of a class requirement.

4.3.1.2 Materials and procedure

The study was conducted on a computer using a university web-based survey software. The same mindset abstraction manipulation as study 1a was adopted by drawing participants' visual attention to either the local versus global aspect of a Navon figure. After the Navon task, participants were presented with a dinner choice task. Specifically, participants were presented with the description, "think about the food products which you would like to eat for the dinner today…," and then instructed to list the food items they seriously consider. Participants were presented with numerous text boxes and were asked to enter only one considered item in a text box. Next, they reported their final choice, the criterion they used to arrive at the final choice, and how hungry they felt at the moment on a 9-point scale (0 = not hungry at all; 9 = very hungry).

Previous research has shown that a strong desire would enlarge a consideration set and thus hungry people might consider more alternatives than satiated people (Goukens et al. 2007), therefore we included the measure of felt hunger in this study. After answering all the questions, participants were thanked and dismissed.

4.3.2 Results

4.3.2.1 Size of consideration sets

The number of food items listed for consideration was analyzed in a one-way ANOVA. Hunger was included as a covariate to control for the confounding effect of hunger on consideration set size. The results of analyses suggested that participants in the concrete mindset condition (e.g., identifying small letters) generated a larger consideration set ($M_{concrete}$=6.96, SD=3.47) than their counterparts in the abstract mindset condition (e.g., identifying large letters) ($M_{abstract}$=5, SD=2.63) ($F_{(1, 48)} = 5.25$, $p < 0.03$) (figure A-5).

4.3.2.2 Content of consideration sets

Content analyzing the food items included in a consideration set showed that the concreteness or abstractness of alternatives listed did not differ by individuals in the concrete versus the abstraction mindset condition. Regardless of mindset abstraction, participants listed similar foods (i.e., sandwich, pasta, steak, chicken, etc.) that they considered for a dinner choice (table B-2).

4.3.3 Discussion

The findings in study 2a provide preliminary evidence supporting hypothesis 2, suggesting that concrete mindsets lead to a larger consideration set. Participants who attended to the local visually perceptual information considered more food items when deciding for a dinner than ones whose attention was drawn to the global aspect of information. Furthermore, it was shown that the nature of considered alternatives did not differ in terms of its abstractness.

4.4 Study 2b

The purpose of study 2b is to get a conceptual replication and generalize the findings of study 2a in a different choice task. Specifically, in study 2b I used a different manipulation of mindset abstraction and examined the mindset abstraction effect on memory sets in a snack choice task. In this study, participants performed a word-generation task in which they generated either superordinate categories or subordinate exemplars of a series of objects. The word generation task that induces an abstract versus a concrete thinking has been employed extensively in prior studies (e.g., Fujita et al. 2006; Tasi and Thomas 2010; Wakslak and Trope 2009). For example, Wakslak et al. (2009) demonstrated that levels of categorization affected extent of thinking abstractness, in turn influencing probability judgments for various events. Using a similar word generation task to prime individuals' thinking at a concrete versus an abstract level, Tasi and Thomas (2010) showed that mindset abstraction moderated the fluency effects on evaluative judgments.

4.4.1 Method

4.4.1.1 Participants

A total of 49 marketing undergraduate students at a university in the Midwest participated in the study in partial fulfillment of a class requirement.

4.4.1.2 Materials and procedure

The procedure of study 2b was similar to study 2a except that (1) I manipulated mindset abstraction by using a procedure priming technique. Participants were randomly assigned to either a superordinate or a subordinate categorization task, in which they generated superordinate categories versus subordinate exemplars for a series of 20 objects (e.g., book, movie, singer, etc.). For example, in the abstract mindset condition, participants generated a superordinate category label for the object "book" by answering the question, "A book is an example of _____." On the other hand, participants in the concrete mindset condition generated a subordinate exemplar for the object by answering the question, "An example of a book is _____."(see Appendix E for the complete list of objects used in the categorization task) After the categorization task, participants were presented with a snack choice task, which was framed as an unrelated study. They were asked to list the considered food items for the snack choice (e.g., "please indicate the items you would "seriously consider"). Similarly to study 2a, participants next answered a series of questions for various dependent measures. First, they indicated their final choice. Second, they described the criterion they used to arrive at the final choice. Finally, participants were thanked and dismissed.

4.4.2 Results

A one-way ANOVA analysis was performed on the number of different snack items listed for consideration. Consistently with study 2a, the finding suggested that participants in the subordinate categorization condition generated a larger consideration set ($M_{subordinate}$ = 7.92, SD = 2.79) than ones in the superordinate categorization condition ($M_{subordinate}$ = 5.08, SD = 2.78) ($F (1, 47)$ =12.8, $p < 0.01$) (figure A-6). The content analysis of snack alternatives in consideration also revealed that the nature (e.g., specificity) of snacks listed did not differ by mindset abstraction (table B-3).

4.4.3 Discussion

In studies 2a and 2b, I used variants of mindset manipulation and demonstrated a consistent finding that concrete mindsets elicit larger memory-based consideration sets. Furthermore, the mindset abstraction effect on size of memory sets is shown across two different choice product categories.

Given the robustness of the finding regarding mindset abstraction effect on size of memory sets, the next question to be asked will be, what is the underlying mechanism accounting for the mindset abstraction effects on the memory-based consideration set formation? From a memory perspective, I propose that individuals in a concrete mindset are more sensitive to contextual information and tend to form a detailed mental presentation of a choice task. The specific contextual features attended to by individuals in the concrete mindset then serve as a rich basis of retrieval cues, facilitating the retrieval of choice alternatives stored in memory and consequently leading to a consideration set consisting of a larger number of alternatives. In contrast, individuals in

an abstract mindset extract gist from the facing environment and from a decontextualized mental representation. This abstract representation would make the retrieval of choice alternatives from memory become more difficult, given the assumption that in a hierarchical perspective, there are fewer global and general connotations at the higher level than local and specific features at the lower level because the global information represents the essence or summary of the local details. It follows that compared to ones in concrete mindsets, there are fewer retrieval cues that individuals in abstract mindset could rely on during the process of alternative retrieval.

The assumption about mindset abstraction effect on number of retrieval cuts has received support in studies 1a and 1b, showing that concrete mindsets lead more associations than abstract mindsets. The next step will be to find the direct evidence showing that individuals in concrete (vs. abstract) mindsets rely on different types of retrieval cues (subordinate details vs. subordinate gist) when constructing a memory-based consideration set, as suggested by hypothesis 3. Therefore, in study 3 I directly manipulate the relative association strength of a product to its superordinate cues versus subordinate cues, and examine how product consideration differs by mindset abstraction.

4.5 Study 3

The purpose of study 3 was to demonstrate that people in abstract mindsets will adopt a top-down approach of memory retrieval, processing information starting from the most superordinate level, while people in concrete mindsets will adopt a bottom-up approach and process information from the lowest-level details. These different directions of information processing further determine the types of retrieval cues and in

turn influence brand consideration. In order to test this idea, I employed a classic memory paradigm. That is, a product knowledge structure, which was organized in three hierarchical levels (product category, brand, and attribute), was first developed in every participant's mind. I manipulated the strengths of associations between the category and brand level as well as the brand and attribute level by varying the frequency that information about a certain association (e.g., category-brand association, brand-attribute association) was exposed. Fictitious brands were used to control the potential confounding effect of existing brand attitude on brand consideration.

It was expected that individuals in an abstract mindset would be more likely to consider brands that had a stronger category-brand association; while individuals in a concrete mindset would be more likely to consider brands with a stronger brand-attribute association. To sum up, this study was a 2 (mindset: concrete vs. abstract) × 3 (choice scenario: diet drink for weight control vs. energy drink for boosting energy vs. soda for quick rehydration) mixed design, with mindset as a between-participants factor and choice scenario as a within-participants factor.

4.5.1 Participants, materials, and procedure

<u>4.5.1.1 Participants</u>

Sixty (21 female; $M_{age} = 21.4$) marketing undergraduate students at a university in the Midwest participated in the study for the partial fulfillment of a class requirement. They completed the following tasks in order on computer using the MediaLab software. These tasks were framed as unrelated studies.

4.5.1.2 Phase 1: Knowledge structure development

Participants were asked to imagine that they were traveling in Russia and they would have to learn product information about beverage brands in that country. They were further informed that they might see the same information several times, but it was normal because some companies spend more marketing budget on promoting their brands and therefore their product information had a higher frequency of exposure.

Two fictitious brands were created for each of the three beverage categories (diet, energy, and soda drink). For each of the six brands, two types of product information were presented. Specifically, one type of information was about the product category that a certain brand belonged to, and the other type of information was about the product attribute that a certain brand was positioned to possess. For example, brands in the diet drink category were described in the following two ways to link the brands to either their corresponding superordinate product categories or their possessing subordinate product attributes: "Fibe is a diet drink to maintain your physical fitness" (category-brand association) and "Fibe has low calories to maintain your physical fitness" (brand-attribute association) (see Appendix E, figure E-1, for the product information boards). I varied the frequency (four vs. two times) that each type of information was exposed to make one (e.g., Fibe, MegaV; Mezzo; called "*superordinate brand*") of the pair brands in each beverage category had a strong (frequency of information exposure = four) association to the superordinate category cue and relatively weak (frequency of information exposure = two) association to the subordinate attribute cue. In contrast, the other brand (e.g., Vinea, Rushh, Quiva; called "*subordinate brand*") in the pair was manipulated to have a strong association to the subordinate cue and relatively weak association to the superordinate

cue. Participants were randomly presented with 36 pieces of product information, one at a time and each for five seconds, formed by six different brands and each brand containing six pieces of information (either "4 category information plus 2 attribute information" or "4 attribute information plus 2 category information") (see Appendix E, table E-1 and figure E-2, for the manipulation scheme of product information and frequency of information exposure, and the expected product knowledge structure).

After that, on 7-point scales (1 = definitely disagree; 7 = definitely agree) participants were asked to report their perceived familiarity with the brands in display ("I have never come across any of the aforementioned local beverage brands available in Russia.") and their involvement when learning the brand information ("I was involved in learning the product information about local beverage brands available in Russia?" and "I paid a lot of attention in learning the product information about local beverage brands available in Russia?") (Cronbach's Alpha = .62).

4.5.1.3 Phase 2: Filler task

A filler task was introduced to offset the potential influence of serial position effects (i.e., primary and recency effects; Murdock 1962). Specifically, in eight 11-point scale questions, participants were asked to evaluate and report their attitudes toward two editorials about a requirement for undergraduate students in the university to take a senior comprehensive exam.

4.5.1.4 Phase 3: Mindset manipulation

Participants performed a similar Navon task in which 26 figures were presented for visual information judgment. They were randomly assigned to either the concrete (identifying local information) or abstract (identifying global information) mindset condition.

4.5.1.5 Phase 4: Consideration set formation

In the last phase, participants were assigned to three beverage choice scenarios, one at a time, with the order of scenarios counterbalanced. Each scenario contained a description with both abstract and concrete cues, which could serve as retrieval cues for brand recall. Participants were told that they were traveling in Russia and encountered a beverage choice scenario, in which only the local beverage brands that they had learning in phase 1 were available for choice (see Appendix E, table E-1, for the scenario protocol). For each scenario, participants were first asked to recall and list any beverage brands they would seriously consider for choice. Participants were given as much time as they needed. Next, they were instructed to respond to a question measuring imagination difficulty ("How difficult is it to imagine the aforementioned beverage choice scenario in Russia?") on a 7-point scale (1 = not at all difficulty; 7 = very difficult) and several questions about demographic information and travel experience to Russia.

4.5.2 Results

4.5.2.1 Brand consideration

I expected that participants in the abstract mindset condition would consider more superordinate brands (e.g., Fibe, MegaV; Mezzo) than subordinate brands, whereas participants in the concrete mindset condition would consider more subordinate brands (e.g., Vinea, Rushh, and Quiva) than superordinate brands. In each of the three choice scenarios (diet, energy, and soda), every participant had six responses representing his/her consideration for the six potential brands. Each response was coded as "1" (vs. "0") if a certain brand was considered. I then summed up the three responses for superordinate (vs. subordinate) brands to get an index of superordinate (vs. subordinate) brand consideration ($Size_{min} = 0$; $Size_{max} = 3$). These two indexes were used as the depend measures in the following analyses. I first conducted three separate repeated-measure analyses for each choice scenario, with mindset (abstract vs. concrete) as a between-participants factor and type of considered brand (superordinate vs. subordinate) as a within-participants factor. The results of analyses showed that the interaction effect between mindset abstraction and type of considered brand reached significant level for the scenario featuring the energy drink consumption context ($F(1, 58) = 6.36$; $p = .01$). Participants in the abstract mindset condition considered more superordinate brands (M = .71) than subordinate brands (M = .55) ($p = .03$). In contrast, participants in the concrete mindset condition considered more subordinate brands (M = .79) than superordinate (M = .48) ($p = .2$). For the other two choice scenarios (diet and soda

context), the interaction effect did not reach a significant level, despite the interaction patterns were consistent with the one in the energy context (figure A-7).

I performed another repeated measure analysis with mindset as a between-participant factor, and type of considered brand (superordinate vs. subordinate) as well as choice scenario (diet vs. energy vs. soda) as within-participants factors. The results revealed a marginal the two-way interaction effect between mindset abstraction and type of considered brand ($F(1, 58) = 3.12$; $p = .08$). When excluding the soda choice scenario and performing a similar repeater measure analysis, it was shown that the two-way interaction effect between mindset abstraction and type of considered brand reached a significant level ($F(1, 58) = 4.31$; $p = .04$).

4.5.2.2 Ancillary measures

Analyses on the depend measures assessing the difficulty of imagining a certain choice scenario showed that individuals in the abstract versus concrete mindset condition didn't differ in terms of their perceived imagination difficulty for the certain scenario (p's > .1). Additionally, in general participants tended to think that they had never encountered the suggesting brands ($M_{concrete} = 6.03$ vs. $M_{abstract} = 5.97$, on a 7-point scale), and were moderately involved in performing the beverage product information learning task ($M_{concrete} = 4.74$ vs. $M_{abstract} = 4.67$, on a 7-point scale). Importantly, the familiarity and involvement findings did not differ by mindset abstraction (p's > .1).

4.5.3 Discussion

The findings of study 3 provided evidence supporting hypotheses 3a and 3b, the top-down versus bottom-up approach of memory retrieval hypothesis. The brand consideration in the energy drink scenario was consistent with the predicted pattern that individuals in the concrete mindset considered more the brands (i.e., Rushh) that had a stronger association to the subordinate attribute cue (i.e., caffeine), whereas individuals in the abstract mindset considered more the brands (i.e., MegaV) with a stronger association to the superordinate category cue (i.e., energy drink). The patterns of the mindset abstraction and type of considered brand interaction in the other two choice scenarios, although not reaching the significant level, were consistent with the one in the energy context.

The failure to find a significant interaction in the other two scenarios might be explained by the gender composition of the participants and the hierarchal relationship between the soda category and the other two categories. First, when further examining the gender composition, I found that 65% of the participants are male (N = 39), more than double of the number of female participants (N = 21). It is possible that male participants, compared to female participants, are less sensitive to diet drinks and therefore the predicted effect in the diet drink scenario was relative weak and did not reach the significant level. Second, the potential explanation for the insignificant finding in the soda scenario might be that soda is a beverage category with more fuzzy and ambiguous category boundaries, compared to diet and energy categories. Soda could be considered as a beverage category superordinate to the categories of diet and energy drink. Therefore, when asking to list considered brands in a choice context characteristic of the

consumption need of quick rehydration, people would consider not only the soda brands, which were featured as fulfilling the rehydration need according to the product information presented in the phase 1, but also the brands in the diet and energy category that could be considered as a sub-category in the soda category. Indeed, the analyses showed that participants facing the soda scenario considered more brands than they did when facing the diet or energy scenario (F(1, 58) = 11.99, $p < .01$). To address this limitation, study 4 used an alternative beverage category (i.e., fruit juice) that has more distinct category boundaries.

Another limitation of study 3 is that the product knowledge structure, in which each brand is associated to a single attribute and belonging to a single category, is somewhat simplified and artificial. In real life, a product is often positioned as possessing multiple attributes/features, and thus its category definition is often fuzzy. For example, Starbucks Doubleshot Energy Vanilla Light Drink could be defined as an energy drink, but also as a diet drink. Although Diet coke is mainly positioned as a diet soda drink with zero calories, it also contains caffeine that helps to maintain mental alertness. The simplified knowledge structure in study 3 might explain why the size of memory set did not vary by mindset abstraction. As the figure in Appendix C-2 suggests, the beverage knowledge structure is composed of three independent category networks and within each network every brand shares only a single association to its superordinate cue as well as to its subordinate cue. Given that the number of associations was controlled to be equal in the category-brand level and the brand-attribute level and participants were presented with a choice scenario that activated a certain consumption need (e.g., diet drink and low calories), it should not be surprising that the size of memory sets did not vary. Therefore,

in study 4 I created a product knowledge structure more closely reflecting the real situation; each brand was manipulated to associate to multiple product attributes, with the degree of each attribute varying within the brand.

4.6 Study 4

The purpose of study 4 was to provide further evidence regarding the hypothesis that individuals in a concrete (vs. an abstract) mindset adopt a bottom-up (vs. top-down) approach of memory retrieval when forming a memory-based consideration set. Similarly to study 3, a four-phase memory paradigm was adopted in study 4. However, differently from study 3, in this study I manipulated the associations among nodes at the three hierarchical levels (e.g., category, brand, and attribute) in an alternative way. In specific, each brand was associated to three product attributes and the category of each brand would be inferred from the degrees of attributes that the brand possessed. With this new setting-up, I was able to create a product knowledge structure with more associations located at the bottom level (i.e., between brand and attribute nodes) than at the top level (i.e., between category and brand nodes). Given that brand retrieval is enhanced by associations related to the brand (because each association represents a possible retrieval cue), it was expected that individuals in a concrete mindset and processed information in a bottom-up manner would form a larger memory-based consideration set than individuals in an abstract mindset wherein a top-down approach of memory retrieval was suggested to take place.

4.6.1 Participants, materials, and procedure

4.6.1.1 Participants

Sixty-four (27 female; M_{age} = 20.7) marketing undergraduate students at a university in the Midwest participated in the study for the partial fulfillment of a class requirement. They completed a similar four-phase study on computer as in study 3.

4.6.1.2 Phase 1: Knowledge structure development

Participants were asked to imagine that they were traveling in Russia and came across a series of product information for various local beverage brands.

Four fictitious brands were created for each of the three beverage categories (diet drink, energy drink, and fruit juice), with a total of 12 fictitious beverage brands. Each brand was described along three attributes: calorie, caffeine, and vitamin, of which diet drink, energy drink, and fruit juice category was correspondingly characteristic (see Appendix F, figure F-1, for the product information board). The degree of each attribute possessed by a brand and the frequency that the information board of each brand was exposed were manipulated. For instance, the category of diet drink contained four brands, including two brands (e.g., Fibe and Mirida; called "*HLL brand*") that were low in calories and low in caffeine as well as vitamin content, and two brands (e.g., Finex and Cidra; called "*MML brand*") moderate in calories as well as vitamins and low in caffeine. Brands within the HLL pair and the MML pair differed in terms of the frequency that their product information was exposed. For example, in the diet HLL pair, the information board for "Fibe" was displayed four times whereas the information for

"Mirida" was presented only two times. Similarly, in the MML pair, information for one brand ("Finex") was exposed four times, while the information for the other brand ("Cidra") was displayed only two times (see Appendix F, table F-1, for the scheme of attribute levels and frequency of information exposure). With these manipulations, I expected that when thinking from a superordinate category level (i.e., diet drink), "Fibe" would be the most representative (due to its feature of low calories) and accessible (because of the relatively higher frequency of information exposure) exemplar that would come to mind; whereas thinking from a subordinate attribute level (i.e., calories) might activate those accessible MML brands that were moderately low in calories (e.g., Finex), in addition to "Fibe" (see Appendix F, figure F-2, for the expected product knowledge structure). In sum, participants were randomly presented with 36 pieces of product information, one at a time and each for 10 seconds, formed by the combination of 12 different brands with six brands being exposed four times and the other six being exposed two times.

After that, participants answered the same questions measuring brand familiarity and involvement as in study 3 (Cronbach's Alpha for the involvement measures = .84).

4.6.1.3 Phase 2: Filler task

A similar filler task as in study 3 was introduced to offset the potential influence of serial position effects.

4.6.1.4 Phase 3: Mindset manipulation

Similarly to study 3, participants were randomly assigned to either the concrete or the abstract version of the Navon task, in which 52 figures were presented.

4.6.1.5 Phase 4: Consideration set formation

Differently from study 3, in the final phase of study 4 participants were presented with only one choice scenario, in which various consumption goals (e.g., weight control, restoring alertness, and nutritional intake) were described:

"Imagine you are traveling in Russia...

Today you have a very tight schedule. You have been rushing in visiting several famous landmarks in Moscow and now you are in the Red Square. It is hot and sweaty summer weather. You feel a little drowsy. You feel like having something to drink, but you are on a diet and you have been watching your daily nutritional intake.

However, the usual beverage brands you are familiar with are not available. There are only local beverage brands available. You remember that you have been seeing some product information about the local beverage brands in Russia during the trip (the product information you have learned in the beginning of the experiment)."

After reading the description, participants were asked to recall and list any local beverage brands they would seriously consider for choice. Participants were given as much time as they needed. Next, they were instructed to respond to a question measuring imagination difficulty ("How difficult is it to imagine the aforementioned beverage

choice scenario in Russia?") on a 7-point scale (1 = not at all difficulty; 7 = very difficult), and questions related to demographic and travel experience to Russia.

4.6.2 Results

4.6.2.1 Consideration set size

The number of considered brands was analyzed on a one-way ANOVA with mindset abstraction as a between-participants factor. The results of analyses showed a marginal significant mindset effect; participants in the concrete mindset condition (M = 2.43) formed a larger consideration set than ones in the abstract mindset condition (M = 1.74) ($F(1, 62) = 3.59$, $p = .06$) (figure A-8).

I surmised that the travel experience to Russia might confound the mindset abstraction effect on consideration set size. People who have been to Russia might know that the beverage brands presented in phase 1 were fictitious ones and be suspicious about the purpose of this study. Therefore, I ran a similar one-way ANOVA analysis with the measure of travel experience included as a covariate. After controlling for travel experience to Russia, the mindset abstraction effect on memory set size revealed to be significant ($F(1, 61) = 4.05$, $p < .05$).

4.6.2.2 Consideration of different types of brands

I further examined the likelihood that each of the different types of brands was considered. A repeated measure analysis on likelihood that each brand was considered was performed, with the following variables as the independent dummy variables: (1) mindset (concrete vs. abstract mindset) as a between-participants variable, (2) frequency

of product information exposure (four vs. two times) as a within-participants variable, and (3) levels of the three attributes (HLL vs. MML) as a within-participants variable. The results of analyses revealed a significant main effect of frequency of exposure. The number of considered brands that were more frequently exposed (M = .61, SD = .78) was larger than the number of considered brands with their information less frequently exposed (M = .43, SD = .63) (F (1, 62) = 4.36, p < .05). The main effect of attribute level also reached a marginal significant level (F (1, 62) = 2.8, p < .1); there were more HLL brands (M = .59, SD = .72) than MML brands (M = .45, SD = .69) in a consideration set. None of the two-way interactions between mindset abstraction and the other independent variables were significant (*p*'s > .1) (figure A-9)

4.6.2.3 Ancillary measures

The results of analyses on perceived imagination difficulty seemed to suggest that people in the concrete mindset conditions ($M_{concrete}$ = 5.97) found it more difficult to imagine the scenario in description than people in the abstract mindset condition did ($M_{abstract}$ = 5.21) (F(1, 62) = 3.24, *p* = .08). Mediation analyses suggested that imagination difficulty was not a significant mediator. To further examine whether perceived imagination difficulty moderated the mindset abstraction effect on consideration set size, a regression analysis on size of memory sets, with mindset abstraction and perceived difficulty as predictors, was performed. The findings suggested that: (1) compared to abstract mindsets, concrete mindsets led to a larger memory set (t = -2.05, *p* < .05); (2) the lower the perceived imagination difficulty, the larger the memory set (t = -2.06, *p*

< .05), and more importantly (3) imagination difficulty did not moderate the mindset abstraction effect on size of memory sets (t = 1.44, $p > .1$).

Analyses on the other ancillary measures suggested that people in the concrete and abstract mindset conditions did not differ in terms of their level of involvement while learning product information ($M_{concrete} = 3.65$ vs. $M_{abstract} = 3.78$; $p > .1$) and their perceived familiarity toward the factious beverage brands ($M_{concrete} = 5.87$ vs. $M_{abstract} = 6.32$, with lower scores standing for higher familiarity; $p > .1$).

4.6.3 Discussion

Study 4 provided further support for the hypothesis of top-down versus bottom-up memory retrieval. Given the assumption that associations enhance memory retrieval and the manipulation of the number of associations in the bottom versus the top level of the knowledge structure, I was able to assess the direction of memory retrieval adopted by different individuals through observing the size of memory-based consideration sets. As predicted, people in a concrete mindset adopted a bottom-up approach of memory retrieval by starting with subordinate cues, and thus formed a larger consideration set. In contrast, people in an abstract mindset adopted a top-down approach and the size of their consideration sets was constrained due to the fewer associations between category and brand nodes.

In real life, a brand could be defined in terms of the superordinate category it belongs to, or the detailed subordinate attributes it possesses. In comparison to the top-down approach by which the brand could be retrieved through only a single route, the bottom-up approach provides more routes, due to the associations to multiple attributes,

in which the brand could be retrieved. In this study, I demonstrated that the direction of memory retrieval depends on mindset abstraction, and therefore the bottom-up versus top-down approach of memory retrieval further explains why concrete mindsets lead to a larger memory-based consideration sets. Building upon study 3, study 4 addresses the limitations of study 3 and directly shows the process underlying the mindset abstraction effect on size of memory sets.

The finding of the exposure frequency main effect is consistent with what has been suggested in previous research. When comparing consideration likelihood of brands in terms its frequency of exposure, it was revealed that brands with their product information exposed four times were more likely to be considered than brands with their product information exposed two times. Shapiro et al. (1997) find that incident exposure to an ad increases the likelihood that a product depicted in the ad will be included in a memory-based consideration set due to its increased accessibility of a semantic representation. It follows that the higher frequency of exposure will lead to higher accessibility (Nedungadi 1990), resulting in a higher likelihood of consideration. Additionally, the comparison of HLL with MML brands in terms of their relative consideration likelihood suggested that HLL brands were more likely to be considered than MML brand. It is possible that compared to the MML brands, the HLL brands are more distinctly encoded, and thus are more likely to be remembered and considered (Eysenck 1979; Meyers-Levy 1989).

CHAPTER V

GENERAL DISCUSSION

5.1 Summary of Findings and Conclusion

The current research examines the role that mindset abstraction plays in influencing the number of choice alternatives individuals consider in a memory-based choice context. Building upon the literature in consideration sets and the construal level theory, I propose that individuals in a concrete mindset will generate a larger memory-based consideration set than ones in an abstract mindset. Furthermore, I propose that the variation of memory set size in concrete versus abstract mindsets is driven by the mindset abstraction effect on type of retrieval cues used in the process of memory retrieval and the consequent extent of associations activated in a mental representation. Individuals in a concrete mindset, who process information in a bottom-up approach, tend to form fine-grained mental representations with the rich contextual details and the concrete representation facilitate the activation of various subordinate retrieval cues and more associations, which consequently enhance the retrieval of numerous choice alternatives stored in memory and result in a larger consideration set. On the other hand, individuals in an abstract mindset process information in a top-down manner and tend to focus on the essence of available information. Therefore, they are more likely to rely on a certain superordinate category cue, which summarizes the detailed instances belonging to the category, when retrieval choice alternatives from memory. Given that the higher likelihood of interference effects occurring when a shared retrieval cue is used, abstract mindsets therefore constraint the size of memory sets.

Across six studies, I document evidence supporting the proposed phenomenon regarding size of memory set in concrete versus abstract mindsets, and further provide explanations of the mechanism that underlies the mindset abstraction effect on size of memory-based consideration sets. Specifically, supporting the proposed hypothesis 1 that there are richer associations in concrete mindsets than in abstract mindsets, studies 1a and 1b showed than people in a concrete mindset generated more concepts associated to a target word given than ones in an abstract mindset did. This mindset abstraction on association set size was replicated across different types of target words. The finding provides a basis for the reasoning that mindset abstraction influences the size of memory-based consideration sets via its impacts on the proliferation of associations and specificity of mental representation and thus the ease of retrieval of alternatives stored in memory. Studies 2a and 2b directly examined the mindset abstraction effect on size of memory-based consideration sets in two different choice tasks, each involving a general product classes (i.e., snack, dinner). As predicted, the findings suggested that concrete mindsets led to a larger set of considered foods than abstract mindsets. Importantly, this mindset abstraction effect on memory sets was robust, being replicated in alternative manipulations of mindset abstraction (perceptual global vs. local Navon task in study 2a and conceptual superordinate vs. subordinate categorization task in study 2b).

Building upon the findings of studies 1 and 2, I propose the hypothesis of top-down versus bottom-up approach of memory retrieval (hypothesis 3)to explain why people in abstract mindsets are more susceptible to the memorial interference effect (and thus forming a smaller consideration set), while the memory retrieval is facilitated for people in concrete mindsets. Studies 3 and 4 were conducted to test this hypothesis.

Following the classic memory paradigm, I asked participants to first learn product information for a series of fictitious brands and later presented a choice scenario in which participants needed to form a memory-based consideration set based on the product knowledge they had learned earlier. This design controlled for the impacts of individual differences in brand attitude and brand accessibility on brand consideration. In a controlled setting in which a common product knowledge structure with given association strengths between concepts located at different levels in the hierarchical knowledge structure was developed, I was able to detect how the mindset abstraction variable alone might influence memory retrieval and the following brand consideration.

Study 3 focused on understanding how the type of retrieval cues (superordinate category vs. subordinate attribute) used in abstract versus concrete mindsets determined brand consideration, therefore a simplified knowledge structure (i.e., each brand was presented to be associated to only a single superordinate and a single subordinate cue with the strength of each association varied)was developed. The findings suggested that individuals in a concrete mindset considered more the brands that had a stronger association to the subordinate attribute cue, whereas individuals in an abstract mindset considered more the brands with a stronger association to the superordinate category cue. Study 4 addressed the limitations of study 3 and developed a more complicated product knowledge structure that brands, superordinate categories, and subordinate attributes were interconnected to each other with a different strength of association. I assumed that this structure would be more representative to the real life situation because a product might be abstractly defined in terms of its fewer (or single) belonging product category, but it could also and often be concretely described along the multiple attributes it

possessed. Therefore, in study 4 I created a knowledge structure in which there were more associations at the bottom level (between brands and attributes) than associations at the top level (between categories and brands). Consistent with study 3, the results of study 4 showed that people in a concrete mindset adopted a bottom-up approach of memory retrieval, starting with subordinate product attributes, and thus formed a larger memory set. On the other hand, people in an abstract mindset started with superordinate product categories and retrieved brands in a top-down manner. The inhibitory effects that occurred due to the shared retrieval cues and different strengths of association to a shared cue consequently resulted in a smaller memory set.

<u>5.2 Theoretical Contributions</u>

5.2.1 Addressing an understudied research question in the
literature

This research identifies a circumstance in which construal levels affect the construction of consideration sets, an understudied research question noticed in previous research. Liberman et al. (Liberman, Trope, and Wakslak 2007b) suggest that construal levels have implications to consideration sets and it is important to study how psychological distance might affect the construction of sets of alternatives; for example, how psychological distance might impact the number of alternatives being considered. The current research addresses this research question and directly manipulates levels of construal through a procedure priming technique that induces participants to adopt an abstract versus a concrete mindset. For the purposed of research, I posit that it would be more advantageous to use a priming paradigm instead of altering psychological distance

to manipulate construal levels. I suggest that the priming paradigm of mindset manipulation helps us to better understand the effects of construal levels on consideration sets and rule out some potential compounding influences of temporal proximity or distance. Temporal proximity or distance itself might influence the construal levels of an individual's thinking and then his/her choice decision; however, degrees of temporal distance from the decision also induces different degrees of perceived time pressure, which has been revealed to affect the characteristics of consideration sets (Chakravarti and Janiszewski 2003).

5.2.2 Demonstrating mindset abstraction effect on memory retrieval in the domain of memory-based consideration sets

To my understanding, the present research is one of the first studies attempting to investigate the effect of construal levels (abstract vs. concrete mindsets) on memory retrieval and to examine its downstream impact on consideration sets in a memory-based choice context. Previous research in the construal level literature primarily focused on how differential psychological distance or construal levels of mental representations affect cognition and consequent evaluations and behaviors, except for few recent studies that have begun investigating how temporal distance influences the recall of different types of information (Herzog et al. 2007; Kim et al. 2009). The issue regarding how levels of mental construal might affect memory and the process of memory retrieval is understudied. The current research investigates effects of abstract versus concrete mindsets on consideration set formation, which provides new insights into understanding how consumers' processing mindset abstraction, especially one being activated in a prior

unrelated task, might affect a critical stage of memory-based decision-making process, namely the memory retrieval of choice alternatives when forming a memory-based consideration set.

This research also contributes to the research stream of consumer decision-making and choice, especially in the memory-based choice task. Inclusion of a product in a consideration set is suggested to be a necessary condition for choice (Howard and Sheth 1969), and retrieval is further argued to play a key role determining whether a certain product will be recalled and then considered. The current research demonstrates how this important earlier stage of the decision-making process, formation of consideration sets, is affected by consumers' cognitive procedures. The findings suggest that individuals' cognitive attention to the contextual details versus to the big picture about a choice task influences the approach of memory retrieval and therefore the construction of memory-based consideration sets.

5.2.3 Extending prior research about attitude flexibility in concrete mindsets

Recently, Ledgerwood et al. (Ledgerwood, Trope, and Chaiken 2010) investigate the effects of construal levels on the stability or flexibility in evaluative responding. Their findings suggest that when individuals mentally construe an attitude object concretely, either because the attitude object is psychologically close or because they have been led to adopt a concrete mindset, their evaluations flexibly incorporate information from their current context. On the other hand, when individuals think about the same issue more abstractly, their evaluations are less susceptible to incidental social influences, and

instead exhibit evaluative consistency reflecting their previously reported ideological values. In sum, people tend to have a more flexible attitude toward the evaluative object when they are in a concrete versus in an abstract mindset. Ledgerwood et al.'s findings regarding the sensitivity to contexts and the flexibility of attitudes in concrete mindsets have implications for consideration set formation. It is possible that individuals in a concrete mindset are more likely to incorporate unique information in the local context when constructing a consideration set, and thus consider a variety of different incidental options implied by the peripheral and detailed features in the context. On the other hand, people in abstract mindsets might focus on the essence of the choice task and consider the preferred ones that they have consistently chosen across different choice occasions. Going beyond the influence of attitude on brand evaluation, the current research focuses on the memory-based choice and demonstrates that the influence of mindset abstraction would extend to the retrieval and consideration of brands themselves. My findings suggest that individuals in a concrete mindset have more flexible memory sets, which include more various choice alternatives.

5.2.4 Showing the mindset abstraction effect on

consideration sets in the brand as well as substitution-in-use

perspectives

The current research demonstrates the mindset abstraction effect on size of consideration sets in a substitution-in-use (SIU) as well as a brand perspective. In studies 2a and 2b, I examine size of consideration sets at a general product class level (e.g., snack, dinner). The findings suggest that people consider choice alternatives from the substitution-in-use (SIU) perspective, meaning that choice alternatives can be used in

place of each other to fulfill a certain consumption goal (Ratneshwar and Shocker 1991).

For example, when thinking about alternatives that are considered as a snack, people

think about food items in terms of product categories, such as sweets, crackers/chips,

yogurt, fruit, and bakery, which all fulfill the same consumption goal of quickly

satisfying a huger need between meals. In addition to the SIU perspective, it is also

important to examine consideration sets at a brand level (e.g., Erdem and Swait 2004;

Hauser and Wernerfelt 1990; Kardes et al. 1993; Nedungadi 1990; Roberts and Lattin

1991). For instance, Hauser and Wernerfelt (1990) define a consideration set as the set of

brands that consumers seriously consider when making a purchase and/or consumption

decision. Understanding consideration sets at the brand level has important implications

especially to marketers because in the marketplace, marketers usually define competition

as brands competing in the same product category. The findings of study 4 demonstrate

that the mindset abstraction effect observed in the consideration of substitute products

also generalizes to the consideration of brands that belong to the same product category,

or to a more general product class.

5.3 Practical Implications

Understanding number of choice alternatives people consider before making the

final choice has critical implications to both consumers and marketers. From consumers'

perspective, size of consideration sets implies different extents of effort to be made for

decision-making. When an individual includes too many alternatives in her/his

consideration set, s/he might need to spend more mental resources to make a decision

from the large consideration set. Previous research (Iyengar and Lepper 2000) has shown

that having too many choices actually is intrinsically demotivating; it increases the likelihood of indecisions and reduces satisfaction with a selection. Although my findings show that thinking concretely tends to make people consider more than thinking abstractly in a memory-based choice task, I am not suggesting that either thinking concretely or abstractly is better. If thinking concretely helps an individual to recall some good alternatives that s/he has forgotten, eliciting a concrete mindset might be beneficial in terms of enhancing decision quality. However, if attention to the contextual details and peripheral features in a concrete mindset just creates some noise by increasing the number of incidental alternatives in a consideration set, concrete mindsets might instead lower overall satisfaction and hurt decision efficiency. In this situation, there are so many choices and they seem all look good, and it is very likely that consumers will end up with indecision. Future research might want to investigate the downstream effects (i.e., consumer satisfaction, choice deferral) of the variation of memory set size induced by mindset abstraction.

From marketers' view point, the variation of consideration set size suggests different levels of difficulty for a product/brand to enter or remain in a consideration set. We can imagine that the more unstable a consideration set is, the more likely it might be for a product/brand to enter the set. This notion has great implications to brand competition in the marketplace. Concrete mindsets might help to mitigate the interference effect that happens in the process of brand retrieval, especially for the product categories with a huge number of brands competing in the market. Leading brands usually have stronger associations to the belonging superordinate product categories in consumer's minds. For instance, when thinking about soda, the market leaders, Coca-Cola and Pepsi,

usually come first to consumers' mind. Therefore, it might be better for market leaders to induce an abstract mindset when consumers make decisions, because when thinking abstractly about a superordinate product category, the leading brands will tend to pop up first and the recall of the relatively accessible brands will further inhibit the recall of other brands. On the other hand, making consumers think concretely might help for new products or follower brands. When thinking concretely, the contextual information comes in to play and influences the brand consideration and consequent decision making. Therefore, it increases the likelihood that consumers include incidental alternatives implied by the context into their consideration sets. Furthermore, compared to abstract thinking that starts with superordinate categories, thinking concretely from subordinate attributes also increases the likelihood for follower brands to be recalled and considered.

Marketers always try to influence consumers' choices and decisions by manipulating the context of a choice environment. The findings of the present research suggest that it might be easier to influence consumers in concrete mindsets than ones in abstract mindsets, because consumers in concrete mindsets are more sensitive to the context and more likely to consider the incidental and peripheral information in the context. The question then will be how markets can do to induce a certain mindset in a retailing setting. In studies 3 and 4, I have showed that concrete (vs. abstract) mindsets lead to a differential attention to subordinate attributes (vs. superordinate categories). Marketers might promote concrete mindsets by emphasizing concrete and subordinate product attributes. Conversely, marketers could also try to facilitate an abstract mindset by highlighting an abstract and superordinate product category. For example, retailers

could choose to arrange or display products either according to their general categories (e.g., fruit juice, energy drink) or detailed attributes (e.g., vitamin, calorie).

5.4 Limitations and Future Research Directions

5.4.1 Concreteness or abstractness of consumption goals

The findings of studies 1a and 1b suggest that the mindset abstraction effect is greater for the target word, "yard," compared to the other target words. There are several possible explanations. First, "yard" is suggested to have a larger default association set (Meyers-Levy 1989) and there is a ceiling effect in the target words with smaller association set. The findings of study 1b seem to rule out this explanation because in study 1b, the mindset abstraction effect on the target word "cork" (which is supposed to have a small association set) was still relatively stronger. Second, "yard" is a relatively concrete word. Therefore, thinking concretely for a concrete word multiplies the associations, whereas thinking abstractly for a concrete word results in fewer key concepts that summarize the concrete details. The design of the current studies could not rule out this explanation. For example, in study 1b, the two concrete words (i.e., yard and cork) happened to be placed in the first and second position in target word list, and the mindset abstraction effect was found to be stronger in the first two concrete target words than in the later-presented two relatively abstract words (i.e., cloud and crisp). Although order effect might account for the differential impact of mindset abstraction on these different target words, it does not rule out the possibility of word concreteness as an alternative explanation. Further research might want to investigate whether the mindset abstraction effect on associations is moderated by concreteness of target words. More

relevant to the current research, it would be interesting to understand whether the effect of concrete versus abstract mindsets on size of memory sets depends on the concreteness or abstractness of a consumption goal.

5.4.2 Effect of mindset abstraction on stimulus-based consideration sets

The present research focuses on the consideration sets formed in a memory-based choice context and investigates the mindset abstraction effects on the process of memory retrieval and the consequent variation of consideration set size. Future research might want to examine whether abstract versus concrete ways of thinking also affect size of stimulus-based consideration sets, and the underlying mechanism of the mindset abstraction effect on stimulus-based consideration sets. Pham and Change (2010) show that people with a promotion-focus orientation are more likely to form larger stimulus-based consideration sets than people with a prevention-focus orientation. Furthermore, previous research has found that regulatory focus and construal level are correlated. For example, Pennington and Roose (2003) suggest that promotion goal importance increases with temporal distance, whereas prevention goal importance remains constant over time. Lee et al. (Lee, Keller, and Sternthal 2010) find that promotion-focused people are more likely to construe information at abstract levels, while prevention-focused people are more likely to construe information at concrete levels. Therefore, I posit that in a stimulus-based choice context where all choice alternatives are directly presented, individuals in an abstract (vs. a concrete) mindset might consider a greater number of

alternatives because of the enhanced promotional motives, which elicit an eagerness state to attain advancement and gains.

5.4.3 Mindset abstraction effect on information encoding versus information retrieval

In this research, a concrete versus an abstract mindset was activated before the formation of memory-based consideration sets, instead of during the stage of product information learning. In other words, this research examines the mindset abstraction effect on information retrieval. Future research may benefit from examining whether the mindset abstraction effect on consideration sets depends on the timing when mindsets are activated. It is possible that individuals encode information differently depending on concrete or abstract ways of thinking. I posit that individuals in a concrete mindset would form a more differentiated and separated representation of the product information than individuals in an abstract mindset, who form a holistic representation summarizing the gist of the product information. Given that a differentiated knowledge structure mitigates the inhibitory effect of part-set cues in memory recall (Alba and Chattopadhyay 1985), I expect that individuals who encode product information while in a concrete mindset would recall and consider more choice alternatives than individuals encoding information in an abstract mindset.

5.4.4 Are individuals in an abstract mindset more sluggish?

One might argue that individuals in an abstract mindset are more indolent to action or exertion than individuals in a concrete mindset, and therefore tend to generate

fewer associations and recall a smaller number of choice alternatives. In other words, concrete mindsets enhance the tendency to engage in more systematic and effortful (as opposed to heuristic and low-effort) processing. Although I do not rule out this possibility, not all the aspects of my current findings can be explained by this account. For example, in study 3, I demonstrated that types of considered brands (i.e., brands with a stronger association to superordinate category cues vs. subordinate attribute cues) differed by mindset abstraction. In future research, it would be interesting to examine response time as an independent measure of effort, and potentially show the effect of mindset abstraction on consideration set formation independent of its potential effect on processing time.

5.4.5 Influence of the breadth of product categories

Prior research in the memory literature has suggested that interference effects generally increase when there is a greater number of instances that are associated to the same shared retrieval cue and they are all competing for access to conscious awareness (competition assumption; Anderson et al. 1994). This implies that when the breadth of a product category increases, the number of product instances sharing the same superordinate category cue is larger. It follows that the interference effect in abstract mindsets will increase because the competition among product instances in the process of memory retrieval becomes more severe, compared to a narrow product category, in which fewer instances are sharing the same general category cue. In studies 2a and 2b, I have demonstrated the mindset abstraction effect on size of memory sets in general product classes, snack and dinner, which have an abundance of product instances. Future research

might want to examine whether the mindset abstraction effect on size of consideration sets is moderated by breadth of product categories. According to interference effects, it is expected that the mindset abstraction effect should be smaller when a narrow product category is under investigation.
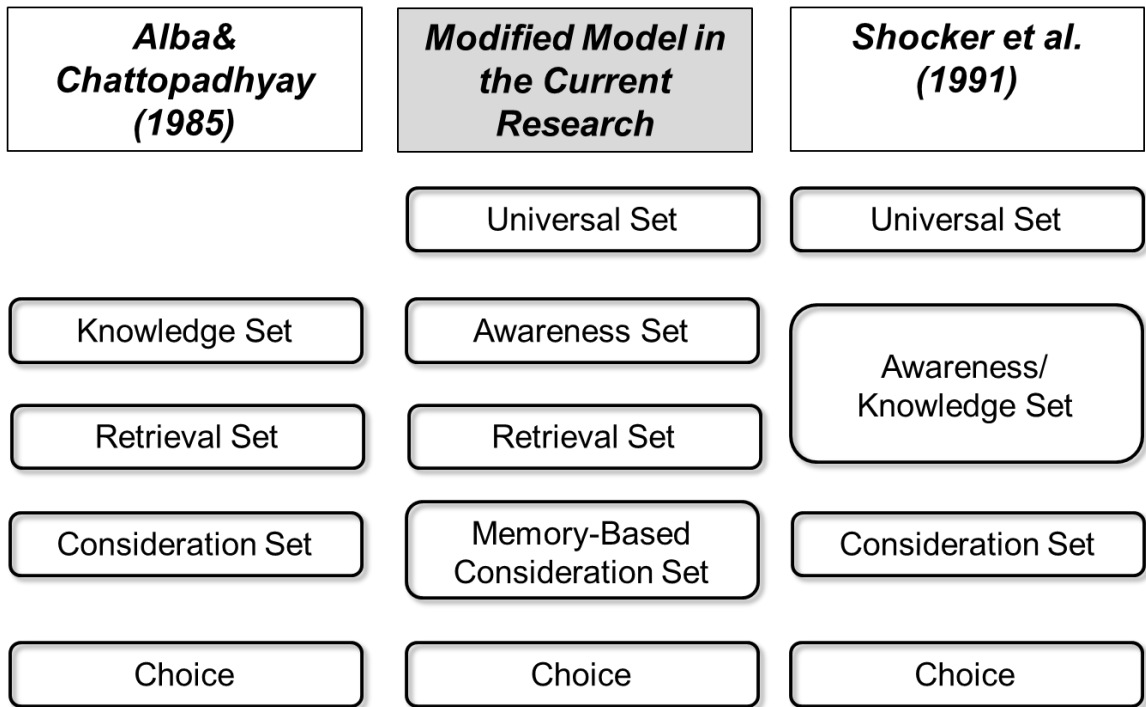
APPENDIX A

FIGURES

Alba& Chattopadhyay (1985)	Modified Model in the Current Research	Shocker et al. (1991)
	Universal Set	Universal Set
Knowledge Set	Awareness Set	Awareness/ Knowledge Set
Retrieval Set	Retrieval Set	
Consideration Set	Memory-Based Consideration Set	Consideration Set
Choice	Choice	Choice

Figure A-1. Hierarchical Model of Consideration Set: Models in Previous Research and the Modified Model of Memory-Based Consideration Proposed in the Current Research
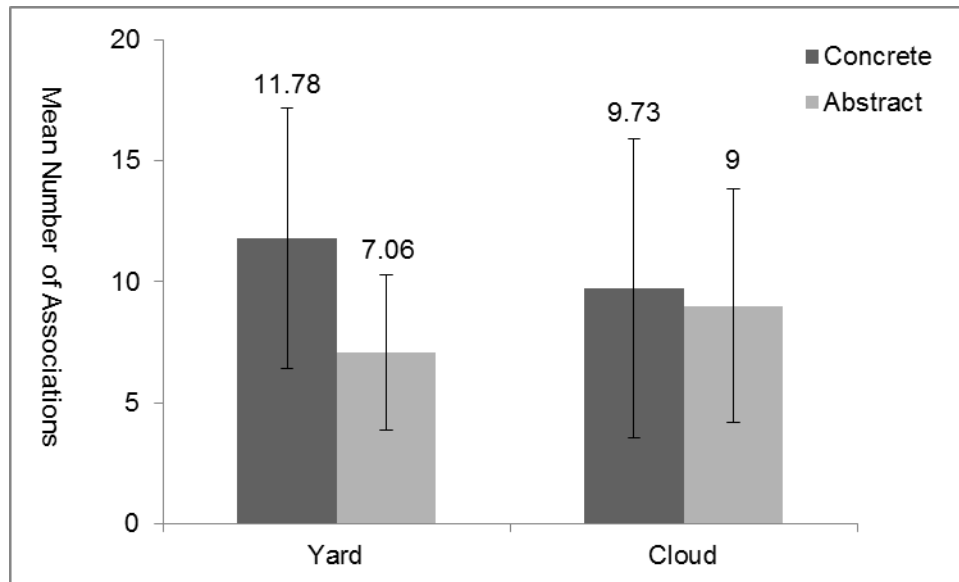
Figure A-2. Mean Number of Associated Words as a Function of Mindset Abstraction and Type of Target Word (Study 1a)
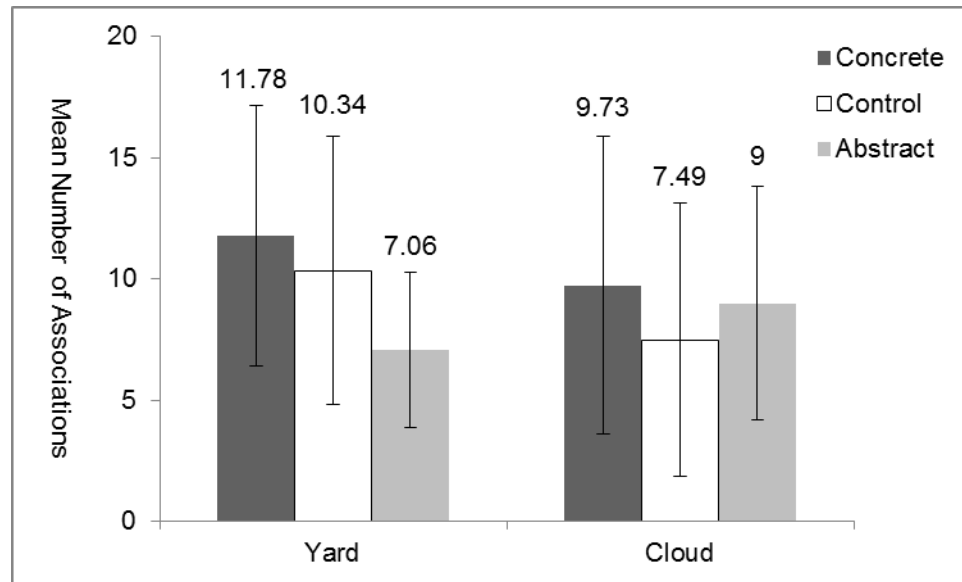
Figure A-3. Comparison of Mean Number of Associated Words among Two Mindset Conditions and Control Condition (Study 1a)
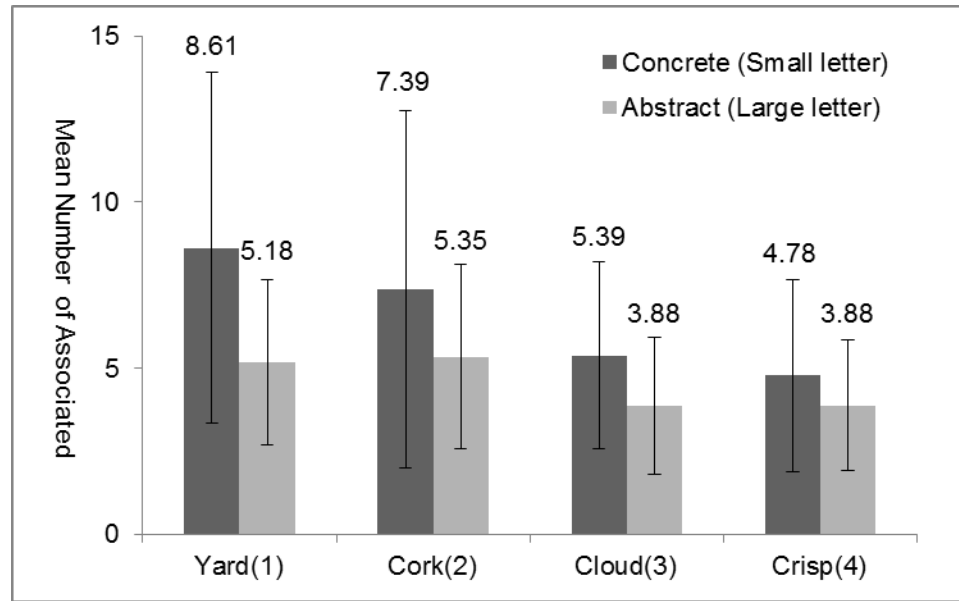
Figure A-4. Mean Number of Associated Words as a Function of Mindset Abstraction and Serial Position of Target Word (Study 1b)

Note:
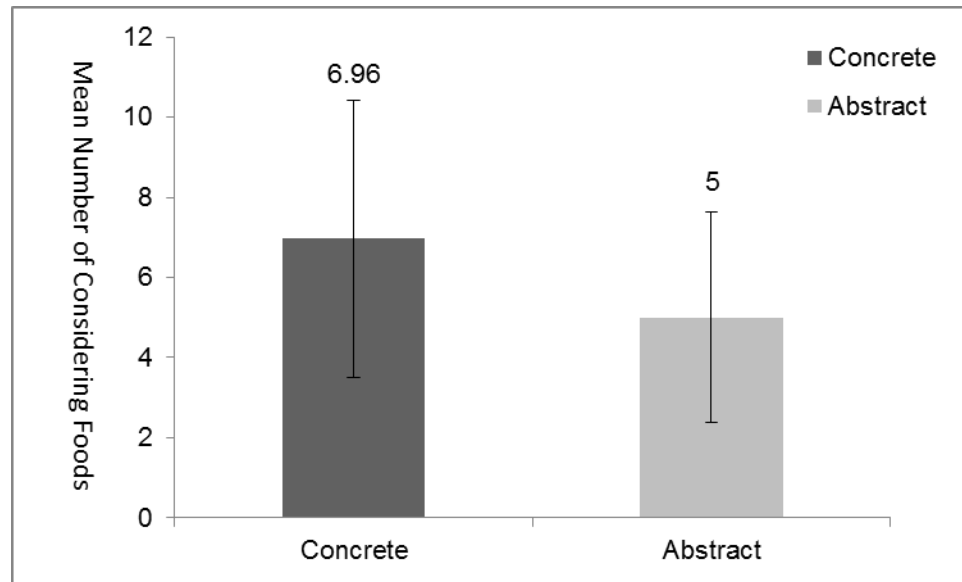Number in the parentheses stands for the serial position in which a target word was presented.

Figure A-5. Mean Number of Considered Dinner Foods as a Function of Mindset Abstraction (Study 2a)
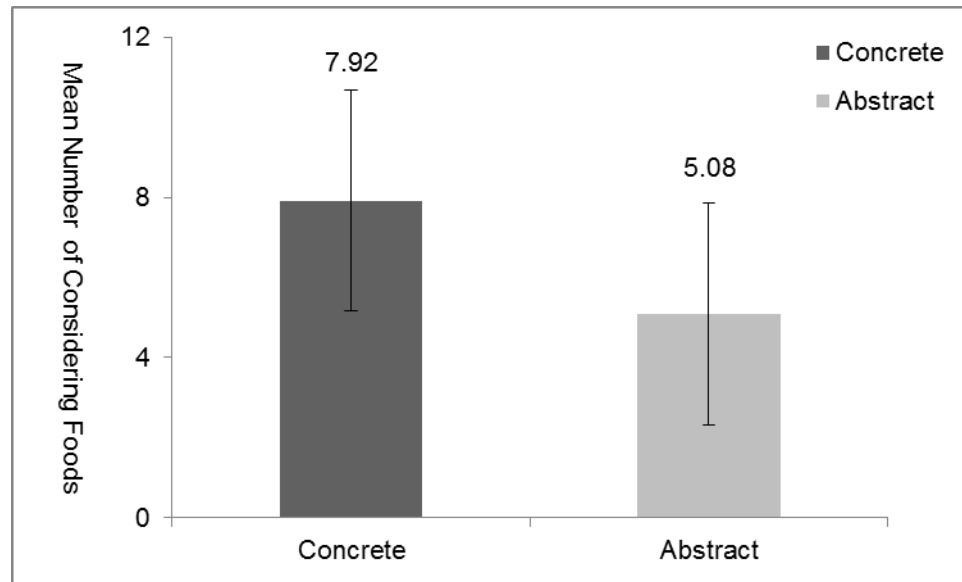
Figure A-6. Mean Number of Considered Snack Foods as a Function of Mindset Abstraction (Study 2b)
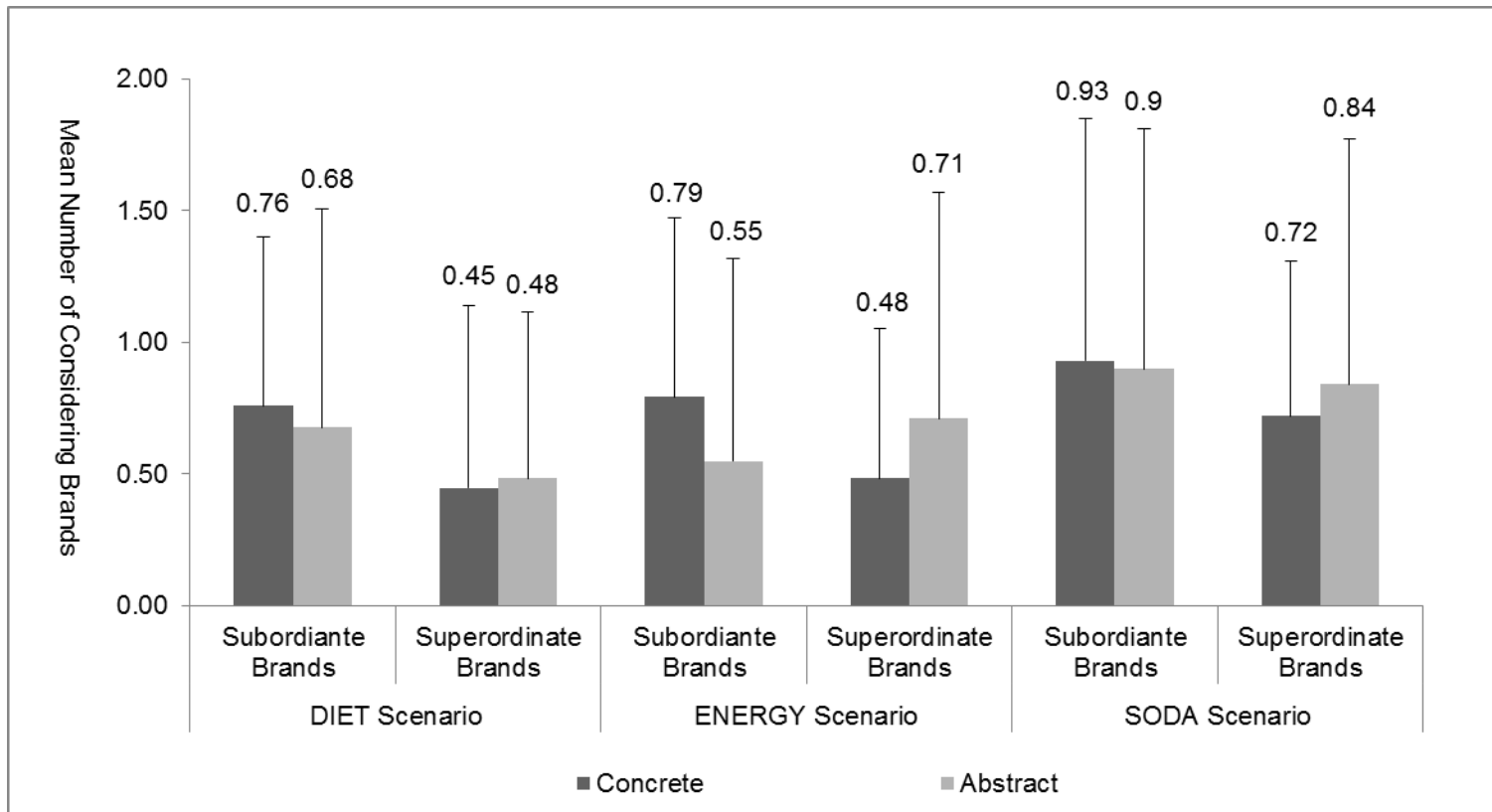
Figure A-7. Mean Number of Considered Brands as a Function of Mindset Abstraction, Type of Brand, and Choice Scenario (Study 3)
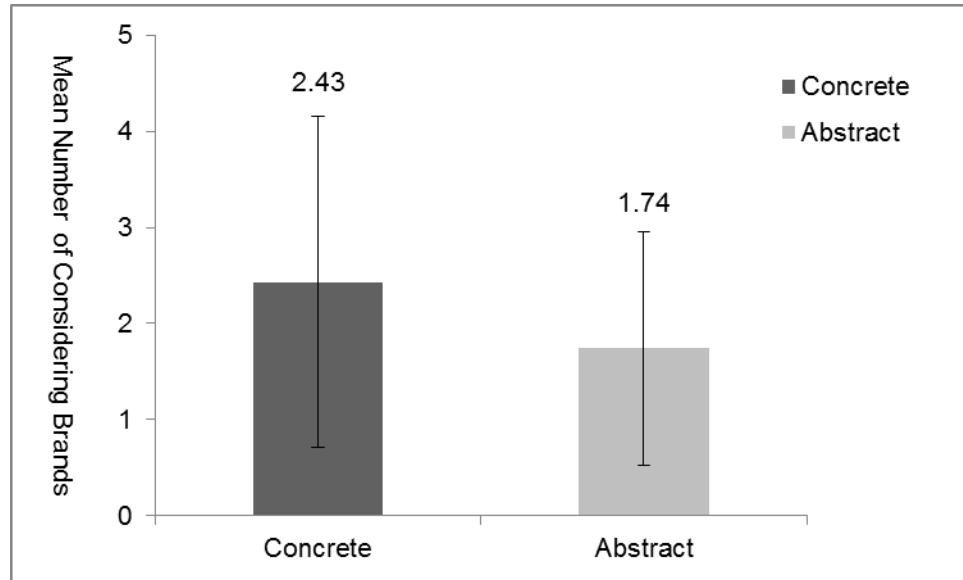
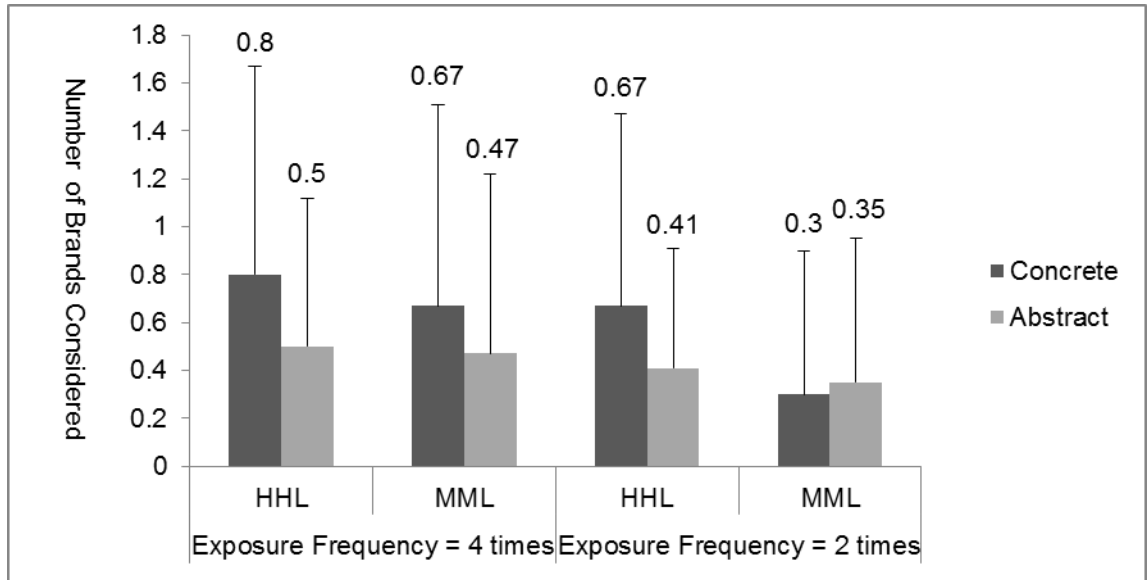Figure A-8. Mean Number of Considered Brands as a Function of Mindset Abstraction (Study 4)

Figure A-9 Mean Number of Considered Brands as a Function of Mindset Abstraction, Type of Brand, and Exposure Frequency (Study 4)

APPENDIX B

TABLES

Table B-1. Summary of Variables Influencing Consideration Sets

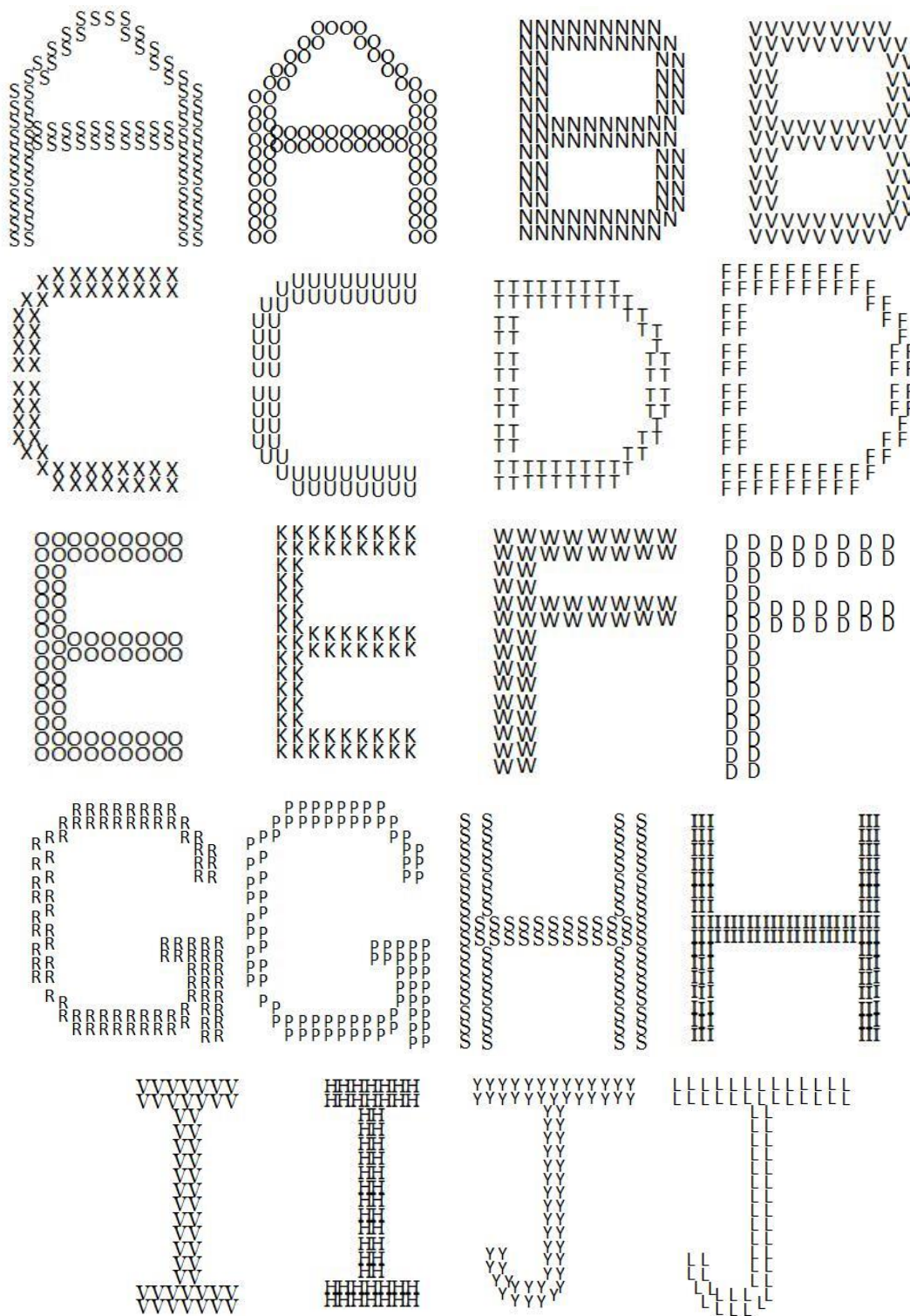| Influencing Variable	Research	Type of Consideration Set	Dependent Measure in Investigation
Goal conflict and ambiguity	Ratneshwar et al.1996	Stimulus-based	Across-category consideration
Choice task difficulty	Heller et al. 2002	Stimulus-based	Size of consideration sets
Involvement and concern for Type II error	Chakravarti and Janiszewski 2003	Stimulus-based	Heterogeneity of consideration sets
Time pressure	Chakravarti and Janiszewski 2003	Stimulus-based	Heterogeneity of consideration sets
Motivation of simplifying versus optimizing	Chakravarti and Janiszewski 2003	Stimulus-based	Heterogeneity and size of consideration sets
Goal activity	Goukens et al. 2007	Stimulus-based	Size of consideration sets
Regulatory focus motivational orientations	Pham and Chang 2010	Stimulus-based	Size of consideration sets
Brand accessibility	Nedungadi 1990	Memory-based	Likelihood that a certain brand is considered
Brand pioneering advantage	Kardes et al. 1993	Memory-based	Likelihood that a certain brand is considered
Incidental ad disposure	Shapiro et al. 1997	Memory-based	Likelihood that a certain brand is considered
Usage occasion and location familiarity	Desai and Hoyer 2000	Memory-based	Stability, size, and variety of consideration sets
Attitude and attitude strength	Priester et al. 2004	Memory-based	Likelihood that a certain brand is considered

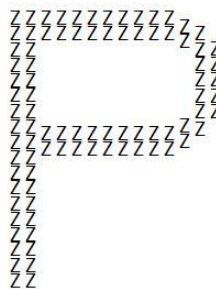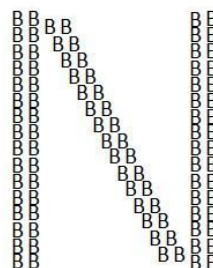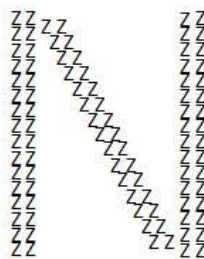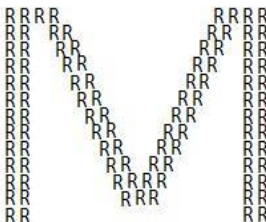Table B-2. Examples of Considered Food Items for a Dinner (Study 2a)

Subject	Mindset	Alt1	Alt2	Alt3	Alt4	Alt5	Alt6	Alt7	Alt8	Alt9	Alt10	CS_SIZE
8	Concrete	sandwich	spegetti	pasta	meatballs							4
10	Concrete	Chicken	Pasta	Pizza	Pork	Tacos	Cereal	Oatmeal	Sandwich	Salad	Brats	10
11	Concrete	turkey	stuffing	mashed potatoes	sweet potatoes	pie	pasta	meatloaf	cake	peas	totwurst	10
12	Concrete	buffalo wild wings	pizza	shrimp	soup	burrittos	ham sandwhich	turkey sandwhich	burgers	quesadilla	breadsticks	10
13	Concrete	pasta	hamburgers	chicken breasts	chicken nuggets	chicken patties	meat loaf	ground beef				7
27	Abstract	Alfredo Pasta	Steak	Salad	Broccoli and Cheese	Sunny Delight						5
28	Abstract	alfredo pasta	steak	pepsi	cheesecake							4
29	Abstract	chicken	beef	ham	noodles	sandwich	wings					5
30	Abstract	Alfredo Pasta	Broccoli and Cheese	Cheesecake								3
31	Abstract	beef	chicken	noodles	ham	pasta	pizza	wings				6

Table B-3. Examples of Considered Food Items for a Snack (Study 2b)

Subject	Mindset	Alt1	Alt2	Alt3	Alt4	Alt5	Alt6	Alt7	Alt8	Alt9	Alt10	CS_SIZE
26	Concrete	bag of chips	candy bar	crackers	nuts	fries	cake	sandwich	apple	orange	bananna	10
27	Concrete	Sandwich	Cereal	fruit snacks	chips	a wrap	noodles and sauce	a burrito	mac n cheese	oatmeal	waffles	10
28	Concrete	Turkey Sandwich	Fruit snack	chocolate bar	potato chips	Granola bar	cereal	fruit	chicken nuggets	protein bar		9
29	Concrete	Apple	Chips	Fruit Snacks	Snickers	Orange	Gatorade	Pop Tart	Pop corn	Rice	Pork Chop	10
31	Concrete	cereal	cereal bar	animal crackers								3
21	Abstract	ice cream	apple	orange	snickers							4
22	Abstract	Beef Jerky	100 Grand Bar	Pepsi								3
23	Abstract	cottage cheese	granola	oatmeal	yogurt	pretzels	cheeze its	apple	banana			8
24	Abstract	apple	chips	cookies	orange	candy						5
25	Abstract	Pizza	Burger	Sandwich								3

APPENDIX C

NAVON TASK STIMULI IN STUDIES 1A, 1B, 2A, 3, AND 4

The large decorative letters shown (formed from repeated small letters) spell out:

S A Y D
L U V B
W W X X
Y Y Z
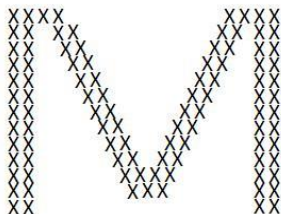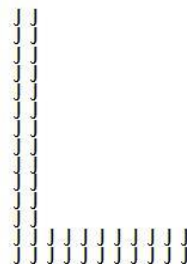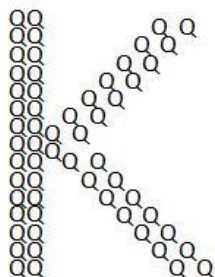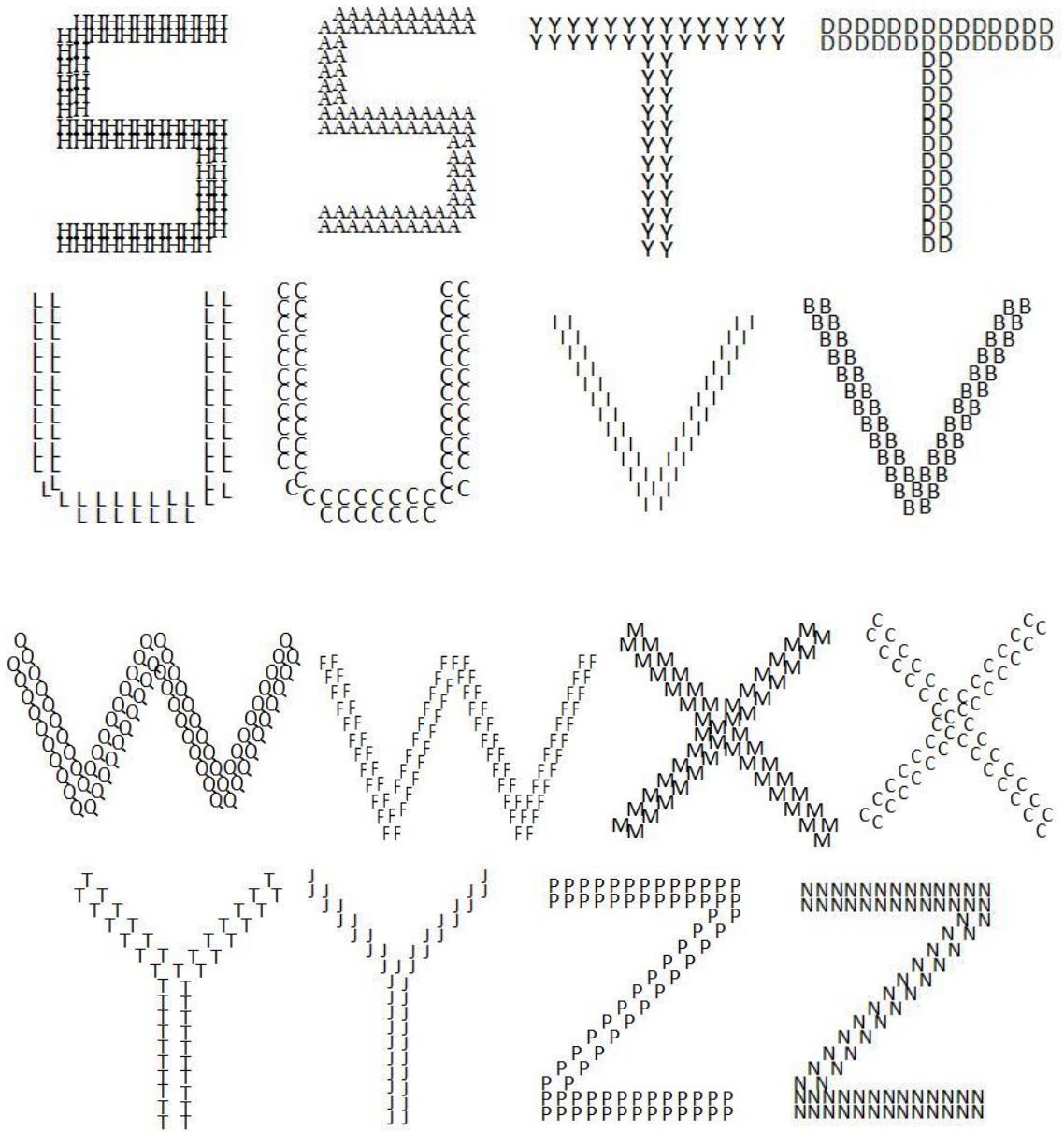
Note:

The appendix here shows the complete set with 52 figures; the set with 26 figures is part of the set with 52 figures.

APPENDIX D

STIMULI FOR THE CATEGORIZATION TASK IN STUDY 2B

[Subordinate Categorization]

An example of a bird is _____

An example of a singer is _____

An example of soap is _____

An example of a bag is _____

An example of a doll is _____

An example of a king is _____

An example of a book is _____

An example of a table is _____

An example of a camera is _____

An example of a computer is _____

An example of a dog is _____

An example of a sport is _____

An example of airplane is _____

An example of a car is _____

An example of movie is _____

An example of an actor is _____

An example of a pen is _____

An example of a MP3 player is _____

An example of jewelry is _____

An example of a shoe is _____

[Superordinate Categorization]

A bird is an example of _____

A singer is an example of _____

Soap is an example of _____

A bag is an example of _____

A doll is an example of _____

A king is an example of _____

A book is an example of _____

A table is an example of _____

A camera is an example of _____

A computer is an example of _____

A dog is an example of _____

A sport is an example of _____

An airplane is an example of_____

A car is an example of_____

A movie is an example of _____

An actor is an example of _____

A pen is an example of _____

A MP3 player is an example of _____

Jewelry is an example of _____

A shoe is an example of _____

APPENDIX E

STIMULI AND MANIPUALTIONS IN STUDY 3

Figure E-1. Information Boards for Fictitious Brands (Study 3)

Figure E-1 (continued). Information Boards for Fictitious Brands (Study 3)

Table E-1. Product Information and Frequency that Information for Each Brand Was Exposed (Study 3)

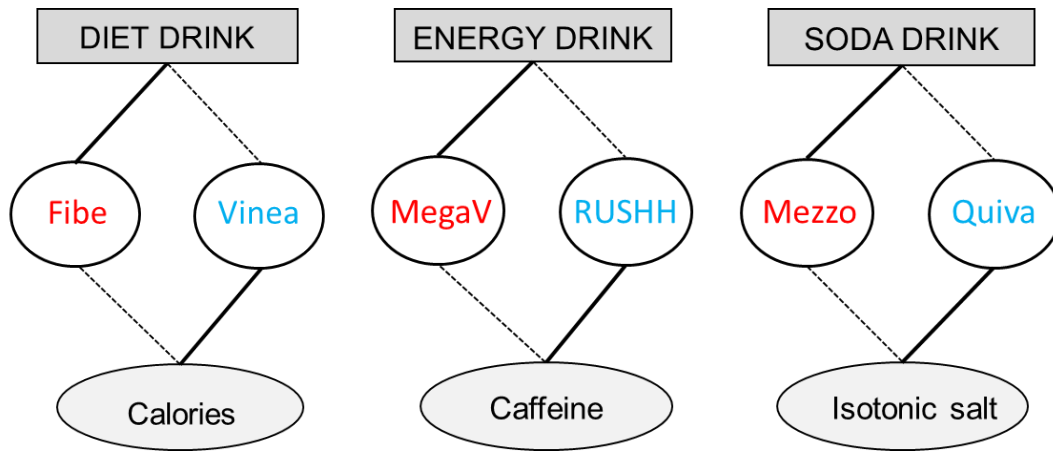| Beverage Category	Brand Name	Exposure Frequency of "Category-Brand" Association Information	Exposure Frequency for the Information of "Brand-Attribute" Association
Diet	Fibe	4	2
	Vinea	2	4
Energy	MegaV	4	2
	Rushh	2	4
Soda	Mezzo	4	2
	Quiva	2	4

Figure E-2. Expected Beverage Knowledge Structure in Phase 1(Study 3)

Note: A solid (vs. dotted) line stands for a strong (vs. weak) association.

Table E-2. Description of Scenarios Presented in Phase 4 (Study 3)

Scenario	Description
Diet Context	Today you have a very tight schedule. You have been rushed in visiting some landmarks in Moscow and now you are in the famous Red Square. You feel like having something to drink but you are on a diet now, so you want the drink which won't make you gain weight.
Energy Context	Today you have a very tight schedule. You have been rushed in visiting some landmarks in Moscow and now you are in the famous Red Square. You feel a little drowsy, but you have more scheduled places to visit later today. You feel like having something to drink which can help you boost energy in a short time.
Soda Context	Today you have a very tight schedule. You have been rushed in visiting some landmarks in Moscow and now you are in the famous Red Square. It is hot and sweaty summer weather and you are dehydrated. You feel like having something to drink which can help you rehydrate in a short time.

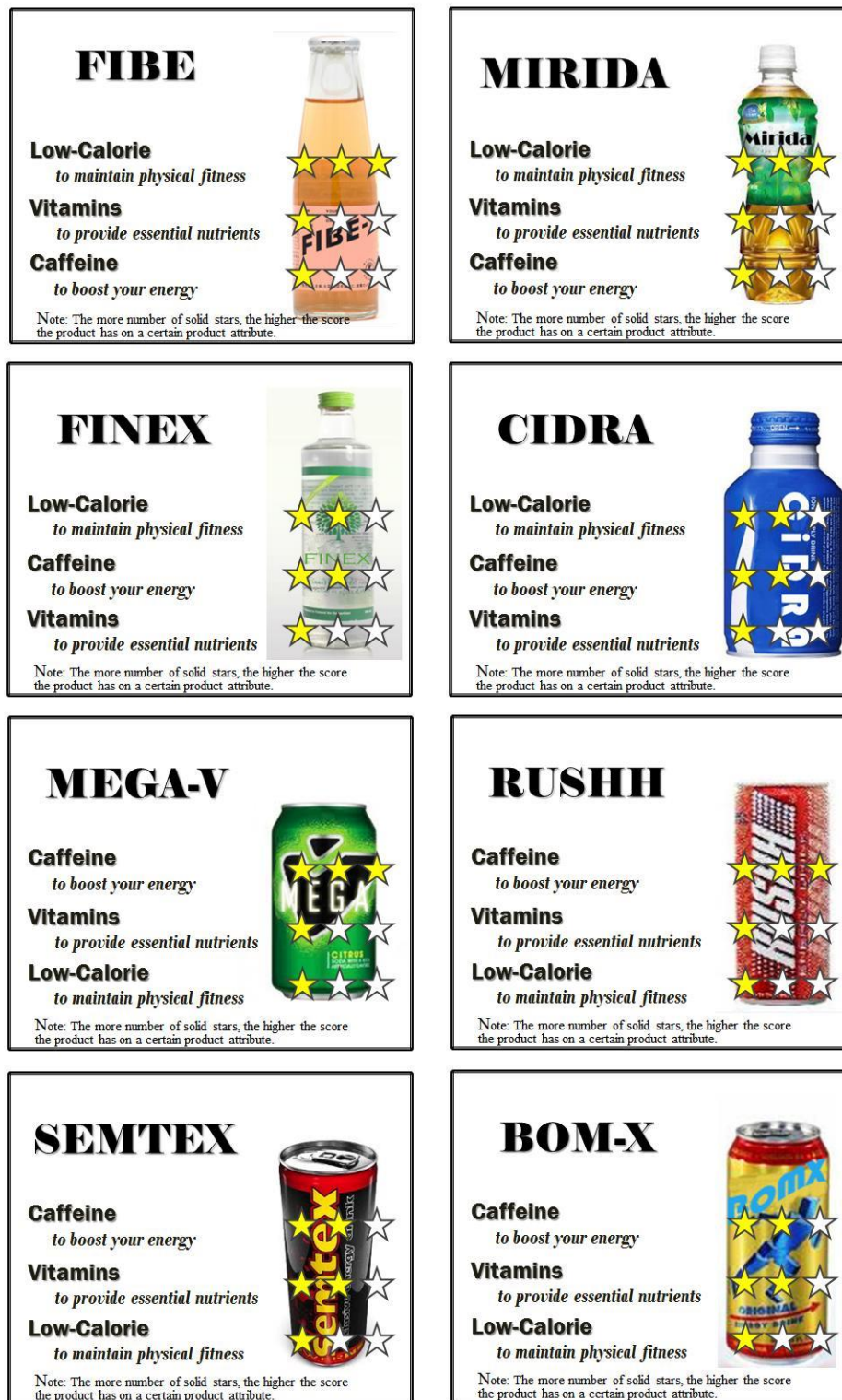APPENDIX F

STIMULI AND MANIPUALTIONS IN STUDY 4

Figure F-1. Information Boards for Fictitious Brands (Study 4)

Figure F-1 (continued). Information Boards for Fictitious Brands (Study 4)

Table F-1. Product Information and Frequency that Each Brand Was Exposed (Study 4)

Exposure Frequency		Product Attribute		
4 times	*2 times*	*Calorie*	*Caffeine*	*Vitamin*
Fibe	Mirida	High	Low	Low
Finex	Cidra	Moderate	Moderate	Low
Mega-V	Rushh	Low	High	Low
Semtex	Bom-X	Low	Moderate	Moderate
Mezzo	Vinea	Low	Low	High
Quiva	Spezi	Moderate	Low	Moderate

Note:
(1) High=3, Moderate=2, Low=1 (The higher the number, the higher the score on a certain product attribute)
(2) The High, Moderate, Low scores are chosen to yield approximately similar total scores. Assuming all three attributes are equally important, combination of HLL and LMM will yield a score of 5. Each brand has a total score of 5.
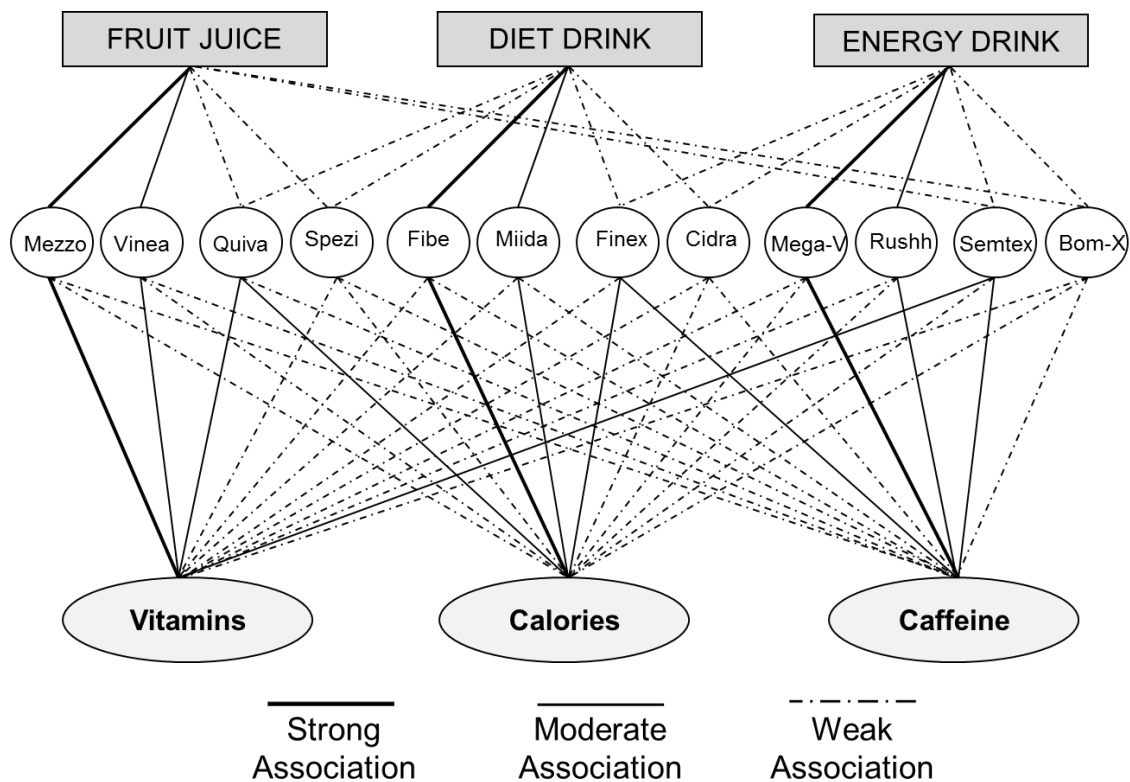
Figure F-2. Expected Beverage Knowledge Structure in Phase 1(Study 4)

APPENDIX G

IRB INFORMED CONSENT DOCUMENTS

INFORMED CONSENT INFORMATION

Project Title: **Construal level and consideration set formation**

Principal Investigator: **Fang-Chi Lu**

Research Team Contact: **Dhananjay Nayakankuppam at (319)335-1981**

We invite you to participate in a research study. The purpose of this research study is to examine the way people make decision for certain purchase goals under different circumstances.

We are inviting you to participate in this research study because you are a student in the Marketing Department at the Tippie College of Business who has signed up for this research study. Approximately 600 people will take part in this study at the University of Iowa.

If you agree to participate, we would like you to complete a study on computer, which contains several separate tasks. You will complete a trivia task, read a decision-making scenario, report your decision making process and answer some general questions about your experience on that decision-making context in an order depends on the condition you are assigned to. Your involvement will last for about 50 minutes.

We will keep the information you provide confidential, however federal regulatory agencies and the University of Iowa Institutional Review Board (a committee that reviews and approves research studies) may inspect and copy records pertaining to this research. To help protect your confidentiality, we will not collect your name or other identifying information on the study materials. We will keep all the study materials in a locked office that is only accessible to the members of the research team. The answers will be saved later by the researchers in electronic records. All the electronic files will be stored in the password secured computers in the offices of members of research team. And only the members of research team can access the data. If we write a report about this study we will do so in such a way that you cannot be identified.

There are no known risks from being in this study, and you will not benefit personally. However we hope that others may benefit in the future from what we learn as a result of this study.

You will not have any direct costs for being in this research study. You will be awarded 1 research credit to fulfill the research credit requirement of 6M 100 (Introduction to marketing strategy).

Instead of being in this research study, you have other options for receiving extra credit for 6M: 100 (Introduction to Marketing Strategy) by writing reports on the topics that the instructors in your session assign.

Taking part in this research study is completely voluntary. If you decide not to be in this study, or if you stop participating at any time, you won't be penalized or lose any benefits for which you otherwise qualify.

We encourage you to ask questions. If you have any questions about the research study itself, please contact: **Dhananjay Nayakankuppam** at **(319)335-1981** or via e-mail: **dhananjay-nayakankuppam@uiowa.edu**. If you experience a research-related injury, please contact **Dhananjay Nayakankuppam** at **(319)335-1981** or via e-mail: **dhananjay-nayakankuppam@uiowa.edu**.

If you have questions about the rights of research subjects, please contact the Human Subjects Office, 105 Hardin Library for the Health Sciences, 600 Newton Road, University of Iowa, Iowa City, IA 52242-1098, (319) 335-6564, or e-mail irb@uiowa.edu. To offer input about your experiences as a research subject or to speak to someone other than the research staff, call the Human Subjects Office at the number above.

Thank you very much for your consideration. If you agree to participate in this study, please tell one of the researchers in the room and s/he will start the study on computer for you. If you decide to leave the study early, we will ask you to return the consent form to the researchers and leave the room.

If you do not wish to be in the study, you are excused from the session.

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