

Research Article

Help or hinder? When recommendation signage expands consideration sets and heightens decision difficulty[☆]

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Abstract

This research examines whether recommendation signage helps or hinders the consumer when faced with choosing from large product assortments. In spite of frequent usage and retailer intuition suggesting that providing recommendation signs (e.g., “Best Seller,” “Award Winner”) should help consumers in the choice process, we propose that signs can hinder choice for consumers with more developed preferences by adding to the complexity and difficulty of the decision process. In three experiments using horizontally differentiated products in multiple categories, we provide evidence that recommendation signs create preference conflict for consumers with more developed preferences, leading these consumers to form larger consideration sets and ultimately experience more difficulty from the decision-making process. In addition, we show that these effects are mitigated for consumers with less developed preferences and when the choice is from a small assortment. The results suggest that recommendation signage may not be an effective tool for aiding choice from large assortments; instead signage can exacerbate the difficulties associated with having too many choices, with implications on purchase quantity.

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Introduction

The “Paradox of Choice” posits that consumers are attracted to more choice, but then experience difficulty due to the negative psychological consequences associated with choosing from such a large set (Schwartz, 2004). A considerable amount of attention has focused on whether and when consumers will experience the negative consequences of choosing from these large assortments (Broniarczyk, 2008; Chernev, Bockenholt, & Goodman, 2010; Scheibehenne, Greifeneder, & Todd, 2010), yet little research has

examined potential strategies that might alleviate the negative consequences of choice. Given the strong desire consumers have for more choice (Broniarczyk, Hoyer, & McAlister, 1998; Chernev, 2006; Goodman & Malkoc, 2012; Huffman & Kahn, 1998), it may not be possible, or even desirable, to reduce the number of options consumers consider; however, there may be tools available to help reduce the pain of choosing.

In this research we examine whether one such tool—recommendation signs such as “Best Seller” or “Award Winner”—will help or hinder consumers in the choice process, and we provide evidence as to how these common tools complicate choice via the formation of consideration sets. Although it seems plausible that such recommendation signs should help consumers in the choice process by providing a heuristic, we show instances when signs can hinder choice. We propose that recommendation signs can conflict with consumer preferences, leading consumers to reexamine their choices and consider more options, increasing consideration set sizes. Paradoxically, instead of simplifying the

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choice process, these recommendations can actually make the decision more difficult for consumers. We focus our attention to situations when consumers are faced with making a single choice from a large assortment of horizontally differentiated options (i.e., there is no universal optimal choice).

We provide evidence for our process across three experiments, and we identify assortment size and preference development as two key moderators to the effect of recommendation signs on consideration set sizes and decision difficulty. Specifically, we show that when consumers with more developed preferences are faced with a choice from a large assortment, signage-induced conflict leads to the formation of larger consideration set sizes and greater decision difficulty. We show these effects across a host of product categories, with real and hypothetical choices, and using multiple types of recommendation signs.

The remainder of this paper is structured as follows. In the next sections, we review the literatures on recommendations and discuss their usage by retailers. We then propose a choice framework of when and why recommendation signs increase the number of options considered and heighten the difficulty associated with choice. We then develop our proposition that preference development and product assortment size will moderate the effect of signage on the choice process. Next, we present three experiments to test these propositions and conclude with a discussion of the theoretical and practical implications of signage on the decision process.

Recommendation signage and the choice process

Previous research on recommendations and advice has focused on preferences and the decision outcome—what a person (the judge) chooses or whether the judge followed the recommendation of the advisor (e.g., Bonaccio & Dalal, 2006; Gino & Moore, 2007; Naylor, Lambertson, & Norton, 2011; Yaniv & Kleinberger, 2000; see Bonaccio & Dalal, 2006, for a review). However, we are interested in how recommendations affect the choice process. To our knowledge, research has not examined whether the presence of advice might affect this choice process, specifically whether it will be useful in reducing decision difficulty or narrowing the consideration set.

Though there has been little research on how recommendations affect the choice process, non-price recommendation signs, such as those proclaiming a “Best Seller,” “Award Winner,” or “Employee Favorite,” are widespread in the retail environment. We examined 52 of the top 100 US retailers and found at least 31 (60%) retailers that use some form of non-price recommendation sign. Intuitively, it seems that providing signs should help the decision process by providing a heuristic for choice. In fact, we surveyed 51 store managers and retail buyers from a large grocery chain and found that at least two-thirds of respondents believed that recommendation signs make the decision easier for consumers. Thus, recommendation signage, which is controllable by retailers and policymakers, may be a tool to help consumers narrow a choice set and construct a decision with less difficulty.

Supporting this retailer intuition that signage should help the decision process, prior literature has shown that when consumers are faced with complex decisions, they look for ways to simplify

the choice process (Payne, Bettman, & Johnson, 1993; Shugan, 1980). Signs may assist the consumer by identifying a preferred option from the product set (e.g., award winner, staff-preferred selection) as well as by pointing out popular norms of the general public (e.g. best seller; Kahneman & Miller, 1986). This information can reduce consumers’ search costs and uncertainty in the decision process (Gershoff, Broniarczyk, & West, 2001; West & Broniarczyk, 1998) and can aid choice by providing an option that is easier to justify (Sela, Berger, & Liu, 2009).

Despite this evidence suggesting that recommendation signs might simplify choice, we propose that the opposite can occur: Recommendation signage can lead some consumers to expand their consideration sets and experience *more* decision difficulty. Difficulty can arise when there is conflict between a consumer’s preferences and a recommendation sign, such as when a recommendation sign suggests a previously unconsidered attribute or alternative, or an alternative that is inconsistent with one’s preferences.

Consumers often cope with choice conflict by expanding their choice set and examining additional alternatives (Anderson, 2003; Tversky & Shafir, 1992); therefore, we would expect consumers to cope with the conflict from recommendation signs by considering additional options. A sign on an attractive alternative not only provides another option worth considering but also highlights additional attributes worth considering. In this way, a sign leads consumers to expand their consideration set even further to include not just the signed option but also non-signed options with attributes similar to those of the signed alternative. Increased elaboration on multiple alternatives can create more conflict and discomfort in the decision making process (Carmon, Wertenbroch, & Zeelenberg, 2003), creating a spiraling effect of conflict. Thus, we propose that signs will lead to an increase in consumers’ consideration set sizes, including the consideration of both signed and non-signed options.

As consumers process these additional options in their consideration set, they are likely to experience an increase in decision difficulty as well. In order to construct larger consideration sets, consumers have to put forth more processing effort, increase their elaboration, and make more tradeoffs, all leading to more decision difficulty (Payne, 1976; Shugan, 1980). As the consideration set size becomes larger, the final decision stage also becomes more complicated, requiring more time, elaboration, and cognitive resources to process the greater number of options. Thus, due to this increase in processing, we expect that recommendation signs will lead to greater decision difficulty.

Based on this conflict framework, there should be cases when we would expect recommendation signage to lead to larger consideration sets and more decision difficulty, and there should be cases when it should not. In the next section we discuss two such moderators to this effect: assortment size and consumer preference development.

Assortment size

Consumers prefer stores offering large assortments (Arnold, Oum, & Tigert, 1983; Broniarczyk et al., 1998; Goodman & Malkoc, 2012) because they provide consumers with a greater opportunity to match their preferences, maintain flexibility, and

satisfy variety-seeking needs (Kahn & Lehmann, 1991; McAlister, 1982; Ratner, Kahn, & Kahneman, 1999; Simonson, 1990). Unfortunately, the initial lure of large assortments is complicated by the fact that consumers are then faced with choosing from such a large set of options. Consumers faced with choice from large (vs. small) assortments experience negative psychological consequences termed “choice overload,” such as heightened decision difficulty and regret, lower satisfaction, and decision deferral (Berger, Draganska, & Simonson, 2007; Botti & Iyengar, 2006; Diehl & Poynor, 2010; Iyengar & Lepper, 2000; see Scheibehenne et al., 2010, for a meta-analysis and a discussion by Chernev et al. (2010).

Given that large assortments are associated with greater effort and decision difficulty, we might expect that recommendation signs are more likely to help consumers when they are choosing from large (vs. small) assortments. In fact, recommendation information is often assumed to be helpful when consumers face the complexity of choosing from a large number of product options (Ying, Feinberg, & Wedel, 2006). However, we propose that signs create conflict with preferences, expand the consideration set, and make choice more difficult, which is more likely to occur when choosing from a large assortment. When choosing from a small assortment, choice is a less cognitively taxing task compared to choice from a large assortment. The option set is manageable and most good options will receive consideration, regardless of signage. Even if a sign creates conflict in the choice from a small assortment, or it brings attention to a new attribute or alternative, consumers will have the additional resources required to resolve the conflict and additional information with little disturbance.

Conversely, a recommendation sign in a large assortment is more likely to create conflict and lead to the consideration of more options, adding more difficulty to an already overloaded cognitive system. As the assortment size increases, the likelihood that a sign is not located on a consumer’s ideal point also increases, therefore increasing the probability that the sign conflicts with a consumer’s preference. Further, this conflict will increase consideration sets more in a large (vs. small) assortment because there are more attractive options to consider, and a sign is more likely to be on a previously unconsidered good option. Thus, we propose that signs will create more conflict in large (vs. small) assortments and lead to a larger consideration set size. In turn, this will translate into more decision difficulty in large assortments compared to small assortments. Thus, we expect signs to expand consumers’ consideration sets and increase decision difficulty when choosing from a large (but not a small) assortment.

Preference development

Consumers vary in terms of how well they have developed their preferences in a product category. They develop their preferences by making choices over time and updating their preferences based on the experienced utility of chosen options, with the hope of converging toward their hypothetical ideal point (Amir & Levav, 2008; Hoeffler, Ariely, & West, 2006). A consumer without developed preferences must learn about attributes and alternatives available, form a consideration set, make relevant tradeoffs, and

identify the product that s/he believes is closest to his or her ideal (Coupey, Irwin, & Payne, 1998; Hoeffler & Ariely, 1999; Mogilner, Rudnick, & Iyengar, 2008). As a result, consumers that have articulated an ideal point usually experience less difficulty compared to those that have not identified their ideal point (Chernev, 2003b). In other words, consumers with less developed preferences have more work to do, as they must construct their preferences in order to make a choice. In such a case, the act of creating preferences itself creates decision difficulty, whereas having preferences reduces difficulty. At the extreme end of preference development, a consumer has perfectly developed preferences, knows what she wants, and simply locates her ideal point on the shelf, ignoring any context or signage. In all other cases, however, the context of the decision influences the decision process. In a recent investigation of the choice overload hypothesis, a meta-analysis suggested that there may not be a simple main effect of assortment on choice overload, rather a key moderator to understanding choice overload is how well consumers have developed their preferences (Chernev et al., 2010; Scheibehenne et al., 2010).

Choice overload effects appear to be largest when consumers have less developed preferences with a category because they must construct their preferences to make a choice, which requires effort; however, it is possible that recommendation signage will create difficulty by creating conflict for those consumers who have existing preferences (i.e., those with more developed preferences). We propose that signs create difficulty not because consumers must construct their preferences, but because they *conflict* with their existing preferences. For consumers without clear preferences (i.e., those with less developed preferences), a recommendation sign should not create any special conflict or difficulty—there are no preferences to conflict with in the first place. Conversely, for consumers with more developed preferences, a recommendation creates conflict from the deliberation between a recommended option and a priori product preferences, leading consumers to consider additional alternatives. The increase in consideration set size will lead to a more complex decision and ultimately more decision difficulty. Thus, we would expect that the effect of signage on consideration set size and difficulty to be moderated by preference development: Recommendation signage will create preference conflict, leading to greater consideration sets and more decision difficulty for consumers with more developed preferences, but not for consumers with less developed preferences.

Experiment overview

We test our proposal across three experiments by methodically examining two key moderators to the theory: assortment size and preference development. We focus on consumers making a single choice from the large assortment context of 20 or more options, and we examine the moderating role of assortment size in our final experiment. In a pilot test and experiment 1 we provide evidence that signage conflicts with preferences by manipulating and measuring preference development. Experiment 1 manipulates preference conflict directly, further testing our theory. In experiment 2 we provide process evidence for our framework by showing how signage increases

consideration set size. Finally, in experiment 3 we test the moderating role of assortment, and we provide more empirical evidence for our theory by showing the mediating role of consideration set size on decision difficulty.

Pilot test: manipulating preference development (juices and chairs)

Method

In this pilot test we first wanted to examine whether developing the preferences of some consumers could actually lead to a more difficult decision when signage is present. The study was a 2(recommendation signage: signage vs. control) × 2(preference development: less vs. more) between subjects design with 190 undergraduate students participating in the computer-based study in exchange for extra credit. To ensure that participants did not have developed preferences to begin with, we chose two relatively obscure product categories for undergraduates: specialty juices and designer chairs. The signage condition included two red “Best Seller” signs attached to the picture of the two most frequently chosen options according to a pretest.

Adapting procedures from previous research (Chernev, 2003a, 2003b; Huffman & Kahn, 1998), we manipulated preference development by instructing participants to think about and express their attribute level preferences. Participants in the less developed preference condition only received attribute information (e.g., “Juice Type”) and the possible values it can hold (e.g., “Juice Blends, Nectars, Organic, Vitamin-fortified”). Participants in the more developed preference condition received attribute information, the range of these possible values, and also rated their preferences for each attribute level on a 7-point scale (1 = strongly dislike to 7 = strongly like). We purposely stopped short of asking participants to make tradeoffs and identify their ideal point.

Next, participants viewed a set of 30 options and selected one product they would purchase in each category (order counter-balanced). After making their choice, participants responded to four decision difficulty questions on 7-point scales (1 = not at all to 7 = extremely) probing to what extent they were overwhelmed, frustrated, annoyed by the choice, and found the decision difficult ($\alpha = .86$). We found no significant differences between the two categories and combined the data for analysis. At the end, as a manipulation check, participants in the more developed condition rated their knowledge as greater than those in the less developed condition ($M_{More} = 3.74$ vs. $M_{Less} = 3.42$, $F(1,183) = 4.41$, $p < .05$).

Results and discussion

The results showed a significant signage by preference development interaction on decision difficulty ($F(1,182) = 8.12$, $p < .01$). Participants with more developed preferences experienced greater decision difficulty when a sign was present ($M_{Sign} = 2.97$) compared to absent ($M_{Control} = 2.38$, $F(1,182) = 6.86$, $p < .01$). Participants with less developed preferences, however, did not exhibit a difference in decision difficulty due to the sign ($M_{Sign} = 2.13$ vs. $M_{Control} = 2.43$, $F(1,182) = 1.90$, $p > .15$).

The results provide initial support for our conflict process. Signs led to more decision difficulty for consumers with more developed preferences, suggesting that signs can create conflict with a consumer’s preferences. One limitation of this pilot test is that our preference development manipulation might have inadvertently cued participants into considering additional attributes. Though it does not account for the interaction with signage, it could have changed the choice task in some way. Therefore, we will measure (as opposed to manipulate) preference development in our subsequent main studies.

Experiment 1: manipulating conflict and measuring preference development (teas)

We designed experiment 1 to specifically manipulate whether the recommendation signage conflicted with a participant’s preferences by obtaining consumer preferences in the first part of the study (Fig. 1). In the second part of the study, we placed signs on options to either conflict or not conflict with these preferences. Based on our theory, we expect that a sign conflicting with preferences will lead to more decision difficulty compared to a sign placed on a non-conflicting option. Most importantly, this should only occur for participants with more developed preferences.

Method

Sixty-one undergraduates participated in the computer-based study in exchange for extra credit. We asked participants to imagine that they were shopping for a box of hot teas in a grocery store and that we would like them to choose which tea they would be most likely to buy. We also told participants that several people would be randomly selected to receive their choice of tea. In the first phase of the study we presented participants with a choice between four Yogi brand teas. After making a choice, participants made a second choice from a different store containing the same four teas plus 24 additional Yogi teas, with two teas marked with “Award Winner” recommendation signs. For participants in the no-conflict condition, one of the signs was placed on the tea they chose in the first choice scenario. For participants in the conflict condition, neither sign was placed on the tea they chose in the first choice. After making a choice from the second assortment, participants responded to the same four decision difficulty measures as in the pilot study ($\alpha = .86$). Participants

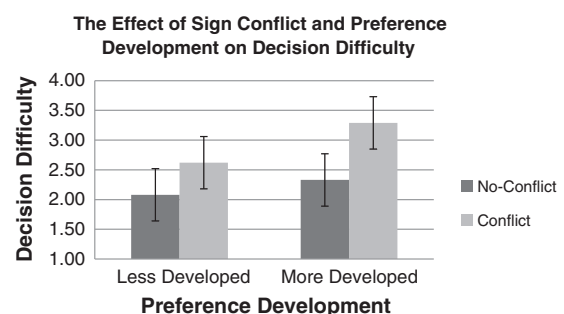


Fig. 1. Experiment 1 means.

then responded to four questions measuring their preference development on 7-point scales ($\alpha=.89$) adapted from Mitchell and Dacin (1996): “Compared to other people, I would say that my knowledge of teas is:” “I know a lot about teas.” “How clear an idea do you have about which characteristics are important in providing you maximum satisfaction in teas?” and “How frequently do you purchase teas?”

We analyzed the data by regressing the independent variables of sign conflict, the continuous measure of preference development, and their higher order interactions onto decision difficulty. The independent variables were mean centered at zero (Irwin & McClelland, 2001), and for expository purposes and paired comparisons we plotted the continuous measure of preference development at one standard deviation above and below the mean.

Results

As expected, we found that the effect of sign conflict on decision difficulty depended on preference development. A significant sign conflict by preference development interaction ($F(1,57)=5.77, p<.05$) showed that participants with more developed preferences experienced more difficulty when the sign was on a conflicting option ($M_{Conflict}=3.29$) compared to a non-conflicting option ($M_{No-conflict}=2.33, F(1,57)=4.81, p<.05$). However, as expected, participants with less developed preferences did not show a significant increase in difficulty when the sign was on a conflicting option ($M_{Conflict}=2.62$ vs. $M_{No-conflict}=2.08, F(1,57)=1.48, p>.2$). The results are consistent with our framework and provide evidence that when signs conflict with preferences, especially when these consumer preferences are more developed, consumers will experience more decision difficulty.

We should also note that these results could not be explained by a choice validation account. One could argue that participants in the no-conflict condition felt that the sign validated their choice. While this might explain a main effect for signs, it would not account for the interaction that we find with preference development.

Experiment 2: measuring consideration set sizes (energy bars)

A key tenet to our proposed theory is that conflict leads consumers to consider additional options in the choice process, leading to decision difficulty. Though our results are consistent with this notion, at this point, we have not measured consumers' consideration set sizes. Thus, experiment 2 was designed to establish the connection between signage and an increase in consideration set size (Fig. 2).

Method

Seventy-nine undergraduates participated in the experiment in exchange for extra credit and their chosen energy/health bar for participating. Participants entered the lab individually and were presented with 20 Larabar brand energy/health bars. They were asked to look at the display of bars and choose which one they would like to receive. In the sign condition we placed one “Top

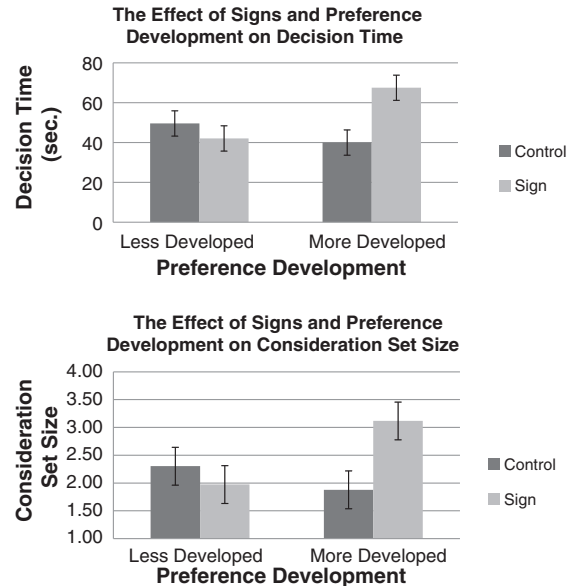


Fig. 2. Experiment 2 means.

Rated” sign on the bar that was marked as top rated by an online retailer; in the control condition there was no sign present. The administrator encouraged the participant to look closer at the options by saying, “Feel free to pick up and take a closer look at any of the energy bars as you make your choice.” To measure consideration set size, the administrator recorded how many options the participant touched. The administrator also timed the participants with an inconspicuous clock hanging on the wall to measure decision time. After participants made a choice we examined whether participants were guessing our hypotheses by asking them to respond to an open-ended question. No one guessed the hypothesis or questioned the credibility of the recommendation sign. Finally, participants responded to the same four preference development questions as in experiment 1 with an added question directed at the Larabar brand ($\alpha=.84$), “How familiar are you with Larabars?”

We analyzed the data by regressing the independent variables of recommendation signage, the continuous measure of preference development, and their higher order interactions onto consideration set size and decision time. As before, the independent variables were mean centered at zero (Irwin & McClelland, 2001) and preference development was plotted at one standard deviation above and below the mean. Five outlier participants were significantly different ($p<.05$) from the other observations according to their studentized deleted residual and were removed from the analysis (McClelland, 2000). These outliers (three from the sign condition and two from the control) were more than five standard deviations from the consideration set mean of 2.37 (i.e., they had consideration sets of 10 or more).

Results and discussion

Consistent with our previous results measuring decision difficulty, we found that the effect of recommendation signage on decision time was moderated by preference development ($F(1,70)=8.95, p<.01$). Participants with more developed

preferences took more time (in seconds) deciding when the sign was present ($M_{Sign}=67.48$) compared to absent ($M_{Control}=39.96$, $F(1,70)=11.56$, $p<.01$). As expected, there was no significant difference for those with less developed preferences ($M_{Sign}=42.04$ vs. $M_{Control}=49.56$, $F(1,70)<1$).

Importantly, we also found support for our consideration set predictions. Specifically, we found that the effect of signage on consideration set size was moderated by preference development ($F(1,70)=5.29$, $p<.05$). Participants with more developed preferences had larger consideration sets when the sign was present ($M_{Sign}=3.12$) versus absent ($M_{Control}=1.88$, $F(1,70)=6.56$, $p<.05$), and as expected those with less developed preferences showed no significant difference ($M_{Sign}=1.97$ vs. $M_{Control}=2.30$, $F(1,70)<1$).

To investigate consideration set sizes further, we partitioned the consideration set size into (a) consideration of the signed option and (b) consideration of the other non-signed options. We found a similar pattern of results for both. For the consideration of non-signed options, there was a significant sign by preference development interaction ($F(1,70)=5.29$, $p<.05$). Paired comparisons showed that participants with more developed preferences considered a greater number of non-signed options when the sign was present compared to absent ($M_{Sign}=2.79$ vs. $M_{Control}=1.77$, $F(1,70)=5.53$, $p<.05$), whereas participants with less developed preferences showed no significant difference ($M_{Sign}=1.86$ vs. $M_{Control}=1.26$, $F(1,70)<1$). For consideration of signed options, the results were directionally consistent but did not obtain significance: Participants with more developed preferences appeared to be more likely to consider the signed option when the sign was present compared to absent ($M_{Sign}=.33$ vs. $M_{Control}=.11$, $\chi^2(1,N=74)=2.34$, $p=.13$). Participants with less developed preferences were not more likely to consider the signed option when the sign was present versus absent ($M_{Sign}=.05$ vs. $M_{Control}=.12$, $\chi^2(1,N=74)<1$). We can see from these results that when signs are more likely to create conflict, people respond by considering more options.

Experiment 2 provides evidence for our proposed process by showing the effect of recommendation signage on consideration set formation, and it again shows the moderating role of preference development. It also shows that participants with more developed preferences took more time to make a decision when the sign was present, suggesting that the decision process was more complex and required more cognitive processing. In our next experiment we will investigate further whether the expansion of consideration sets operates through the consideration of both signed and non-signed options and whether this process mediates the effect on decision difficulty.

Experiment 3: consideration set mediation (chocolates)

We had several goals in experiment 3. First, we wanted to provide additional support for our proposed process (Fig. 3). We propose that the difficulty created by recommendation signage is due to consumers expanding their consideration sets. To examine this process, we measured decision difficulty and then consideration set size to test for mediation. Second, we designed the experiment to provide further evidence that larger consideration

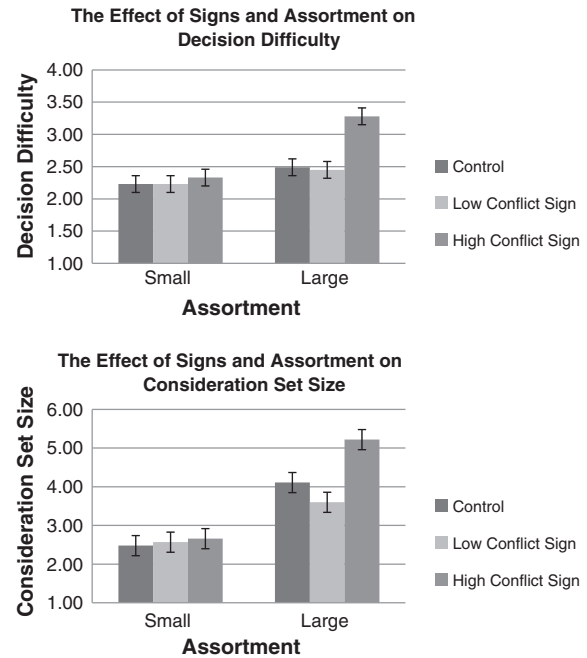


Fig. 3. Experiment 3 means.

sets are due to preference conflict by manipulating sign conflict in a novel way. We manipulated conflict by either placing the sign on a high attractive (high conflict) or low attractive (low conflict) option. If signs are on highly attractive options, then tension will result when they conflict with a consumer's initial preference, leading consumers to expand their consideration sets, and create more decision difficulty. However, if signs are on unattractive options, then the option can be easily dismissed and conflict should be low, and hence the sign will not affect consideration sets or create decision difficulty.

Third, we wanted to identify another important boundary condition to the effect of signage on consideration set size and difficulty. At this point all of our experiments have focused on large assortments, but our framework proposes that signage will only lead to conflict and larger consideration sets when there are many good options to consider (i.e., large assortments), but not in small assortments. Thus, we expect signs to increase consumers' consideration set sizes and increase decision difficulty when choosing from a large assortment, but not when choosing from a small assortment.

Method

The study was a 2(assortment: large vs. small) × 3(recommendation signage: control, low conflict signage, high conflict signage) between subject design and 293 undergraduate students participated in the study in exchange for extra credit. Participants entered the lab individually and were presented with a table displaying either a small (6 options) or large (30 options) assortment of Godiva chocolates with name cards. Conflict was manipulated by either placing the signs on attractive (high conflict) or unattractive (low conflict) options. The high conflict signage condition included two red "Best Seller" signs attached to the name cards of the two most

frequently chosen chocolates according to a pretest. The low conflict signage condition included two red “Best Seller” signs on the two chocolates that were rated as the most unappealing. A control condition with no recommendation signs was also included. We asked participants to choose a chocolate to receive later in the study. After making their decision, they responded to the same decision difficulty questions ($\alpha=0.80$) as in our previous experiments and then proceeded to a different room to receive their chosen chocolate and answer a consideration set question (only 172 participants responded to the consideration set measure due to an error). To measure their consideration set sizes, we showed participants a planogram containing photos and names of chocolates that corresponded to the original display and asked them to circle all the chocolates that they considered when making their choice.

To analyze the data we used orthogonal contrast codes to partition the sum of squares for the three signage conditions (Rosenthal, Rosnow, & Rubin, 2000). The first contrast code tested our main hypothesis: that the high conflict signage condition would lead to more decision difficulty than the control and low conflict signage condition, and the interaction with assortment tests whether this depends on assortment size. The second contrast code compared the low conflict signage condition to the control condition, and the interaction with assortment tests whether this effect depends on assortment size. Since we did not find any differences between the low conflict signage and control conditions (F 's < 1), nor did it interact with assortment (F 's < 1), it will not be discussed further.

Results

Consistent with our predictions, we found that only high conflict signage led to more decision difficulty in large assortments: The effect of high conflict signage on decision difficulty was moderated by assortment size ($F(1,288)=6.77$, $p<.01$). Specifically, when participants were choosing from the large assortment, recommendation signage heightened decision difficulty in the high conflict signage condition ($M_{High}=3.28$) compared to the low conflict signage and control conditions ($M_{Low}=2.45$ and $M_{Control}=2.49$, $F(1,288)=17.03$, $p<.001$). However, and as expected, when participants were choosing from the small assortment, recommendation signage did not affect decision difficulty ($M_{High}=2.33$ vs. $M_{Low}=2.23$ and $M_{Control}=2.23$, $F(1,288)<1$).

Supporting our proposed theory, we also found that only high conflict signage in large assortments led to larger consideration sets. A significant high conflict sign by assortment size interaction ($F(1,174)=4.93$, $p<.05$) showed that signage had a significant effect on consideration set sizes. Specifically, when choosing from a large assortment, participants formed larger consideration sets in the high conflict signage condition ($M_{High}=5.22$) than in the low conflict sign and control conditions ($M_{Low}=3.60$ & $M_{control}=4.11$, $F(1,174)=4.93$, $p<.05$). However, as expected, when participants were choosing from the small assortment, signage did not affect consideration set size ($M_{High}=2.66$ vs. $M_{Low}=2.57$ and $M_{control}=2.48$, $F(1,174)<1$).

As in experiment 2, we investigated consideration set sizes further by partitioning the consideration set into (a) consideration of the two high conflict signed options and (b) consideration of the other non-signed options. We found the same pattern of results as experiment 2, suggesting that signage expanded consideration sets by increasing the consideration of both signed and non-signed options. In terms of signed options, we found a significant interaction between assortment and high conflict signage ($F(1,174)=5.41$, $p<.05$). When participants were choosing from the large assortment, a greater number of signed options were considered in the high conflict signage condition compared to the others ($M_{High}=.67$ vs. $M_{Low}=.27$ and $M_{Control}=.41$, $F(1,174)=5.26$, $p<.05$), and, as expected, when participants chose from the small assortment, recommendation signage did not affect consideration of the signed options ($M_{High}=1.03$ vs. $M_{Low}=1.14$ and $M_{Control}=1.17$, $F(1,174)<1$). In terms of non-signed options, when participants were choosing from a large assortment they considered a greater number of non-signed options in the high conflict condition ($M_{High}=4.63$) compared to the low conflict sign and control conditions ($M_{Low}=3.31$ and $M_{Control}=3.71$, $F(1,174)=6.94$, $p<.01$), and as expected, when choosing from the small assortment, signage did not affect whether participants considered non-signed options ($M_{High}=1.53$ vs. $M_{Low}=1.51$ and $M_{Control}=1.29$, $F(1,174)<1$).

We predicted that the effect of recommendation signage on decision difficulty is due to an increase in consideration set sizes. Thus, the theory predicts that we should find that consideration set size mediates the high conflict signage by assortment interaction on decision difficulty. To examine this mediation hypothesis we used the recommended indirect bootstrapping technique for testing mediated moderation (Preacher & Hayes, 2008). We found a significant effect of consideration set size on decision difficulty ($\beta=.14$, $t(179)=3.06$, $p<.01$), and, more importantly, we found a significant indirect effect of signs on difficulty operating through consideration set size ($\beta=.031$; 95% CI = .001, .086). In other words, the increase in decision difficulty caused by the signs can be explained by the increase in consideration set size.

Discussion

The results of experiment 3 provide additional support for our theory that recommendation signage expands choice and leads to more decision difficulty. The results show that recommendation signage increases consideration set sizes and decision difficulty, and that the effect of signage is limited to high conflict signs when consumers are choosing from large assortments. A mediation analysis shows that this effect of signage on difficulty is created by consumers constructing larger consideration sets. The results of this experiment along with experiment 2, also suggest that signage increases consideration set sizes by increasing consideration of both signed and non-signed options, suggesting that signage leads consumers to reconsider their choice and expand their choice set beyond their norm. Interestingly, this finding suggests that a recommendation sign on one option could actually increase the probability of consumers considering another option. Our results also identify assortment size as a key boundary condition to the effect of signage on difficulty and consideration set size.

General discussion

In this research we explored a common tool that retailers often use to assist consumers when making complex choices—recommendation signage. Across three experiments we show that instead of narrowing the choice set and simplifying decisions, recommendation signs can actually lead to the consideration of more options, causing consumers to experience more difficulty when making a decision. We propose that the consequences of recommendation signage are due to recommendations conflicting with consumer preferences, which leads consumers to expand their consideration set. We provide evidence for this process by identifying two key moderators—preference development and assortment size—to the effect of recommendations signage. When consumers have more developed preferences, which is when signs are likely to conflict with preferences, we find that recommendation signs increase consideration set sizes and decision difficulty. However, when consumers have less developed preferences signage is unlikely to conflict with these consumers' ill-defined preferences and we find that it does not negatively impact the choice process.

In our pilot test and first experiment we examined the effect of signage on decision difficulty and the moderating role of preference development in three different product categories. Manipulating preference development in a pilot test, we showed that the presence of the recommendation signs increased decision difficulty for participants in the high preference development condition but not those in the low preference development condition. Experiment 1 measured preference development and again showed that only consumers with more developed preferences experienced greater decision difficulty, suggesting that consumers must have some preferences in order for the signs to create conflict, expand consideration sets, and increase difficulty. Experiment 1 also tested conflict more directly by manipulating conflict at the individual level (i.e., sign location was based on the individual participants' preferences).

Experiments 2 and 3 further examined the effect of signage on consideration set expansion by measuring consideration set sizes. Experiment 2 found that consumers with more developed preferences expand their considerations sets when the sign is present compared to absent. In experiment 3 we manipulated assortment size and sign conflict, while testing for the mediating role of consideration set size on decision difficulty. The results provide more empirical evidence for our theory by showing that a high conflict sign in a large assortment leads to larger consideration set sizes and greater decision difficulty. Finally, a mediation analysis found that the effect of consideration set size was a significant mediator to our effect of signage on decision difficulty.

Our results are especially noteworthy as they depart from the classic theory of reactance. Prior research has examined how recommending an option can lead consumers to feel restricted and react against the recommendation, experiencing more decision difficulty (Brehm & Brehm, 1981; Fitzsimons & Lehmann, 2004). In our studies, however, recommendation signage does not lead to choice restriction, or reactance, but instead leads to the expansion of consideration sets, and we find this effect in conditions not

predicted by reactance. First, reactance should be less likely to occur when consumers are choosing from large assortments, as consumers feel more power and control when they have more options (Inesi, Botti, Dubois, Rucker, & Galinsky, 2011). However, we found that when choosing from a large (vs. small) assortment, consumers formed larger consideration sets and experienced more decision difficulty. Second, whereas reactance has been shown to be greatest when advisors recommend options that are unattractive (vs. attractive) (Fitzsimons & Lehmann, 2004), our theory predicts just the opposite: Placing signage on attractive (vs. unattractive) options will lead to conflict, creating larger consideration sets and more difficulty.

Managerial implications

While our experiments investigated the negative consequences of providing recommendation signs to consumers, we should note that signs could have some positive downstream managerial implications. Our studies showed that signs create more difficulty due to larger consideration sets, which suggests that perhaps consumers are considering options that they would not otherwise consider. Though it is unlikely that our results are driven by variety seeking because it is novice consumers with less (and not more) developed preferences that tend to diversify and seek more variety (Fox, Ratner, & Lieb, 2005; Redden, 2008; Simonson, 1990), it is possible that the increased consideration set size and decision difficulty could lead to the purchase of additional options for consumers with more developed preferences. This notion raises an important managerial question: Could signs increase the quantity of options purchased in a retail setting by expanding consideration sets?

To investigate this question further, we conducted a follow-up study that allowed some of the participants to purchase multiple options from the choice set. In the experiment we provided 152 participants with \$3 and asked half of them to buy one chocolate from an assortment of 30 chocolates, and we asked the other half to buy *at least one* chocolate, but allowed them to buy additional chocolates at \$.50 each. We also manipulated the presence of two "Best Seller" signs and measured preference development as we did in experiments 1 and 2. After participants made their choices, we asked them to circle on a planogram all the chocolates that they considered when making their decision.

Replicating our results, we found that recommendation signs led to larger consideration sets for participants with more developed preferences (sign \times preference development interaction $F(1,144)=7.55, p<.01$), and this did not depend on whether participants could only buy a single option or could buy multiple options. Even more interestingly, however, was that this increase in consideration set size led participants to buy more than the single option: There was a significant sign by preference development interaction on whether participants purchased more options ($\chi^2(1,N=77)=4.44, p<.05$). For participants with more developed preferences, 96% decided to purchase more than one option when the sign was present compared to only 74% when the sign was absent ($\chi^2(1,N=77)=3.31, p=.07$). For those with less developed preferences, there was no significant difference due to the sign (42% vs. 65%, $\chi^2(1,N=77)=1.70$,

$p = .19$). To examine whether consideration set size mediated the effect on purchasing additional options, we used the recommended indirect bootstrapping technique for testing moderated mediation with a dichotomous dependent variable (Preacher & Hayes, 2008). We found an indirect effect of signs on purchasing additional options through consideration set size ($\beta = .034$; 90% CI = .004, .072), suggesting that larger consideration set sizes can lead consumers to purchase more options in a retail setting.

Extensions and future research

In practice, there are many variations on the form recommendation signs take and how they can be interpreted, and one might wonder how participants interpreted the signage in our studies. In our managerial survey we found that people do not intuitively believe that signage could make a decision more difficult. In our follow-up study, we also asked participants open-ended questions regarding the recommendation signs that they saw in the choice process. Our results showed that participants interpreted the signage as intended: 95% viewed the signs as a designation of the most frequently purchased/sold option. When asked how the signs affected their decision, 71% thought that the signs had no effect. Interestingly, 24% reported that the sign helped their decision and no one indicated that it hurt their decision process.

Across our studies we tested a breadth of recommendation signs—“Award Winner” (experiment 1), “Top Rated” (experiment 2), and “Best Seller” (experiment 3)—to examine the generalizability of our effects. Nonetheless, this list is by no means exhaustive and we do not want to suggest that all signs are created equal. Despite the fact that these signs had the same effect on consideration set sizes and decision difficulty, they do convey different meanings, and we cannot rule out the possibility that other signs might be more or less effective. For instance, some signs promote a popular option while others might promote a popular option within a niche, which may exacerbate our findings even further. In addition, we purposely did not examine price-related signage as it is likely to lead to a host of inferences and stockpiling behaviors, something that we could not accurately measure in our studies. Future research should examine different recommendation signs, especially price-related signage and signage targeting a niche. It should also be noted that our signs were picked and placed as to not mislead or misrepresent information to the consumer. Signs such as “Best Seller”, simply convey the preference of the masses, and do not imply that one option, in a horizontally differentiated assortment, is objectively superior.

In our studies we were interested in generic recommendations provided to all consumers during the decision making process because they offer the advantage of low cost and easy implementation. However, Internet recommendation systems that customize a recommendation based on an individual's preferences and decision history require individual-level data and more sophisticated analyses (Ying et al., 2006). Such personalized recommendation agents have been shown to decrease the size of consideration sets under certain conditions (see Haubl & Trifts, 2000), such as when search costs are high (Diehl, 2005). Additional research should examine conditions

under which personalized recommendations may also induce larger consideration sets and more decision difficulty.

Future research should also investigate new ways to measure consumer consideration sets and how they are formed. Measuring consideration sets is a challenging endeavor, and no single measure is perfect. Though our two different measurement procedures found consistent results, there may still be room for future research. It would also be interesting to note whether the composition of a consumer's consideration set changes as a function of assortment size and signage. For instance, as the number of options in a choice set increases, consumers may be more likely to use a less effortful inclusion strategy. The focus on positive features in an inclusion versus exclusion decision strategy for consideration set formation (Meloy & Russo, 2004) may have other consequences on the final decision process.

In a world where choosing has become a symbol of freedom associated with personal power and control (Inesi et al., 2011), there are few instances when it may be desirable to reduce the number of options available to consumers (Chernev, 2006; Goodman & Malkoc, 2012); however, we would still like to believe that there are some tools and/or strategies out there that consumers can use to navigate the new world of too much choice (Schwartz, 2004). The results of a pilot study and three experiments show that the commonly used recommendation sign may not be one of these tools. Instead of helping to narrow the choice set, recommendation signs lead to the consideration of more options, precisely when consumers have the fewest resources to cope with more complexity—when choosing from a large assortment. We show that providing consumers with recommendation signs leads to greater consideration set sizes and more difficulty when the assortment is large, when the decision maker has relatively more developed preferences, and when the sign is likely to create conflict with these developed preferences.

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