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Decision-Tree Structures and Their Impact on Similarity Judgment and Replacement Choices

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This paper explores how the decision-making structure impacts consumers' preferences for a replacement option (when the originally chosen option is unavailable). We find that consumers tend to stick with attribute levels that were chosen earlier in the decision-making process. 17 studies explore different underlying mechanisms and support a categorization-similarity process.

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Beyond the Choice Set: The Impact of Considering Similar Outside Options

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Paper #1: The Role of Similarity when Considering Alternatives in Purchase Decisions

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Paper #2: The Impact of ‘Display Set Composition’ on Purchase Likelihood

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Paper #3: Decision-Tree Structures and their Impact on Similarity Judgment and Replacement Choices

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Paper #4: Moderating the Effect of Self on Choice

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SESSION OVERVIEW

Extensive choice research focuses on providing a set of alternatives to examine preferences. While several important contributions have emerged from this literature (e.g., Simonson and Tversky, 1992; Dhar and Simonson, 2003), the majority of focus to date has been on this final aspect of the decision--choosing among available alternatives-- and relatively little attention has been given to how consumers think about options that are not explicitly part of the decision. Consideration of outside options may be guided by marketers through advertising and marketing communications, shelf displays, etc., or they may be a result of the consumer’s thought process (Spiller 2011). In recent years, research has begun to explore how taking into account outside options affects the decision process as compared to only evaluating the immediate choice set (Frederick et al., 2009; Parker and Schrift, 2011; Posavac et al., 2004; Pratkanis and Farquhar, 1992). However, relatively little attention has been given to how the type of option considered impacts preferences and choice, and in particular, to the importance of how the outside options relate to the immediate choice set.

The current session seeks to address the following two questions: In what ways do consumers incorporate evaluations of outside options into their decision process? How does the perceived similarity of the outside option to the current choice set affect decisions?

The first two papers examine how similar versus dissimilar outside options affect purchase interest of a focal item. Friedman, Savary and Dhar explore the impact of consumer-generated alternatives, and find that when consumers consider alternatives that are dissimilar to the target item under consideration, purchase interest is decreased more than when they consider alternatives that are similar to the target item. The authors propose that this pattern is driven by additional goals being activated when considering dissimilar alternatives, which weakens the importance of the focal goal. Karmarkar finds an overall similar pattern of results when exploring how externally provided (rather than consumer-generated) display-only alternatives affect purchase decisions. Though she finds that similar display sets increase purchase intentions for a focal item above controls, she too finds that these intentions decrease when it is displayed with dissimilar items. In addition, she demonstrates that these similarity-

based effects occur independently of the value or intrinsic preferences people have for the specific alternatives themselves.

Schrift, Parker, Zauberaman and Srna explore sequential decision-processes in which options are selected one attribute at a time (i.e., a decision-tree). They find that the order by which attributes appear in the tree impacts how similar or dissimilar consumers construe the outside options (i.e., the forgone alternatives in the set) to the one they initially preferred. Such a categorization process substantially impacts consumers’ replacement choices. Finally, Baskin, Novemsky and Dhar examine differences in consumption when consumers think about the current choice as being a unique opportunity versus having the outside option of future instances of a similar choice. The authors explain that viewing a choice as an opportunity shifts the attribution of choice process away from the self and towards the situation, which results in more vice consumption and less virtuous consumption.

This session ties together four ways of looking at how specific outside options affect preferences, and in particular, the role of similarity in these varied decision processes. The session remains focused while also advancing connections, as the researchers build from a diverse set of literature, from traditional choice theory to decision neuroscience.

The Role of Similarity when Considering Alternatives in Purchase Decisions

EXTENDED ABSTRACT

When deciding whether to buy an item, consumers sometimes think about other uses for their money. For example, a man who is considering purchasing a \$25 button-down shirt might first think about other ways to spend that money. The alternatives may be similar to the target item, such as a polo shirt or a tie, or different, such as gas or a video game. In the current research we explore how purchase decisions vary depending on whether consumers consider alternatives that are similar versus dissimilar to the target item.

Past research on consideration of alternatives has primarily focused on comparing situations where no alternative is considered to situations where an alternative is considered (e.g. Posavac et al., 2004). In consumer contexts, subtle reminders to think about alternative uses of money have been shown to decrease purchase incidence (Frederick et al 2009). However, while past research has explored whether people do or do not consider alternatives, and the broad effect of prompting them to do so, an open question is if and how behavior may systemically vary depending on which alternatives are considered.

In the current research, we explore how purchase decisions vary depending on the similarity of the alternatives considered to the target item. Specifically, we show that when consumers consider dissimilar alternatives, they will be relatively less interested in purchasing the target item, as compared to when they consider similar alternatives. Our results are explained by a difference in goal activation. Viewing the target option activates a focal goal. When consumers consider dissimilar alternatives, additional goals are activated, which decrease the importance of the focal goal, and in turn decrease purchase intent of the target option. In contrast, considering similar alternatives does not activate a new goal, so the focal goal remains important, and purchase intent of the target does not decrease to the same extent.

Study 1A tested our primary hypothesis, that purchase intent of a target option decreases more when dissimilar alternatives are considered than when similar alternatives are considered. All participants evaluated two target items: movie tickets and a massage, with the order counterbalanced. After viewing a picture, price and short description of the target item, participants were asked to briefly list three alternative ways of spending the exact amount of money as the price of the focal. There were four between-subjects conditions: Participants in the similar condition listed alternatives similar to the focal. Participants in the dissimilar condition listed alternatives NOT similar to the focal. Participants in the unspecified condition did not receive instructions indicating type of alternative to list, and participants in the control condition skipped the step of listing alternatives. All participants then indicated their likelihood of purchasing the target item a 9-point likert scale.

We found that the type of alternative considered had a significant impact on purchase intent for the target item. As predicted, participants in the control condition indicated the highest interest in purchasing the target ($M=5.9$), followed by participants in the similar condition ($M=4.8$), followed by those in dissimilar condition ($M=4.1$). Participants in the unspecified condition resembled those in the dissimilar condition in purchase intent ratings ($M=3.7$), as well as the type of alternatives they listed. The unspecified condition sheds light on the types of alternatives consumers might consider spontaneously, and offers evidence against the explanation that the difference in purchase intent between the similar and dissimilar conditions is due to similar alternatives already being taken into account in some capacity. Study 1B replicates these results using utilitarian rather than hedonic target items, and suggests that the effect is not limited to hedonic target items.

In study 2, we rule out an alternative explanation that the difference in purchase intent is driven by the attractiveness of alternatives, rather than by their similarity to the focal item. We use a 2 (attractiveness: more vs. less) \times 2 (similarity: similar vs. dissimilar) design, where we manipulate attractiveness by prompting participants to generate alternatives that are more or less attractive than the focal. We replicate our main effect of similarity, and find null results for the attractiveness manipulation.

In study 3, we examined a situation in which participants faced a choice between multiple target options (two shirts), rather than viewing one item in isolation, to test if considering alternatives impacts choice in the same way when multiple options are already available. There were 3 between-subjects generation conditions: similar, dissimilar and control. Like in study 1, participants in the similar and dissimilar conditions generated three alternatives before indicating whether they would buy one (or both) of the shirts, or choose to buy neither; participants in the control condition skipped the generation step. Consistent with previous studies, more participants chose not to buy a shirt in the dissimilar condition (54%) than in the similar condition (38%), and fewest in the control condition (14%).

Finally, study 4 explored a real world online shopping scenario in which marketers provide alternatives, rather than consumers generating the alternatives. Participants viewed a screenshot of a shopping webpage with the target option (wireless speakers) and its description. Beneath the speakers were two recommended products, which were either similar to the speakers (other music players) or dissimilar (two shirts). Participants were more likely to buy the speakers when the alternatives were similar ($M = 5.4$) than when they were dissimilar ($M = 4.9$). Moreover, we use a mediation model to investigate our underlying mechanism. We asked participants to specify the goal that the wireless speakers would fulfill for them, and subsequently asked them how important that goal was to them.

We show that the effect of similarity of the alternative considered on purchase interest of the target is mediated by goal importance. Participants in the dissimilar condition viewed the focal goal as less important, and in turn were less interested in purchasing the target.

Taken together, these results suggest that considering alternatives to purchase has an effect beyond merely taking them into account or not; the type of alternative considered can have a significant impact on purchase decisions.

The Impact of ‘Display Set Composition’ on Purchase Likelihood

EXTENDED ABSTRACT

Suppose you are shopping online, and deciding whether to buy a specific coffee maker. Are you more likely to click the “buy” button it when it is featured on its own product page, or when it is on a page that shows other recommended coffee makers? What if you came across it on a site advertising popular products from several different categories?

It’s well established that changing the composition of a choice set can influence people’s decisions and shift their preferences (e.g. Tversky and Simonson, 1993; Bettman, Luce and Payne, 1998; etc.). These studies often examine how increasing the options in a set will cause switching, or influence preferences for one item of interest in comparison to the others. However, it remains unclear how a buy/no buy decision about one particular item might be influenced by its display set composition.

Previous research has examined the impact of “phantom” alternatives, or choice options that are presented to an individual despite being unavailable (Pratkanis and Farquhar, 1992). Phantom alternatives create a range of biases dependent on several factors, including the degree of uncertainty about their unavailability (Farquhar and Pratkanis 1993). But when their unavailability is concrete, phantoms can create preference shifts similar to those observed with real alternatives (e.g. Doyle et al. 1999). Thus in the current work, we propose that the mere (viewable) presence of additional items in the display will impact perceptions of value and likelihood of purchase, even when the actionable “choice set” is held to a single target product.

Recent findings in decision neuroscience on “value normalization” mechanisms have shown that adding options to a set can create a net reduction in the perceived value of a preferred item in addition to making it less discriminable from other options (e.g. Louie et al. 2013, Webb et al., 2014). As a whole, these findings suggest that additions of display-only items may decrease the target’s purchase likelihood by decreasing its perceived value. Furthermore, they predict that the effects may be strongest when the display items are comparable to the target.

Study 1 tested our basic hypothesis that display set composition can alter purchase intentions, as well as the predictions arising from value normalization. Participants ($n=225$) were asked to make four hypothetical buy/no-buy decisions. Those in the “alone” condition saw a labeled photo of the target product and its price. Participants in the “comparable” condition saw the same target product/price information flanked by photos of two products from the same general category (e.g. a target board game shown between two other board games). Participants in the “non-comparable” condition saw the products flanked by photos of two products from other categories (e.g. a target board game flanked by a Swiss army knife and a candle.) Participants were informed that the non-target products were only there as part of the display.

Comparing the three conditions, we found significant differences ($p < .01$), largely arising from whether the “display items” were from the same or different product categories. Average total purchase rates for the four products in the comparable condition ($M = 1.77$) were marginally higher than the alone condition ($M = 1.47$, $p = .08$), and significantly higher than the non-comparable condition ($M = 1.25$, $p < .02$). The difference between non-comparable and alone was not significant. Surprisingly, despite these differences in purchase intent, the display items did not change average liking rates for the target items, nor did they influence average willingness to pay for them.

Given the disparity between these results and the decreases in value predicted by value normalization, Study 2A tested how much the impact of display items depends on the specific products shown. We offered participants a single hypothetical purchase decision assigned via a counterbalanced 2x2 design that varied the type of target item (art poster vs. board game) and the category of the display items (comparable vs. non-comparable). Once again, we found a (main) effect in which purchase intentions were higher in the comparable compared to the non-comparable condition. There was no main effect of product type, nor interaction effects, suggesting that the increases in target purchase likelihood were not due to the display items themselves, but to their similarity to the target. Study 2B tested this question using a within-subject design where each participant made multiple incentive-compatible decisions about target products in both types of displays. We again found a significant benefit of comparable over non-comparable display sets on willingness to purchase.

Secondary regression analyses on data from Studies 1 and 2A did reveal that, pooling across conditions, preferences for the display items had a significant positive correlation with purchase intent towards the target item. This raises the question of whether our observed effects could be boosted or diminished by the relative value of the display items as compared to the target. Study 3 examined this by manipulating the display items’ a priori value (high vs. low) and similarity to the target item (comparable vs. non-comparable). We once again replicated our main similarity finding, but found that the value of the display items had no direct or moderating effects on purchase rates.

Overall, we find that adding items to the “display set” does indeed significantly impact buy/no buy decisions, but in a direction seemingly contrary to the predictions of value normalization models. Rather our results suggest that when the display set consistently reflects one category, it increases the likelihood of making a purchase from that category. One practical implication of this work is that retailers may be most effective at promoting a product by ensuring that it draws attention on the shelf among similar products rather than featured separately as one-of-a-kind.

Decision-Tree Structures and their Impact on Similarity Judgment and Replacement Choices

EXTENDED ABSTRACT

Consumers often seek replacement options when their preferred option is unavailable. The current research demonstrates that slight variations in the initial decision-making process—which do not affect initial preferences—significantly impact consumers’ replacement choices. Specifically, we focus on a hierarchical decision structure (i.e., decision-tree) in which alternatives are first screened on a single attribute and then further screened on other attributes, in a sequential process, until an option is chosen. Integrating research on preference trees and runner-up options, we find that the specific decision-tree structure (i.e., the order of attributes in the tree) impacts consumers’

replacement choices. Consumers tend to replace their most preferred option with alternatives from the same branch (i.e., stick with attribute levels that were chosen earlier in the tree).

Such patterns may, at first, appear contradictory to existing literature showing that consumers tend to deemphasize the importance of screening attributes, and over emphasize post-screening (or “selection”) attributes (e.g., Chakravarti et al. 2006; Diehl et al. 2003). According to these findings, one would expect that consumers would be more likely to stick to later attributes in the sequence when choosing replacement options. However, this previous work (i) did not explore replacement choices, (ii) did not manipulate order of attributes in the tree, and (iii) examined nested hierarchical decision-trees; that is, contexts in which the initial screening criterion (e.g., “beef” vs. “fish”) substantively alters the options available in the subsequent stage(s) (e.g., “steak or roast-beef” vs. “sole or trout”). The current work examines contexts in which all combinations are feasible (i.e., non-nested decision-trees) and whether the order of attribute decisions in such non-nested trees impacts replacement choices. We find that consumer’s preference for a replacement option is affected by the tree structure, and that consumers tend to stick with earlier decisions they made in the tree. Seventeen studies demonstrate this extremely robust effect. We explore different possible mechanisms underlying the effect and discuss relevant literature.

In Study 1 participants chose between different pens, each described in terms of color (5 levels) and material (2 levels), resulting in 10 available color-material combinations. In a between-subjects design, participants either directly chose one of the 10 pens (control), or made their choice in a two-stage decision process (color first then material vs. material first then color). After learning that their chosen pen was unavailable, participants chose their replacement option by either keeping their choice of color and replacing the material or vice versa. The decision-tree structure significantly impacted participants’ replacement decisions. Participants that chose material first were more likely to keep the pen’s material (64%) compared to those that chose color first (38%, $z = 2.72$, $p < .006$; control condition = 47%). Participants’ assigned attribute weights (using a constant-sum allocation task) showed a consistent and significant pattern. Eight additional studies replicated this robust effect across different decision contexts (e.g., cups, clocks, catering-services, food-items, hiring-decisions, paintings, visual-tasks). Additionally, the results were replicated with more than two hierarchy levels and when all attributes possessed the same number of levels. Further, the effect persisted in incentive compatible contexts and across different response and presentation modes. That is, participants tended to stick with their choice of initial attribute even when all alternatives were initially presented (screening, as opposed to choosing, format) and also when all replacement options were available for choice.

Exploring different potential mechanisms, we found the effect to persist when the initial choice was made for the participants either randomly (study 10) or by a third-party (study 11). That is, even when participants did not choose the original option, their choice of replacement option was still driven, in the hypothesized direction, by the decision-tree structure. Thus, choice-based explanations such as dissonance, self-perception, and reason-based choice, as well as explanations based on need for internal consistency or choice closure (suggested by Wright and Barbour 1977) do not fully account for the pattern of results (in Study 12 neither need for closure or internal consistency were found to moderate the effect).

Next, we examined whether the effect may be driven by inferences about attribute weights. In particular, previous literature suggested (and demonstrated) that decision makers attend to

attributes by order of their importance (e.g., elimination-by-aspect). Therefore, it is possible that when the order of attributes in the tree is externally provided, decision-makers infer that initial attributes are more important and therefore tend to stick with their originally chosen branch. In Studies 13 and 14 it was made extremely salient to participants that the order of attributes was determined randomly. In Study 15 participants were asked to choose among 4 tasks that were described on completely meaningless attributes (letters and colors). The effect persisted, indicating that inferring weights from the order in the tree is not the main driver of the results.

Finally, in Study 16 we explored whether the effect is driven by a categorization and similarity judgments (e.g., Goldstone 1994, 2001; Livingstone et al. 1998). We find that decision-makers perceive alternatives that belong to the same branch in the decision-tree as more similar and perceive the action of switching branches as more extreme (i.e., a greater change). As in Study 15, participants chose among 4 tasks that were described on completely meaningless attributes. However, when learning about the unavailability of their chosen task, participants either received a positive cue about this task (triggering a motivation to replace this task with a similar task), or received a negative cue (triggering a motivation to replace the task with a dissimilar task). The effect replicated in the positive but not in the negative cue condition. Thus, indicating that decision-makers associate the decision-tree structure with a similarity judgment between alternatives. In Study 17, we find that the motivation to replace the original option with either a similar or a distinct option mediates the effect.

In the current investigation we attempted to isolate the effect (which is theoretically and substantively important) using different paradigms. The results lend support to a categorization process in which consumers construe alternatives that share a branch on the decision tree as more similar.

Moderating the Effect of Self on Choice

EXTENDED ABSTRACT

Opportunity: A favorable combination of circumstances, time, and place

Merriam-Webster Dictionary (2014)

In both profit and non-profit sectors, marketers often position their products as an opportunity. For instance, Honda ran an ad campaign centered around a character named Mr. Opportunity who let viewers know that opportunity was knocking for them to buy a car. In the non-profit sector, many organizations position their volunteer and donation appeals as an opportunity to support their charity's mission. In fact, the five universities with the highest endowments all discuss charitable giving as an opportunity to make a gift to an institution of higher learning. Despite consistent use of the word, "opportunity," by marketers, relatively little is known about how thinking about a choice or decision as an opportunity affects consumer cognition and preferences.

We propose that when a choice is framed as an opportunity, the salience of the situation is increased. This increases the tendency to attribute the choice to the situation (Storms 1973). Generally, research has found that choices influence individuals' self-concept (Bem 1972) and these influences can be anticipated (Bodner and Prelec 2003). However, once the attribution shifts to the situation, choice attribution shifts to the situation and their impact on one's self-concept is reduced thus shifting preferences.

In many important choices, consumers are confronted with vices - tempting, impulsive options that have a negative association

with the self-concept (e.g., they make consumers feel that they are someone who has low self-control; Dhar and Wertenbroch 2012; Khan and Dhar 2006). We propose that when a vice is considered as an opportunity, the situation becomes the perceived basis of choice for the vice. This leads to fewer negative self-inferences if the vice is chosen since the reason for the choice can be attributed to the situation rather than the self. Lacking negative repercussions to the self-concept, preferences for vice opportunities increase.

It is important to note that the shift in attribution of the choice to the situation does not predict a general increase in an option's choice share when viewed as an opportunity. Rather, the change in preference depends on how choosing the option affects the self-concept. Consumers often face virtuous options - options linked to more positive, long-term aspects of the self-concept (Dhar and Wertenbroch 2012; Khan and Dhar 2007). Accordingly, when a virtuous option is framed as an opportunity, the choice of that option is more likely to be attributed to the situation, thus decreasing the positive benefits to one's self that would otherwise be received from choosing that option, and, therefore, preference for that option decreases.

To illustrate, consider a person who is deciding whether or not to choose an indulgent chocolate cake for dessert at a restaurant. Choosing to consume the chocolate cake may entail negative attribution about one's self-concept and hence may decrease the willingness to choose the chocolate cake (Okada 2005). However, if the choice of the same indulgent chocolate cake is an opportunity, the person might focus on the situation that brought about the chance for them to have chocolate cake. Thus, the negative costs to their self-concept from choosing the chocolate cake, such as thinking that they are unhealthy or have low self-control, decrease. Since the costs decrease and the benefits remain the same, it becomes more likely for the person to choose the chocolate cake.

Conversely, imagine a person who is called by their university alumni association for a donation. They might choose to donate because they want to signal something good about themselves when making their decision (Gneezy et al. 2012; Savary, Goldsmith, and Dhar 2014). However, the donation becomes a less diagnostic signal that the person cares about their alma mater when it is framed as an opportunity by the university. This is because the donation is attributed to the specific situation, such as the alumni officer calling them and asking for a donation. Thus, the donation's positive self-benefits decrease and therefore, the individual is less likely to donate.

The present research differs from previous research in several important ways. First, to the best of our knowledge, it is the first to demonstrate that framing a choice as an opportunity can influence attributional processes and subsequent preferences. Second, we show that this novel framing effect, i.e. opportunity framing, operates like a mindset and can persist and affect subsequent choices much like other mindsets. Finally, our research has important implications for any product whose choice results in either positive or negative self-attribution.

To explore the effects of opportunity frames on choice, we conducted six studies. Studies 1A and 1B show that preference for a vice increases when participants think about the choice as an opportunity. In support of our theory, the extent of the vice choice's dispositional attribution mediates this effect. Study 2 demonstrates that, in an opportunity frame, virtuous choices, such as donating to charity, become less preferred. Study 3 supports our underlying mechanism that opportunity framing of a choice increases situational attribution by putting participants in a strongly dispositional mindset and showing that this attenuates the effects of an opportunity frame. Next, we demonstrate that opportunity framing can lead to

a temporary mindset that carries over to unrelated choices. Study 4 shows that thinking about several events as opportunities prior to making an unrelated choice can cause that choice to be viewed as an opportunity. Finally, in study 5, we show that the use of the word opportunity in an advertisement is sufficient to induce an opportunity frame and generate both an increased preference for a vice and a decreased preference for a virtue.

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