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**Categories Create Mindsets: The Effect of Exposure to Broad versus Narrow
Categorizations on Subsequent, Unrelated Decisions**

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We find that exposure to different types of categories or assortments in a first task creates a mindset that changes how consumers process information. These mindsets in turn, have a spillover effect that alters consumers' decision making in a variety of subsequent and unrelated tasks, from basic cognitive behaviors (e.g., grouping), and consumer decisions (e.g., new product adoptions), to more general decision making strategies (e.g., susceptibility to heuristics). Consumers previously exposed to broad assortments or categorizations base their decisions on fewer pieces of information, typically those made salient by the environment. In contrast, consumers who have previously been exposed to narrow assortments or categorizations, employ multiple pieces of information, both salient and non-salient, without exerting any extra effort. Consequently, prior exposure to broad versus narrow categorizations leads to greater susceptibility to some common context effects and to heuristic decision making.

The world consumers encounter comprises a vast collection of objects that can be categorized in various ways. The characteristics of such categories or assortments can significantly influence how consumers perceive their environment and make decisions due to general tendencies like partition dependence (Fox, Ratner, and Lieb 2005) and variety seeking (Ratner, Kahn, and Kahneman 1999). Recent research has studied the effects of organizing alternatives by taxonomic or goal-based categorizations (Poynor and Diehl 2007), by brand or by feature levels (Simonson, Nowlis, and Lemon 1993), and with their complements or substitutes (van Herpen, Diehl, and Poynor 2007). Further, the organization and symmetry of an assortment (Kahn and Wansink 2004) and the congruence between consumer and retailer organization schemes (Morales, Kahn, McAlister, and Broniarczyk 2005) impact consumer decisions. These various aspects of externally imposed categories influence important decision outcomes such as choice, decision difficulty and time, satisfaction with the assortment, and consumption quantity.

Thus, extensive research demonstrates that how products are categorized influences consumers' reactions in the *same* decision context. We focus on how exposure to different types of external categorizations in one decision context affects consumers' information processing and evaluations in *subsequent* and *unrelated* contexts. While several aspects of a decision context can be considered, we look at whether the context involves many, narrow or a few, broad categorizations. In other words, what is the consequence of being exposed to a decision context with broader categorizations (e.g., DVDs classified as comedy or drama movies) versus narrower categorizations (e.g., DVDs classified as dark comedy, romantic comedy, courtroom drama, or historical drama movies), not on the movie choice itself, but on unrelated subsequent decisions, such as whether to purchase a new type of candy at the checkout counter? Thus, our main objective is to investigate how exposure to broad versus narrow categorizations in one decision

context, affects judgments and decisions made in subsequent, unrelated decision contexts.

THEORETICAL FRAMEWORK

Our theoretical framework rests on two main propositions. First, exposure to broad versus narrow categories in a decision task will instigate certain information processing changes. Specifically, exposure to broad (narrow) categories primes decision makers to use relatively few (many) dimensions and/or attributes. Second, this change in information processing style will spill over to subsequent tasks. Thus, exposure to broad (narrow) categories in one decision task will lead to consideration of relatively few (many) pieces of information *even* in subsequent and unrelated decisions. We expand further on these principal arguments in the sections that follow.

Exposure to Broad-Narrow Categorizations and Changes in Information Processing Style

We propose that exposure to broad versus narrow categories in a decision task will change how consumers process information. This assertion is not altogether surprising, given that people use categories and concepts as tools to organize information and give meaning to an ever-changing world. Mental representations of concepts change in a dynamic manner to facilitate cognitive functions and allow people to adapt to task demands (Barsalou 1993). In fact, most contextual manipulations capitalize on the notion that situations can strategically instigate compatible cognitive organizations. In particular, we propose that an individual who is exposed to a detailed environment with narrow (versus broad) categories, will be cued to the notion that objects differ from each other in many different ways, and will fine tune her cognitive apparatus accordingly, using a more multidimensional approach to perceive and evaluate these objects.

Where does the link between exposure to narrow categories and use of multidimensional

processing come from? When consumers believe that objects differ on multiple dimensions, they will group them into many, narrow (versus a few, broad) categories, since the combination of these dimensions lead to multiple groups. For example, if a consumer who is grouping fruits believes that only sweetness matters, only a few, broad categories would emerge (e.g., sweet versus tart), but if she also considers color, then many, narrow categories would be formed (e.g., red and sweet, red and tart, yellow and sweet, yellow and tart, etc.). This association between the use of multiple/few dimensions and the resulting narrow/broad categories is very strong, and we therefore posit that a *reverse causal relationship* might also hold (e.g., Dijksterhuis and Bargh 2001, Bargh, Chen, and Burrows 1996). Thus, being exposed to narrowly categorized fruits should automatically sensitize, or cue consumers to the fact that objects differ from each other in many meaningful ways. Such consumers would then be cued to discern and use multiple dimensions in subsequent decisions. In contrast, consumers exposed to broad categorizations would be cued to use fewer dimensions that are made salient by the environment. Even though they may be aware of all underlying dimensions, they may not feel the need to act on all of them.

Our specific claim that Narrow (versus Broad) categorizations cue more (versus less) multidimensional information processing, has not, to the best of our knowledge been demonstrated before, although some research suggests that narrow mental representations (i.e., fine-grained) may be associated with complex information processing. The individual-level category width literature shows that narrow equivalence ranges may be associated with a preference for greater dimensionality (Jackson and Messick 1963, Sloane et al. 1963). Linville (1982) shows that targets who have a multidimensional representation (e.g., in-group members) are evaluated in a more complex manner than other targets (e.g., out-group members). Park and Lessig (1981) find that low (high) familiarity consumers had a broad (narrow) perceptual

category breadth, and felt more (less) confident relying on few, non-functional attributes like price and brand name. Our research differs from this past work in several ways. We (1) establish a causal connection between narrow mental representations and complexity of thought by situationally manipulating category width, rather than using individual level traits (Jackson and Messick 1963, Sloane et al. 1963) or existing representations that differ in complexity (e.g., Linville 1982, Park and Lessig 1981), and (2) document effects that carry over to unrelated, subsequent decision contexts, rather than occurring in the same decision context.

To summarize, we argue that simply being exposed to many, narrow categorizations, as opposed to a few, broad categorizations, should evoke a more complex worldview. Therefore, consumers exposed to narrow (versus broad) categorizations will employ multiple dimensions when processing stimuli since they are now cued to the notion that subtle details on these dimensions may matter. Such multidimensional thinking is often characterized by conceptual complexity (Suedfeld and Coren 1992), which has two major components: differentiation and integration. Differentiation refers to the ability to discern more than one dimension, and integration refers to the ability to combine these dimensions. We posit that exposure to narrow categories will cue consumers to discern multiple dimensions in their environment, and will encourage them to use and combine these dimensions in their decision making.

Information Processing Changes and Spillover to Subsequent Tasks

We further propose that as long as the subsequent context does not cue the need for a cognitive reorganization, the recently tuned cognitive apparatus will likely be used *as is* for the next task at hand. Past research documents numerous similar instances where activated cognitive procedures or “mindsets” are transferred and applied, as is, to new situations (e.g., Bargh and

Chartrand 2000; Smith and Branscombe 1987). We therefore suggest that the changes in information processing styles triggered by prior exposure to narrow and broad categorizations will spill over to subsequent, unrelated tasks. Thus, in a subsequent, unrelated task, Broad (Narrow) participants are likely to base their decisions on relatively fewer (many) dimensions.

Additionally, we suggest that decision makers who use fewer dimensions (i.e., those exposed to broad categories) are more likely to use easily available, salient information in subsequent tasks, while those who use many dimensions (i.e., those exposed to narrow categories) are more likely to go beyond what is easily available, and use both salient and non-salient information. The second decision environment may selectively highlight relatively few dimensions (e.g., one dimension emphasized in an ad) and Broad participants may feel comfortable basing their decision on these few pieces of information. In contrast, since Narrow participants are primed to use many dimensions, they will be less satisfied relying only on these few dimensions and are more likely to go beyond what has been made easily available, and use both salient and non-salient information. Thus, we predict that prior exposure to broad (narrow) categories will lead to consideration of relatively few, salient (many, salient and non salient) pieces of information in a subsequent, unrelated decision task.

Effect of Changes in Information Processing Style on Subsequent Tasks

Figure 1 depicts how exposure to narrow (versus broad) categorizations affects consumer behavior in a wide range of subsequent tasks. First, these effects should clearly manifest in subsequent grouping decisions. If decision makers who have previously been exposed to narrow (broad) categorizations become more likely to use many different (fewer) pieces of information in their decisions, then they should employ more (fewer) dimensions in the sorting task as well.

They should then sort the objects into many, narrow (fewer, broad) groups.

H1: Consumers who have been previously exposed to a decision context with narrow (broad) categorizations will, in a subsequent unrelated grouping task, sort the given set of objects into more, relatively smaller (fewer, relatively larger) subcategories.

The broad-narrow nature of external categorizations that consumers encounter should also affect their subsequent product evaluations and choices. In particular, consumers who were previously exposed to broad categories should base their product evaluations on the few pieces of information that are most salient. In contrast those previously exposed to narrow categories should base their evaluations on more pieces of information, including less salient information.

The particular dimensions that are most salient and used by consumers will vary across buying situations. Due to consumers' familiarity with the product category or marketing efforts that selectively highlight certain aspects of products, some dimensions may become more obvious, important, actionable, or top of mind than others. For example, for new products, some product attributes may relate to an overall dimension of product innovativeness, while others may relate to an overall dimension of product risk. The decision context may make one of these dimensions more salient. For high-tech electronics, consumers might focus more on innovativeness, perhaps because advertisements selectively highlight innovation. For other products, such as laser eye surgery, the risk of failure might be more dominant.

Nevertheless, for all new products, it is important to consider both information that is and is not made salient by the decision environment. For example, in the former case (i.e., electronics), it is important to consider risk, even though it is less salient, as new products are often based on immature technologies that may fail to deliver the promised benefits, malfunction, or pose compatibility problems. In the latter case (i.e., laser eye surgery), it is

important to consider the potential benefit that one might forgo by not adopting the product. While most consumers will consider the salient aspects, only those who use multiple dimensions will ferret out the less salient aspects. Thus, in new product domains where innovativeness (risk) is more salient, we expect prior exposure to broad categorizations to lead to adoption judgments that are based primarily on the salient innovativeness (risk) dimension. Exposure to narrow categorizations, on the other hand, should lead to more multidimensional decision-making, with adoption decisions being based on both the salient, innovativeness (risk) aspects, and the less salient, risk (innovation) aspects. We should then observe that when innovativeness (risk) is salient consumers exposed to broad (versus narrow) categorizations in a prior task will hold more (less) favorable attitudes toward these new products. Therefore:

H2: For new products primarily associated with innovation (risk), consumers exposed to broad categorizations in a prior task will have more (less) favorable preferences toward those new products than consumers exposed to narrow categorizations.

Our process explanation for the effects described in H1-H2 posits:

H3: Consumers previously exposed to broad (narrow) categorizations, will base their subsequent decisions on a few, salient (many, salient and non salient) dimensions.

----Insert figure 1 about here----

More generally, we expect these categorization-induced changes in information processing style to impact consumers' decision quality, by affecting their susceptibility to common biases and heuristics in subsequent, unrelated decisions. In many decision paradigms, considering a greater number of dimensions leads to normatively better decisions (e.g., Payne, Bettman, and Johnson 1988). However, in some other paradigms such as those involving the

dilution effect (Nisbett, Zukier and Lemley 1981), blindly using more pieces of information can be detrimental to decision quality. If exposure to narrow categories simply leads to incorporating more dimensions, this would aid decision quality in some tasks, but abate it in others. However, if exposure to narrow categories leads to consideration of more information, as well as the relative importance of these dimensions, than it should more generally lead to an improvement in decision quality across a variety of tasks. We explore these possibilities in our studies.

To explore the process by which these changes occur, we examine two plausible routes. Exposure to narrow categories might either (a) prompt a consumer to try harder and longer at discerning these multiple dimensions (a more motivational route), (Payne, Bettman, and Johnson 1988) or (b) change a consumer's cognitive orientation and allow her to come up with these multiple dimensions without any added effort (a more cognitive route), (Dijksterhuis et al 2006, Wilson and Schooler 1991).

MANIPULATING EXPOSURE TO NARROW OR BROAD CATEGORIZATIONS

In this paper, we use three different manipulations to expose participants to either broad or narrow categories, and obtain a similar pattern of results across all three manipulations.

Prior Categorization Manipulation #1: Personality Task

In the "Personality Task," manipulation, participants responded to questions that differed in the number of response categories. For some participants, the response options for each question constituted many, narrow categories (Narrow condition), while for others, the response options comprised a few, broad categories (Broad condition). Specifically, participants first completed Goldberg's (1990) Big Five personality inventory by marking their responses on 9-

point (Narrow) or 3-point (Broad) semantic differential scales. Next, participants in the Narrow (Broad) condition indicated their height, hair color, eye color, choice of film genre if they were to rent a DVD, preferred cat breed for adoption, and choice of holiday type from amongst many (few) alternatives. Finally, they were asked to classify a picture of the moon into one of many (few) distinct phases. Thus in the narrow (broad) condition participants answered questions in a decision context that had more (less) fine-grained response scales.

Prior Categorization Manipulation #2: Shopping Task

Although prior Categorization Manipulation #1 has important implications for survey research, it covaries with the number of response options. Therefore, in this manipulation, we held the number of response options constant across conditions. Specifically, participants undertook a “Shopping Task” in which they were told that they were shopping for a friend’s party and needed to make choices in eight different categories (wine, cheese, beer, music, etc.). The key manipulation consisted of whether the sets of identical products were organized in a few, broad categories (Broad) or many, narrow categories (Narrow). For example, a set of 24 wines was either categorized into two groups in the Broad condition (red or white), or twelve in the Narrow condition (e.g., Italian-Red, Italian-White, French-Red, French-White, etc.). This both controls for the number of response options and reflects a realistic marketing scenario, with implications for the design of internet shopping portals.

Prior Categorization Manipulation #3: Website Evaluation Task

The Shopping Task requires participants to *actively* make choices, and it is possible that for both this and the Personality task, choice difficulty differs across the narrow and broad

conditions, which in turn alters subsequent decisions. To control for this, we devised the Website Evaluation Task, where participants are shown a series of 12 product web pages from an online store, which varied in their color combinations, and asked to rate how aesthetically pleasing they were. As participants evaluated the web pages, the key manipulation consisted of exposing them in an incidental manner to products on these pages that were grouped into broad or narrow categories. The product categories, and broad and narrow categorizations, were identical to those used in the Shopping Task. Importantly, this manipulation of broad versus narrow categorizations did not require participants to make any product-related choices or evaluations.

Control Measures Used Across the Studies

Taken together, these manipulations are designed to rule out several potential alternative mechanisms for our effects. In order to more confidently rule these out, and to gain insight into the underlying process, in most of the studies we also include control measures related to task involvement, decision difficulty, preference matching, and product expertise (awareness, familiarity, knowledge, ownership). We also record task completion times as an unobtrusive proxy for some of these measures. We also measure mood, because past research (e.g., Estrada, Isen, and Young 1997, Isen, and Daubman 1984, Murray et al. 1990) has shown that positive (negative) affect affects cognitive performance, via the use of wider (narrower) categories.

STUDY 1: GROUPING TASK

The goal of Study 1 is to test H1, that participants exposed to Narrow (Broad) categorizations will classify objects into many, narrow (fewer, broad) classes in a subsequent, unrelated sorting task. Since the width of conceptual categories can also be co-determined by

individual level tendencies as well as contextual demands (Rokeach 1956), we used the Pettigrew (1958) category width (CW) scale to capture individual level differences in the width of categorizing. We expect to observe the effects of our context manipulation (i.e., exposure to broad or narrow categories in a previous task) over and above the effects of this innate trait.

Method

Sixty-eight undergraduates participated in the study in exchange for partial course credit. Participants were told that the experiment session comprised two unrelated studies. The first constituted the prior categorization manipulation #1 (i.e., Personality Task). After completing the manipulation, participants moved on to an ostensibly unrelated grouping study (Mikulincer, Kedem, and Paz's (1990) object sorting task). They were given 12 typical members of the fruit category, and asked to sort them into subgroups in any way that made sense to them. Last, they completed a 10-item short version of the individual level CW scale (Pettigrew 1958).

Results

A one-way ANOVA on the number of fruit groups revealed a significant effect of our context manipulation ($F(1, 66) = 7.78, p < .02$).¹ Supporting H1, participants exposed to narrow categorizations created more groups than those exposed to broad categorizations ($M_{\text{NARROW}} = 4.50, M_{\text{BROAD}} = 3.42$). To compare with baseline categorization tendencies, we also had an independent group of 26 participants not involved in this study, complete the sorting task alone. The mean for this group fell in between the broad and the narrow conditions ($M_{\text{CONTROL}} = 3.92$).

We divided participants into Narrow and Broad categorizers using Tajfel and Bruner's

¹ All test statistics reported are based on two tailed significance tests, unless indicated otherwise.

(1966) definition with the CW scale ($\alpha = .78$). A 2 (Prior Context: Narrow, Broad) x 2 (CW: Narrow Categorizers, Broad Categorizers) ANOVA on the number of fruit groups revealed significant main effects of Context ($F(1, 33) = 9.63, p < .02$) and individual level CW ($F(1, 33) = 5.77, p < .03$)². As expected, the two-way interaction was not significant ($F(1, 33) < 1$). The context manipulation successfully altered the number of fruit groups created by both individual level Narrow ($F(1,33) = 4.62, p < .05$) and Broad categorizers ($F(1,33) = 5.04, p < .04$). Figure 1 provides a summary of these results as well as the results of the other studies in this paper.

Discussion

Study 1 shows that the effects of exposure to a decision context with narrow or broad categorizations carries over to a subsequent, unrelated grouping decision. This effect occurs over and above individual level tendencies, thus providing strong support for H1. The data also seem to support a multidimensional processing account. An inspection of the groupings showed that the Broad participants created simple groupings based on either color (e.g., red versus yellow) or taste (sweet versus sour), whereas Narrow participants used more than one grouping criterion, often combining them (e.g., red and sweet, yellow and sour, etc.), and generated more groups.

STUDY 2A: NEW PRODUCTS

The main aim of studies 2A, B, and C is to demonstrate that previously encountered taxonomies more generally affect object evaluations, and in this case, consumers' new product evaluations. Study 2A tests if in new product contexts primarily associated with innovation, consumers first exposed to broad categorizations will have more favorable product preferences than consumers first exposed to narrow categorizations (H2). This study also tests (H3), that

² This main effect is also significant if we use the continuous measure and Tajfel and Bruner's (1966) definition.

participants in the Broad condition primarily consider the innovativeness of the new products, but participants in the Narrow condition also consider the risks associated with these products.

Method

Ninety-six undergraduate students participated in the study in exchange for partial course credit. We first exposed participants to the prior categorization manipulation #2 (i.e., Shopping Task). They next evaluated a new product, the “Sony SRS-RF90RK Wireless Speaker System,” which was described as having several benefits (e.g., no unsightly wire clutter, easy portability, etc.) and few potential pitfalls (e.g., interference from other wireless devices). A note also stated that the wireless system provided a 10% improvement over the existing industry standard with its innovative wireless technology and great design; however consumers were also warned that there was a 5% probability of failure in signal transmission, due to the immature technology.^{3 4}

Participants next responded to the dependent measure by indicating their overall attitude towards the product on a 100-point slider scale (disliked it very much/liked it very much). Then they responded to several process measures. In two open-ended responses, they first briefly listed the key factors that they had considered in their evaluation, and then reported the number of factors that they had considered in their evaluation more generally. We also measured participants’ involvement and mood (across the entire experiment session), their familiarity, knowledge, awareness, and ownership of the product, and recorded study completion times.

³ We used a 2 to 1 ratio based on empirical studies of loss aversion (Tversky and Kahneman 1991).

⁴ A pretest verified that this new product context was an innovation-salient one. Sixty-seven participants read the wireless speaker description, and on 100-point slider scales, rated the relative salience of risk versus innovativeness (a) in general, and (b) if they were in the market for a wireless speaker (risk more salient/innovativeness more salient). The combined measure ($r = 0.55, p < 0.01$) verified that these speakers were considered to belong to a relatively innovation-salient domain ($M = 58.05$ vs. $50.00, F(1, 66) = 3.27, p < 0.01$). A majority (69.7%) rated the wireless speakers above the midpoint of the risk-innovativeness continuum ($\chi^2(67) = 9.33, p < 0.01$).

Results

Dependent Measure. Supporting H2, compared to those in the Narrow condition, Broad condition participants had more favorable attitudes toward the new product ($M_{\text{BROAD}} = 71.40$, $M_{\text{NARROW}} = 62.83$; $F(1, 94) = 6.41$, $p < .02$) (see Figure 2 for stimuli and results).

Process Measures. Participants previously exposed to narrow categories reported considering a greater number of factors when evaluating the speakers ($M_{\text{BROAD}} = 2.96$, $M_{\text{NARROW}} = 3.57$; $F(1, 93) = 4.43$, $p < .04$). Wireless speakers have several attributes such as no-clutter technology which are related to the innovation dimension, and others such as the probability of signal interference that are related to the risk dimension. We coded the key factors participants listed in their open-ended responses as either risk- or innovation-related. Participants did not differ across conditions in their consideration of the salient innovation dimension ($M_{\text{BROAD}} = 0.92$, $M_{\text{NARROW}} = 0.77$; $F(1, 94) < 1$). However, supporting H3, Narrow condition participants considered the less-salient risk factor more than did Broad condition participants ($M_{\text{BROAD}} = 0.29$, $M_{\text{NARROW}} = 0.73$; $F(1, 94) = 12.20$, $p < .01$). The difference in attitudes across conditions was partially mediated by this number of risk related thoughts (Sobel test statistic = -1.66, $p < .09$).

The control measures showed that there was no difference across conditions in participant involvement, and the time spent on the Shopping Task manipulation or the wireless speaker evaluation task. The two conditions also did not differ in terms of participants' mood, or their familiarity, knowledge, awareness, and ownership of the wireless speakers.

----- Insert figure 2 about here -----

STUDY 2B: MANIPULATING FOCUS

Study 2A tested H2 in a domain where innovation is more salient than risk. Study 2B

provides a more complete test of the proposition that if innovation (risk) is made more salient, then exposure to broad categories should lead to a greater consideration of innovation (risk), and thus, more (less) favorable new product evaluations. In contrast, new product evaluations in the Narrow condition should not vary with our manipulation.

Method

Ninety-five undergraduate students participated in the study in exchange for partial course credit. Participants were randomly assigned to one of the cells in a 2 (Prior Context: Narrow, Broad) x 2 (Focus: Innovation, Risk) between subjects design. Participants first completed the prior categorization manipulation #1 (i.e., Personality Task). Next, they moved on to the new product study. Those in the [innovation / risk] focus condition were next told:

“As you evaluate the product, please keep in mind that *new products differ in their degree of [innovativeness / risk they pose to consumers]*. Some new products are [really novel and they offer substantial improvements over the existing products in the market, whereas other new products may be less novel and offer a limited amount of improvement over existing products / more risky than existing products in the market and run a high risk of product failure, whereas other new products may pose considerably less risk].”

Next, participants were shown the advertisement for the wireless speakers used in Study 2A and asked to indicate their relative attitude (inferior to existing brands/superior to existing brands) towards the product. They next responded to a question assessing their relative consideration of the risk and innovation dimensions as they were evaluating the product, on a bipolar scale (the degree of risk it posed / the degree of improvement it offered).

Results

Attitudes. All dependent measures were submitted to a 2 (Prior Context: Narrow, Broad) x 2 (Focus: Innovation, Risk) ANOVA. For the attitude measure, only the predicted two-way

interaction ($F(1, 91) = 5.41, p < .03$) was significant, supporting H2. Participants in the Broad condition had more favorable attitudes when they were directed to focus on innovation ($M = 69.20$) than on risk ($M = 58.13; F(1, 91) = 4.38, p < .01$), while in the Narrow condition attitudes did not differ ($M_{\text{INNOVATION}} = 58.04, M_{\text{RISK}} = 63.58; F(1, 91) = 1.33, p > .29$).⁵

Consideration of innovation and risk: relative weights. Supporting H2, the interaction on the weight measure was significant ($F(1, 91) = 5.85, p < .03$). Broad condition participants placed more weight on innovation when they were asked to focus on innovation ($M = 79.05$) versus risk ($M = 65.48; F(1, 91) = 5.19, p < .04$), while in the Narrow condition weights did not differ across conditions ($M_{\text{INNOVATION}} = 67.04, M_{\text{RISK}} = 72.92; F(1, 91) = 1.19, p > .27$).

STUDY 2C: MANIPULATING MULTIDIMENSIONAL THINKING

The results from Studies 2A and 2B seem to be driven by the differential consideration of less salient information across conditions. Therefore, a manipulation that reminds participants to consider *both* the less salient and the more salient dimension should eliminate this effect. Such a reminder should encourage multidimensional thinking and reduce product evaluations in the Broad condition, but, it should not alter processing (or evaluations) in the Narrow condition.

Method

One hundred and twenty undergraduate students participated in the study in exchange for partial course credit. Participants were randomly assigned to one of the cells in a 2 (Prior Context: Narrow, Broad) x 2 (Focus: Control, Multidimensional) between subjects design. First,

⁵ Note that while our theory predicts that when risk is made salient, Broad condition participants should have lower attitudes than Narrow condition participants, the difference that we observed, while in the hypothesized direction, was not statistically significant ($M_{\text{BROAD}} = 58.13, M_{\text{NARROW}} = 63.58, F(1, 91) = 1.21, p > .1$). This may have occurred because even though we increased the salience of risk through our instructions, electronic products may be inherently associated with innovation and thus might always have relatively high salience.

participants completed the prior categorization manipulation #2 (i.e., Shopping Task) and were next directed to the “New Product Study.” In the Control condition participants directly evaluated the new product (i.e., wireless speakers). Participants in the Multidimensional focus condition, before evaluating the new product, were told:

“As you evaluate the product, please keep in mind that *new products differ in their degree of innovativeness* and the *risk they pose to consumers*. Some new products are really novel and they offer substantial improvements over the existing products in the market, whereas other new products may be less novel and offer a limited amount of improvement over existing products. Some are more risky than existing products in the market and run a high risk of product failure, whereas other new products may pose considerably less risk.”

Next, participants were shown the advertisement for the wireless speakers used in studies 2A and 2B, and asked to indicate their overall attitude (disliked it very much/liked it very much) towards the product. As control measures, participants also indicated their involvement and mood (across the entire experiment session), their involvement in the Shopping Task separately, their familiarity, knowledge, awareness, and ownership of the wireless speakers, their decision difficulty, and their ability to find options that matched their preferences during the Shopping Task. We also recorded study completion times associated with the two studies.

Results

Attitudes. A 2 (Prior Context: Narrow, Broad) x 2 (Focus: Control, Multidimensional) ANOVA revealed only a significant two-way interaction ($F(1, 116) = 4.604, p < .04$). As predicted, in the Control focus conditions the speakers were evaluated marginally more positively in the Broad than in Narrow condition ($M_{\text{BROAD}} = 74.93, M_{\text{NARROW}} = 67.50; F(1, 116) = 3.04, p < .09$). However, in the Multidimensional focus conditions, evaluations did not differ across the Broad and Narrow conditions ($M_{\text{BROAD}} = 65.47, M_{\text{NARROW}} = 70.97; F(1, 116) = 1.66, p$

> .20). Note participants in the Broad condition had less favorable attitudes in the Multidimensional versus the Control condition ($F(1, 116) = 4.93, p < .05$). Attitudes in the Narrow condition did not differ with the focus manipulation ($F(1, 116) < 1$).

Control Measures. None of the controls (overall involvement, involvement in the Shopping Study, familiarity, knowledge, awareness, ownership, decision difficulty, preference matching, mood, completion time for the Shopping Study, completion time for the New Product Study) showed any significant main effects or higher order interactions.

Discussion

When participants in the Broad condition are reminded of the less salient risk factor, their product attitudes become less favorable. Participants in the Narrow condition do not change their attitudes when they are reminded of the less salient factor. Even though the manipulation of multidimensionality we use in this study allows us to test our process explanation in a straight forward manner, one limitation is its very explicit nature. However, we feel that taken together, the results from this set of studies support our assertion that prior exposure to broad (narrow) categories primes people to consider a few, salient (multiple, salient and non salient) dimensions.

STUDY 3: SUSCEPTIBILITY TO HEURISTICS

While new product decisions are well suited to examining whether decision makers use a few, salient (versus many, salient and non-salient) criteria in their decisions, in Study 3, our aim was to broaden our investigation in three ways. First, we move beyond the domain of new products, and examine whether our observed effects indicate a more general tendency to process any product-related information in a similar fashion. Second, we move to a decision paradigm

that allows us to derive some normative implications. To that end, in Study 3, we use a robust, well-established paradigm that has been shown to lead to biased decisions, thus allowing us to more easily infer whether prior exposure to narrow (or broad) categorizations aids or abates this bias. Third, we relax our previous assumption that considering a greater number of dimensions leads to better decisions, since past research (e.g., Dijksterhuis 2004) has shown that in many domains blindly using more pieces of information can be detrimental to decision quality. In such tasks, normative outcomes occur when decision makers not only consider all available pieces of information but also weigh them appropriately. This can be difficult because information on the relative importance of information is not readily available. If exposure to narrow categories only leads to consideration of more pieces of information, then this should lead to poorer decisions. However, if participants exposed to narrow categories not only take more information into account, but also consider their relative importance, then this should improve decision quality.

In Study 3 we use a well documented consumer heuristic: the *dilution effect* (Nisbett, Zukier and Lemley 1981). In a typical dilution effect experiment participants in a control and an dilution group are given some diagnostic information regarding a target object or person. Those in a dilution group are also given some non-diagnostic (or irrelevant) information. Participants in both groups then render a judgment regarding the target. Typically, people find it difficult to ignore the irrelevant information, and as a result, judgments in the experimental condition tend to get “diluted” (i.e., less strong) in comparison to those in the control condition. If participants previously exposed to Narrow categorizations simply use more pieces of information, without considering their relative importance, this should exacerbate the dilution effect. However, if they appropriately weigh the irrelevant pieces of information, the dilution effect should be mitigated.

Method

One hundred and three undergraduate students participated in the experiment in exchange for partial course credit. The experiment involved a 2 (Prior Context: Broad, Narrow) x 2 (Information: Control, Dilution) x 3 (Replicate: Computer, Apartment, Car) mixed-design, with Replicate as a within-subject factor. Participants were randomly assigned to one of the four between-subject conditions. Participants were first administered the prior categorization manipulation #2 (i.e., Shopping Task). Next, they completed the “Product Evaluation Study.”

For the Product Evaluation Study, we adapted the stimuli and experimental procedures used by Meyvis and Janiszewski (2002). Participants were presented with three different product categories in a random order. For each category, participants were first given a specific desirable benefit (e.g., “You are looking for a fast computer”) and then received a product description. In the Control condition this description consisted of only one piece of diagnostic information (e.g., “Very Powerful Processor”), while in the Dilution condition the description also contained three pieces of irrelevant information (e.g., “Assembled in USA”). Next, participants indicated, on 100-point slider scales, the extent to which they believed that the target product delivered the specific desirable benefit. After answering this key dependent measure for all three replicates, participants rated their overall involvement and extant mood across the entire experiment session, the decision difficulty they experienced, and the extent to which they engaged in systematic processing in the Shopping Task. We also recorded study completion times.

Results

Dependent Measure. We submitted the key dependent measure to a 2 (Prior Context: Broad, Narrow) x 2 (Information: Control, Dilution) x 3 (Replicate: Computer, Apartment, Car)

mixed ANOVA. Since none of the higher order effects involving Replicate were significant, the data were collapsed across this factor. The results revealed a significant main effect of Information ($M_{\text{Control}} = 74.35$, $M_{\text{Dilution}} = 65.86$, $F(1, 99) = 20.36$, $p < .01$), which was qualified by a significant interaction between Prior Context and Information ($F(1, 99) = 7.55$, $p < .01$). While participants in the Broad condition show significant dilution effects ($M_{\text{Control}} = 76.37$, $M_{\text{Dilution}} = 62.71$, $F(1, 99) = 26.11$, $p < .01$), participants in the Narrow condition do not ($M_{\text{Control}} = 72.33$, $M_{\text{Dilution}} = 69.00$, $F(1, 99) = 1.56$, $p > .20$).

Control Measures. Analysis of the control measures indicates that there were no significant interaction or main effects for the self-reports of involvement, mood, systematic processing, and decision difficulty. The study completion times also did not differ significantly.

Discussion

The results show that decision makers exposed to narrow categorizations do not mindlessly use the information that is made salient to them. Instead they are better able to consider a less salient aspect of this information, that is, the relative importance of the attributes. Thus, it appears that exposure to narrow categorizations enables decision makers to behave in a more normative manner in situations where both taking too little (Studies 2A, B, C), or too much information (Study 3) into account may result in non-normative outcomes. Note however, although in the paradigm we examined, exposure to Narrow (versus Broad) categorizations did instigate normatively better decisions, we are hesitant to claim that this will always be the case. Quite plausibly, there are other decision paradigms that we have not examined, like creative problem solving, where Narrow participants could perform comparatively worse.

STUDY 4: COGNITIVE VERSUS MOTIVATIONAL NATURE OF THE EFFECT

The main aim of Study 4 is to examine whether the effect of exposure to narrow versus broad categorizations is primarily cognitive or motivational in nature. Is a consumer who has been exposed to narrowly categorized objects simply motivated to work harder on subsequent tasks? Or is the process more cognitive, where the consumer is primed with the existence of multiple dimensions in the environment, and therefore uses multiple dimensions in the next task, without necessarily working harder? The results from our earlier studies seem to show that exposure to narrow categories leads to the use of more and better weighting of information, but involves no more time or effort. Although this finding may seem counterintuitive, it is consistent with research on unconscious thought that has documented a “deliberation without attention” effect (Dijksterhuis 2004), which shows it is possible to engage in more complex thinking without more effort. Conscious thought has low processing capacity, and therefore can hurt the quality of decisions by making people focus on a few attributes at the expense of other relevant attributes (Wilson and Schooler 1991). In contrast, unconscious thought can lead to better decisions, especially under complex circumstances, by enabling decision makers to integrate large amounts of information in their judgments (Dijksterhuis, Bos, Nordgren and van Baaren 2006; Dijksterhuis and Nordgren, 2006). Unconscious thought, in comparison to conscious thought, leads to consideration of more information, but requires much less time and effort.

To investigate this we examine whether differences across conditions will manifest only to the extent that the subsequent task is one that involves processing on few versus multiple dimensions or whether it will manifest in any task where simply working harder would lead to different results. Therefore, study 4 included a series of tasks, two of which are more cognitive (e.g., grouping and categorization tasks), and one which is more motivational in nature (e.g.,

recall task). If the effect of exposure to narrow versus broad categories is cognitive then it should have an effect on the grouping and categorization tasks, but not on the recall task. If the effect is more motivational, then it should have an impact on all three tasks. The recall task always came in between the two cognitive tasks. Therefore, if we observe an impact on the cognitive tasks (sequenced 1st and 3rd), but not the recall task (sequenced 2nd), we know that the null effect for the recall task was not due to the diminishing impact of the manipulation over time.

Method

Forty-seven undergraduate students participated in the study in exchange for partial course credit. Participants were first exposed to either narrow or broad categorizations via the prior categorization manipulation #3 (i.e., Web Evaluation Task). They next completed three studies in a fixed order: the “Face Classification,” “Recall,” and “Grouping” tasks.

In the “Face Classification Task” participants judged whether an object belongs to a target category. Participants were sequentially presented with six faces (created using a morphing program (Corneille, Huart, Becquart, and Brédart 2004) to constitute a race continuum of Caucasian-Chinese. The first face they saw was a typical Caucasian face and the sixth was a typical Chinese face (see web appendix, top panel). As each face appeared on the screen, participants marked either “This is a Caucasian face” or “I am not sure.” If a participant selected the first option, she was presented with the next face on the continuum, which possessed slightly less Caucasian and more Chinese characteristics. The task ended when the participant selected the second response alternative. The key dependent variable was the number of faces the participant included, prior to becoming uncertain. As the face on the screen changes gradually, from a typical Caucasian to a typical Chinese face, multiple factors account for this change (e.g.,

eyes, eyebrows, lips, forehead, etc.). Thus, we expected that participants first exposed to Narrow (Broad) categorizations would be more (less) sensitive to these multidimensional changes, would react to these changes earlier (later) in the face continuum, and consequently include a fewer (greater) number of these racially ambiguous faces into the category “Caucasian.”

In the second “Recall Task” participants were given one minute to read and memorize a list of 15 meaningless, three-letter combinations (e.g., *vaw*, *rox*, etc.) adopted from Peixotto (1948). After a 90-second filler task participants were given a free-recall task for 70 seconds to assess their memory for the nonsense syllables. Note that while recall accuracy could be affected by participants’ motivation to perform well, it does not involve multidimensional processing.

In the third “Grouping Study” participants were provided with pictures of 10 “multidimensional” bugs taken from Minda and Smith (2001) and asked to sort them into as many or as few groups as they deemed fit. These bugs (see web appendix, bottom panel) were designed to vary on eight, binary dimensions (e.g., Eyes: open vs. closed, Tail: long vs. short, Antenna: bent forward vs. bent backward, etc.). Participants could potentially create as few as one, or as many as ten insect groupings, depending on the number of dimensions they used. We expected participants in the narrow (broad) condition to create more (fewer) insect groupings.

Finally, participants reported their involvement and extant mood throughout the experiment session, and the involvement, systematic processing, and decision difficulty associated with the Web Evaluation Task. We also recorded task completion times.

Results

Dependent Measures. Our Broad-Narrow manipulation affected the Face Classification and Grouping tasks (which came first and third), but not the intervening recall task. In the Face

Classification task, participants in the Narrow condition included fewer faces in the Caucasian category than did those in the Broad condition ($M_{\text{Narrow}} = 3.58$, $M_{\text{Broad}} = 5.43$, $F(1, 45) = 5.74$, $p < .03$; also Mann-Whitney $U = 181.50$, $p < .04$). However, in the Recall task, participants in the Narrow and Broad conditions did not differ in the number of syllables correctly recalled ($M_{\text{Narrow}} = 4.13$, $M_{\text{Broad}} = 3.55$, $F(1, 44) < 1$). Finally, in the Grouping task, Narrow condition participants created more bug groupings than did Broad condition participants ($M_{\text{Narrow}} = 3.08$, $M_{\text{Broad}} = 2.48$, $F(1, 45) = 5.76$, $p < .03$). Note that since the recall task always came second and since the results for the third, grouping task were significant, the null result for the recall study do not appear to be because the impact of our manipulation had diminished over time.⁶

Control Measures. None of the control measures, either self-reported (overall mood, overall involvement, involvement in the Web Evaluation Task, systematic processing, and decision difficulty), or unobtrusively measured (completion times for Web Evaluation Task, Face Classification Task, and Grouping Study), showed any significant differences.

Discussion

Study 4 shows that the Broad-Narrow manipulation influences only those tasks that require the use of multiple dimensions. If “Narrow” participants were generating additional dimensions simply due to trying longer and harder at these tasks, then this would be reflected in longer task completion times and higher self-reported effort. The lack of significant differences on measures of completion time and effort in this, as well as previous studies, favors a more cognitive account of the observed effects.

GENERAL DISCUSSION

⁶ However, since there can be many reasons for null findings, our conclusions about this must remain tentative.

This research demonstrates that incidental exposure to broad versus narrow categorizations significantly alters decision makers' information processing styles. In comparison to participants exposed to broad categories, those who were exposed to narrow categories adopted a more multidimensional processing orientation in subsequent, unrelated decision contexts. This difference influenced the number of dimensions used in subsequent tasks, reliance on both salient as well as non-salient pieces of information, and how the information is weighed. We show that prior exposure to broad or narrow categorizations affects basic cognitive behaviors (e.g., grouping, categorization), substantive consumer decisions (e.g., new product adoptions), and general consumer decision making (e.g., susceptibility to heuristics).

The Nature of the Effect

We questioned whether exposure to narrow categories activates a multidimensional processing tendency or simply prompts consumers to try harder on tasks? Our results show that consumers who have been exposed to narrow (versus broad) categories use more dimensions in their decisions, even though they do *not* spend more time or effort. These results are consistent with research on unconscious thought (Dijksterhuis 2004) as well as with findings from several different literatures. For example, the literature on individual level differences in category width (e.g., Pettigrew 1958), which finds no differences in decision time between individuals who differ in their chronic tendencies to categorize narrowly versus broadly (Tajfel and Bruner 1966). Gardner (1953) argues that a chronic broad categorizer may place seemingly different objects in the same group even though she is aware of the multiple dimensions on which objects differ from each other, simply because she chooses to act upon differences on certain dimensions and not on others. Similarly, in our research Broad and Narrow participants may be equally aware of

both salient and non-salient dimensions, and therefore take the same amount of time to make their decisions, but may simply choose to weigh these dimensions differently.

Also relevant is literature on the dilution effect, which as we discuss in study 3, uses an experiment paradigm that deals with the tradeoff between processing different pieces of information versus the ability to discriminate among them and appropriately weigh them. The moderators that turn off the dilution effect (e.g., Meyvis and Janiszewski 2002, Tetlock and Boettger 1989), often do so, without the participants spending additional time on their decisions.

Finally, creativity and problem solving literatures can also shed light on this issue. Moreau and Dahl (2005) show that participants under slight constraints are better at solving creativity problems. Having more time does not improve performance. In a similar vein, and more closely related to categorization, Chrysikou (2006) shows that a certain kind of categorization training makes people better at problem solving, but without them having to spend more time in generating the solutions to those problems. Taken together, these diverse areas of research lend credence to our finding that more complex, multi-dimensional thinking can occur in a decision without a significant increase in the time required to make that decision.

Ruling out Alternative Mechanisms

It is important to note that our manipulations and control measures rule out several alternative mechanisms that could masquerade as our proposed categorization-based effect including option availability, match with preferences, choice difficulty, careful/systematic processing, task involvement, task effort, decision difficulty, preference matching, product expertise (awareness, familiarity, knowledge, ownership), and mood. Two other possible mechanisms deserve discussion. One is whether it is possible that the narrow categorization

manipulation is overwhelming participants, depleting their cognitive resources, and consequently leading to average responses or responses near the mid points of the scale. Note however, a depletion-based account is inconsistent with the fact that the Narrow condition participants, compared to the Broads, report similar levels of decision difficulty in the first manipulation task, create a greater number of groups in the subsequent grouping task, and spend the same amount of time in subsequent tasks. A depletion-based account would argue for exactly an opposite pattern. Another potential concern could be that our context manipulation may be inducing an acquiescence bias in the Broad condition, leading to relatively more positive scale responses in subsequent tasks. However, our results in the new product studies show that in the Broad condition, attitudes can also become more negative with increasing salience of risk perceptions (Studies 2B, 2C). Thus, participants in the Broad condition are not simply acquiescing.

Theoretical Implications

There has been extensive research demonstrating that the way in which products are categorized in a decision context can influence consumers' reactions in the same decision context. In contrast, in this paper we show how exposure to different types of external categorizations in one decision environment can affect consumers' information processing and evaluations in a subsequent and unrelated decision environment.

Considerable past research shows that different kinds of mindsets lead to different kinds of categorization strategies. For example, an affectively positive (negative) mindset (Isen and Daubman 1984), and a distant (near) construal mindset (Trope and Liberman 2003), have both been associated with the use of broader, more coarse (narrower, more fine) grained categories. Our results provide evidence for the opposite causal path: that exposure to broad or narrow

categories tends to trigger a less or more thorough information processing style.

Finally, given that these categorization-induced changes in information processing (a) spill over to a wide variety of unrelated tasks, and (b) are unaccompanied by differential mood, involvement, feelings of task difficulty, systematic processing, or completion times, it is quite likely that this effect operates through automatic, system 1 processes, outside of conscious awareness (Evans 2008, Sloman 1996).

Our research might also help bring together and complement findings from several diverse literatures. By establishing a causal relationship between category width and multidimensionality of evaluations, our findings might help explain why narrow chronic category width and in-group members involve more complex evaluations (Jackson and Messick 1963; Linville 1982; Sloane et al. 1963) and why broad category width consumers tend to rely only on salient dimensions (e.g., price and brand name) in their decisions (Park and Lessig 1981). Additionally, we complement the studies on individual-level category width, by showing that changes in category width are very malleable and easily susceptible to situational factors.

Managerial Implications and Opportunities for Future Research

Extant research has shown that the way products are grouped in stores, in ads, or on web pages can influence how consumers process the information in that immediate environment (e.g., Mogilner, Rudnick, and Iyengar 2008; Poynor and Diehl 2007). We show these groupings may also affect how consumers process information they come across later, in an unrelated web site or retail setting. Further, these broad-narrow groupings appear to affect how consumers process product dimensions that have been made salient.

In this paper, we focused on two major dimensions that influence new product adoptions:

innovation and risk. However theoretically, our findings should generalize to other dimensions made salient by marketing actions, like price-quality, brand name-flavor or style, etc. For example, a brand can emphasize quality over price through advertisements. In this case, we would predict that broad categorizers would mainly consider quality information, but narrow categorizers would consider both quality *and* price information before making a purchase.

Our first manipulation involved survey scales that varied in the number of scale points available. A large body of research has examined the effect of the number of scale points in survey measures on reliability, validity, ease of responding, and the likelihood of responding to an item (e.g., Cox 1980). Our research suggests that whether a survey scale comprises few, broadly grouped response options, or many, narrowly grouped response options, can affect responses to subsequent and unrelated survey questions. For example, can exposure to items with broadly versus narrowly grouped response categories prior to a conjoint task affect price sensitivities and part-worths obtained for the attributes in the conjoint task? ⁷ Similarly, the Broad-Narrow groupings could also affect a multidimensional scaling task.

On the surface, our findings seem to suggest that exposure to narrow (versus broad) categorizations lead to normatively better decisions. Future research should examine contexts in which exposure to narrow categorizations, and the resulting tendency to consider and integrate all available information, is detrimental to decision quality. Another question pertains to the persistence of the effects: these effects may last for a short while, with consumers reverting to their innate tendencies, or regular exposure to such categorizations may have a permanent effect. Finally, future research should also explore the effects of exposure to such categorizations in other domains, such as brand extension evaluations, risk tolerance, and mental accounting.

⁷ In some preliminary results we do indeed find evidence that our manipulations alter respondents' sensitivity to changes in the levels of product attributes in a choice-based conjoint task.

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FIGURE 1
SUMMARY OF PROCESSES AND EFFECTS

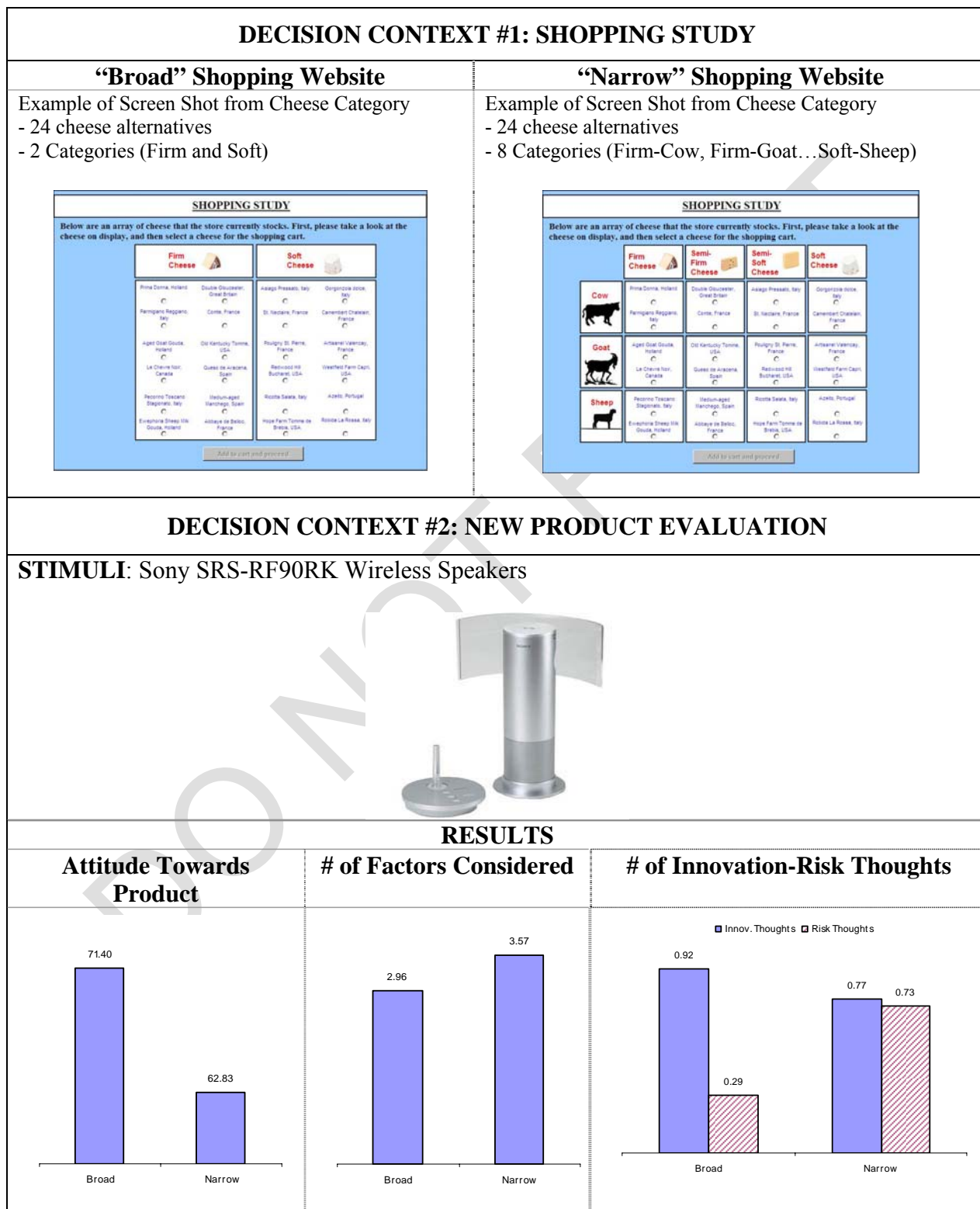
Decision Context #1 (Manipulated)	Changes in Information Processing Style	Effects on Subsequent and Unrelated Decision Context #2		
		Grouping & Categorization	New Product Evaluation	Susceptibility to Heuristics
Exposure to Broad Categories	<u>Less Multidimensional Processing</u> -Less conceptually complex -Few salient dimensions	Few, large groups; Less sensitive to multidimensional changes	Few, salient contextual cues guide evaluation	Use of few, salient contextual cues influence reliance on heuristics
Exposure to Narrow Categories	<u>More Multidimensional Processing</u> -More conceptually complex -Both salient and non-salient	Many, small groups; More sensitive to multidimensional changes	Both salient and non-salient cues guide evaluation	Use of both salient and non-salient cues influence reliance on heuristics

OVERVIEW OF RESULTS

		Broad	Narrow
Study 1	# of Fruit Groups Created	3.42	4.50
	New Product Evaluation When Innovation is Naturally Salient	71.40	62.83
Study 2A	# of Innovation Thoughts	0.92	0.77
	# of Risk Thoughts	0.29	0.73
	New Product Evaluation When Innovation is Primed	69.20	58.04
Study 2B	New Product Evaluation When Risk is Primed	58.13	63.58
	Innovation Importance Weights (when Innovation is Primed)	79.05	67.04
	Innovation Importance Weights (when Risk is Primed)	65.48	72.92
Study 2C	New Product Evaluation When Innovation is Primed	74.93	67.50
	New Product Evaluation When Both Innovation & Risk are Primed	65.47	70.97
Study 3	Evaluation of "Control" Product	76.37	72.33
	Evaluation of "Diluted" Product	62.71	69.00
Study 4	# of Faces Categorized as Caucasian from Continuum	5.43	3.58
	# of Nonsense Syllables Recalled	3.55	4.13
	# of Multidimensional Insect Groups Created	2.48	3.08

FIGURE 2

MANIPULATIONS, STIMULI, AND SUMMARY OF RESULTS FROM STUDY 2A



WEB APPENDIX**(A) STUDY 5: FACES IN THE ORDER THEY WERE PRESENTED**

Face 1



Face 2



Face 3



Face 4



Face 5



Face 6

(B) STUDY 5: MULTIDIMENSIONAL BUGS USED IN THE CATEGORIZATION TASK