Take It or Leave It?

Preference Testing Effects in the Consumers’ Decision to Purchase

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ABSTRACT

This research examines the consumer’s decision whether to make a purchase. I propose one psychological process underlying this decision, namely, a metacognitive process I call preference testing. Specifically, when deciding whether to purchase a particular option, people observe whether they have tested the option against alternative options for purchase. Seeing they have considered a competing option but find the focal option to be more attractive creates a cue that the focal option has been tested, leading to a higher likelihood of purchase. In a series of seven studies, I show that features of the consideration set and the decision making procedure can have systematic influences on purchase likelihood through the process of preference testing. In particular, I find that consumers are more likely to purchase (1) when an option is considered next to a competing option that is inferior by a small, rather than large, magnitude (the magnitude of advantage effect); (2) when options are evaluated under a tournament procedure (the tournament effect); and (3) when options are ranked rather than rated (the ranking effect). This research contributes to the theory of decision making, and has important marketing research and managerial implications.
In today’s consumer society, people are constantly encountering products and services they could potentially purchase (Wood 2005). For example, people may spend a Saturday afternoon at the mall or in front of a computer, where they can look at the new fashions for the upcoming season, or check out the sales on home electronics. When people spot a product or service of interest, they generally have the option to either act on the opportunity and purchase the item, or walk away (at least for the moment). Thus an important research question is, how do consumers make the decision to “take it” or “leave it”? That is, what are the psychological processes involved in this decision, and under what conditions are people more likely to make a purchase?

While such questions are of fundamental importance to designing effective marketing strategies and to the development of behavioral decision making theory, this topic has so far received limited attention, as decision making research typically focused on “brand choice”, that is, the decision of which option to buy, rather than whether to buy. More recently however, there has been a growing interest in studying the purchase/non-purchase decision, focusing on aspects of the problem such as goals and self-regulation (e.g., Baumeister 2002; Mukhopadhyay and Johar 2004), and the negative effect of choice difficulty (e.g., Dhar 1997; Iyengar and Lepper 2000). In the current research, I wish to provide further insight into the consumer’s purchase behavior by examining the cognitions underlying the decision to purchase. Specifically, I propose a metacognitive process I call “preference testing” as a determinant of people’s decision to purchase.

I argue that people often experience uncertainty in judging an option’s appropriateness for purchase (e.g., March 1978; Kahneman and Snell 1992), which keeps
them from turning an inclination to purchase into a committed action. However, this uncertainty may be reduced by a spontaneous metacognitive process of preference testing. Specifically, when deciding whether to pursue a particular option, people observe whether they have considered challenges (tests) to the option in the form of competing alternatives. Seeing that the focal option can pass such tests, that is, judging it to be superior to the competing options, leads to greater confidence and readiness to commit to its purchase.

The process of preference testing gives rise to predictions about the purchase decision that may not be apparent based on existing research. In particular, features of the purchase context, such as the characteristics of the consideration set and the decision procedures used, may systematically impact the likelihood of purchase through the preference testing process. In this paper, I test three effects of the consideration set and decision procedure, and show that purchase likelihood tends to be higher (a) when an option is considered next to a competing option that is inferior by a small, rather than large, degree (the magnitude of advantage effect); (b) when an option has been selected over other alternatives through a tournament procedure rather than a simultaneous choice procedure (the tournament effect); and (c) when an option has been selected over other alternatives through a ranking procedure rather than a rating procedure (the ranking effect).

In the next sections, I will review the literature relevant to this research, leading to the theorizing of the preference testing process. I then present a series of seven studies examining the effects of preference testing: studies 1-4 examine a consideration set context effect, namely, the magnitude of advantage effect; studies 5-7 examine the effect
of decision procedures by demonstrating the tournament effect and the ranking effect. I conclude by discussing the theoretical and managerial implications of this research.

THEORETICAL BACKGROUND

Evaluative Uncertainties in the Purchase Decision

A purchase can be seen as motivated by the perceived benefits a product or service can provide, which in general may be characterized as serving hedonic, emotional or utilitarian goals (e.g., Hirschman and Holbrook 1982; Belk 1988; Edell and Burke 1989; Batra and Ahtola 1990; Schmitt 1999; Dhar and Wertenbroch 2000; Kivetz and Simonson 2002). To the extent an option is perceived as fulfilling (often a combination of) these goals, the option will be considered for purchase. Normative theory of decision making suggests that people should purchase when the expected utility of the option’s benefits exceeds the utility of the resources needed to acquire the option. However, much research in behavioral decision making has shown that the judgment of this equation often involves substantial ambiguities and uncertainties (see Bettman, Luce and Payne 1998 for a review). In particular, there may be uncertainties regarding the objective outcome of the purchase, and one’s subjective liking for those outcomes (March 1978). For example, there might be uncertainty over the performance of the acquired option (e.g., Savage 1954), and uncertainty in projecting the satisfaction one will derive from it (e.g., Kahneman and Snell 1992; Ito and Cacioppo 1999; Lowenstein and Schkade 1999).
An additional source of uncertainty comes from the difficulty in equating the often non-monetary benefits of options with monetary measures (e.g., Fischhoff 1991; Kahneman, Ritov and Schkade 1999). Thus in deciding whether to purchase a particular item, while the person may have a general inclination toward action or non-action, there is often a significant amount of uncertainty in one’s judgment, due to the ambiguities in one’s knowledge about the option, one’s own likings, and the monetary value of the option’s benefits. The subjective experience of uncertainty in judgment\(^1\) in turn may prevent people from making a commitment to purchase; instead, they may choose to either defer or abandon the current opportunity for purchase.

**Reducing Uncertainties in the Purchase Decision: The Metacognitive Process of Preference Testing**

A question that naturally arises is, what are the mechanisms for reducing people’s uncertainty in the judgment of whether to purchase? One process might be through obtaining more information about the option, and thus reduce the amount of unknown variables. Previous research shows that indeed people are likely to search for more information when they have uncertainty in their preferences (e.g., Urbany, Dickson and Wilkie 1989). Interestingly however, recent research has demonstrated the effect of another type of information that people use as inputs to their judgment and decision making, namely, metacognitive information.

Metacognition refers to the idea that people can have thoughts about their own thoughts and thought processes (e.g., Jost, Kruglanski and Nelson 1999). For example,

\(^1\) In this paper, “confidence”, “certainty” and “conviction” in judgment are used interchangeably.
people may monitor the pattern of their thinking, such as the decision rules they are using to make choices (Drolet 2002), or the presence of counter reasoning in judgment (e.g., Koriat, Lichtenstein and Fischhoff 1980). Alternatively people may observe the experiential states accompanying their thinking process, such as the experience of difficulty (e.g., Winkielman, Schwarz and Belli 1998). The metacognitive information is then used to inform the task at hand. For example, in making frequency judgments, such as how many excellent restaurants there are in Chicago, people may observe the difficulty with which they can come up with examples, and make the inference “if I have trouble generating examples, there must not be that many” (Schwarz 2004). Thus people who had experienced difficulty in generating examples would conclude that there were fewer good restaurants in Chicago than those who experienced less difficulty, even when the former group in fact came up with more examples.

Similarly, in the decision making domain, metacognition can also influence people’s choices. In particular, recent research on preference fluency demonstrates that the purchase decision can be affected by the amount of difficulty people experience in forming preferences among options (Novemsky, Dhar, Schwarz and Simonson 2004). By asking people to give many (rather than few) reasons for choosing a particular option from a given choice set (a relatively difficult task), or by using a degraded font that is hard to read, the authors increased the subjective experience of difficulty in choosing among the options, which in turn lead to greater instances of purchase deferral. However, while this research provided evidence for the role of metacognitive experiences in the purchase decision, interesting questions remain as to whether metacognitive processes
may also affect the decision to purchase in ways beyond the subjective experience of difficulty, such as through monitoring the thought process in making a purchase decision.

In this research, I propose one such metacognitive process involved in the decision to purchase. Specifically, I focus on a mechanism I call preference testing. I propose that when deciding whether to purchase a particular option, consumers observe their thought process in this decision context. In particular, they attend to whether they have tested/challenged the focal option by comparing it to alternative options for purchase. Seeing the focal option pass such challenges, that is, seeing they have considered competing options but find the focal option to be more attractive creates the impression that the option has been tested, resulting in greater confidence to purchase the option. Furthermore, the preference testing process – the observation of tests for a focal option – is often an implicit process that is spontaneously evoked in a purchase context.

The notion that seeing a judgment withstanding challenges/tests builds confidence in this judgment is consistent with previous research on metacognition showing that (unsuccessful) counterarguments are particularly effective at increasing judgment confidence (e.g., Koriati, Lichtenstein and Fischhoff 1980; Petty, Tormala and Rucker 2004; Rucker and Petty 2004). For example, Rucker and Petty (2004) showed that when people try to generate counterarguments against an attitude but could not come up with one readily, they become more certain of their initial attitude. Notably, the role of metacognition – the perception of the thinking process itself independent of that of the message content – becomes apparent in this case, because the content of the message (a counterargument) should in fact produce the opposite effect, that is, counterarguments should cause a reduction, not increase, in attitude certainty. Thus the observation of one’s
thought process of trying to generate counterarguments produced a unique effect on judgment certainty. Here, in the preference testing process, the notion of counterattacks is generalized to beyond declarative arguments, but any thoughts that can be construed as a challenge or test to the focal option. In particular, in a purchase context with more than one option under consideration, the option that emerges as the most preferred becomes the focal option. At the same time, comparisons of the focal option to the other options are being observed as tests for the focal option, which may serve to enhance the confidence to pursue the focal option.

The Moderating Role of Perceived Quality of Test

Although the comparison with competing options may serve as tests for the focal option, all comparisons may not be equally effective tests; that is, they may not be equally effective in increasing the certainty to purchase. Specifically, based on previous research on the metacognition of counterarguments (e.g., Tormala and Petty 2002), I propose that the outcome of preference testing may be sensitive to perceptions about the test – particularly, the perception of quality of test. In their work on resistance to persuasion, Tormala and Petty (2002) showed that while the observation of oneself resisting a counterattack on one’s attitude enhanced the certainty of the initial attitude, this effect was more pronounced when the counterarguments were perceived to be strong, compared to when they were perceived to be weak. Thus, in addition to monitoring the presence of counter-attitudinal thoughts, people were also attuned to the quality (strength) of these thoughts. Similarly, in preference testing, observing a focal option withstand a
strong test may be more effective at increasing conviction towards purchase than the observation of a weak test. In particular, when the focal option is being compared to a competing option that is almost just as good (but still falls short; otherwise the preference would be reversed), it would appear that the focal option has passed a strong test; on the other hand, if the competing option is inferior to the focal option by far, it would appear that there was only a weak test for the focal option. The monitoring of the quality of test would thus imply that the efficacy of preference testing will depend on the relative closeness in attractiveness among options in the context, whereby a closer competitor will provide a stronger test for the focal option, resulting in greater propensity to purchase. This reasoning leads to the first prediction in this paper, namely, the magnitude of advantage effect.

**H1**: Purchase of an option is more likely when it is considered along with another alternative that is inferior by a small amount, than when it is considered along with another alternative that is inferior by a large amount.

Thus the preference testing process predicts a systematic impact of the characteristics of the consideration set on purchase likelihood. In this light it may be instructive to compare the magnitude of advantage effect due to preference testing with previous research related to context effects on purchase. In particular, research regarding choice difficulty has examined how certain features of the choice set can lead to non-purchase by creating difficulties for people to decide which option is the most preferred within the choice set. The difficulty can be due to, for example, high amount of conflict (e.g., Tversky and Shafir 1992), involvement of emotional attributes, such as safety, that the person does not want to tradeoff (e.g., Luce 1998), information overload as a result of
having too many options (e.g., Iyengar and Lepper 2000), or the lack of discernable advantage of one option over others in terms of overall attractiveness (Dhar 1997). Thus by focusing on the role of choice difficulty, the above research typically examined purchase situations where people cannot resolve their preference order; in such cases, selection uncertainty becomes the dominant concern in the purchase decision. However, this focus leaves open the question regarding the relationship between the choice set and purchase in cases where people do have relatively clear preferences among options. For example, in real life shopping environments, people are often able to resolve the differences in attractiveness among available alternatives (such as different flavors of ice cream, different pieces of clothing or electronic gadget) to a satisfactory degree, and arrive at a focal option. It is not clear what psychological processes are at work in the purchase decision once the preference order among competing options has been established. Therefore, preference testing compliments previous insights on choice difficulty by presenting an additional process underlying the purchase decision, and the relative applicability and prevalence of each mechanism depends on whether people are able (or motivated) to resolve their preference order. When people cannot decide which option is more attractive (e.g., Dhar 1997), choice difficulty and decision avoidance will tend to be the dominant force, while preference testing is unlikely to be at play. However, when people are able to determine which option is more advantageous, and focus on the decision of whether to purchase this option, choice difficulty becomes less relevant, and preference testing for the focal option is likely to be engaged; consequently, the characteristics of the choice set such as the magnitude of advantage of the focal option will exert its influence through its implications on preference testing.
Another research related to the effect of the consideration set context on purchase is work on the attraction effect (Huber, Payne and Puto 1982; also referred to as the asymmetric dominance effect, Simonson and Tversky 1992). This research suggests that having a preference for a focal option over another alternative may generally be helpful to making a purchase, compared to when the option is presented alone. For example, in one demonstration, Simonson and Tversky (1992) showed that people were more likely to choose an elegant Cross pen over cash when the Cross pen was presented with an inferior alternative, namely, a Sheaffer pen. However, the mechanisms behind this effect have not been systematically examined – for example, the effect may be due to a contrast effect (e.g., Sherif, Taub and Hovland 1958), or it may be based on more involved processes. Indeed, the current research suggests the metacognitive process of preference testing may be a possible mechanism, and as such, the attraction effect can also be seen as an instance of preference testing. However, the process of preference testing would go further to suggest that, due to the monitoring of the quality of tests, there may be differential effectiveness of attraction contexts, depending on the magnitude of advantage of the focal option over the inferior option. Specifically, small advantage of the focal option over the “decoy” may be more effective in increasing confidence for purchase than a large advantage.

Thus adding to previous research on contextual influences on the decision to purchase, the present research provides greater understanding of the psychological processes underlying purchase by examining the metacognitive process of preference testing. In particular, the attention to the quality of test leads to the prediction of the magnitude of advantage effect. In the next sections, I present four studies examining the
STRENGTH OF TEST: THE MAGNITUDE OF ADVANTAGE EFFECT

Study 1: Manipulating the Magnitude of Advantage

Overview and Design

The objective of study 1 is to test the magnitude of advantage effect – people are more likely purchase a focal option when it is considered with another alternative that is inferior by a small amount, than when it is accompanied by another alternative that is inferior by a large amount. To test this hypothesis, I compare the purchase likelihood of a focal option in three contexts: when the focal option is presented alone, when the focal option is presented with a “decoy” option who is inferior by a large amount, and when the focal option is presented with a “decoy” option that is inferior by a relatively small amount. Thus study 1 is based on a single-factor design, where magnitude of advantage (lone option, small advantage, large advantage) is manipulated between subjects. I predict that purchase likelihood will be higher in the small advantage condition than in either the large advantage or lone-option condition. I do not make a prediction regarding the difference between the large advantage and lone-option conditions. Furthermore, study 1
employs a choice paradigm involving consequential transactions, so as to conceptually simulate committing resources to a purchase in real life.

Method

Participants (N = 148, mean age = 34, 33% male), paid $2 to participate in an online consumer research study, were ordinary consumers recruited from all over the country through a web survey service. Participants read that the purpose of the study was to learn about what people would like to receive in prize drawings. Specifically, the study consisted of several prize drawings, in each of which two participants would be selected at random as the winners. Furthermore, the winners in each drawing would have a choice among several options for the prize, including products and cash. Their task was to indicate (before finding out whether they had won in any of the drawings) which option they would prefer to receive as prize in each drawing. After the study, the winners would be randomly selected, and they would indeed receive the prize they had earlier chosen, delivered to them through the mail. Thus participants understood that they would make choices among prize options, and that they had a real chance of receiving those options. After this introduction, participants made four prize decisions involving four product categories (chocolates, CD cases, DVD’s, and small toasters). In each decision, they were shown one or two products from a given category, and were asked: “For this question, two participants will win a prize. If you are a winner, you can choose either (one of) the product(s) below, or $XX cash. Which one would you choose for the prize?” Thus participants clicked on one of two (three) buttons – product A, (product B,) and $XX.
This procedure of choosing product versus cash was conceptually similar to a purchase decision of exchanging money for a product (Novemsky and Kahneman 2005).

Participants were randomly assigned to three conditions. In the “lone option” condition, for each prize decision, the person was presented with just the focal option by itself, with a picture of the product and a brief description, and he/she could choose either this product or a certain amount of cash (which was less than the typical price of the product in the market so as to encourage consideration of purchase). In the large (small) advantage condition, the person saw two products presented together in each prize decision – the focal option, and a decoy option that was pretested to be inferior to the focal option by a large (small) amount. The large (small) advantage was manifested in numeric advantage (e.g., capacity for CD cases: 264 vs. 60 (264 vs. 240)) and/or differences on qualitative dimensions (e.g., appearances, brands; see Appendix 1 for an example). The person decided whether to take one of the products or cash as prize. When the participant submitted his/her decision for one prize, he/she was taken to the next page showing the next set of options. The time spent on each decision (including looking at the options and deciding on a prize) was recorded as an indicator of involvement. After making four bonus prize decisions, the order of which randomized, all participants entered their demographic information, and an email address by which they could be contacted about the prize drawing results. After all data was collected, winners were selected and sent their chosen product or cash prizes.

Results and Discussion
Pooling across four product categories\(^2\) (total observations = 581), a binary logistic regression on purchase likelihood of the focal option\(^3\) with magnitude of advantage as the independent variable, and gender and age as covariates\(^4\), revealed a significant effect for the magnitude of advantage \((p < .0005)\). Specifically, as predicted, purchase rate was significantly higher in the small advantage condition \((M = .33)\) than in either the large advantage condition \((M = .16, B = .87, p = .001)\), or lone-option condition \((M = .17, B = .79, p = .001)\). The large advantage and lone-option conditions were not significantly different \((p = .77)\).

One might argue that because the difference between options in the small advantage condition may be less obvious than in the large advantage condition, it might take longer to form a preference between the options, and this greater investment in time (aside from observation of preference testing strength) might have led to greater purchase. However, planned contrasts showed that while there was a significant difference between the lone-option condition \((M = 11.41 \text{ seconds})\) and the two two-option conditions \((M_{\text{small-advantage}} = 15.98, M_{\text{large-advantage}} = 14.53)\) in processing time \((t(547) = -4.12, p < .0005)\), there was no significant time difference between the small versus large advantage conditions \((t < 1, p = .35)\). Further, a binary logistic regression on purchase likelihood with time included as a covariate showed that the effect of magnitude of advantage was not significantly different \((p = .67)\) on purchase. Furthermore, the patterns of means were consistent with prediction in all four product categories. This applies to all studies in the research, and therefore all analyses are based on pooled data.

\(^2\) A binary logistic regression with magnitude of advantage, product category, and their interaction as independent variables (and with gender and age as covariates) revealed no effect for the interaction \((p=.67)\) on purchase. Furthermore, the patterns of means were consistent with prediction in all four product categories. This applies to all studies in the research, and therefore all analyses are based on pooled data.

\(^3\) A small number of observations in study 1, study 3, and study 4 (1.9%, 2.5%, and 3.0% respectively) chose the decoy option, rather than the focal option or cash, perhaps for idiosyncratic reasons. These cases were excluded from the analyses reported as I wished to focus on purchase of the focal option; however, alternative analyses that included these cases whereby the purchase of any option (decoy or focal) in each condition was examined yielded qualitatively and statistically equivalent results.

\(^4\) There was a significant effect for gender \((p = .002)\) and age \((p = .03)\) whereby male consumers and older consumers were less likely to make a purchase. Gender and age were included in all other analyses in this paper, and their effects were similar to those in this study. For brevity, their effects will not be discussed.
advantage persisted even after controlling for time ($p = .001$). Hence the effect did not appear to be driven by the amount of time spent on the task.

Thus results from study 1 provided support for the magnitude of advantage effect – people were more likely to purchase when the focal option appeared next to a competing option that was inferior by a small degree, and hence served as a strong test, than when the competing option was inferior by a large degree and hence provided only a weak test, or when there was no competing option to serve as test. However, the limitations of this study merit notice. In particular, because different products were featured in each condition, the information contained in all conditions was not equivalent. Consequently, the effect of the decoy option may potentially be driven by the information contained in this option, rather than the metacognition of its role as test. For example, if people perceived the decoy option to be of low quality or price tier, they might infer that the focal option was also of lower quality and value. Second, a relatively unappealing decoy option may cast a negative halo on the focal option, making it also unattractive. While the results comparing the large advantage condition with the lone-option condition provided partial defense against this possibility – purchase likelihood in the large advantage condition was not lower than in the lone-option condition, it is nevertheless a potential concern that needs to be addressed more directly. Therefore, study 2 seeks to rule out the above confounding factors by manipulating the perception of magnitude of advantage while keeping the information constant across conditions.

Study 2: Perceptual Manipulation of Magnitude of Advantage
Overview and Design

The objective of study 2 is to provide a conceptual replication of the magnitude of advantage effect, and address the concern over differential information across conditions. To this end, I employ a perceptual manipulation through changing the formatting of the information presented. Formatting has been used in previous research to change people’s perceptions and judgments (e.g., Sanna, Schwarz and Small 2002; Novemsky et al. 2004). For example, in their study of preference fluency, Novemsky et al. (2004) used visually degraded font (which was difficult to read) to influence people’s perception of difficulty in choosing among options. Similarly, in this study, I use a manipulation of font, and in particular, its size, to change the perception of magnitude of advantage. Specifically, participants read verbal information about two products whose attributes differ by a large degree, presented in either regular (i.e., large) font, or a small font. When the information is presented in a large font, the large difference will be highly apparent; however, when the information is presented in a small font, the difference would be less obvious (e.g., Sanocki 1988, 1991). Recent research shows that when people experience less fluency in judging a difference, the difference will be seen as smaller (Thomas and Morwitz 2005). Consequently, under the small font presentation, the reduced fluency in judging the difference between the options would make the difference appear smaller, resulting in the perception of a stronger test for the focal option. Thus participants were presented with pairs of products similar to those in the large advantage condition in study 1. Each product was depicted by a picture and a simple verbal description of key attributes. Product pictures were of the same size in all conditions. However, for one
group, the verbal descriptions were presented in a small font (Arial 8)\(^5\), while in another group, the same information was presented in regular font (Arial 12).

One caution about the font size manipulation is that it might bring about other unwanted influences, such as the perception of novelty or other aesthetic issues. To alleviate this concern, I included a second pair of conditions in which the focal option was presented alone, and participants saw the attribute information in either regular or small font. If the font sizes should have differential aesthetic implications, these effects should manifest themselves in both the two-option conditions and the lone-option conditions, resulting in a main effect for font size. However, if there is minimal aesthetic difference, as I would expect, then font size should have no effect in the lone-option condition, but only affect purchase in the two-option context by influencing the perception of magnitude of difference between the options.

Thus study 2 has a 2 (context: lone-option vs. advantage) x 2 (font: regular vs. small) between-subjects design. An interaction is predicted, whereby the small font will lead to greater likelihood of purchase in the advantage context, but have no effect in the lone-option context.

\textit{Method}

Participants \((N = 201, \text{mean age} = 31, 19\% \text{ male})\), were consumers recruited from all over the country as in study 1. The cover story and procedure were also similar to

\(^{5}\) Note that the small font, while significantly smaller, was clear and legible, and thus should not impair people’s ability to read and understand the information. Furthermore, because the objective difference in attractiveness between options is quite substantial, there should not be significant choice difficulty in either font conditions.
those in study 1, whereby participants were told that they were taking part in an online
c consumer research study, and they would be making consequential bonus prize selections
among products and cash. Participants were randomly assigned to four conditions. Half
of them were presented with just the focal option by itself, while others saw two products
presented together – the focal option, and a decoy option that was inferior by a large
amount. Importantly, within each context, one group saw the product information in
small font, while others saw it in regular font. Participants chose either a product or a
certain amount of cash for their prize.

Each participant made eight bonus prize decisions, the order of which
randomized, and all within the same experimental condition. After they made their
choices, participants in the advantage conditions were asked to indicate on a 7-point scale
“To what extent is one product more attractive than the other?”, serving as manipulation
check for magnitude of advantage. Finally, participants entered their demographic
information, and an email address by which they could be contacted about the prize
drawing results. After all data was collected, winners were selected and sent their chosen
product or cash prizes.

Results and Discussion

Pooling across eight product categories (total observations = 1567), I first
analyzed the measures of perceived difference in attractiveness as manipulation check.
An ANCOVA on the measure “To what extent is one product more attractive than the
other?” with font size as factor of interest, and age and gender as covariates revealed a
significant effect of font size ($F(1, 762) = 3.81, p = .05$) whereby as predicted, those in the small font condition ($M = 3.67$) perceived a smaller difference in attractiveness between the options than those in the large font condition ($M = 3.90$), evidence that the manipulation of magnitude of advantage was successful.

Next, a binary logistic regression was run on the key outcome measure of purchase likelihood of the focal option, with context and font size, and their interaction as independent variables, and gender and age as covariates. The regression revealed a marginally significant main effect for context ($B = -.29, p = .08$) whereby people were more likely to purchase in the advantage context than in the lone context ($M = .28$ vs. .27), and a main effect for font size ($B = -.39, p = .02$), whereby people were more likely to purchase in the small-font condition than in regular-font condition ($M = .29$ vs. .26). Importantly however, these main effects were qualified by a significant interaction between context and font size ($B = .45, p = .05$). To unpack this interaction, separate regressions for the lone-option and advantage contexts were run (see figure 1 for the pattern of means). Consistent with prediction, there was a significant effect for font size in the advantage context ($B = -.39, p = .02$), whereby those in the small-font condition were more likely to purchase than those in the regular-font condition ($M = .32$ vs. .24). On the other hand, in the lone-option condition, there was no effect of font size ($M = .28$ vs. .27, $B = .06, p = .74$). A planned contrast further shows that the purchase rate in the small-font advantage context condition is significantly higher than those in the other three conditions ($t(1563) = -2.16, p = .03$).

Study 2 provided further support for the proposition that people are more likely to make a purchase when they perceive a stronger test in the context, as indicated by a
relatively small advantage of the focal option over the inferior option. Furthermore, by holding information constant across conditions, study 2 showed that the metacognitive monitoring of strength of testing is separate from the processing of substantive information about the products.

However, while study 1 and 2 provided converging evidence for the magnitude of advantage effect, in both studies, the advantage of the focal option was established based on relatively “objective” standards, that is, standards of quality or value most consumers would agree on (e.g., larger capacities are better for CD cases). The reliance on objective advantages was partly due to the need to establishment experimental control of magnitude of advantage between conditions. An interesting question thus remains – can the magnitude of advantage effect generalize to advantage established on less objective grounds, such as idiosyncratic fit (Kivetz and Simonson 2003) with one’s own needs and tastes? These types of situation are common in real life whereby the options under consideration for a certain purchase are similar in quality by objective standards, and have comparable levels of acceptance by the overall market, but any given individual may have different preferences for one option versus another based on his/her own needs and tastes. Capturing magnitude of advantage effects in such situations would thus provide a strong demonstration of the preference testing process, showing that the relative magnitude of preference between options per se (aside from any tests for an option’s objective qualities) serves as a test cue in the decision to purchase. This possibility is examined in study 3.

Study 3: Individual Differences in Magnitude of Advantage
Overview and Design

The main objective of study 3 is to provide further evidence for the preference testing process by demonstrating people’s monitoring of magnitude of advantage in situations where there are no objective differences in options’ attractiveness. To this end, I employ a study in which I capture the subjectively-based magnitude of advantage with scale ratings, and examine its effect on purchase likelihood. Specifically, in this study, I present participants with pairs of products that they can consider purchasing. The products in each decision are chosen such that they are of similar quality by objective standards but emphasized different benefits such that there would be individual differences in perceived magnitude of advantage of one option over the other. For example, participants are presented with two magazines for purchase, “National Geographic Traveler” and “Money” – although both magazines are of approximately equal quality and price tier, I expect there to be individual differences in interest in travel versus financial magazines. Some consumers may be interested in both traveling and personal finance, and will find the two options close in overall attractiveness; but some other consumers may only be interested in traveling but not finance, and hence find a large advantage for the traveling magazine. Thus when considering whether to purchase the favored magazine in this context, if people test their favored magazine, say National Geographic Traveler, against the other alternative and monitor the strength of the test, those who enjoy both traveling and financial readings would be more likely to purchase the Traveler magazine because they have found a strong test in the Money magazine.
alternative, compared to those who are only interested in traveling but not finance, and find only a weak test in the Money alternative.

Therefore, study 3 measures individual differences in magnitude of advantage, and tests the effect of this variable on purchase likelihood. Further, because the individual difference measure can identify a range of levels in magnitude of advantage, a secondary interest of this study is to provide refined evidence at different levels of advantage, including levels close to zero – and at zero, where the person rates both products as equally attractive. The effect of perceived advantage near or at zero would allow me to compare the present research with previous work on choice difficulty (e.g., Dhar 1997).

Method

Participants (N = 122, mean age = 34, 22% male), paid $2, were recruited to participate in a consumer research study as in previous studies. They read that the purpose of the study was to learn about people’s preferences for consumer products, and they would be asked to rate a number of products. Furthermore, they would have chances to win product or cash prizes. They were then taken to the products pages. On each products page, they were shown two products from a given product category (e.g., magazines, wireless mice, photo frames, DVD’s), with a picture and brief description for each product, and were asked to rate the attractiveness of each product to them on a 10-point scale (“How attractive is this product to you? Please indicate on a scale of 1 to 10.”). Separate ratings were given for each product, and in the analysis, the absolute difference was taken as the measure of magnitude of advantage. Thus across participants,
both the magnitude and direction of advantage would vary; however, the direction would be immaterial since I took the absolute difference. In fact, the products were chosen such that I expected the two products in each decision to both garner substantial “market share”, thereby ruling out the possibility of one product being considered of higher quality or market value than the other. Before participants went on to the next page, they saw the following question: “For this question, two participants will win a bonus prize. If you are the winner, you can choose either your preferred product above, or $XX cash. What would you choose for the prize?” And participants clicked on one of three buttons: Product A, Product B, $XX. After the bonus prize decision, participants were taken to the next product category. Each participant completed questions in 8 product categories, the order of which were randomized. Finally, participants entered their demographic information, and an email address by which they could be contacted about the prize drawing results. After all data was collected, winners were selected and sent their chosen product or cash prizes.

Results and Discussion

Pooling across eight product categories (total observations = 976), I first checked the variation in magnitude of advantage (i.e., the absolute difference between ratings of the two products in question) across participants. Consistent with expectation, even

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6 The procedure of obtaining ratings of products prior to the purchase decision, rather than after it, was implemented for two reasons. First, this is consistent with the theory of preference testing – because preference testing is the process of monitoring relative likings as tests, the ratings will become test cues in the subsequent purchase decision. More importantly however, obtaining ratings prior to decision ensures the validity of the ratings as measures of magnitude of advantage. Specifically, previous research shows that after a choice, people tend to bolster their chosen option (Festinger 1957), thus rendering the post-choice ratings problematic as representations of perceptions used during the decision.
though all participants saw the same products in each decision, there was significant variance in their subjective advantage perceptions, ranging from 0 (i.e., tied ratings) to 9 (the maximum possible), with the majority of the magnitude numbers falling between 0 and 4 (23.8% of all observations fall under advantage = 1, 24.4% under advantage = 2, 16.1% under advantage = 3, and 8.7% under advantage = 4, while even larger magnitudes received relatively few observations). Of interest, 14.5% of the observations were of zero magnitude of advantage, that is, the two options tied for attractiveness. According to earlier theorizing, when magnitude of advantage is zero, that is, when the decision maker cannot decide which option is better, decision avoidance caused by choice difficulty will be the dominant effect; preference testing will come into play when the person is able to resolve his/her preference order. Therefore, the main analysis below focuses on only those observations with magnitude of advantage > 0 (N = 834)\(^7\), which is the main region of interest for preference testing effects. The case of advantage = 0 will be discussed separately.

The dependent variable of interest was a choice of either product (i.e., whichever product the person liked better) over cash. A binary logistic regression on purchase likelihood was conducted with the rating of the superior option (i.e., max(rate1, rate2)), and the magnitude of advantage (i.e., absolute(rate1 - rate2)) as independent variables, and gender and age as covariates. Not surprisingly, the regression revealed a significant effect for the rating of the superior option (\(B = .24, p < .0005\)) on the likelihood that this option was purchased. However, more interestingly, there was also a significant negative effect for magnitude of advantage (\(B = -.13, p = .02\)). Consistent with the mechanism of

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\(^7\) The same analysis including the magnitude of advantage = 0 cases yielded qualitatively and statistically equivalent results. However, I believe it is theoretically more valid to consider the case of zero and non-zero magnitude of advantage separately.
preference testing, magnitude of advantage was shown to have a negative effect on the purchase of the focal option, such that purchase was more likely when magnitude of advantage is small rather than large. Of note, the effect of magnitude of advantage emerged even after controlling for the perceived attractiveness of the focal option, suggesting an effect of preference testing that was additional to influences, if any, the inferior option may have had on the perceived attractiveness of the focal option.

To gain further insight into the magnitude of advantage effect, and in particular, to shed light on the interplay between choice difficulty and preference testing, I examined the different levels of magnitude of advantage categorically (see figure 2 for illustration). Specifically, I computed the likelihood of purchase at each level of magnitude of advantage between 0 and 5 (advantage > 5 were not examined due to too few observations). As shown in figure 2, indeed purchase likelihood was the highest when advantage was the smallest (but greater than zero) at 1, with purchase likelihood of .25. Purchase rate dropped to .22 at advantage equal to 2 or 3, and declined further to about .18 as advantage increased to 4 or 5. On the other hand, when the decision maker did not see an advantage of one option over the other, that is, when advantage was zero, purchase rate was also low, at .18. This pattern of results suggests that while advantage = 1 and advantage = 0 are adjacent on the magnitude of advantage scale, having a preference (albeit seeing only a small advantage) is a qualitatively different state than not having a preference. Specifically, when people see that they do not have a preference between two options, they are likely to avoid the decision to purchase. However, when people do have a preference for one option over another, they engage in preference testing when deciding
whether to purchase the favored option, whereby a small advantage is taken as a sign that the focal option has passed a strong test, leading to greater confident to make a purchase.

Thus unlike in studies 1 and 2 where magnitude of advantage was manipulated by varying the objective level of quality of the options, study 3 relied on the heterogeneity in consumers’ tastes to examine the effect of magnitude of advantage. Results in study 3 showed that the preference testing process can be based on metacognition of preference patterns itself, rather than any objective information underlying it. Furthermore, the negative relationship between magnitude of advantage and purchase likelihood emerges as soon as the person is able to form a preference among competing options; however, when the person sees the options as equally attractive, the difficulty of choice between the options will lead to avoidance of purchase.

Studies 1 through 3 provided converging evidence for the magnitude of advantage effect whereby people are more likely to make a purchase when there is a small rather than large advantage of the focal option over a competing option. However, although these studies demonstrated the use of magnitude of advantage cues in the purchase decision, it remains unclear what is the nature of the process by which such cues are used. Specifically, the proposed mechanism of preference testing suggests a relatively involved process that includes a metacognitive assessment of one’s judgment uncertainty, and the monitoring and application of test cues to reduce this uncertainty. However, another possibility is that in fact the magnitude of advantage information is utilized at a more basic level, whereby perhaps through practice and learning, the perception of a small advantage becomes automatically associated with readiness to purchase (i.e., becomes “effortless”, Kahneman 2003). Thus in one case, the magnitude of advantage effect relies
on a relatively cognitively involved process, whereas in the other case, the effect is an automatic outcome of the perception of advantage. The two potential processes would then imply different conditions in which the magnitude of advantage effect would emerge. In particular, if a more involved metacognitive process underlies the effect, then the effect should only occur when people are able (and motivated) to devote a sufficient amount of cognitive resources to the purchase decision; however, if the effect takes place through a basic associative process, cognitive resources should not affect the occurrence of the magnitude of advantage effect. The role of cognitive load, and the nature of the process underlying the magnitude of advantage effect is examined in the next study.

Study 4: The Role of Cognitive Load

Overview and Design

The objective of study 4 is to examine the effect of cognitive load on the magnitude of advantage effect, thereby provide deeper insight into the process by which it occurs. In particular, studying the role of cognitive resources will help to distinguish two potential mechanisms underlying the effect, namely, the metacognitive mechanism of preference testing, and a mechanism of direct association between magnitude of advantage and action. Because the metacognitive monitoring of test cues would be disrupted under high cognitive load, the magnitude of advantage effect should be eliminated under load if it relies on preference testing. On the other hand, if the
competing mechanism of direct perceptual association underlies the effect, the effect would not be affected by cognitive load.

Therefore, study 4 has a 3 (magnitude of advantage: lone-option, small advantage, large advantage) x 2 (cognitive load: low/default, high) between-subjects design, and I predict an interaction effect consistent with the preference testing mechanism.

**Method**

Participants (N = 328, mean age = 34, 19% male), paid $2, were recruited to participate in a consumer research study as in previous studies. The purchase decision was set up in a similar manner as in study 1, whereby people participated in prize drawings, and they chose among products and cash for each prize. In addition to the same context manipulation (lone option, large advantage, small advantage) used in study 1, a second factor, namely, cognitive load, was manipulated. In the high cognitive load condition, prior to the prize drawing decisions, participants were instructed to first participate in a memory study. Specifically, they were shown 10 words for about 1 minute, and they were asked to remember as many of these words as they could throughout the rest of the session. At the end of the session, they would be asked to recall these words. Participants were given 10 words that were selected to be irrelevant to the current study (e.g., mailbox, chair, rain), and they tried to memorize these words as they went through the prize decisions. In the default “no-load” condition, no memory task was given, and people went directly to the prize selection task.
Each participant made eight bonus-prize decisions, the order of which randomized, before they entered their demographics information and email addresses. Finally, after the study was completed, winners were selected and sent their chosen prizes.

Results and Discussion

Pooling across eight product categories (total observations = 2610), a binary logistic regression with magnitude of advantage, cognitive load, and their interaction as terms of interest, and gender and age as covariates, revealed no main effects for either the magnitude of advantage factor ($p = .20$) or the cognitive load factor ($p = .52$). Importantly however, as predicted, there was a significant effect for the interaction between magnitude of advantage and cognitive load ($p = .05$).

To unpack the interaction, a group of planned contrasts were conducted (see figure 3 for pattern of means). First, I examined whether the magnitude of advantage effect was replicated in the low cognitive load condition. Thus a contrast was computed comparing the (small advantage, low load) cell with the (large advantage, low load) cell, and another one between the (small advantage, low load) and (lone-option, low load) cells. Both contrasts were significant, revealing that consistent with study 1 results, when cognitive load was low, the small advantage condition ($M = .30$) had higher purchase likelihood than either the large advantage condition ($M = .24$; $t(794) = 2.29$, $p = .02$) or the lone-option condition ($M = .22$; $t(948) = 2.95$, $p = .003$). And as in study 1, the large
advantage condition was not significantly different from the lone-option condition ($t(753) < 1, p = .69$).

However, the corresponding contrasts in the high cognitive load condition showed that the boost in purchase in the small advantage condition was eliminated under cognitive load. Specifically, the difference between the (small advantage, high load) and (lone option, high load) cells was not significant ($M_{\text{small-advantage}} = .21, M_{\text{lone-option}} = .20; t(839) < 1, p = .68$). Further, the difference between small advantage and large advantage contexts was directionally reversed under high cognitive load ($M_{\text{small-advantage}} = .21, M_{\text{large-advantage}} = .25; t(690) = 1.33, p = .19$).

Two additional contrasts were run to gain greater clarity regarding the nature of effects under high cognitive load. Specifically, the drop in purchase likelihood from (small advantage, low load) to (small advantage, high load) was significant ($M = .30$ vs. .21, $t(858) = 3.15, p = .002$). Furthermore, under high cognitive load, a boost in purchase occurred in the large (rather than small) advantage context compared to the lone-option condition ($M = .25$ vs. .20, $t(662) = 1.80, p = .07$).

The pattern of means together suggests that under high cognitive load, because the preference testing process is disrupted, the small advantage in the context no longer serves as a strong test cue that facilitates purchase. Interestingly, the results also suggest that under high cognitive load, the more basic perceptual effect that emerges might be one of a contrast effect, whereby larger difference in attractiveness tends to result in greater purchase.

Thus study 4 provided evidence for a metacognitive testing process that underlies the magnitude of advantage effect against an alternative explanation of direct perceptual
association. Specifically, people are not “mechanically” responding to magnitude of advantage information; instead, the magnitude of advantage cue needs to be interpreted through the metacognitive monitoring of “have I tested the focal option in this context”. This is also consistent with previous research showing that people may only consider the implication of their resistance to counterarguments when elaboration is high (Tormala and Petty 2004). Thus, when under high cognitive load such that people are unable to engage in preference testing, the facilitating effect of a small advantage context on purchase is eliminated.

Discussion of Studies 1-4

In four studies, I demonstrated the magnitude of advantage effect. Specifically, people are more likely to make a purchase in a context where the focal option is superior to another option by a small degree, than when the option is superior by a large degree, or when the option is presented alone. This is because in the small advantage context, people detect a strong test to the focal option in the form of a close competition, increasing the confidence to purchase. On the other hand, the large advantage or lone-option contexts have lower likelihood of purchase due to the lack of strong test cues. Furthermore, study 3 provided more refined understanding of the preference testing process, demonstrating a generally negative relationship between the magnitude of advantage and purchase likelihood across a range of advantage levels. Study 3 also demonstrated the special case of equally attractive options, which tends to lead to avoidance of purchase. Thus one boundary condition for the magnitude of advantage
effect is that people need to be able to form a preference between the options. Study 4 further demonstrated that preference testing is a relatively involved metacognitive process, and it is disrupted when the person is put under high cognitive strain.

Germane to the preference testing process is the observation of competition between a focal option and other options as a testing process for the focal option. In the next sections, I wish to extend the implications of the preference testing process by considering two more moderators of preference testing, namely, in addition to attending to the quality of the tests, people may also form an impression of the “preponderance” of testing in the decision context, which may be a function of the number of competitions explicitly resolved, and the salience of competition with other options, whereby more instances of testing, and more salient test cues lead to greater likelihood of purchase. Furthermore, these two dimensions may be influenced by the decision making process. Thus in the next studies, I examine the effect of decision procedures on the likelihood of purchase, based on their implications for the perceived quantity and salience of test cues.

QUANTITY OF TESTS: THE TOURNAMENT EFFECT

In this section, I turn to the question whether in making a purchase decision, people may form an impression of the quantity of tests performed during the decision making process, such that the perception of many instances of tests leads to greater likelihood of purchase. I examine this possibility by looking at different evaluation procedures used in a purchase decision context, based on the conjecture that certain
procedures may create the impression of more tests than others do, and hence are more conducive to purchase. To this end, I juxtapose an evaluation process in which people select an option for purchase through a tournament procedure, with a basic process of making a choice among options, and compare the likelihood of purchasing the selected option.

The tournament procedure has been discussed in previous literature as a generally natural strategy of information processing (e.g., Payne, Bettman, and Johnson 1993), and refers to the following way of selecting a preferred option from a set of options: the person starts the evaluation by seeing two of the options. The person decides which option is better between the two, and discards the inferior one, while keeping the better option to be compared to a third option from the collection, and again, the person decides which option is better between these two. This process of always carrying the current best to the next comparison is repeated until the person has gone through all of the options, and ends up with a final winner. Thus the feature of this procedure is that, by the time a final winner (i.e., the focal option for purchase) was selected, this option in general would have withstood several explicit challenges from competing options – if the final focal option had been introduced at the very beginning of a tournament with n options, it would have passed n-1 tests; if the final option happens to be the last option to occur in the sequence, it would have passed only one test; everything else falls in between the two extremes. When the person then considers whether to purchase the final selected option, he/she would observe that there have been many instances of tests for this option, and thus feel more confident in making a purchase.
However, if instead of a tournament procedure, a simple choice procedure is used for selecting a favored product from the consideration set, that is, all options are shown simultaneously and the person simply indicates which one is the most preferred, then when he/she considers whether to purchase this option, he/she will not have an impression of the option having passed multiple tests. Thus I predict that

**H2:** An option that has been selected through a tournament procedure is more likely to be purchased than an option that has been selected through a simultaneous choice procedure.

Furthermore, because a focal option that was introduced early in the sequence in the tournament procedure has been through more tests than a focal option that was introduced later in the sequence, it follows that,

**H2b:** In the tournament procedure, a focal (final) option that was first introduced early in the sequence is more likely to be purchased than a focal (final) option that was introduced late in the sequence.

These hypotheses are tested in study 5.

**Study 5:** The Tournament Effect

*Method*

Participants ($N = 145$, mean age = 32, 26% male), paid $5$, were invited to a mock online-shopping website ("Funshopper.com") as part of a consumer research study. At the website, participants learned they would be presented with ten products offered at
special discounted prices, and they would select one product they were most interested in, and decide whether to purchase that product at the special price. At the end of the study, two participants would be randomly selected to receive a bonus prize of $100 – but, if they had decided to make a purchase during the session, they would receive the product they had purchased, and a cash prize of $100 minus the price of the product. Participants who were not winners would not have their purchase decisions materialize, that is, they would not receive any cash bonus nor any product they had indicated they would like to purchase.

When participants understood how purchase worked, they were then taken to the product offers. In the simultaneous procedure, people were presented all ten product offers together on the same page (all products were offered at 30% discount compared to a leading retailer such as Walmart.com or Circuitcity.com, and the discount was explicitly stated), and were asked to indicate which one they were most interested in. After they made a selection, they were asked whether they would like to purchase the selected product.

In the tournament condition, people saw the ten products in a number of stages. They began by seeing two options, and were asked to indicate which one they were more interested in. When they did so, the lesser option was replaced with the third option, and they were asked again which one they would like to keep. This process of always “keeping the winner” was repeated until all ten options had been shown, and one option was left standing. They were then asked whether they would like to purchase it.

A second factor manipulated in this study was the order in which the products appeared. For half the participants (in either simultaneous or tournament condition), the
products were presented in one order, but for the other half, the order was reversed. I predict that, because the tournament procedure creates the impression of multiple tests for the focal option, people will be more likely to purchase in the tournament condition than in the simultaneous condition. Furthermore, within the tournament condition, purchase will be more likely if the focal option was initially introduced early in the sequence, rather than late in the sequence. Because order of appearance was manipulated, the position of introduction was dissociated with any particular product, rendering this second prediction about initial position testable.

Each participant took part in two “Funshopper” sessions (of the same experimental condition), thus each saw two collections of 10 product offers, and made two purchase decisions. They then entered their demographic information, and an email address by which they could be contacted about the prize drawing results. After all data was collected, winners were selected and sent their appropriate prizes.

Results and Discussion

Pooling across two product collections (total observations = 290), a binary logistic regression on purchase with selection procedure as the main variable of interest, and gender and age as covariates, revealed a significant effect for the selection procedure ($B = .50, p = .04$), whereby those in the tournament condition were more likely to purchase their selected product than those in the simultaneous condition ($M = .45$ vs. $M = .34$). To garner support for the notion that within the tournament condition itself, purchase rate would be higher when the selected option first appeared early rather than late.

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8 The order factor had no effect on purchase and was dropped from the analysis.
late in the sequence because of the greater number of tests early options have gone through, I ran a binary logistic regression on purchase within the tournament condition, with the “initial position” of the final option (coded as 1 for the first two options, 2 for the 3rd option, etc., and 9 for the 10th option) as the predictor, and gender and age as covariates. The results showed that, as predicted, there was a marginally significant effect for the initial position of the option under consideration for purchase ($B = -.10$, $p = .08$), whereby a final option with a smaller position number (i.e., appeared early) had higher likelihood of being purchased than a final option with a large position number.

Therefore study 5 provided evidence for the facilitating role of the tournament procedure in the decision to purchase. Specifically, because the tournament procedure involves subjecting a focal option to repeated comparisons with competing options, the metacognition of this multiple testing process leads to greater confidence to purchase the focal option.

Building further on the idea that the greater preponderance of tests perceived in a purchase context can lead to higher likelihood of purchase, in the next section, I examine another way in which the impression of prevalence of tests may vary, namely, in terms of the salience of test cues in the context. I do this by varying the salience of an option’s competition with other options through the use of different evaluation procedures.

**SALIENCE OF TEST: THE RANKING EFFECT**
Extending the idea that people monitor the presence of competition between a focal option and other options as tests for the focal option, I propose that decision processes that make the competition between options more salient will lead to greater likelihood of purchase than processes that make competition less salient. Thus in a purchase decision, if options are evaluated in a comparative manner (e.g., Hsee 1996, 1998; Nowlis and Simonson 1997) and a focal option is selected, it would be highly salient that the focal option has been tested by comparisons with competing options; however, if the options are evaluated in a non-comparative manner, there will be less salient cues that the focal option has been tested through competition with other options. Consequently, I propose that decision procedures that involve comparative processing will create greater propensity for purchase than non-comparative procedures. This idea is tested in study 6 by comparing a ranking (comparative) procedure to a rating (non-comparative) procedure as ways of evaluating options considered for purchase.

**H3:** An option that has been selected through a ranking procedure is more likely to be purchased than an option that has been selected through a rating procedure.

**Study 6: The Ranking Effect**

*Method*

Participants ($N = 131$, mean age = 36, 24% male), paid $2, were invited to take part in a consumer research study on the web in which they were asked to evaluate some art posters. All participants were presented with colored pictures of six art posters on the
same page (see appendix 2). Half of the participants were told to rank the art posters in order of their attractiveness, while the other half were told to rate their attractiveness on a scale of 1-100. After they have ranked or rated the posters, they were told that they were eligible for a bonus prize drawing, and if they were a winner, they could choose to receive either their top-ranked (rated) poster in a frame, or $25. Finally, participants entered their demographic information, and an email address by which they could be contacted about the prize drawing results. After all data was collected, winners were selected and sent their chosen prizes.

Results and Discussion

A binary logistic regression on the purchase decision with evaluation procedure (ranking vs. rating) as the main variable of interest, and gender and age as covariates, revealed a significant effect for the evaluation procedure ($B = .88, p = .02$), whereby those in the ranking condition were more likely to purchase their selected product than those in the rating condition ($M = .44$ vs. $M = .25$). Furthermore, the result remained the same after removing the cases of tied top ratings in the rating condition (adjusted $M = .29$), thus adjusting for the potential effect of choice difficulty that may have negatively affected purchase likelihood in the rating condition.

Therefore, as predicted, because a comparative procedure such as ranking, compared to a non-comparative procedure such as rating, makes it more salient that the focal option has been tested by the other options in the context, it leads to greater propensity to make a purchase. However, two questions could be raised regarding the
results from study 6. First, past research has shown that comparative versus non-comparative evaluation procedures differ in the way attribute information is processed (e.g., comparative evaluations emphasize attributes that are easy to compare, while non-comparative evaluations emphasize attributes that are meaningful in itself, Hsee 1996; Nowlis and Simonson 1997). Therefore it is possible that the results may have been driven by differences in the assessment and weighting of attributes, rather than salience of fact that the focal option has been proven superior to competing options. Second, if indeed the differential salience of the cue that the focal option has passed the tests presented by the other options is driving the ranking effect, then one might be able to remove the effect by eliminating the difference in salience of testing between rating and ranking procedures. One way to do this may be to explicitly direct people’s attention to the relative relationship between the focal option and other options even in the rating condition. These issues are addressed in the next study by using the rate-and-rake procedure.

Study 7: The Rate-and-Rank Procedure

*Overview and Design*

The objective of study 7 is to provide greater insight into the ranking effect by isolating the role of salience of preference testing cues. Specifically, I wish to compare conditions in which the attribute information of the products are similarly processed, but differ in the salience of the fact that the focal option has been deemed superior to the rest
of the options. To this end, I employ a procedure of rate-and-rank, and compare it to the rating and ranking conditions. Specifically, in the rate-and-rank condition, people first rate the options as in the rating condition in study 6, but then go through an extra step of explicitly converting the ratings into rankings. In other words, after people have made their ratings, they are instructed to write down the ranking of the options according to the ratings (e.g., write “1” next to the top-rated option). Thus under this procedure, while the options are assessed through a non-comparative manner, the final conclusion from the evaluation is comparative and highlights the relationship between the focal option and other options. In particular, writing down a rank #1 for the top option provides a highly salient cue that this option is superior to all the other options in the set. As a result, the rate-and-rank condition should lead to greater likelihood of purchase than the original rating condition, even though the two conditions are similar in the way information about the products has been processed. Furthermore, the rate-and-rank condition should have a similar level of purchase likelihood as the ranking condition, given the salient testing cue in both conditions.

Thus study 7 has a single factor design, with three levels: ranking, rating, and rate-and-rank procedures, manipulated between subjects. I predict that purchase likelihood will be lower in the rating condition than either the ranking, or rate-and-rank conditions, but purchase likelihood will not be different between the ranking and rate-and-rank conditions.

Method
Participants \((N = 177, \text{mean age} = 36, \text{33\% male})\), paid $2, were invited to take part in a consumer research study on the web in which they were asked to evaluate some art posters as in study 6. Participants were randomly assigned to the ranking, rating, and rate-and-rank conditions. The ranking and rating conditions were identical to those in study 6, while the rate-and-rank condition is similar to the rating condition except after people made their ratings, they were also asked to state the ranking of the options. After the evaluations in each condition, participants were asked whether they would like to receive the top art poster or $30 as a bonus prize. Finally, participants entered their demographic information, and an email address by which they could be contacted about the prize drawing results. After all data was collected, winners were selected and sent their chosen prizes.

**Results and Discussion**

A binary logistic regression on the purchase decision with evaluation procedure (ranking, rating, rate-and-rank) as the main variable of interest, and gender and age as covariates, revealed a significant effect for the evaluation procedure \((p = .05)\). Closer examination of the effect revealed that, as predicted, purchase was significantly more likely in both the rate-and-rank condition \((M = .32, B = 1.43, p = .01)\) and the ranking condition \((M = .28, B = 1.22, p = .05)\), compared to the rating condition \((M = .10)\). On the other hand, there is no difference in purchase likelihood between the rate-and-rank condition and the ranking condition \((p = .60)\). Thus by manipulating the availability of ranking results, study 7 demonstrated the effect of the salience of test cue on purchase –
when people can observe that they have reached an explicit ranking of the alternatives, they perceive that the focal option has been tested by the other alternatives for purchase, and thus are more likely to purchase this option.

GENERAL DISCUSSION

The decision to purchase is ubiquitous in everyday life. This research examines the psychological processes underlying this decision. Specifically, consumers often encounter products or services they find of interest, but may have doubts about their worthiness for purchase. The lack of conviction thus leads people to forsake the purchase. Building on recent research on metacognition (e.g., Rucker and Petty 2004; Schwarz 2004), this research proposes a psychological process called preference testing as a determinant of people’s conviction to purchase – when considering the purchase of a particular product, consumers attend to their consideration of competing options as tests for the focal option. Observing the focal option pass strong tests increases the confidence to purchase the option.

Due to the process of preference testing, certain characteristics of the purchase consideration set and decision procedure are shown to have a significant impact on purchase likelihood by influencing the quality, quantity and salience of test cues. In particular, studies 1 through 4 showed that purchase is more likely in a context in which the focal option has a small, rather than large, advantage over an inferior option, because a small advantage signals the presence of a strong test for the focal option. Study 5
demonstrated the positive effect of a tournament selection procedure on purchase likelihood, due to the impression of multiple tests created through this procedure. Studies 6 and 7 showed that a ranking evaluation is more conducive to purchase than ratings, because ranking makes the tests for the focal option more salient.

Value Uncertainty versus Selection Uncertainty. This research contributes to the theoretical understanding of the purchase decision by considering its psychological underpinnings more broadly. In particular, complementing the existing work on selection uncertainty as a deterrent of purchase (e.g., Dhar 1997; Iyengar and Lepper 2000), this research highlights the role of another important uncertainty in the purchase decision, namely, value uncertainty. Specifically, because people often have only limited knowledge regarding the objective or subjective attractiveness of an option (March 1978), and the translation of the option’s psychological value into monetary terms (Kahneman, Ritov and Schkade 1999), there tends to be significant uncertainty regarding the appropriateness of an option for purchase. Thus, when studying a particular purchase situation, one needs to consider the implications of both selection and value uncertainty.

For example, with respect to the magnitude of advantage variable, this research (study 3) demonstrates the interplay between value and selection uncertainty. Consistent with previous findings (Dhar 1997), when options are too close in overall attractiveness such that people cannot decide which is better (i.e., magnitude of advantage is zero), purchase likelihood is low due to significant selection uncertainty. However, when people are able to determine which option is superior, a small advantage would in fact facilitate purchase compared to a large advantage, because in this case, people become concerned about value uncertainty rather than selection uncertainty. Hence when both
selection and value uncertainty are considered, the “sweet spot” for purchase occurs when there is a “just-decidable” preference (e.g., magnitude of advantage = 1) between the options.

Just as previous research has studied the determinants of selection uncertainty (e.g., conflict, Tversky and Shafir 1992; choice overload, Iyengar and Lepper 2000), it may be instructive to examine the factors that influence value uncertainty. For example, value uncertainty may be a function of the consumers’ knowledge about the option in question, and perhaps more importantly, their assessment of their own knowledge (e.g., Alba and Hutchinson 2000). Related, the perceived degree of variety and total number of alternatives existing in the category (e.g., Kahn and Wansink 2004; Morales, Kahn, McAlister and Broniarczyk 2005) may affect value uncertainty by influencing the perception of opportunity costs (Northcraft and Neale 1986). However, aside from product knowledge, another interesting factor to consider may be the nature of the product category, in particular, the ease by which people can justify the value of the category (Simonson 1988, 1989). For example, the value of hedonic and luxury goods may be more difficulty to justify than utilitarian products and necessities (e.g., Kivetz and Simonson 2002). Thus value uncertainty may be of particular concern in considering the purchase of hedonic and luxury items, and the effect of preference testing may be more pronounced in these categories. This possibility might be interesting to test in future research.

Metacognition in Decision Making. A second contribution of this research to behavioral decision making theory is greater knowledge regarding the metacognitive processes involved in decision making. Specifically, recent research indicates people
often monitor their own preference construction processes, and such monitoring can have a significant effect on subsequent decisions. For example, Drolet (2002) found that people tend to monitor the decision rules they use in choices, and they tend to vary the rules they apply in sequential decisions. This suggests people may possess naïve theories regarding how decisions should be made (e.g., “should not use the same decision rules all the time”). Similarly, the present research suggests people might also have implicit theories about making the purchase decision – “if the option is tested against competing options, it may be safe to purchase”. Indeed beyond the aforementioned cases, people might possess other implicit theories about decision making, which they may use to monitor an ongoing decision. These possibilities should be examined in future research.

Further, an important question that arises regarding metacognitions in decision making is to what extent the implicitly used metacognitive information such as testing cues can stand up to explicit reasoning – for example, can the effects of implicit metacognitive monitoring persist when people are made aware of their usage? Existing research suggests people tend to consider much metacognitive information as unwanted (i.e., “misattributed”; e.g., Lee 2004; Schwarz 2004). Thus when people are made aware of the potential influence of metacognitive information, they tend to correct for such “biases” (e.g., Novemsky et al. 2004). However, it is possible that the use of certain information, such as the failure to counter argue, or the passing of tests posed by competing options, are not discounted, and may be considered valid reasoning when used to generate judgment confidence. One interesting test may be to see whether the preference testing effects such as the magnitude of advantage effect would persist when
people expect to give reasons to justify their decision (e.g., Simonson 1988; Briley, Morris and Simonson 2000).

**Future Extensions.** In addition to addressing the above theoretical perspectives, future research may also look to provide greater insight into the preference testing effects by considering extensions and moderating conditions of the effects. For example, this research showed that a small magnitude of advantage of an option is taken as a sign of the option passing a strong test, thus enhancing confidence. Future studies might examine other dimensions that may affect the perception of strength of test, such as the similarity between the options (e.g., Lefkoff-Hagius and Mason 1993; Lopez 1995), and the specific shared or unique features (e.g., Dhar and Sherman 1996). The nature of the competing option may also be explored – for example, the strength of test may depend on the degree to which the competing option is considered typical and representative of the category (e.g., Tversky and Kahneman 1974; Moreau, Markman and Lehmann 2001), and whether it is a “default” option (e.g., the “normal” choice such as the leading national brand, Kahneman and Miller 1986; the safe option, Simonson, Kramer and Young 2004). Another interesting aspect to consider is the potential moderating role of presentation formats and other marketing variables. For example, research could look at whether preference testing effects are stronger under holistic, alternative-based presentation than attribute-based presentation (e.g., Johnson 1989), and whether vividness (e.g., Pham, Meyvis and Zhou 2001) also has an impact on preference testing.

Future research may also examine the potential interaction between the temporarily or chronically active motivational or affective states and the preference testing process. For example, people with a promotion versus prevention focus going into
a purchase situation (e.g., Crowe and Higgins 1997), and people who seek to maximize rather than satisfice (Schwartz et al. 2002) in the purchase may be differentially prone to spontaneously engage in preference testing. Another area that is important to address is the consequences of purchase decisions (e.g., Botti and Iyengar 2004). For example, are people more likely to feel satisfied with their purchase, and less likely to have regrets, when the item was bought from a small advantage context, or was selected through a tournament or ranking procedure?

*Marketing Research and Managerial Implications.* In addition to its theoretical contributions, this research also has significant implications for marketing research and marketing management. From a marketing research perspective, the magnitude of advantage effect suggests that marketing researchers might incorporate this feature of the consideration set into models of consumer purchase to improve the models’ predictive ability. Second, the ranking effect may have implications for market researchers who conduct surveys using ranking or ratings. Although ranking and rating have been found to differ in many ways such as their accuracy and stability (e.g., Alwin and Krosnick 1985; Visser, Krosnick and Lavrakas 2000), this research points to another difference to be considered, namely, their implications for purchase intentions. Third, the magnitude of advantage effect may provide an interesting perspective on the study of the pioneering brand (e.g., Carpenter and Nakamoto 1989). Specifically, research have found that the pioneering brand often has an advantage over a follower brand despite low barriers to entry, one reason for this being that the pioneering brand could shape preferences within a category. If one were to focus not on the relative share between the pioneering brand and follower brand, but on the success of the pioneering brand itself, this research offers
the intriguing possibility that in certain conditions the pioneering brand may benefit from the entrance of a competitor, because a competitor can help grow the purchase rate for the category.

From a managerial perspective, the magnitude of advantage effect suggests that retailers might place products of similar (rather than dissimilar) attractiveness close together such that the brands can serve as better tests for one another. Similarly, for marketers introducing a new line of products, they may consider creating a decoy variation that is slightly (rather than greatly) inferior to a target product to boost sales. The use of “meaningless/trivial attributes” (e.g., Carpenter, Glazer and Nakamoto 1994; Broniarczyk and Gershoff 2003) may be particularly relevant, since such attributes are a good way of creating small (subjective) advantages without the risks of unwanted inferences about the products’ objective qualities. Second, the tournament and ranking effects have implications for marketers who have a certain amount of control over the product evaluation process. Such situations are becoming increasingly common with the growth of online commerce. For example, one version of the Goldbox feature on Amazon.com employs a variation of the tournament procedure. Further, websites such as Sears.com that provide decision aid features to the consumer (e.g., compare all interested products) may consider allowing consumers to produce a ranking of the products. Finally, this research raises the interesting possibility that companies can also try to associate test cues with their products by entering the products into competitions and rankings, so that consumers informed of the (high) rankings will be more ready to purchase their products next time they see them.
REFERENCES


Figure 1. Study 2 Results

Effect of Perceptual Manipulation of MOA

Purchase Likelihood

- Lone-Option
- Two-Option

- Regular Font
- Small Font

Values:
- Lone-Option: 0.27, 0.24
- Two-Option: 0.28, 0.32
Figure 2. Study 3 Results

Effect of MOA on Purchase

![Bar Chart]

- **X-axis:** Magnitude of Advantage (0, 1, 2, 3, 4, 5)
- **Y-axis:** Purchase Likelihood (0.15, 0.2, 0.25, 0.3)

Values:
- Magnitude of Advantage 0: 0.18
- Magnitude of Advantage 1: 0.25
- Magnitude of Advantage 2: 0.22
- Magnitude of Advantage 3: 0.22
- Magnitude of Advantage 4: 0.18
- Magnitude of Advantage 5: 0.18
Figure 3. Study 4 Results

Role of Cognitive Load

Purchase Likelihood

Low Load

High Load

Lone-Option

Small Adv

Large Adv
Appendix 1. Example of Small Advantage Condition in Study 1

**Bonus Prize Drawing**

For this drawing, if you are the winner, you can choose to receive either one of the toasters below, or $20.00 cash. What would you choose?

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="CuisinArt 2-Slice Toaster" /></td>
<td><img src="image2.png" alt="Hamilton Beach 2-Slice Toaster" /></td>
</tr>
</tbody>
</table>

*In the large advantage condition, everything was the same as the above except the brand of the decoy option “Hamilton Beach” was replaced by “TCX”.

*In the lone-option condition, only the focal option CuisinArt was presented.*
Appendix 2. Stimuli for Studies 6 and 7

A

B

C

D

E

F