# Choice Construction versus Preference Construction: The Instability of Preferences Learned in Context

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## Abstract

Preference consistency implies that people have learned their willingness to trade off attributes. We argue that this is not necessarily the case. Instead, we show that when preferences are learned in context (e.g., through repeated choices made from a trinary choice set that includes an asymmetrically dominated decoy), people learn a context-specific choice heuristic (e.g., always choose the asymmetrically dominating option), which leads to less consistent preferences across contexts. In contrast, repeated choices from sets containing only two options impel people to learn their subjective attribute weights, yielding preferences that are consistent across contexts. The difference between choice construction and preference construction is of importance to marketing managers because repeat purchase is typically interpreted as a signal of customer preference. We show that this "preference" might just be a learned solution to the choice problem, and that as soon as the competitive context changes (even in a normatively meaningless way), so will consumers' "preferences."

The prevailing view on the psychology of preferences is that people hold subjective values only for very basic attribute combinations that define an option, and that preferences for most other attribute combinations are *constructed* during the decision process (Fischhoff 1991; Slovic 1995; Payne, Bettman, and Johnson 1993). Making repeated choices is supposed to reveal people's subjective attribute values because it enables them to learn how they prefer to resolve trade-offs between conflicting attributes in a choice set. In a study on preference learning, for instance, Hoeffler and Ariely (1999) asked participants to make repeated choices between microwaves that differed along the dimensions of price, capacity and power. The authors found that as participants made more choices in this domain, they became more confident in their subjective value for levels of each attribute and more internally consistent in their choices. With knowledge of subjective values come preferences that are consistent across contexts, a basic requirement of any normative choice theory (Bettman, Luce, and Payne 1998).

Does the context in which the repeated choices are made affect the learning that takes place? Research on anchoring suggests that the initial circumstances in which a preference is formed are a strong determinant of the subsequent revealed preference (Ariely, Loewenstein, and Prelec 2003). The authors provided participants with irrelevant high and low numerical anchors and found that multiple subsequent monetary valuations of experiences were close to whatever anchor the participants had been exposed to—their preferences were biased by the context in which they were formed. Similarly, in this paper we show that the type of learning that is evoked in the course of making repeated decisions is highly sensitive to the structure of the choice set (e.g., a choice set with two options versus a set with three options; see also Hoeffler and Ariely

1999). Some structures induce people to learn the value that they ascribe to product attributes and generate preferences that are portable across contexts, while other structures induce people to learn about a context specific decision strategy rather than their preferences for the attributes themselves. The type of learning that takes place should influence the degree of preference consistency that people will subsequently exhibit: portable preferences should be consistent across contexts, whereas context-specific decision strategies will not (cf. Hoeffler and Ariely 1999).

## Preference Learning

There are two basic ways in which people can learn from repeated choices. The first is learning from feedback and experience; as choices are repeated, the feedback and people's reactions to it are assimilated into their preference structure. For example, Hoeffler and Ariely (1999) examine the effect of repeated experience with a stimulus (listening to an aversive sound) and find that this repetition leads to greater preference stability than a case where participants simply read about a stimulus. Learning from feedback, however, is complicated by the fact that in information rich environments the consequences of a choice can be difficult to trace back to their specific antecedents (Einhorn and Hogarth 1981). In fact, in many consumption situations it is impossible to trace the utility from a product to a specific attribute combination or trade-off. For example, a consumer who is working on his new laptop is unlikely to be able to ascribe the laptop's performance to whether or not the CPU speed is 1.6GHz or 1.83GHz.

A second form of learning arises from the inferences people make about their repeated choices, even in the absence feedback. Such learning occurs, for instance, in certain economic games where players converge on equilibrium strategies even in the absence of outcome information (Weber 2003a, 2003b) and is analogous to attitude formation through self-perception (Baumeister 1998; Bem 1972). Likewise, as choosers confront the trade-offs inherent in a choice, they learn how they prefer to resolve them. The more choices that they observe themselves making, the more they learn how much value they place on an attribute. For instance, as she shops for a digital camera, a consumer might learn the value she places on megapixels in the course of forming her final consideration set. We focus our investigation on this form of preference learning.

We liken choice to a "problem" that the decision-maker must "solve" (Simon 1957). Faced with a choice, the decision-maker can retrieve his previously-constructed preferences about attributes and use them as a guide to evaluate each option, or, alternatively, she can rely on a contextual cue and retrieve a context-specific choice strategy. The key difference between these two decision strategies relates to the role of attribute trade-offs. Whereas the former strategy is based on applying the subjective value of attribute trade-offs to a choice situation, the latter is based on applying a rule or heuristic that is related to the local decision context and is applied without regard to attribute trade-offs. Previously-constructed preferences are portable across contexts because they contain attribute information; context-specific decision strategies are by definition specific to the local context and therefore not portable.

As an example of reliance on the local context, in the asymmetric dominance or attraction effect people are more likely to choose option *a* over option *c* when an option that *a* dominates, *a'*, is available than when the core set of two alternatives {*a, c*} is presented alone (Huber, Payne and Puto 1982) because the presence of an irrelevant alternative makes the dominating option *seem* much better. A second example is the compromise effect, where an option is preferred more when it is presented as a middle option (such as option *b* in a set {*a*, *b*, *c*}) than when it is presented as an extreme option (such as in a binary set {*a*, *b*}) because the middle option is easier to justify (Simonson 1989). A third example is when a decision-maker (consciously or unconsciously) applies a decision rule—for instance, "always take the product with the largest discount relative to the original price" or "always take the stockings on the right hand side of the display" (Nisbett and Wilson 1977; Amir and Ariely 2007)—without regard to the attributes of the options themselves. In other words, the contextual cue (e.g., dominance, compromise, or a rule) allows the decision-maker to solve the local decision problem without relying on subjective attribute values. Note that a lexicographic strategy that is attribute-based such as, "always choose the item with greatest power," is not a context-specific strategy, and is therefore considered to be a portable preference.

## Choice Construction

In this paper we study the consequence of repeated choices on the learning of preferences and context-specific choice strategies. Specifically, what happens when repeated choices are made in a context that facilitates a choice without requiring any trade-offs to be made? For instance, what happens when repeated choices are made from a choice set that includes an asymmetrically-dominated or compromise alternative? The preference construction view implies that repeated choices should facilitate learning of subjective attribute value and increase preference stability (see, e.g., Carlson and Bond 2006; Carpenter and Nakamoto 1989; Hoeffler and Ariely 1999; Yoon and Simonson 2006); in other words, repeated choices reduce the uncertainty surrounding "optimal" trade-off values. Our view is different. We argue that some decision contexts avail decision-makers with a heuristic cue to solve the choice problem and allow them to avoid the difficulty of assessing their willingness to trade off one attribute for the other. Instead of constructing a preference, they simply *construct a choice*. People who engage in *choice construction* will not exhibit true learning of preferences for attribute values and will not generate portable preferences, but instead will learn their strategy for solving a decision problem within a certain context. As a result, if they later are faced with a decision that requires them to make a trade-off, they will experience greater uncertainty about their subjective attribute values.

The consequence of choice construction is inconsistent preferences. If choices depend on contextual factors, then the underlying preferences that guide these choices are as stable as their context. When the decision-maker is presented with a novel decision context, he may reveal a preference for a different attribute value combination than his decisions had ostensibly revealed before. For instance, if he repeatedly prefers a laptop with a powerful CPU over one with a large memory (*ceteris paribus*) in one context, but reverses this preference under a different context, then his choices cannot be described as reflecting consistent preferences because the hallmark of a consistent preference is that it leads to decisions that are unaffected by normatively irrelevant contextual variables (Tversky, Sattath, and Slovic 1988). Conversely, resistance to normatively irrelevant contextual variables is taken as a sign of well-established preferences (Simonson and Tversky 1992). Note that in cases of uncertainty about category expertise, Wernerfelt (1995) argues that it may be rational to infer one’s preferences from the choice context, as sometimes context can be used as a source of market information. The purpose of this inferential process, however, is to learn how much one does or should value an attribute.

As a result, even though it relies on a contextual cue, the choice process described by Wernerfelt is attribute-based, ultimately leading to a consistent preference.

The use of the context-specific heuristic might be quite consistent and stable, which means that as long as the context remains unchanged a person's choice will appear to reflect a fully constructed, stable preference. For instance, imagine a customer who always chooses an option that is at eye level on the shelf. As long as the item at eye level is the same from occasion to occasion, he will appear to have learned the trade-offs among the different options and display stable preferences. However, imagine that at some point in time the item at eye level changes; that is, the context of the decision is altered. Now the customer will continue choosing whichever item is at eye level, even it if represents an entirely different attribute combination from what he chose previously. Here the application of the decision strategy is consistent, but the resulting choice is not. In contrast, the person who holds the constructed, portable preference will continue to choose the same item, regardless of shelf placement. Thus, choice construction and preference construction are distinguished not only by their reliance on attribute trade-offs, but also in the kind of choice consistency that they engender. While choice construction results in consistency within a certain context, preference construction leads to consistency *across* contexts.

## Overview

We hypothesize that preferences revealed following a series of choices made in a context that includes a choice-facilitating cue will be less consistent than preferences revealed following a series of choices made in a context that induces respondents to determine their subjective value for levels of attributes. In order to test this hypothesis we conducted five experiments that use different manipulations intended to enhance or hinder attribute trade-off learning. We impair trade-off learning in order to evoke choice construction and we enhance trade-off learning in order to evoke preference construction.

Our experiments share a common structure: a learning phase, a filler task, and a target choice or judgment. The learning phase consists of six successive choices and provides the decision experience. In the conditions designed to evoke preference construction, the learning phase options were presented such that participants would be impelled to make trade-offs in order to arrive at a choice. In the conditions designed to evoke choice construction the learning phase options included a contextual cue that enabled participants to make a choice while avoiding the trouble of making difficult attribute trade-offs. The filler and target choice phases were identical for all participants across conditions within each experiment. Taken together, the first experiment distinguishes choice construction from preference construction, the second and third support the suggested underlying process, the fourth generalizes our theorizing to a different decision context, and the fifth tests the consequence of choice construction on uncertainty in subjective value. We conclude with a discussion of the implications of our findings to marketers and to the study of preferences.

## Experiment 1

We begin by establishing our premise that preferences learned in context are less consistent than preferences learned where respondents are impelled to make trade-offs and ascertain the subjective value of attributes. We include both attraction and compromise in this experiment both in order to establish the generalizability of our findings across contexts.

## Method

Three hundred and eighteen participants were recruited online and logged into our experiment site. They were randomly assigned to one of three conditions: binary (*n* = 141), attraction (*n* = 91), or compromise (*n* = 86).[1] The experiment had two phases for all participants. In the first phase of all conditions, the "trade-off learning task," participants made six successive choices of laptop computers, which they were told were all equally priced and varied only in processing speed (in gigahertz or GHz) and memory (RAM, in megabytes). The options were structured such that computers with relatively high processing speed had relatively low RAM, and vice versa. In this way every option represented a trade-off between processing speed and memory. For example, in one of their selection tasks, participants were asked to choose between a laptop with 2.0 GHz CPU speed and 768 MB RAM memory and a laptop with 2.6GHz CPU speed and 512 MB RAM memory. Furthermore, each successive set of options required a relatively more extreme trade-off to be made. That is, an option became relatively stronger along one attribute rather than the other (e.g., CPU speed increased from choice set to choice set for one of the options; see Table 1 for actual stimuli levels and Figure 1 for a pictorial representation). The purpose of this was to make the trade-offs increasingly more difficult so that participants would really be forced to ponder the subjective value of each attribute. After making a choice, participants continued to a next screen where they were presented with another choice; they were not allowed to go back and change their choices.

The trade-off learning task was structured in one of three ways. In the binary condition, participants made repeated choices between two options, one that was high on

[1] We purposely over-sampled in the control condition.

processing speed and low on memory and another that was low on processing speed and high on memory (laptops A and C in Table 1). By making repeated choices between options characterized by different attribute combinations, we expected that participants would be prompted to learn the importance that they place on each attribute.

In the attraction condition participants made repeated choices between three options: the two options presented in the binary set and a third, asymmetrically dominated option (laptop B in Table 1, top panel). In the compromise condition a third option was also added to the set from the binary condition, but was located such that its attribute level combination would stand (almost) exactly between the attribute level combinations of the binary set (laptop B in Table 1, middle panel). The objective of the attraction and compromise conditions was to provide participants with a choice situation wherein they could use contextual cues to make their decision, rather than having to rely on their subjective attribute importance weights. As a result, participants were expected to develop a context-specific heuristic—dominance or compromise—to make a decision, rather than their preference for a certain attribute combination or level. For instance, they might learn that they always pick the middle option, but not that they have an affinity for computer memory. (See Appendix for sample screen shots of the experiment.)

Having completed the trade-off learning phase, all participants then proceeded to a short filler task followed by a target choice phase that presented them with three options in an attraction effect setup. We included the filler because we wanted to mimic a situation where the preference or choice that is constructed at one decision phase is applied to a subsequent, ostensibly separate decision. The objective of the target choice was to test whether participants in each condition had developed a preference with respect to a certain attribute (i.e., constructed a preference) or whether they had simply learned to use the contextual cue to make their choice (i.e., constructed a choice). Participants were asked to make a selection from a choice set that included an option similar to the one that they had chosen in their final, sixth decision in the trade-off learning phase (i.e., an option strong along the same dimension as the option they had last chosen), a second option with an attribute combination at the other extreme, and a third, decoy option located next to this second option.[2] We assumed that whatever decision the participant made on the last choice set in the learning phase reflected an evolution in preference for strength in one laptop dimension over another. Thus, with our asymmetrically dominated decoy we attempted to induce participants to "switch" and choose the option that was of the opposite attribute combination to the one that they had just chosen (see Table 1, bottom panel for actual stimuli). Our key dependent variable was whether participants had "switched" away from the implied attribute weights in their final learning phase decision and instead elected to take the target option that we had made attractive by adding a decoy. Had they truly learned their preferences, participants would be less likely to fall prey to our "inducement" and therefore would switch less. Thus, we expected a main effect such that participants in the attraction and compromise conditions would show higher switching rates than their binary condition counterparts.

Results

[2]The compromise condition presented a challenge with regard to composing the target choice set because any of the three options could have been sensible choices in the learning phase (in attraction there are only two sensible options, as the third option is dominated). As a result, creating the target choice was problematic because there were potentially two options that were "eligible" to have an asymmetrically dominated decoy placed next to them (e.g., if the last learning phase choice had been A, then either B or C were eligible). In order to overcome this issue we arbitrarily designated an option in the compromise choice set option "A," the other extreme "C," and the middle choice "B." If participants had chosen A in the final decision of the tradeoff learning task, their final, target choice set included a decoy on an option similar to C. If they had chosen B or C, their final, target choice set included a decoy on an option similar to A.

The results conformed to our predictions and are presented in Figure 2. The proportion of participants who were "lured" by the decoy in the final, target choice—and that we therefore characterize as "switchers"—was significantly lower in the binary condition (31.2% switched) than either the attraction (47.3%; $\chi^2 = 6.60$, $p < .02$) or compromise (59.3%; $\chi^2 = 17.33$ $p < .001$) conditions.[3] The difference between the attraction and compromise switching rates approached significance ($\chi^2 = 2.57$, $p < .11$) and is not surprising given Yoon and Simonson's (2006) finding that preferences formed in a compromise context are less stable than those formed under an attraction context. In attraction, the authors argue, people learn to (mis)attribute a superior quality to the dominating option because (by definition) it dominates another; in contrast, in compromise the same option is simply seen as a vehicle to resolve a difficult choice and therefore is remembered as less compelling.

According to our account, respondents in the trinary conditions who were lured by the decoy or by the compromise alternative in the learning phase were unlikely to have learned subjective attribute values, and as result were more likely to switch in the target choice phase. However, it is entirely possible that the participants who opted for the dominating or compromise option did so simply because they really preferred the dominance attribute or a particular attribute level combination. Although we cannot distinguish with certainty between such participants and those who were constructing a choice, we can examine this issue indirectly by assessing the link between the number of context-driven choices (i.e., choice of compromise and asymmetrically dominating

[3] We conducted a similar analysis where we calculated the modal choice in the learning phase (i.e., the attribute combination that was chosen most often) and tested whether participants were more likely to switch from the implied attribute weights in their modal choice. The results were identical (see Figure 2).

options) in the learning phase and the likelihood of switching in the target choice phase. A strong positive correlation would serve both as a strong test of our hypothesis and as a confirmation that the tendency to make the context-driven choice in the learning phase was more likely the result of a reliance on a contextual cue rather than a true preference for an attribute. In order to test our prediction, we classified participants by the number of asymmetrically dominating or compromise alternatives that they chose in the learning phase and conducted a probit regression with probability of switching as the dependent variable. The number of context-driven choices was a significant predictor of switching ($z[176] = 6.26$, $p < .0001$).[4] Figure 3 graphs the switching rate as a function of the number of context-driven choices in the learning phase; note that switching increases monotonically. In other words, participants who had shown a greater reliance on the contextual cue in the learning phase developed less consistent preferences compared with participants who had shown greater resistance to the cue.

Our results suggest that participants in the trinary conditions may have resolved the choice problem by simply relying on a contextual cue instead of forming a preference for the attributes. Then, when the context changed, so did their preferences.

One weakness of this study is that the reduced switching in the binary condition may be a consequence of the fact that shifting from two options in the learning phase to three options in the target choice phase prompted participants to pay more attention to the stimulus. As a result of this increased attention, binary condition participants' switching rate decreased. In order to reject this alternative, our subsequent experiments include multiple binary conditions where switching rates are manipulated.

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[4] Note that this analysis collapses the compromise and attraction conditions; the results are identical and significant for each individual condition as well.

## Experiment 2

We assumed that the lower switching rate exhibited by participants in the binary condition of Experiment 1 was the result of these participants making trade-offs and hence learning the subjective value of attributes. The present experiment tests this assumption more directly by manipulating the opacity of the trade-off. In addition to replicating the binary (*n* = 101) and trinary (*n* = 97) attraction conditions from Experiment 1 using a similar web-based participant population, we also include binary (*n* = 94) and trinary (*n* = 72) conditions where attribute levels in the learning phase are presented as ranges (e.g., 1 – 1.5GB RAM) rather than as "points" (e.g., 1.5GB RAM).[5] The purpose of the range manipulation is to obscure the trade-off implied in each choice and therefore impair participants' ability to learn their subjective attribute values (in the instructions these participants were told that they would be presented with choices between laptop series and that later they would be asked to choose a specific model from the series). The target choice phase was identical to the target choice in Experiment 1. (See Table 2 for the stimuli.)

The range manipulation should exert the greatest effect in the binary conditions, where participants purportedly choose by assessing their willingness to trade off attribute levels. Since the manipulation should impair learning, preferences in the binary-range condition should be less consistent and switching rates in the target choice phase should be higher than the binary-point condition. Because participants in the trinary conditions are less likely to base their decisions on trade-offs to begin with, the range manipulation should have no effect on their tendency to switch at the target choice phase. Stated differently, we predict an interaction whereby switching is higher in the trinary than

[5] The reason for the imbalanced cell size was a programming glitch in the trinary-range condition.

binary condition where attribute levels in the learning phase are presented as precise points, but high and similar in the binary and trinary conditions where attribute levels in the learning phase are presented as imprecise ranges.

Results

The results confirmed our predictions and are presented in Figure 4. First, switching rates were greater in the trinary-point condition (47.4%) than the binary-point condition (18.8%; $\chi^2 = 18.37$, $p < .0001$), a replication of the findings in the attraction and binary conditions in Experiment 1. Second, switching rates in the binary-range (53.2%) and the trinary-range (45.8%) conditions were not significantly different from each other or from the trinary-point condition. The interaction was significant ($z[359] = 3.7$, $p < .0001$).[6] These findings support our conjecture that switching rates in the binary-point condition were lower because participants had learned their subjective attribute trade-off values in the learning phase. When the ability to make these trade-offs was hampered, even binary condition participants had a difficult time constructing stable preferences and exhibited switching rates comparable to those revealed in the trinary conditions.

## Experiment 3

Even though we obtain our hypothesized effect in experiment 2, it is possible that our participants believed that the attribute ranges reflected the fact that the experimenters were unsure about which laptop the participants would (hypothetically) receive. This ambiguity makes it somewhat difficult to conclude that our manipulation only hampered the ability to make trade-offs. In order to overcome this concern and extend our findings,

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[6] Some readers might be concerned that our participants did not understand how to interpret the idea of a range of memory or processing speed. In this regard it is noteworthy that none of our participants in any phase of the trinary conditions or in the binary conditions' target choice phase selected the dominated option, suggesting that they had understood the meaning of the ranges.

we conducted an experiment using the same web-based participant population and the same attraction and binary condition stimuli as in Experiment 1. This time we influenced participants' need to make trade-offs in the learning phase by manipulating the preference elicitation mode: participants expressed their preference for each option in the set either using a 1-10 rating scale or by allocating 100 points using a constant sum scale (ties were allowed). The option with the highest rating or highest constant sum was considered to be the "preferred" option.[7]

The rating scale allows participants to express their gestalt evaluation about each option without impelling them to consider how much of one attribute they would trade off for the other; a careful comparison between the options is not necessary to gain an impression that is sufficient to make a rating assessment. In contrast, the constant sum scale is comparative by nature, which forces participants to assess the subjective value of the attributes. The trinary condition should be insensitive to this manipulation because of the salience of the dominance relationship. Hence, we expected an interaction such that switching frequency would be lower in the binary-constant sum condition (where participants had presumably learned trade-off values; $n$ = 33) than the binary-rating condition (where presumably they had not; $n$ = 41), but relatively high in the trinary conditions irrespective of elicitation mode ($n$ = 82 and $n$ = 69 for rating and constant sum, respectively).[8] Note that in the target choice phase all participants were asked to actually make a selection, rather than rate or assign points, just as in Experiments 1 and 2.

[7] Where ratings or constant sum values were equal, we randomly assigned that participant to one of the two attribute combinations. It is noteworthy that the number of ties was similar in the binary-constant sum (10) and trinary-constant sum (13) conditions ($\chi^2$ = 1.68, *n.s.*). There were only 3 ties in the binary-ratings condition and none in the trinary-rating condition.

[8] Cells are imbalanced in the trinary conditions because of a programming error that lead to over-sampling in some conditions.

Results

The results revealed the predicted interaction and are presented in Figure 5. Switching rates were similarly high in the trinary-rating and trinary-constant sum conditions (59.9% versus 60.9%, respectively, $\chi^2 = 0.02$, *n.s.*), but significantly different in the corresponding binary-rating and binary-constant sum conditions (51.2% versus 21.2%, respectively, $\chi^2 = 7.0$, $p < .01$). The interaction was significant ($z[100] = 2.28$, $p < .03$) and there was no difference between either of the trinary conditions and the binary-rating condition ($\chi^2(2) = 1.1$, *n.s.*). In other words, switching was low only in a condition where the preference elicitation mode in the learning phase compelled participants to make trade-offs between the options' attributes. In the conditions where a contextual cue was available or where the elicitation mode did not require making trade-offs, switching rates were high and similar to each other.

## Experiment 4

Thus far all of our experiments manipulate preference versus choice construction using asymmetric dominance or compromise in the learning phase. Choice construction, however, is not restricted to these context effects. Instead, we suggest that, even in the absence of contextual cues such as dominance or compromise, any decision situation will give rise to choice construction as long as trade-offs are difficult to make and a decision-maker can form a simple decision rule. In order to test this we drew on work by Hsee (1996) on the evaluability hypothesis and created two experimental conditions: one in which both attributes of an option are evaluable by the participant and another in which only one of the option's attributes is evaluable and the other is difficult to evaluate. We hypothesized that in the latter case participants would choice construct, and simply rely on the rule that more of the evaluable attribute is better. As a result, their preferences would be less consistent once the context of the choice changed, and they would show weaker reliance on the rate of exchange between the attributes that characterize the option. In addition, instead of using laptops as a product class, in this experiment we used CD changers (similar to Hsee's experiments).

Method

One hundred and twenty-one participants were recruited on the campus of a west coast university and asked to complete a paper and pencil questionnaire. They were randomly assigned to one of two experimental conditions: high evaluability ($n$ = 61) or low evaluability ($n$ = 60). The experiment included a learning phase of six choices and four target judgments, separated by a filler task. The learning phase required participants to make choices between two compact disc changers that varied in disc capacity—expressed in number of discs—and sound quality or THD—expressed in percentages (there also was a warranty that was identical for both options). In order to create a trade-off, capacity and quality were negatively correlated such that an increase in one was associated with a decrease in the other. Like in the previous experiments, as participants proceeded through the learning phase the trade-offs became increasingly extreme. We presumed that our participants would find disc capacity easy to evaluate and THD difficult to evaluate. In order to make THD more evaluable, in the high evaluability condition we added the following text to each decision of the learning phase: "By the way: For most CD changers on the market, THD ratings range from 0.001% (the very best) to 0.015% (the very worst)." In all other respects the experimental conditions were identical. Table 3 presents the stimuli used in the experiment.

The target choice phase was different than in the previous experiments. Instead of a trinary option set, participants were presented with four CD changers in sequence, and were told that for the purposes of an internet auction they were being asked to enter their maximum bid price (or willingness-to-pay, WTP) for the changer in question (in order to restrict the variance, participants were told that they had budgeted $150-$300 for this purchase [cf. Hsee 1996]). The changers were described by four attributes, three of which participants had encountered in the learning phase (capacity, sound quality [THD], warranty) and one that they had not (number of preset radio channels). We added attributes in order to slightly change the context of the decision so that it would not map perfectly onto the learning phase task.

We structured the target judgments such that two of the judgments (the second and the fourth; see bottom panel of Table 3) had a dominance relation: CD capacity and radio presets were identical, but one of the changers had a superior THD (0.001% versus 0.006%). In addition, we designed the target judgment items such that there would be greater differences in THD from changer to changer, but only two levels of CD capacity, 15 and 18. We expected to find more (implied) dominance violations and a diminished sensitivity to changes in THD in the low evaluability condition than in the high evaluability condition.

Results

The experimental design allows us to test multiple related hypotheses that highlight the distinction between choice construction and preference construction. We have argued that preference construction is akin to learning one's subjective attribute values and choice construction is akin to learning context specific solutions to the choice problem. By this view, the target judgment phase WTPs of participants who constructed their preferences should be more sensitive to changes in attribute values than participants who constructed their choices. In order to test this hypothesis we conducted a regression for each experimental condition where we modeled WTP as a function of an individual specific fixed effect, CD capacity, THD, and radio presets. The results of these regressions are presented in Table 4. We ascertain the differential sensitivity to attribute values by comparing the overall fit of the model to the data. Fit was greater in the high evaluability condition ($F(3,180) = 70.66$, $p < .0001$) than in the low evaluability condition ($F(3,177) = 9.75$, $p < .0001$), a statistically significant difference ($\chi^2(3) = 240.1$, $p < .0001$ by Hausman test). In other words, a model that includes attribute values is a superior predictor of the preferences of participants in a condition designed to induce learning of attribute value trade-offs, i.e., preference construction. Note also that the coefficient for THD is greater in the condition where sound quality was highly evaluable than in the condition were it was less evaluable (-6.94 vs. -4.51, respectively, $t(477) = 3.61$, $p < .0001$).[9]

We also conducted a more direct test of the role of attribute trade-offs on our participants' implied preferences by regressing WTP on condition (i.e., evaluability level), the ratio of CD capacity to THD for each of the four changers in the target judgment phase, and a ratio by condition interaction. The results of this regression further confirmed our hypothesis. We find a main effect for the ratio ($\beta = 1.58$, $t(480) =$

[9] Note that the low evaluability condition could have possibly generated a lexicographic preference rule (which is an extreme form of preference learning where one attribute receives all the decision weight), rather than choice construction. Our data are inconsistent with this account. Even though CD capacity was the more important determinant of WTP for the low evaluability group, clearly THD exerted some statistically significant influence in these participants' judgments. In other words, the fact that THD was less evaluable does not mean that participants in this condition acquired a lexicographic rule—and therefore a portable preference—that a changer with higher CD capacity is preferrable, regardless of other alternatives.

2.6, $p < .01$) and a significant interaction ($\beta = 0.24$, $t(480) = 2.76$, $p < .01$), such that the ratio between the attribute values exerted a stronger effect in the high evaluability condition than the low evaluability condition. Having accounted for the ratio and the interaction, there was no main effect for the condition ($\beta = -.22$, $t(480) = 0.37$, *n.s.*). Stated differently, where participants received external information that enabled trade-off learning in the learning phase, they were more likely to use the rate of exchange between the attributes as an input to their WTP.

Relative to preference construction, choice construction is defined by a diminished sensitivity to an option's attribute levels. So, if a participant had simply learned to choose the option higher on CD capacity (the evaluable dimension) in the learning phase—and thus simply constructed a choice—then we would expect the variability in his WTPs in the target judgment phase to be low because they would correspond closely to the (low) variability in the capacity dimension. To test this hypothesis we conducted a conceptually similar analysis to the Probit regression in Experiment 1. In particular, we regressed each participant's variability in WTPs on the number of times he favored the high CD capacity option in the learning phase ("capacity-favoring"), condition and a condition by capacity-favoring interaction. The results of this regression confirmed our predictions. The main effect of capacity-favoring was significant ($\beta = -252.93$, $t(722) = 4.33$, $p < .001$), but the condition effect was not ($\beta = -40.49$, $t(722) = 1.48$, $p > .10$). However, these simple effects were qualified by a significant capacity-favoring by condition interaction ($\beta = 23.23$, $t(722) = 2.68$, $p < .01$), such that the capacity-favoring was a significant predictor of variability in WTP for participants in the low evaluability condition but not in the high evaluability condition.

Stated differently, in the condition designed to elicit choice construction, preferences in the target judgment phase were sensitive only to the evaluable, CD capacity attribute. In fact, the correlation between capacity-favoring choices and WTP variability was negative and highly significant in the low evaluability condition ($r$ = -.35, $p$ < .0001) but nil in the high evaluability condition ($r$ = .002, *n.s.*).

Finally, recall that we had purposely created a dominance relationship between changers 2 and 4 in the target judgment phase. We hypothesize that participants in the low evaluability condition will show a greater tendency to violate dominance—i.e., display inconsistent preferences by indicating a higher willingness-to-pay for the inferior option—because they did not learn their subjective value for the trade-off between capacity and THD. This was indeed the case: participants were 3.5 times as likely to violate implied dominance with their WTP judgments in the low evaluability condition (23.3%) than in the high evaluability condition (6.5%; $\chi^2$ = 6.72, $p$ < .01).

In summary, participants who benefited from information that allowed them to assess the subjective value of the changer's attributes were more likely to construct a more consistent preference, and their preference was more likely to be determined by the attribute values and the ratio of the attributes to each other. Participants for whom making a trade-off was more difficult because one of the attributes was less evaluable instead constructed choices: their preferences were less reliant on attribute values, and consequently were more inconsistent.

## Experiment 5

Thus far we have hampered (Experiments 2 and 3) or facilitated (Experiment 4) preference construction by influencing our respondents' ability to make attribute trade-offs. In this experiment we prod preference construction by encouraging participants to make attribute trade-offs despite the presence of a contextual cue. To test this, we conducted an experiment that was based on the same structure as the previous studies—a learning phase and a target choice phase separated by a filler—but that also included a pair of conditions in which participants were explicitly requested to attend to trade-offs in the learning phase.

We included an additional change in this experiment in order to test the consequence of choice construction on preference uncertainty and the tendency to defer choice. Instead of presenting participants with a target trinary choice set or a WTP task, they were given a choice between an mp3 player and $40. We hypothesized that in the condition intended to evoke choice construction participants would experience greater uncertainty about the value of the mp3's attributes. As a result, they would be more likely to prefer the cash prize to the mp3 player because their prospective value from the cash would be more certain than their prospective value from the mp3 player's attribute combination (Dhar 1997; Tversky and Shafir 1992). In other words, because participants in the choice construction conditions develop context-specific choice heuristics, their preferences are less portable to new decision contexts than those of participants in the preference construction conditions. We further elaborate on our method and predictions for this experiment below.

Method

Three hundred and twenty-four participants were recruited through a world wide web-based participant pool. The experiment was a 2 by 2 factorial design. As in the previous experiments, the first factor was the choice set structure in the learning phase, binary versus trinary. The trinary condition was set so as to elicit an attraction effect. The second factor was focus-of-attention. In the “normal” conditions participants were simply asked to make a choice between the mp3 alternatives as in the previous experiments. In the “attention” conditions participants were asked to make a choice, but were also told that, “When making your choice, we would like you to consider how important each attribute is to you, and how much you are willing to trade off one attribute for the other.” Participants logged onto the experiment site and were randomly assigned to one of four conditions: binary-normal ($n$ = 80), trinary-normal ($n$ = 81), binary-attention ($n$ = 83) and trinary-attention ($n$ = 80).

As in the previous experiments, here too participants made six successive choices in the learning phase. Each mp3 alternative was characterized by capacity in gigabytes and battery life in hours. As participants proceeded through the experiment, they were faced with choices that involved giving up more gigabytes in exchange for hours and vice versa (see Table 5 for stimuli). Following a filler task, participants were asked to make the target choice: they were told to imagine that they were playing a lottery that would award one of two prizes to the winner, $40 in cash or an mp3 player with 20 gigabytes of memory and four hours of battery life, and that they had to make their prize selection prior to the drawing. The target mp3 represented a slightly more extreme attribute combination than alternative *c* (mp3 player C in Table 5) in the sixth and final choice in the learning phase, and was the same for all participants regardless of their final choice in the learning phase (note that this is a departure from the procedure in Experiments 1-3). In other words, the target choice was on the opposite end of the trade-off spectrum from the option that had previously been presented with an asymmetrically dominated decoy.

We anticipated that participants in the trinary-normal condition would use the contextual cue to construct their choice, and as a result would be more likely than binary-normal participants to select the cash over the mp3 player because of their uncertainty about the subjective value of the player's attributes. In contrast, we expected no such difference in mp3 choice in the conditions where participants had been prodded to attend to the trade-offs inherent in their choices. Thus, we predicted an interaction such that the choice likelihood of the mp3 player would be greater in the binary-normal condition than in the trinary-normal condition, but equal in the binary-attention and trinary-attention conditions. Furthermore, choice of mp3s would be greater in the trinary-attention condition than in the trinary-normal condition because in the attention condition participants were expected to have more preference certainty with respect to the subjective value of the mp3s' attributes.

Results

The results conformed to our predicted pattern of simple effects and interaction and are presented in Figure 6. Whereas a greater proportion of participants chose the mp3 player in the binary-normal condition (34%) than the trinary-normal condition (16%; $\chi^2 = 6.75$, $p < .01$), there was no difference in the respective attention conditions (27% vs. 29%, $\chi^2 = 0.1$, *n.s.*). This interaction was significant ($z[320] = 2.1$, $p = .036$). Furthermore, choice of mp3 was greater in the trinary-attention condition than in the trinary-normal condition (29% vs. 16%, $\chi^2 = 3.74$, $p = .05$). There was no significant difference between the binary-attention and binary-normal conditions ($\chi^2 = 1.01$, *n.s.*). The key finding here is that when participants were explicitly asked to pay attention to the attribute trade-offs, they displayed similar choice behavior—in this case a reduced tendency to defer a decision—irrespective of the context that they had been exposed to in the learning phase. This provides additional evidence for our contention that when people choose in context they are more likely to learn their reaction to that context rather than their subjective attribute value. By focusing our participants' attention on attribute values, we were able to reduce this propensity to "choice construct" and instead prodded participants to "preference construct." It bears mentioning that in order to prod preference construction when a ready contextual cue was available we practically had to demand that our participants attend to the trade-offs inherent in their choices. However, even though we demanded a decision *process* in the learning phase, our instructions did not introduce any demand characteristics with respect to our dependent variable.

## General Discussion

By now there is little doubt that, except in some very basic cases, (revealed) preferences can be labile and subject to contextual influence (Payne, Bettman, and Johnson 1993; Bettman, Luce and Payne 1998). This preference construction view assumes that people's choices reflect preferences that are formed at the time of decision. Less is known about what happens once the preference is actually "constructed," but there is an implicit assumption in the preference construction literature that growing familiarity with the preference object leads to a stable, context-independent preference for that object (Hoeffler and Ariely 1999; Yoon and Simonson 2006) and there is experimental evidence that expertise is associated with greater resistance to contextual influence (Carlson and Bond 2006; Coupey, Irwin and Payne 1998). In this paper we suggest that people might approach choices as problem-solving situations, and that rather than construct their preferences, they simply construct choices. The difference between preference construction and choice construction is that in preference construction people are assumed to assess and learn subjective attribute values and eventually arrive at relatively stable preferences, while in choice construction they simply learn context-specific choice strategies without ever really engaging in difficult subjective value assessment. In contexts that include an asymmetrically dominating or a compromise alternative, for example, choice construction leads people to learn that the contextual cue solves their decision problem. We show that in such situations people are less likely to arrive at a stable preference in the subjective attribute value sense; instead, they simply learn to repeatedly use contextual cues.

We present the results from five experiments. In the first experiment we demonstrate the basic effect that repeated choices made in context yield less stable preferences than a binary choice situation where participants are impelled to make a trade-off between attributes. In the second experiment we show that when trade-off difficulty increases, preference construction decreases even in a binary choice condition. The results of this experiment support our conjecture that participants in the binary choice conditions learn attribute trade-offs, and that trinary condition participants do not. In the third experiment we show that different preference elicitation modes in the learning stage can beget choice versus preference construction—and the concomitant increase or decrease in preference stability—depending on whether the mode requires attention to trade-offs. In the fourth experiment we find that when an attribute is less evaluable, people are unlikely to learn the subjective value of trade-offs, and as result are less sensitive to actual attribute values and may even exhibit dominance violations. Finally, in the fifth experiment we show that it is possible to elicit preference construction and stable preference by explicitly instructing respondents to attend to the attribute trade-offs implied by their choices. Furthermore, we show that choice construction results in greater preference uncertainty and a greater tendency to defer choice.

Even though some of our demonstrations of choice construction have relied on non-normative choice effects (e.g., attraction), preference consistency may reflect choice construction even in situations where the context is not "biasing" in a normative sense. Recall the example presented in the introduction about products located at eye level on a grocery store shelf. A consistent revealed preference captured by scanner data might represent a preference for the location of, say, a specific detergent on the shelf (e.g., at eye level) rather than a preference for its particular attribute combination. When the detergent is moved to a different part of the shelf the consumer might change his or her choice. To the marketing researcher this change may signal a preference shift with respect to detergents, whereas in fact the choice of the new detergent will be consistent with a consumer's preference in a context (i.e., likes to pick what is at eye level on the shelf). Similarly, in Experiment 4 participants in the low evaluability condition consistently assigned greater value to the changer with greater CD capacity. There is nothing that is necessarily "biased" about such a behavior; it might be a reasonable approach to value a changer. However, because this consistency disguised the fact that people did not learn their subjective value for the changer's attribute trade-offs, then as soon as the context changed—i.e., as THD varied—participants valuations were relatively insensitive to an attribute that they otherwise would have considered important (as implied by the valuations of high evaluability condition participants).

Note that the presence of a context—biasing or otherwise—does not necessarily mean that choosers will always construct a choice by using the contextual cue and ignoring the subjective value of attributes. Sometimes people do have preferences that are context independent. Experts, for instance, should be able to avoid undue contextual influence because knowledge of attribute values is inherent in expertise (Carlson and Bond 2006; Coupey, Irwin and Payne 1998). In terms of our experiments, an expert at laptops would have been unlikely to switch her preference irrespective of the placement of the asymmetrically dominated decoy option in the target choice phase.

Choice construction will be more prevalent under greater uncertainty and when situational cues are more pronounced or available; we suspect that many consumer decisions occur in such contexts. Indeed, choice construction may help explain why context effects persist, despite the fact that they lead to normative errors and inconsistencies in choices. Simonson and Tversky (1992) contend that context effects are driven by a desire to identify the best choice, not merely to simplify the decision task. Making a context-influenced choice might be perceived by the decision-maker as somehow based on an underlying true preference; constructing a choice might *feel* like a real preference is being constructed (see Hoeffler and Ariely 1999). Such a seemingly real preference might even be held with more confidence than a preference that is based on subjective attribute value (cf. Yoon and Simonson 2006). This confidence may engender a belief that a true preference has been revealed, even though our experiments show that such a context-dependent preference is weaker than it appears.

A related reason why context effects persist may be that the effect of context on choice may be lost on the decision-maker. When Nisbett and Wilson (1977) found that customers at a mall overwhelmingly preferred pairs of stockings that were hung on the right hand side of a display that included three other identical pairs, their participants were unable to identify—and even denied—the effect of this context on their choices. If choice is not attributed to its context, then it makes sense for context-dependence and the consequent preference inconsistency to persist. In some ways this problem is unavoidable, as it is rooted in the fact that people incompletely account for the effects of a situation on their behavior because they are always an integral element of the situation (Jones and Nisbett 1972).

Similarly, consumers cannot fully perceive the effects of context because their decisions are *always* made in some context (even a binary choice set is technically a context). To isolate the effect of the context on consumers' decisions from the impact of the attribute values experimentally is extremely difficult, and perhaps even impossible. What might be of interest for the academic, however, may be unnecessary for the practitioner. All a marketing manager needs is to understand that when consumers construct their choices, the critical variable affecting their choice is the context of the decision and not the value of a product's attributes.

Table 1: Experiment 1 Stimuli

| **Attraction learning phase** | **Laptop A** | | **Laptop B *(decoy for Laptop A)*** | | **Laptop C** | |
|---|---|---|---|---|---|---|
| **Choice #** | CPU Speed | Memory size | CPU Speed | Memory size | CPU Speed | Memory size |
| **1** | 2.0 GHz | 768 MB | 1.8 GHz | 768 MB | 2.6 GHz | 512 MB |
| **2** | 2.2 GHz | 640 MB | 1.9 GHz | 640 MB | 2.6 GHz | 512 MB |
| **3** | 2.2 GHz | 512 MB | 1.9 GHz | 512 MB | 2.8 GHz | 384 MB |
| **4** | 2.0 GHz | 768 MB | 1.7 GHz | 768 MB | 2.8 GHz | 512 MB |
| **5** | 1.9 GHz | 1.0 GB | 1.7 GHz | 1.0 GB | 3.0 GHz | 512 MB |
| **6** | 1.7 GHz | 1.0 GB | 1.5 GHz | 1.0 GB | 3.2 GHz | 512 MB |

| **Compromise learning phase** | **Laptop A** | | **Laptop B *(compromise)*** | | **Laptop C** | |
|---|---|---|---|---|---|---|
| **Choice #** | CPU Speed | Memory size | CPU Speed | Memory size | CPU Speed | Memory size |
| **1** | 1.8 GHz | 768 MB | 2.0 GHz | 640 MB | 2.6 GHz | 512 MB |
| **2** | 1.9 GHz | 640 MB | 2.2 GHz | 576 MB | 2.6 GHz | 512 MB |
| **3** | 1.9 GHz | 640 MB | 2.4 GHz | 512 MB | 2.8 GHz | 384 MB |
| **4** | 1.7 GHz | 768 MB | 2.0 GHz | 640 MB | 2.8 GHz | 512 MB |
| **5** | 1.7 GHz | 1.0 GB | 2.2 GHz | 768 MB | 3.0 GHz | 512 MB |
| **6** | 1.5 GHz | 1.0 GB | 2.5 GHz | 640 MB | 3.2 GHz | 512 MB |

| | **Laptop A** | | **Laptop B *(decoy)*** | | **Laptop C** | |
|---|---|---|---|---|---|---|
| **Target choice** | CPU Speed | Memory size | CPU Speed | Memory size | CPU Speed | Memory size |
| **If choice #6 was A:** | 1.7 GHz | 1.0 GB | 2.5 GHz | 640 MB | 3.2 GHz | 640 MB |
| **If choice #6 was C:** | 2.5 GHz | 1.0 GB | 1.7 GHz | 1.0 GB | 3.2 GHz | 512 MB |

The top panel lists the six learning phase options presented to participants in the attraction condition (each row corresponds to one phase); laptop B is the decoy for laptop A. The middle panel lists the learning phase options presented to the compromise condition participants; the compromise option is laptop B. The bottom panel lists the possible target choices presented to participants in all conditions; laptop B is the decoy for laptop A. Note that two versions are listed because the target choice depended upon what choice the participant had made in his or her sixth choice in the learning phase, as specified in the table.

Table 2: Experiment 2 Stimuli

| **Learning phase** | **Laptop Series A** | | **Laptop Series B** ***(decoy for Laptop A)*** | | **Laptop Series C** | |
|---|---|---|---|---|---|---|
| **Choice #** | CPU Speed (GHz) | Memory size (MB) | CPU Speed (GHz) | Memory size (MB) | CPU Speed (GHz) | Memory size (MB) |
| **1** | 1.8 - **2.0** | **768** - 1024 | 1.5 - **1.8** | **768** – 1024 | **2.6** – 2.8 | 256 - **512** |
| **2** | 1.9 - **2.2** | **640** - 1024 | 1.6 - **1.9** | **640** – 1024 | **2.6** – 2.8 | 256 - **512** |
| **3** | 1.9 - **2.2** | **512** - 768 | 1.6 - **1.9** | **512** – 768 | **2.8** – 3.0 | 256 - **384** |
| **4** | 1.8 - **2.0** | **768** - 1024 | 1.5 - **1.7** | **768** – 1024 | **2.8** – 3.0 | 384 - **512** |
| **5** | 1.7 - **1.9** | **1024** - 1536 | 1.5 - **1.7** | **1024** – 1536 | **3.0** – 3.2 | 384 - **512** |
| **6** | 1.5 - **1.7** | **1024** - 1536 | 1.2 - **1.5** | **1024** – 1536 | **3.2** – 3.5 | 384 - **512** |

Binary choice stimuli attribute levels in bold

| | **Laptop A** | | **Laptop B *(decoy)*** | | **Laptop C** | |
|---|---|---|---|---|---|---|
| **Target choice** | CPU Speed | Memory size | CPU Speed | Memory size | CPU Speed | Memory size |
| **If choice #6 was A:** | 1.7 GHz | 1024 MB | 2.5 GHz | 640 MB | 3.2 GHz | 640 MB |
| **If choice #6 was C:** | 2.5 GHz | 1024 MB | 1.7 GHz | 1024 MB | 3.2 GHz | 512 MB |

The top panel lists the six learning phase options presented to participants in Experiment 2. In the binary conditions participants were only presented with laptops A and C; laptop B was the decoy in the trinary conditions. Numbers in bold indicate the values used in the binary and trinary point conditions. The bottom panel lists the possible target choices presented to participants in all conditions; laptop B is the decoy for laptop A. Note that two versions are listed because the target choice depended upon what choice the participant had made in his or her sixth choice in the learning phase, as specified in the table.

Table 3: Experiment 4 Stimuli

| **Learning phase** | **Changer A** | | **Changer B** | |
|---|---|---|---|---|
| **Choice #** | CD capacity | Sound quality (THD) | CD capacity | Sound quality (THD) |
| **1** | 18 | 0.008% | 15 | 0.006% |
| **2** | 20 | 0.001% | 12 | 0.008% |
| **3** | 25 | 0.011% | 10 | 0.004% |
| **4** | 30 | 0.012% | 8 | 0.003% |
| **5** | 40 | 0.013% | 6 | 0.002% |
| **6** | 50 | 0.015% | 5 | 0.001% |

| **Target valuation** | CD capacity | Sound quality | # preset radio channels |
|---|---|---|---|
| **Changer 1** | 18 | 0.008% | 6 |
| **Changer 2** | 15 | 0.006% | 10 |
| **Changer 3** | 18 | 0.015% | 18 |
| **Changer 4** | 15 | 0.001% | 10 |

The top panel lists the six learning phase choices. Note that in addition to CD capacity and THD, all changers (both in the learning and target phases) also had a 1 year warranty. The bottom panel lists the four changers for which participants were asked to provide their willingness-to-pay in the target valuation phase. Note that changer 4 dominates changer 2. Note also that the variability in THD is greater than the variability in CD capacity.

Table 4: Experiment 4 Results

| Parameter | Low Evaluability | High Evaluability |
|---|---|---|
| **CD Capacity** | 7.13** (2.95) | 4.92[a] (2.56) |
| **Sound Quality (THD)** | -4.51*** (1.15) | -6.94*** (0.99) |
| **Radio Presets** | 1.52[a] (0.82) | 1.29[a] (0.71) |
| **$R^2$** | 0.046 | 0.252 |

[a]significant at the 0.1 level; ** at 0.01; *** at 0.001. Dependent variable is WTP.

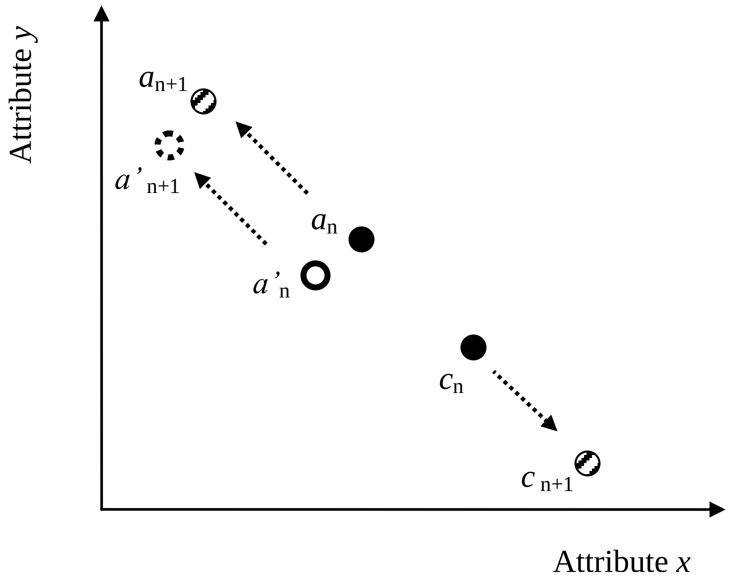
Table 5: Experiment 5 Stimuli

| **Learning phase** | **MP3 player A** | | **MP3 player B *(decoy for player A)*** | | **MP3 player C** | |
|---|---|---|---|---|---|---|
| **Choice #** | Capacity (GB) | Battery life (Hours) | Capacity (GB) | Battery life (Hours) | Capacity (GB) | Battery life (Hours) |
| **1** | 3.5 | 21 | 3.5 | 20 | 4 | 18 |
| **2** | 3 | 24 | 3 | 22 | 4.5 | 15 |
| **3** | 2.5 | 27 | 2.5 | 25 | 5 | 12 |
| **4** | 2 | 30 | 2 | 28 | 5.5 | 9 |
| **5** | 1.5 | 33 | 1.5 | 30 | 6 | 6 |
| **6** | 1 | 36 | 1 | 33 | 10 | 6 |

| | **MP3 player** | | **Cash** |
|---|---|---|---|
| | Capacity (GB) | Battery life (Hours) | $40 |
| **Target choice** | 20 | 4 | |

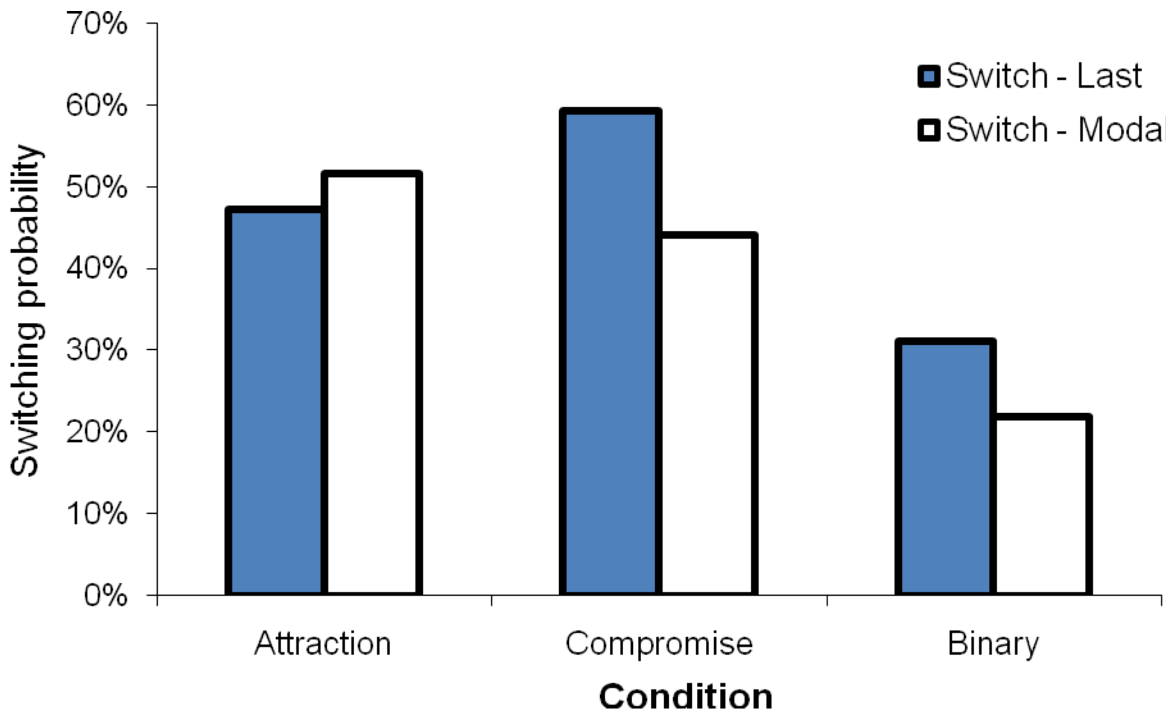
The top panel lists the six learning phase options; player B is the decoy for player A.  The bottom panel lists the target, final choice given to all participants.

Figure 1: Learning Phase



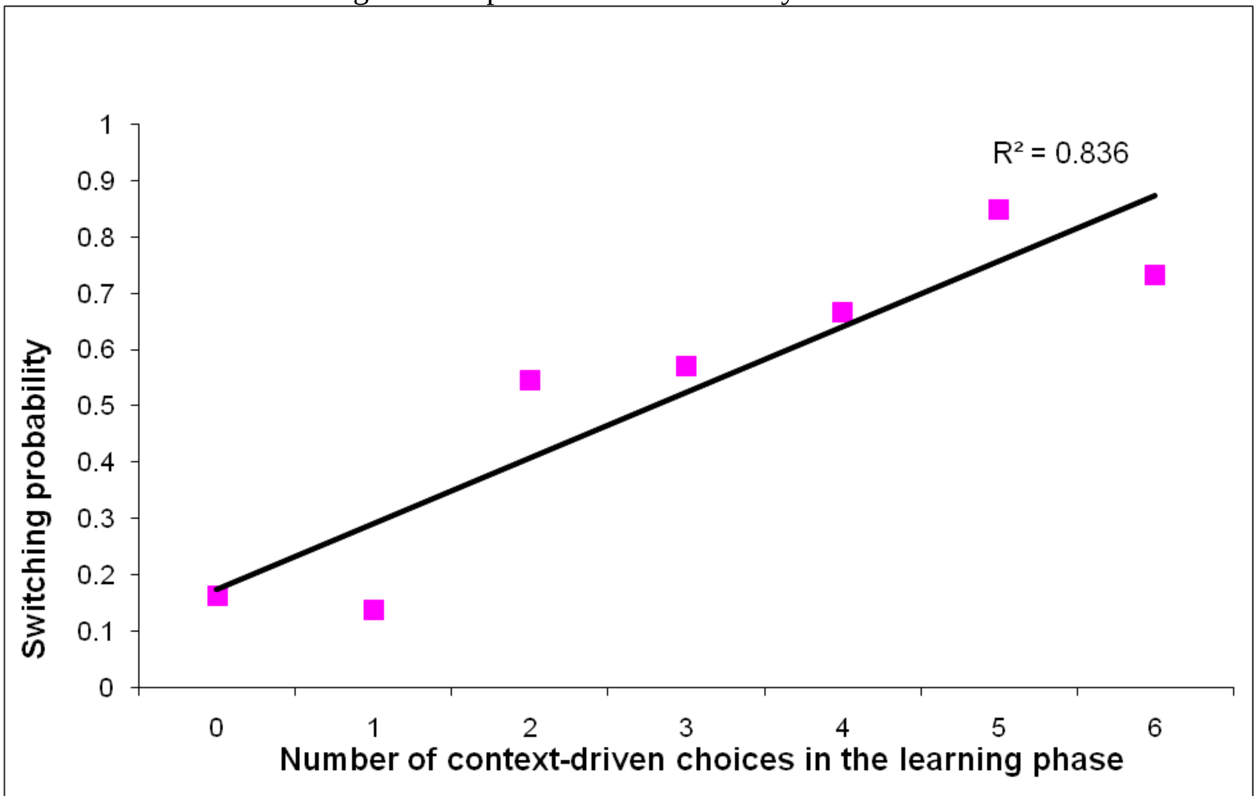

A pictorial representation of the learning phase. The arrows represent the fact that options became increasingly strong on one attribute. "*n*" denotes the number of the decision in the six decision learning phase.

Figure 2: Experiment 1 Results



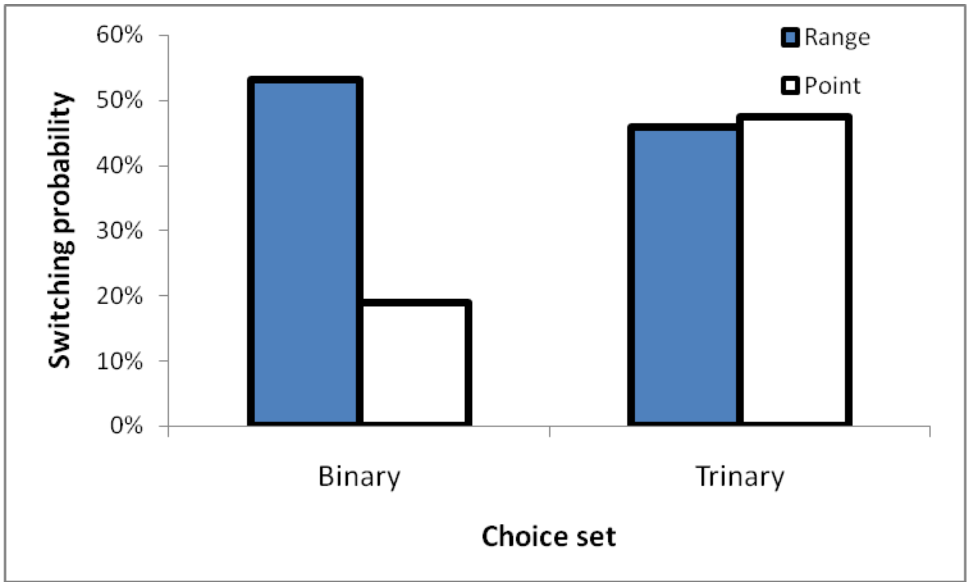

Target choice phase switching rates relative to the last choice of the learning phase or the modal choice in the learning phase for each experimental condition.

Figure 3: Experiment 1 Probit Analysis



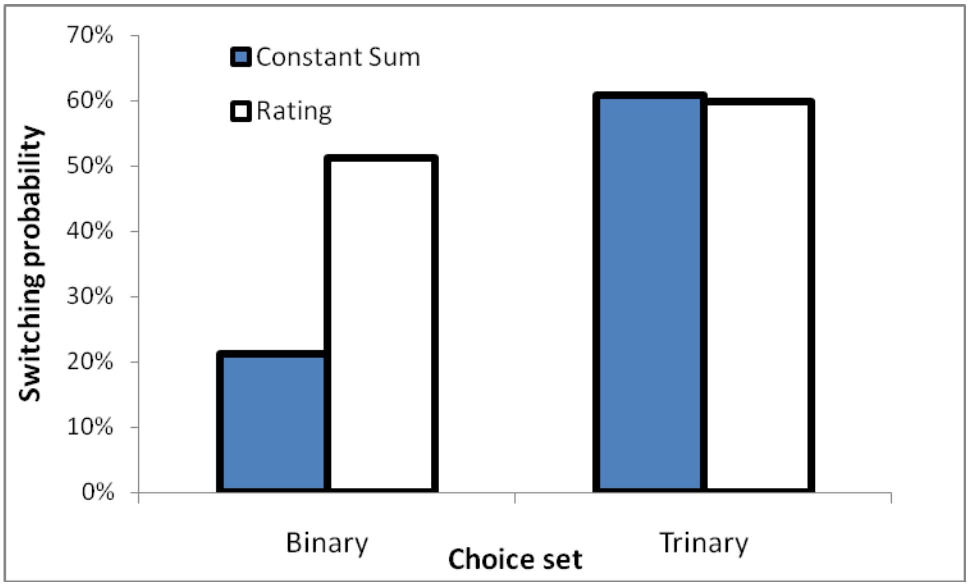

Switching rate in target choice phase as a function of degree of context dependence in the learning phase.

Figure 4: Experiment 2 Results



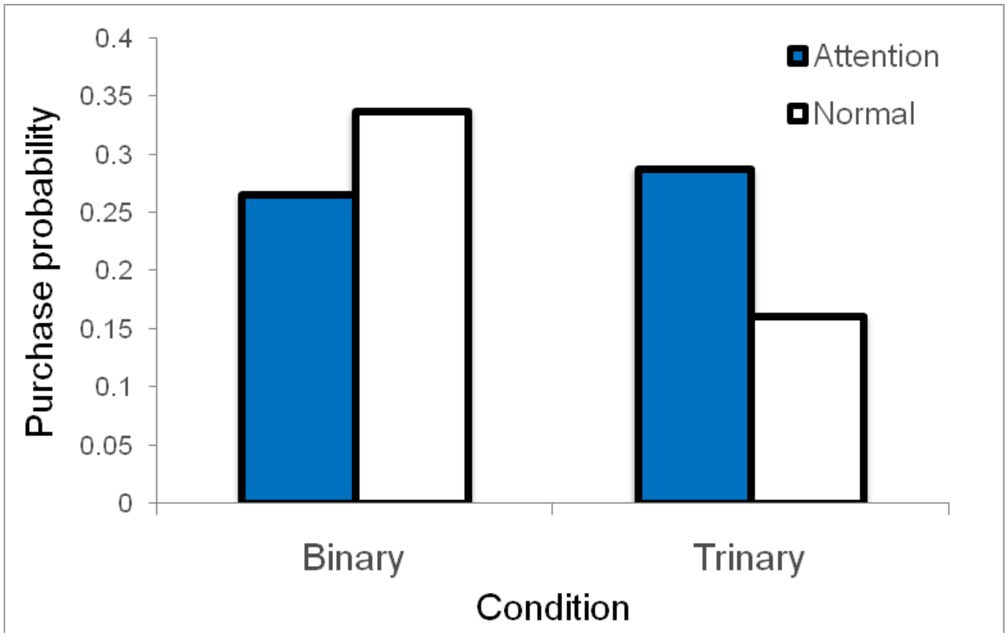

Switching probability in the target choice phase as a function of the uncertainty in attribute values (point versus range) in the binary and trinary conditions.

Figure 5: Experiment 3 Results




Switching probability in the target choice phase as a function of preference elicitation method in the binary and trinary conditions.

Figure 6: Experiment 5 Results




Purchase probability in the target choice phase as a function of the attention to attribute trade-offs in the binary and trinary conditions.

**References**

Amir, On, and Ariely, Dan (2007), "Decisions by Rules: The Case of Unwillingness to Pay for Beneficial Delays," *Journal of Marketing Research*, 44, 142-152.

Ariely, Dan, Loewenstein, George F. and Drazen Prelec (2003), "Coherent Arbitrariness: Stable Demand Curves Without Stable Preferences," *Quarterly Journal of Economics*, 118, 73-105.

Baumeister, Roy F. (1998), "The Self," in D.T. Gilbert, S.T. Fiske and G. Lindzey (Eds.), *Handbook of Social Psychology* (4th ed.; pp. 680-740). New York: McGraw-Hill.

Bem, Daryl J. (1972), "Self-Perception Theory," in L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (Vol. 6; pp. 1-62). New York: Academic Press.

Bettman, James R., Luce, Mary-Frances and John W. Payne (1998), "Constructive Consumer Choice Processes," *Journal of Consumer Research*, 25, 187-217.

Carlson, Kurt A. and Samuel D. Bond (2006), "Improving Preference Assessment: Limiting the Effect of Context through Pre-exposure to Attribute Levels," *Management Science*, 53(2), 410-421.

Carpenter, Gregory S. and Kent Nakamoto (1989), "Consumer Preference Formation and Pioneering Advantage," *Journal of Marketing Research*, 26, 285-298.

Coupey, Eloise, Irwin, Julie R., and John W. Payne (1998), "Product Category Familiarity and Preference Construction," *Journal of Consumer Research*, 24, 459-468.

Dhar, Ravi (1997), "Consumer Preference for the No Choice Option," *Journal of Consumer Research*, 24, 215-231.

Einhorn, Hillel J. and Robin M. Hogarth (1981), "Behavioral Decision Theory: Processes of Judgment and Choice," *Annual Review of Psychology*, 32, 53-88.

Fischhoff, Baruch, (1991), "Value Elicitation: Is There Anything in There?" *American Psychologist*, 46, 835-847.

Hoeffler, Steve and Dan Ariely (1999), "Constructing Stable Preferences: A Look into Dimensions of Experience and Their Impact on Preference Stability," *Journal of Consumer Psychology*, 8, 113-139.

Hsee, Christopher K. (1996), "The Evaluability Hypothesis: An Explanation for Preference Reversals between Joint and Separate Evaluations of Alternatives," *Organizational Behavior and Human Decision Processes*, 67, 247-257.

Huber, Joel, Payne, John W. and Christopher Puto (1982), "Adding Asymmetrically Dominated Alternatives: Violations of the Regularity and Similarity Hypothesis," *Journal of Consumer Research*, 9, 90-98.

Jones, Edward E. and Richard E. Nisbett (1972), "The Actor and the Observer: Divergent Perceptions of the Causes of the Behavior," in E. E. Jones, D. E. Kanouse, H. H. Kelley, R. E. Nisbett, S. Valins and B. Weiner (eds.), *Attribution: Perceiving the Causes of Behavior* (pp. 79-94). Morristown, NJ: General Learning Press.

Nisbett, Richard E. and Timothy D. Wilson (1977), "Telling More Than We Can Know: Verbal Reports on Mental Processes," *Psychological Review*, 84, 231-259.

Payne, John W., Bettman, James R. and Eric J. Johnson (1993), *The Adaptive Decision Maker*, Cambridge: Cambridge University Press.

Payne, John W., Bettman, James R., Schkade, David A. (1999), "Measuring Constructed Preferences: Towards a Building Code," *Journal of Risk and Uncertainty*, 19, 243-270.

Simon, Herbert A. (1957), *Rational Choice and the Structure of the Environment,* New York: Wiley.

Simonson, Itamar (1988), "Choice Based on Reasons: The Case of Attraction and Compromise Effects," *Journal of Consumer Research*, 16, 158-174.

Simonson, Itamar and Amos Tversky (1992), "Choice in Context: Tradeoff Contrast and Extremeness Aversion," *Journal of Marketing Research*, 29, 281-295.

Slovic, Paul (1995), "The Construction of Preference," *American Psychologist*, 50, 364-371.

Tversky, Amos and Eldar Shafir (1992), "Choice Under Conflict: The Dynamics of Deferred Decision," *Psychological Science,* 3, 358-361.

Tversky, Amos and Itamar Simonson (1993), "Context-Dependent Preferences," *Management Science*, 39, 1179-1189.

Tversky, Amos, Sattath, Shmuel, and Paul Slovic (1988), "Contingent Weighting in Judgment and Choice," *Psychological Review*, 95, 371-384.

Weber, Roberto A. (2003a), "Learning and Transfer of Learning with No Feedback: An Experimental Test across Games," unpublished manuscript.

Weber, Roberto A. (2003b), "'Learning' With No Feedback in a Competitive Guessing Game," *Games and Economic Behavior,* 44, 134-144.

Wernerfelt, Birger (1995), "A Rational Reconstruction of the Compromise Effect: Using Market Data to Infer Utilities," *Journal of Consumer Research*, 21, 627-633.

Yoon, Song-Oh and Itamar Simonson (2006), "The Context of Construction as a Determinant of the Stability of Consumer Preferences," unpublished manuscript.

## Appendix

Compromise:

In the following you will be asked to choose between equally priced options that differ only in terms of two characteristics. There are no right or wrong answers; we are simply interested in your preference. You will be asked to make multiple choices; we are interested in your preference for each choice.

| | Laptop A | Laptop B | Laptop C |
|---|---|---|---|
| CPU SPEED | 1.9 GHz | 2.2 GHz | 2.6 GHz |
| MEMORY SIZE | 640 MB | 576 MB | 512 MB |
| Your choice: | ◘ | ◘ | ◘ |

Continue

Attraction:

In the following you will be asked to choose between equally priced options that differ only in terms of two characteristics. There are no right or wrong answers; we are simply interested in your preference. You will be asked to make multiple choices; we are interested in your preference for each choice.

| | Laptop A | Laptop B | Laptop C |
|---|---|---|---|
| CPU SPEED | 2.2 GHz | 1.9 GHz | 2.6 GHz |
| MEMORY SIZE | 640 MB | 640 MB | 512 MB |
| Your choice: | ◘ | ◘ | ◘ |

Continue

Binary control:

In the following you will be asked to choose between equally priced options that differ only in terms of two characteristics. There are no right or wrong answers; we are simply interested in your preference. You will be asked to make multiple choices; we are interested in your preference for each choice.

| | Laptop A | Laptop B |
|---|---|---|
| CPU SPEED | 2.2 GHz | 2.6 GHz |
| MEMORY SIZE | 640 MB | 512 MB |
| Your choice: | | |

Continue

Top, middle, and lower panels present sample screen shots for the compromise, attraction, and binary conditions, respectively.