STEPHEN M. NOWLIS, RAVI DHAR, and ITAMAR SIMONSON*

Consumers often resolve trade-offs in a particular order. For example, when making flavor and size decisions, consumers might first decide which flavors to choose and then decide which sizes of those flavors to choose. This research examines the effect of decision order on purchase quantity decisions. The authors build on prior work on decision difficulty and conflict to show that consumers choose more overall, and more variety, when they consider a less replaceable attribute in an earlier, rather than a later, stage in the purchase decision. For example, consumers choose a greater quantity when flavor (or brand) decisions precede, rather than follow, size decisions. The authors find that the degree of attribute replaceability also moderates the effect of decision order on quantity chosen. Furthermore, marketers can influence the amount chosen by altering the organization of the shelf display. Finally, the authors find that when consumers explicitly consider the possibility of deferring their decisions, the effect of decision order declines.

Keywords: consumer choice, purchase quantity decisions, decision order, brand choice, attribute replaceability

The Effect of Decision Order on Purchase Quantity Decisions

Imagine that a consumer is choosing between different types of yogurt and focusing on trade-offs involving size and flavors. This consumer might first decide which flavors and how many of those flavors to choose, or the consumer might first decide which sizes and how many of those sizes to choose. Although prior research on consumer decision making has commonly focused on choice and choice incidence, relatively little research has focused on another important aspect of consumer decision making—the quantity of the product chosen (e.g., Chernev 2008; Wansink, Kent, and Hoch 1998). A major finding from prior research on choice and choice incidence reveals that both aspects depend on the context, or the set of alternatives under consideration, and the task, or the procedure for making the decision (e.g., Huber, Payne, and Puto 1982; Simonson et al. 2001). In this research, we examine how the purchase quantity decision may also be influenced by certain aspects of the context or task—in this case, the order in which consumers make decisions, such as in the yogurt example.

Prior work on consumer choice and choice incidence has shown that decision conflict is an important variable in determining what people choose and whether they make a choice. Our research builds on this work by suggesting another important consequence of decision conflict; namely, it can also affect the amount chosen. In particular, we propose that as the decision becomes more difficult, consumers resolve this difficulty by choosing a greater variety and, therefore, greater overall quantity. By distributing the choice of options across several different product configurations, consumers can resolve this decision conflict.

If the purchase quantity decision is also systematically affected by decision difficulty, it can have important consequences for decision making that occurs in stages. Because consumers often make decisions in a specified sequence, we posit that the order in which these decisions are considered (e.g., Tversky and Sattath 1979) will have a systematic effect on the overall quantity chosen. If a consumer confronts a more difficult attribute trade-off in the first stage of a decision, we predict that he or she will choose a greater variety and greater quantity of this attribute than if he or she considered an easier trade-off in the first decision stage.

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When the consumer chooses more of an attribute in the first stage, it can translate into more chosen in the second stage as well. For example, if a consumer decides among different flavors before deciding among different sizes, the greater difficulty in making trade-offs among flavors than among sizes will lead to a greater quantity chosen than if the size decision precedes the flavor decision.

We conduct seven studies to test our framework and predictions. We begin by focusing on trade-offs involving flavors (a more difficult trade-off, as we show) and trade-offs involving sizes (an easier trade-off). Across experiments, we find that when the flavor decision precedes the size decision, consumers choose more overall and more variety than when the decision order is reversed. We then show that our framework is not limited to flavor and size decisions but also can account for other types of trade-offs that differ in terms of decision difficulty, such as brand and size decisions or brand and flavor decisions. When the difficulty of a trade-off is reduced, it eliminates the effect of order on the amount chosen. Furthermore, we examine the implications of our findings for the way that products should be organized on store shelves. Finally, we show that the effect of decision order on quantity chosen declines when consumers have alternative ways of resolving decision conflict, such as by electing to defer the choice altogether.

RESOLVING ATTRIBUTE TRADE-OFFS ACROSS DECISION STAGES

In this research, we focus on how the order for resolving decision trade-offs can affect the amount and variety chosen. For example, in the case of yogurt, a consumer might want to decide how many and which type of flavor to buy first and then decide which sizes of those flavors to choose. The order in which consumers consider the different comparisons can happen because the retailer sets up the store display to encourage the flavor decision first, or because the consumer naturally chooses flavors first according to an internal decision rule. Alternatively, a consumer might decide to make the yogurt purchase in the opposite order, namely, make the size decision before the flavor decision. Note that from a normative perspective, the decision order should not affect the amount and variety chosen. If the flavor decision is made first, the size decision follows. In the other order, the same decisions are made, just in a different sequence. However, we argue that the decision order can exert a systematic effect on the amount and variety chosen, as we consider in more detail next.

Purchase Quantity Decisions and Decision Difficulty

Prior work on consumer decision making has focused on the degree to which attribute trade-offs influence decision difficulty (e.g., Carmon, Wertenbroch, and Zeelenberg 2003; Kivetz 2003). This research has found that certain types of attributes are more difficult to trade off than others (e.g., Luce, Bettman, and Payne 2001). In particular, attributes differ in the degree to which they offer unique benefits and can be directly compared and exchanged (e.g., Hsee 1996; Nowlis and Simonson 1997; Yeung and Soman 2005; Zhang and Markman 1998). Those attributes that are the same along a common dimension and can be directly compared and exchanged are easier to trade off than attributes that are not as easily compared and exchanged. For example, attributes that are quantitative in nature, such as prices and quality ratings, are easier to trade off and exchange than attributes that are qualitative in nature, such as brand names. This idea is consistent with research showing that currency decisions are easier than commodity decisions (Beattie and Barlas 2001) and that comparable attributes are easier to trade off than noncomparable attributes (e.g., Slovic and MacPhailly 1974).

Building on prior literature, we propose that the more "replaceable" an attribute, the easier it is for consumers to make trade-offs involving that attribute. We focus on this particular dimension of trade-off difficulty because it is most relevant for the types of decisions we consider in this article: decisions that consumers frequently make among relatively mundane attributes, such as size, flavor, or brand name. As we mentioned previously, this proposition is in line with work showing that trade-offs involving a directly comparable and substitutable dimension typically lead to easier decisions. Conversely, a decision involving an attribute that offers unique advantages and disadvantages is more difficult because it requires more trade-offs. Thus, when one attribute can simply replace a different level of that same attribute, there are no separate advantages and disadvantages to consider; it is just a matter of exchanging one amount for another amount. However, when an attribute offers unique characteristics that cannot be easily exchanged, it requires more difficult trade-offs because one aspect of the attribute must be traded off against a different aspect.

Consider the consumer who is buying yogurt at the grocery store and is first deciding which flavor or flavors of yogurt to select. In such a situation, flavors are not directly replaceable, because vanilla yogurt, for example, offers unique advantages and disadvantages over cherry yogurt, and one cannot directly replace the other. Thus, one flavor cannot be exchanged easily for the other flavor, because the flavors are inherently different along dimensions that are unique. However, some attributes, such as sizes, can be exchanged more easily and therefore act as replacements. For example, four 8-ounce packages of vanilla yogurt can replace one 32-ounce package.

We posit that these differences in the ease of replacement affect decisions when the consumer can choose more than one option. For example, if a consumer is choosing among flavors, he or she can choose multiple flavors. We propose that in such a situation, the less replaceable the attribute, the more the consumer will pick greater variety, and therefore greater overall quantity, as a way to resolve this conflict (e.g., Dhar 1997). For example, a consumer could resolve the difficulty of choosing between a vanilla and a coffee yogurt by choosing one of each. However, a consumer would not be as likely to follow this strategy for a more replaceable attribute, such as size. For sizes, there is not as much conflict because one size can replace a different size, and thus there is less of a need to resolve the conflict by choosing multiple sizes. This idea is also consistent with research showing that consumers resolve preference uncertainty by choosing a greater variety of options as a means to ensure that they can match their changing preferences with the appropriate option (Simonson 1990).

In this research, we are specifically evaluating purchase situations in which a variety of options is available and the consumer can choose multiple options. We are not investi-
gating situations in which the consumer has already purchased multiple options and then is trying to decide which one item to choose for consumption. We argue that consumers can “spread out” their choices over multiple options at the time of purchase but likely only choose one item at the time of consumption. In addition, we consider the effect of the ability to defer choices on how attribute replaceability influences quantity decisions.

We next go into more detail on how our general proposition relates to the specific attributes we study in this research. We begin with flavor and size decisions and subsequently discuss other attributes. We propose that flavor trade-offs will be more difficult to resolve because flavors are not as replaceable as other attributes. For example, as we mentioned previously, one flavor cannot serve as a direct replacement for another flavor. In comparison with flavor decisions, we believe that size decisions are easier to resolve because they are more replaceable. To test this basic idea, we ran a pilot study.

Pilot Study

Participants were 80 undergraduate marketing students fulfilling a course requirement. They rated the degree of difficulty in making trade-offs involving flavors and sizes. For example, for the flavor decision in the ice-cream category, participants were told to imagine that they were deciding among different flavors (chocolate, vanilla, and strawberry) of ice cream at a store. They then rated the degree of difficulty in deciding on three 11-point scales, ranging from 0 to 10, with the endpoints “not at all difficulty/very difficult,” “not at all simple/very simple,” and “not at all likely to regret/very likely to regret” (Chatterjee and Heath 1996; Dhar and Nowlis 2004). Each participant rated the decision difficulty in three different categories (ice cream, juice, and cookies), and each category appeared on a separate page of the survey. The particular flavors and sizes we chose to test in each category were standard levels that consumers can find in the marketplace. The order of the categories was counterbalanced, and we found no significant order effects.

Given the high correlation among the three measures of decision difficulty, we used a composite measure ($\alpha = .81$). The results regarding the degree of difficulty in Table 1 are consistent with our assumptions: Participants found decisions among flavors to be more difficult than size decisions ($t = 4.13, p < .01$). This pilot study shows that, as we predicted, flavors and sizes differ in predictable ways in terms of their trade-off difficulty. We next consider how these differences influence the effect of decision order on purchase quantity.

Asymmetries in Decision Order

Although a major focus of choice research has been the simultaneous evaluation of options, decisions that involve processing information according to some hierarchical structure have also received attention (e.g., Bettman and Park 1980; Gensch and Ghose 1992). Typically, hierarchical processes arise in choices involving a large number of attributes or options or in sets with variance in the comparability among the options (Bettman and Sujan 1987). Many studies show that constraints in the order of processing can lead to systematically different outcomes in comparison with what would be expected in the absence of constraints (e.g., Glazer, Kahn, and Moore 1991; Tversky and Sattath 1979). In contrast with previous work that examines the effect of partitioning a larger choice set into subgroups, we examine how the order of the decision process can affect the amount and variety chosen.

When consumers face a more difficult decision in the first stage of the decision sequence, they are more likely to resolve this difficulty by choosing multiple options. Furthermore, prior research has shown that when decisions are made in stages, the results from the first stage have a systematic carryover effect on the results in the second stage (e.g., Dhar and Nowlis 2004; Dhar, Nowlis, and Sherman 1999). In particular, a great deal of prior work has shown that the choice process becomes more discriminating in later stages of the decision process (e.g., Bettman and Park 1980). For example, the decision process often includes an initial phase for screening out options and then a more deliberate phase to compare the remaining options more carefully. As a result, we propose that the decision process in the first stage will lead to more discrimination in the second stage.

To apply this concept to a specific example, consider the decision to choose flavors and sizes. When the flavor decision is made first, it will result in more variety and a greater quantity chosen because consumers resolve the conflict by choosing more. However, when the flavor decision is second, the decision process will then be influenced by the size decision, which now comes first. The size decision can be resolved by choosing fewer units, which means that the consumer is becoming more discriminating. This discrimination process then passes on to the second stage of the decision and makes consumers more discriminating when they choose flavors.

$H_{1a}$: Consumers who make decisions among less replaceable attributes (e.g., flavors) before making decisions among more replaceable attributes (e.g., sizes) will choose more overall quantity than if the decision process were to occur in the opposite order.

In addition to affecting the overall amount chosen, the choice order should have a systematic effect on the variety chosen across the two decision stages. When flavors are chosen in the first stage, the selection of more variety is a means to resolve the decision conflict. However, when the size decision precedes the flavor decision, we predict that consumers will choose less flavor variety (in the second phase of the decision) because of the influence of the decision process from the first stage. We expect the decision process to encourage greater discrimination across stages. When consumers choose sizes first, they should be less likely to use increased variety as a means to resolve the decision conflict. We expect this decision process to influence the second stage of the choice when flavors are chosen.

Table 1

<table>
<thead>
<tr>
<th>Product Category</th>
<th>Size</th>
<th>Flavors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ice cream</td>
<td>4.62</td>
<td>6.38</td>
</tr>
<tr>
<td>Juice</td>
<td>4.38</td>
<td>6.53</td>
</tr>
<tr>
<td>Cookies</td>
<td>4.11</td>
<td>6.13</td>
</tr>
<tr>
<td>Totals</td>
<td>4.37</td>
<td>6.35</td>
</tr>
</tbody>
</table>
In summary, we expect that more flavor variety will be chosen when the flavor decision occurs before the size decision than when the size decision precedes the flavor decision.

Although we expect decision order to affect flavor variety, we do not expect it to affect size variety. When the size decision is first, consumers should not resolve the decision by choosing greater variety. When the size decision is second, we do not expect the greater flavor variety that occurred in the first stage to affect the size variety in the second stage, because sizes are easy to choose from already. This idea is consistent with research finding that consumers choose greater variety among flavors than sizes during shopping trips (Harlam and Lodish 1995), though prior research does not offer an explanation for this result.

$H_{1b}$: Consumers who make decisions among less replaceable attributes (e.g., flavors) before making decisions among more replaceable attributes (e.g., sizes) will choose more variety along the less replaceable attribute than if the decision process were to occur in the opposite order.

### STUDY 1: QUANTITY DECISIONS INVOLVING FLAVORS AND SIZES

#### Method
Participants were 85 undergraduate marketing students fulfilling a course requirement. They were asked to imagine that they were shopping at a warehouse store and needed to make purchases in two product categories (bagels and ice cream). There were two between-subjects conditions. In one condition, participants made size decisions before flavor decisions (for an example, see Figure 1). They were asked to circle the size or sizes they would buy and write in each box the number they would buy of each size. After making decisions in the two product categories, participants read on the last page of the questionnaire the following:

You have just finished choosing which sizes you would buy. Next, we would like you to go back to the beginning of the survey, and write in how many you would buy of each flavor, so that you match the numbers you put in for the number of sizes you would buy. In other words, for each size you chose, fill in below each size, on the lines, which flavor or flavors you would buy of each size (and make sure the numbers equal each other).

In the second condition, participants made flavor decisions before size decisions, following a parallel procedure. The order of the categories was counterbalanced, and we found no significant order effects. The instructions in this and subsequent studies also emphasized that there were no right or wrong answers and that the respondents should choose the option that best reflected their preferences.

#### Results
We report the results regarding the amount of product and flavor variety chosen in Table 2. Consistent with $H_{1a}$, participants chose more of the product in the flavor–size (3.36) than in the size–flavor (1.92) condition. We tested $H_{1a}$ with an analysis of variance (ANOVA) model. The dependent variable was how much of the product was chosen and was modeled as a function of the following independent variables: (1) the order of the decision and (2) an interaction between the manipulation and the two categories, which tests whether the effects differed across the problems (e.g., Chernev 1997; Dhar 1997). Consistent with $H_{1a}$, the main effect of the decision order variable was statistically significant ($F(1, 168) = 9.97, p < .01$). We also found no significant differences in the effects across the two categories ($F(1, 168) = 1.38, n.s.$).

We calculated the variety chosen with the Herfindahl index (Simonson and Winer 1992; Tirole 1989). This index is the sum of squares of the item’s choice shares. For example, if a respondent chooses two orange, three grape, and five lemon flavors, his or her score would be $(2/10)^2 + (3/10)^2 + (5/10)^2 = .38$. The lower the score, the greater is the variety chosen. However, to make this score more intuitive, we report it after we subtract it from 1. Thus, in the preceding example, we would report the score as $1 - .38$. Therefore, the greater the score, the greater the variety chosen, which is a more intuitive way to think about this calculation.

Consistent with $H_{1a}$, participants chose more flavor variety in the flavor–size (.35) than in the size–flavor (.20) condition. We tested this effect in the same manner as that for $H_{1a}$, except here the dependent measure was the Herfindahl index. The main effect of the manipulation was significant ($F(1, 168) = 4.61, p < .05$), and there were no significant differences in the effects across the two categories ($F(1, 168) = 1.38, n.s.$).

#### Table 2

<table>
<thead>
<tr>
<th>Product Category</th>
<th>Size–Flavor Decisiona</th>
<th>Flavor–Size Decisionb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Amount Chosen</td>
<td>Overall Flavor Variety Chosen</td>
<td>Overall Amount Chosen</td>
</tr>
<tr>
<td>Bagels</td>
<td>1.90</td>
<td>.17</td>
</tr>
<tr>
<td>Ice cream</td>
<td>1.93</td>
<td>.24</td>
</tr>
<tr>
<td>Totals</td>
<td>1.92</td>
<td>.20</td>
</tr>
</tbody>
</table>

aThe size decision is made before the flavor decision.
bThe flavor decision is made before the size decision.
ferences across the two categories (F < 1). In addition, there was no difference in size variety across the conditions. In particular, size variety was .04, averaged across categories, when the size decision was first, and it was .08 when the flavor decision was first.

In summary, Study 1 shows that consumers choose more overall, and more flavor variety, if the flavor decision precedes the size decision. Furthermore, this study reveals that decision order does not affect size variety. This finding enables us to rule out an alternative explanation. That is, consumers could simply find the first stage of a decision to be more stimulating than the second stage, which would then result in more variety chosen. However, if this explanation were true, there should be a greater variety of either the flavor or the size attribute when that attribute was resolved in the first stage. Because we only found an effect of decision order on flavor variety, but not size variety, Study 1 gives less weight to the alternative explanation and more weight to our account. 2

So far, we have shown that consumers choose more overall, and more flavor variety, when the flavor decision precedes the size decision. We suggest that this result is driven by the underlying replaceability of the attribute trade-offs. To provide a stronger test of our predictions, we next explicitly manipulate the replaceability of the attribute trade-off. This enables us to provide stronger support that the results are not due to characteristics of the particular attribute itself but rather to the underlying replaceability of those attributes. For example, we can describe flavors, as we have done up to this point, in terms of the flavor itself (e.g., vanilla or strawberry). However, we can also describe flavors in a way that makes them easier to trade off because they become more replaceable, such as their taste ratings. A vanilla flavor that appears with a taste rating is more replaceable for a strawberry flavor that also appears with a taste rating. Because the flavor trade-off becomes more replaceable, it should reduce the effect of the decision order, which leads to our next hypothesis.

H 2: The degree of attribute replaceability moderates the effect of decision order on the amount chosen. When the attribute chosen first becomes more replaceable, the effect of decision order on the amount chosen decreases.

2Another alternative explanation would be that our results were due to differences in attribute importance rather than trade-off difficulty. Prior research has found that brands and sizes are the first and second most important product attributes in consumer decision making (Kumar and Divakar 1999). Thus, if the size decision were more important than the flavor decision, more should be chosen when the size decision preceded the flavor decision—but the opposite occurred.

STUDY 2: THE MODERATING EFFECT OF ATTRIBUTE REPLACEABILITY

Method

Participants were 121 undergraduate marketing students fulfilling a course requirement. There were three between-subjects conditions. In one condition, participants made size decisions before flavor decisions. In the second condition, participants made flavor decisions before size decisions. In the third condition, participants made flavor decisions before size decisions and also were given taste ratings for those flavors. This was done to increase the replaceability of the flavor trade-offs. In particular, participants were told, “You may encounter products which you have never seen (such as unfamiliar flavors or sizes) which are only sold in certain parts of the country. Because some of these flavors may be unfamiliar, we are also providing you with taste ratings of each flavor, as judged by Consumer Reports, an independent agency.” Thus, for this manipulation, participants saw flavors and a taste rating (between 1 and 100) of each flavor. Each participant made choices in two categories (chips and soda), and each category appeared on a separate page of the survey. Furthermore, the flavors were pretested to be unusual, such that it would make sense to provide taste ratings as a way to increase attribute replaceability. For example, the chip flavors were Parmesan & Garlic, Salt & Cracked Pepper, and Smokehouse Cheddar. The order of the categories was counterbalanced, and we found no significant order effects.

We also pretested the degree of decision difficulty when taste ratings were provided, using the same scales as in the main pretest, with a group of 45 students. Averaged across the two categories and three measures, decision difficulty was rated as 4.77, which is significantly less than 6.35, the rating for flavors (t = 2.62, p < .01). This finding suggests that our manipulation of taste ratings makes the flavor decision more replaceable.

Results

We report the results, which show the amount of product chosen and flavor variety, in Table 3. Consistent with H 1a, participants chose a greater quantity of the product in the flavor–size (4.81) than in the size–flavor (3.54) condition. We tested the hypotheses with an ANOVA model, as in Study 1. To test H 1a, we examined the planned contrast between the size–flavor order and the flavor–size order. Consistent with H 1a, this effect was significant (F(1, 240) = 4.51, p < .05). We tested H 2 with the planned contrast between the flavor–size decisions, with or without the taste ratings. Consistent with H 2, this effect was significant (F(1, 240) = 4.77, p < .05).

Table 3

<table>
<thead>
<tr>
<th>Product Category</th>
<th>Size–Flavor Decision</th>
<th>Flavor–Size Decision</th>
<th>Flavor–Size Decision with Taste Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall Amount Chosen</td>
<td>Flavor Variety Chosen</td>
<td>Overall Amount Chosen</td>
</tr>
<tr>
<td>Soda</td>
<td>4.27</td>
<td>.26</td>
<td>5.27</td>
</tr>
<tr>
<td>Chips</td>
<td>2.80</td>
<td>.24</td>
<td>4.35</td>
</tr>
<tr>
<td>Totals</td>
<td>3.54</td>
<td>.25</td>
<td>4.81</td>
</tr>
</tbody>
</table>
Consistent with $H_{1p}$, participants chose more flavor variety in the flavor–size (.38) than in the size–flavor (.25) condition. We tested this effect in the same manner as $H_{1a}$, except the dependent measure was the Herfindahl index. The main effect of the manipulation was significant ($F(1, 240) = 4.10, p < .05$), and there were no significant differences across the two categories ($F < 1$). In addition, there was no difference in size variety across the conditions. In particular, size variety was .07, averaged across the categories when the size decision was first, and .13 when the flavor decision was first. We tested this finding in the same manner and found that the difference was not significant ($F(1, 240) = 1.94, n.s.$). Furthermore, as we predicted, the amount of flavor variety was the same across the size–flavor and flavor–size conditions when flavor included taste ratings (.25 in each case).

Study 2 also allows us to rule out an alternative explanation based on variety seeking. Such an account would suggest that consumers choose more when the flavor decision precedes the size decision because consumers seek variety, and there is more variety available in flavors than in sizes. However, Study 2 shows that the effect of decision order on quantity chosen disappears when information about taste ratings is available with information about flavors. This information makes flavors more replaceable and the flavor decision easier, but it does not reduce the amount of variety available (the same flavors are still available). Thus, Study 2 shows that the results more likely indicate attribute replaceability than differences in variety seeking as the underlying cause.

The two prior studies used a certain procedure to test the hypotheses. In particular, respondents decided both which attributes they wanted and how many of each attribute they wanted in the first stage of the decision. In the second stage, they chose which and how many they wanted of the second attribute, to match the quantities they had chosen in the first stage. However, this procedure raises the possibility that the results are driven by an anchoring mechanism rather than the hypothesized effect of the first decision stage on the second stage. In particular, if participants chose ten total items in the first stage, the procedure would not allow the number of items to be different in the second stage. Thus, the prior tests do not allow us to determine whether the decision process from the first stage affected the second stage in terms of the total number of units chosen, because the first stage locked in the total number of units.

To rule out this alternative account, the next study employs a different procedure. Specifically, it does not lock in the total number of units chosen in the first stage. Instead, respondents merely select the different attributes they want in the first stage (e.g., they might choose two flavors), without specifying a particular number of attributes (e.g., two of one flavor, three of the other flavor). Thus, this procedure serves as a better test of whether the decision process from the first stage has a systematic effect on the second stage. With the procedure used in the first two studies, if a respondent chose 8 total yogurts in the first stage (after making the size decision), he or she had to stay with 8 total yogurts in the second round (after making the flavor decision). However, with the new procedure, if the respondent chooses 2 sizes in the first round, without specifying the total number of yogurts chosen, he or she can choose any total number in the second round. This new procedure allows respondents to choose any total amount of yogurt they want (with the restriction that they must choose 2 sizes), so that the total amount of yogurt could be only 2 or as many as 20 total. In summary, the procedure offers more support for the proposed decision process by focusing on the number of first-stage attributes chosen, not the total quantity chosen in the first stage.

Finally, Study 3 tests the idea of attribute replaceability. An attribute can become more replaceable as its values become more similar. In the prior studies, we tested typical flavor trade-offs in which a consumer might decide between vanilla flavor and strawberry flavor. However, sometimes flavor decisions involve very similar attribute levels, such as when a consumer is deciding between a regular vanilla flavor and a vanilla bean flavor. In this situation, it would be easier for the consumer to replace one level of the attribute with another level. As the levels of an attribute become more similar, we expect them to be more replaceable and easier to trade off, resulting in less of an effect on the quantity purchased compared with the situation in which the attributes were not as replaceable. This is consistent with Festinger (1957), who suggests that the degree of trade-off conflict in a choice increases with the size of the difference in attribute values, and with Chatterjee and Heath (1996), who find evidence of increased conflict as attribute value differences increase.

**STUDY 3: TEST OF THE DECISION PROCESS AND ATTRIBUTE REPLACEABILITY**

**Method**

Participants were 207 undergraduate marketing students fulfilling a course requirement. The experiment used a 2 (decision order: flavor before size versus size before flavor) × 2 (attribute similarity: very similar flavors versus less similar flavors) between-subjects design. Two product categories were tested: ice cream and yogurt. We manipulated attribute similarity by presenting either three very similar flavors or three less similar flavors. In the previous two studies, the flavors represented less similar flavors, so this study added a condition pertaining to very similar flavors. For example, in the ice-cream category, the three dissimilar flavors were chocolate, strawberry, and vanilla (as in Study 1). The three very similar flavors were regular chocolate, mild chocolate, and rich dark chocolate.

In addition, this study manipulated decision order differently than the prior two studies. In particular, when the size decision was first, participants were asked to “circle the size or sizes you would buy below.” In the prior studies, participants both circled the sizes they wanted and specified quantities for each size. In Study 3, after they circled the sizes they wanted in each category, they were instructed to “go back to the beginning of the survey and write in how many you would buy of each flavor. In other words, for each size you chose, fill in below each size, on the lines, which flavor or flavors you would buy of each size (and then put the total on top).” The procedure for the other condition, in which the

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3We pretested this with 30 participants, who rated the degree of similarity among various flavors on a seven-point scale. The “very similar” flavors were rated significantly more similar than the “less similar flavors” ($M = 6.1$ versus $4.0$; $t = 2.88, p < .01$).
flavor decision preceded the size decision, paralleled this procedure. The order of the two tested product categories was counterbalanced, and we found no significant order effects.

Results

The results regarding the amount of product and flavor variety chosen appear in Table 4. Consistent with H1a, participants chose more of the product in the flavor–size (4.48) than in the size–flavor (2.83) condition. We tested this effect in the same manner as in Study 1 and found that it was statistically significant (F(1, 203) = 12.81, p < .01). Consistent with H1b, participants chose more flavor variety in the flavor–size (.28) than in the size–flavor (.14) condition. As in Study 1, the difference was significant (F(1, 203) = 5.11, p < .05). In addition, consistent with H2, the interaction between decision order and attribute similarity was significant (F(1, 203) = 7.46, p < .01). When the flavors were very similar, we found no significant effect of decision order on either quantity chosen (M = 2.35 versus 2.36) or flavor variety chosen (M = .12 versus .12). Finally, consistent with the prior studies, there were no significant differences in size variety across the conditions (F < 1) for all comparisons.

The prior studies only examined trade-offs involving flavors and sizes. However, this limitation raised a potential alternative explanation for our results. Namely, the results could be due not to differences in replaceability but rather to specific characteristics inherent to flavor and size decisions. When flavor decisions were first, the flavor decision might have primed a desire for indulgence that led to a greater overall amount chosen. Furthermore, size decisions that came first could have primed respondents to think more about frugality. To rule out this rival account, we needed to consider other types of attributes that consumers commonly encounter (for an overview, see Figure 2). Therefore, we decided to consider brand names (e.g., Morton and Zettelmeyer 2004). We propose that brand names are less replaceable than sizes, and we tested this in the same manner as in the pilot study.4 As we predicted, respondents rated brand decisions as more difficult than size decisions (p < .05).

In addition, in Studies 2 and 3, we manipulated attribute replaceability by focusing on the flavor decision. To vary the degree of attribute replaceability for brand names, we substituted the brand names with quality ratings (e.g., Nowlis and Simonson 1997). Brand names are more difficult to compare than quality ratings. As a result, we expect that when brand name decisions precede size decisions, consumers will choose more overall product and more brand variety (H1). However, when quality ratings substitute for brand names, the decision is easier, which should eliminate the effect of decision order on quantity and brand variety chosen (H2). We tested these ideas in Study 4.

**STUDY 4: GENERALIZING TO OTHER TYPES OF TRADE-OFFS**

Method

Participants were 223 undergraduate marketing students fulfilling a course requirement. The experiment used a 2 (decision order: brand before size versus size before brand) × 2 (attribute replaceability: brand names versus quality ratings) between-subjects design. Two product categories were tested: cookies and soda. We manipulated attribute replaceability by using either brand names or quality ratings. For example, in the cookie category, the three brand names were Warehouse Store Brand, Nabisco, and Pepperidge Farm Gourmet. For the quality ratings manipulation, respondents were told to “Assume that each of these products has been given a quality rating by Consumer Reports, which is an independent tester of consumer products.” For the cookie category, the quality ratings were listed as 81, 87, and 93 (with prices corresponding to the condi-

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4We also found that brand decisions were more replaceable than flavor decisions, as our framework predicts.

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<table>
<thead>
<tr>
<th>Product Category</th>
<th>Dissimilar Flavors</th>
<th>Similar Flavors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Size–Flavor Decision</td>
<td>Flavor–Size Decision</td>
</tr>
<tr>
<td></td>
<td>Overall</td>
<td>Flavor</td>
</tr>
<tr>
<td></td>
<td>Amount Chosen</td>
<td>Variety Chosen</td>
</tr>
<tr>
<td>Ice cream</td>
<td>2.69</td>
<td>.18</td>
</tr>
<tr>
<td>Yogurt</td>
<td>2.96</td>
<td>.11</td>
</tr>
<tr>
<td>Totals</td>
<td>2.83</td>
<td>.14</td>
</tr>
</tbody>
</table>

**Figure 2**

THE EFFECT OF ATTRIBUTE REPLACABILITY ON QUANTITY CHOSEN

**A1. Situations in Which One Attribute Is More Replaceable Than the Other**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>More Replaceable</th>
<th>Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flavors</td>
<td>Sizes</td>
<td>Studies 1, 2, 3, 5, and 7</td>
</tr>
<tr>
<td>Brand</td>
<td>Sizes</td>
<td>Study 4</td>
</tr>
<tr>
<td>Flavors</td>
<td>Brands</td>
<td>Study 6</td>
</tr>
</tbody>
</table>

**A2. Result:** Consumers choose more of the product when a decision involving the less replaceable attribute is made before the decision involving the more replaceable attribute.

**B1. Situations in Which Attributes Are Equally Replaceable**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flavor</td>
<td>Sizes</td>
</tr>
<tr>
<td>quantitative ratings</td>
<td>Sizes</td>
</tr>
<tr>
<td>Very similar flavors</td>
<td>Sizes</td>
</tr>
</tbody>
</table>

**B2. Result:** Quantity chosen is not influenced by decision order because there were no differences in ease of replacement across attributes.
tion in which we used the brand names). We manipulated decision order in the same manner used in Study 3.

Results

The results in Table 5 indicate the amount of product and brand/quality variety chosen. Consistent with H1a, participants chose more of the product in the brand–size (4.89) than in the size–brand (2.18) condition. Using the same test as in Study 1, we found that this difference was statistically significant (F(1, 219) = 17.60, p < .01). Consistent with H1b, participants chose more brand variety in the brand–size (.17) than in the size–brand (.02) condition. According to the test from Study 1, the difference was statistically significant (F(1, 219) = 6.05, p < .01). In addition, consistent with H2, the interaction between decision order and attribute replaceability was significant (F(1, 203) = 6.24, p < .01). In particular, when we replaced the brand names with quality ratings, there was no significant effect of decision order on either quantity chosen (M = 2.10 versus 2.34) or variety chosen (M = .04 in both cases). Finally, consistent with the prior studies, there were no significant differences in size variety across the conditions (F < 1) for all comparisons.

In the preceding studies, we manipulated decision order by explicitly asking participants to make one decision before the other. These studies all revealed that decision order had a systematic effect on the amount and variety chosen. However, when consumers make purchases in the actual marketplace, it is unlikely that they explicitly make one type of trade-off before the other. A Web site can be organized to enforce this order, but such a strict order rarely is followed. Consumers usually have a choice about how they want to order the decision process. In a store, a consumer can choose which type of decision to make before the other. However, marketers can encourage consumers to make one type of decision before the other by organizing shelf displays in a particular manner that encourages a particular decision order (e.g., Simonson, Nowlis, and Lemon 1993; Simonson and Winer 1992). If a consumer must decide between different flavors and sizes, the store shelf could be organized by flavors. In this case, the trade-offs between the different sizes become more salient than the trade-offs between the different flavors because the different sizes appear next to one another on the shelves, whereas the flavors are separated. When size trade-offs are more apparent, consumers should choose less of an item than if the shelves were organized by sizes, where flavor trade-offs are more apparent. This reasoning leads to H3, which we test in the next study:

H3: Consumers will choose more overall quantity and more variety when products are organized by more replaceable attributes (e.g., sizes) than when products are organized by less replaceable attributes (e.g., flavors).

STUDY 5: THE EFFECT OF SHELF DISPLAYS ON PURCHASE QUANTITY

Participants were 284 undergraduate marketing students fulfilling a course requirement. There were four between-subjects conditions. In two of the conditions, participants made either flavor decisions before size decisions or size decisions before flavor decisions. In the other two conditions, we told participants that they would see products organized on shelves, as they would in a store. In one condition, the products were organized by flavors, such that the trade-offs between the sizes become more apparent (see Figure 3). In the other condition, the products were organized by sizes, such that the trade-offs between flavors became more apparent. Each participant made decisions about both soda and yogurt.

We tested our predictions with an ANOVA model. The dependent variable was how much of the product was chosen and was modeled as a function of the following independent variables: (1) the order of the decision, which tests H1a; (2) whether the products were organized by flavors or size.

Table 5

<table>
<thead>
<tr>
<th>Product Category</th>
<th>Size–Brand Decision</th>
<th>Brand–Size Decision</th>
<th>Size–Quality Decision</th>
<th>Quality–Size Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall Amount Chosen</td>
<td>Brand Variety Chosen</td>
<td>Overall Amount Chosen</td>
<td>Brand Variety Chosen</td>
</tr>
<tr>
<td>Cookies</td>
<td>1.59 .02</td>
<td>3.58 .23</td>
<td>1.49 .02</td>
<td>1.61 .02</td>
</tr>
<tr>
<td>Soda</td>
<td>2.76 .02</td>
<td>6.19 .12</td>
<td>2.71 .06</td>
<td>3.07 .06</td>
</tr>
<tr>
<td>Totals</td>
<td>2.18 .02</td>
<td>4.89 .17</td>
<td>2.10 .04</td>
<td>2.34 .04</td>
</tr>
</tbody>
</table>

Figure 3

EXAMPLE CATEGORY FROM STUDY 5: SHELF DISPLAYS

YOGURT

Imagine that you would like to buy some yogurt at the warehouse store. The store offers three flavors and sizes, which are organized on shelves as you can see below. Which of the items below would you buy at that warehouse store and how many containers of each would you buy? (circle the item or items you would buy and write in the box the number you would buy of each one).

<table>
<thead>
<tr>
<th>Coffee</th>
<th>Mixed Berries</th>
<th>Vanilla</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 oz (small)</td>
<td>8 oz (small)</td>
<td>8 oz (small)</td>
</tr>
<tr>
<td>(Price: 35¢ per serving)</td>
<td>(Price: 35¢ per serving)</td>
<td>(Price: 35¢ per serving)</td>
</tr>
<tr>
<td>16 oz (medium)</td>
<td>16 oz (medium)</td>
<td>16 oz (medium)</td>
</tr>
<tr>
<td>(Price: 35¢ per serving)</td>
<td>(Price: 35¢ per serving)</td>
<td>(Price: 35¢ per serving)</td>
</tr>
<tr>
<td>32 oz (large)</td>
<td>32 oz (large)</td>
<td>32 oz (large)</td>
</tr>
<tr>
<td>(Price: 35¢ per serving)</td>
<td>(Price: 35¢ per serving)</td>
<td>(Price: 35¢ per serving)</td>
</tr>
</tbody>
</table>
sizes, which tests H1; and (3) interactions between the main manipulations and the two categories, which tests whether the effects differed across the categories.

Consistent with H1a, the main effect of the decision order variable was statistically significant (F(1, 563) = 11.44, p < .01). When participants made flavor decisions before size decisions, they chose 5.58 items, averaged across the two categories (Table 6). When their size decisions preceded brand decisions, the amount chosen dropped to 3.99 items. In addition, we found that the interaction between this main effect and the product categories was not significant (F < 1), which suggests that the results were consistent across the two categories. We next tested H2a, as in the prior studies, and found that it was significant (F(1, 563) = 5.34, p < .05). In particular, flavor variety was .26, averaged across the categories, when the flavor decision was first but only .15 when the size decision was first. In addition, consistent with our previous studies, we found no significant difference in size variety across the two conditions.

We next tested H3, which predicted that consumers would choose more overall and greater flavor variety when the products were organized by sizes, such that the flavor trade-offs were more apparent, than if they were organized by flavors. We tested this hypothesis as we did H1. Consistent with our hypothesis, the main effect of shelf organization was significant (F(1, 563) = 55.35, p < .01). When the products were organized by sizes, participants chose 8.33 items, averaged across the two categories. When the products were organized by flavors, the amount chosen fell to 3.46 items. In addition, we found that the interaction between this main effect and the product categories was not significant (F < 1), which suggests that the results were consistent across the two categories. We next tested our prediction that consumers would choose greater flavor variety when the products were organized by sizes and found a significant result (F(1, 563) = 4.91, p < .05). In particular, flavor variety was .35, averaged across the categories, when products were organized by sizes and .25 when products were organized by flavors. There was no significant difference in size variety across these two conditions.

The preceding studies focused on trade-offs involving flavors and sizes or brands and sizes. To broaden our framework, we also examined trade-offs involving brands and flavors. According to our framework, we predict that consumers will choose a greater overall amount and greater variety when the less replaceable attribute decision precedes the more replaceable attribute decision. As mentioned previously, we found that the flavor decision is less replaceable than the brand decision. Therefore, we predict that consumers will choose a great overall amount and greater flavor variety when they make the flavor decision before the brand decision than in the reverse decision order.5 In addition, we argued that greater decision difficulty makes it more likely that consumers will resolve this difficulty by choosing multiple options. As a result, felt decision conflict, which is an indicator of decision difficulty, should mediate the relationship between decision order and amount chosen. We follow other researchers and measure decision conflict as the degree of felt ambivalence about the decision (Nowlis, Kahn, and Dhar 2002; Priester and Petty 1996), which we test in the next study. In addition, the prior studies focused on hypothetical decisions. To build more confidence in our framework, we need to examine whether the results also hold for actual decisions, and therefore, in Study 6, we measure real purchases of jelly beans.

**STUDY 6: ACTUAL PURCHASE**

Participants were 100 undergraduate marketing students fulfilling a course requirement. In this experiment, each participant was given $0.50 to purchase some jelly beans. Each jelly bean cost $.01, so participants could buy up to 50 jelly beans. In addition, participants could keep whatever money they did not spend. There were two between-subjects conditions. In one condition, participants first decided which flavors of jelly beans they wanted to buy and then decided which brands of those flavors to purchase. In the other condition, they made the brand decision before the flavor decision. The same flavors were available for each of the brands.

Consistent with our prediction, participants chose a greater quantity when the flavor decision preceded the brand decision, compared with the opposite order. In particular, participants chose 18.5 jelly beans when the flavor decision was first and 12.2 jelly beans when the brand decision was first. We tested this result with an ANOVA model, which was significant (F(1, 98) = 9.92, p < .01). In addition, consistent with our prediction, participants chose more flavor variety when the flavor decision was first (.55) than when the brand decision was first (.41). This difference was also significant (F(1, 98) = 4.47, p < .05). Finally, there was no difference in brand variety across the conditions (.35 when the brand decision was first and .37 when the flavor decision was first).

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5In addition to examining whether our framework extends to trade-offs involving brands and flavors, the next study serves another purpose. It is possible that the results from the first five studies can be explained through a different account, namely, as driven by considerations of storage capacity rather than attribute trade-off difficulty. Because participants chose less overall when the size decision was first, they may have been more likely to think about how much their home could hold, whereas if the flavor or brand decision was first, this consideration may not have been as salient. To examine this possible explanation, we needed trade-offs for which capacity was not an issue.
In summary, this study shows that decision order has an effect on the amount purchased and variety chosen when consumers make actual purchase decisions. In a follow-up study, we explicitly measured decision difficulty (with hypothetical decisions, as in Studies 1–5). Participants were 81 undergraduate marketing students fulfilling a course requirement. Before making their decisions, the participants answered three questions that measured the degree to which they felt ambivalent about their decisions (Priester and Petty 1996). These questions enabled us to test whether greater feelings of ambivalence led to a greater amount purchased. In particular, participants were asked: “How indecisive are you when evaluating these products; how conflicted do you feel when evaluating these products; and how much mixed emotion do you feel when evaluating these products?” All responses used an 11-point scale (e.g., 0 = “feel no indecision at all,” and 10 = “feel very indecisive”).

The results show that participants chose more of the product in the flavor–brand (5.81) than in the brand–flavor (4.05) condition, and this effect was significant (F(1, 160) = 4.30, p < .05). We also found that participants chose more flavor variety in the flavor–brand (.40) than in the brand–flavor (.28) condition, and this effect also was significant (F(1, 160) = 4.29, p < .05). Finally, we found that feelings of ambivalence (α = .90) were higher in the flavor–brand condition than in the brand–flavor condition (F(1, 160) = 3.99, p < .05). We next tested whether felt ambivalence mediated the effect of the decision order on the amount chosen. To show mediation, we must demonstrate three relationships (Baron and Kenny 1986). First, we must show that the independent variable (decision order) significantly affects the mediator (felt ambivalence). This relationship was significant. Second, we must show that the processing measure significantly affects the dependent variable (amount chosen). This relationship was also significant (F(1, 160) = 4.50, p < .05). Third, we must show that the effect of decision order on amount chosen declines or disappears if the processing measure is also included. This result was also supported because the effect of decision order on amount purchased was no longer significant when the processing measure was included as a variable.

In the prior studies, respondents were required to make a decision about how much of a particular attribute they wanted. In these situations, respondents consistently chose more when they first made decisions about the less replaceable attribute. However, respondents did not explicitly consider the possibility of deferring their decisions. If such an option were available, it could have a systematic effect on the quantity chosen. In particular, prior work has shown that greater trade-off difficulty can lead to a greater likelihood of choice deferral (e.g., Dhar and Nowlis 1999). Thus, we anticipate that when the deferral option is explicitly available, the effect of decision order on quantity chosen will decline because consumers can resolve a decision involving a less replaceable attribute by choosing to defer rather than choosing more. This leads to our next hypothesis:

H4: The ability to defer a decision moderates the effect of decision order on the amount chosen. When the deferral option is explicitly available, the effect of decision order on the amount chosen decreases.

**STUDY 7: MODERATING EFFECT OF THE ABILITY TO DEFER THE DECISION**

Participants were 396 undergraduate marketing students fulfilling a course requirement. The experiment was a 2 (decision order: flavor before size versus size before flavor) × 2 (deferral option was explicitly available or not) between-subjects design. Four product categories were tested: bagels, fruit juice, potato chips, and soda. We manipulated decision order as in Study 3. We manipulated the explicit availability of a deferral option by either telling respondents they could “choose none and shop elsewhere” or not giving this option (as in the prior studies).

Consistent with H1a, participants chose more of the product in the flavor–size (3.21) than in the size–flavor (2.18) condition. We tested this effect in the same way we did for the prior studies and found that it was statistically significant (F(1, 395) = 4.18, p < .05). Consistent with H1b, participants chose more flavor variety in the flavor–size (.30) than in the size–flavor (.04) condition. This difference was tested, as in the previous studies, and was found to be significant (F(1, 395) = 6.96, p < .01). Furthermore, consistent with H2, the interaction between decision order and the ability to defer was significant (F(1, 395) = 4.77, p < .05). When the ability to defer was explicitly available, there was no significant effect of decision order on either quantity chosen (M = 2.64 versus 2.31) or flavor variety chosen (F < 1). Also consistent with the prior studies, there were no significant differences in size variety chosen across the conditions (F < 1 for all comparisons). Finally, consistent with our logic, there was more deferral in the flavor–size condition (20%) than in the size–flavor condition (13%) (t = 2.5, p < .01).

**GENERAL DISCUSSION**

This research examined the effect of decision order on the amount and variety of a product chosen. In particular, we studied common consumer trade-offs among attributes, such as size, flavor, and brand name, and how making one attribute decision before the other might affect the amount chosen. For example, consumers can decide which flavors they want before deciding which sizes they want, or they can choose which sizes they want before deciding which flavors they need. It might be expected that decision order would have no systematic effect on amount and variety chosen, but we found a systematic, robust effect. We next review our findings in more detail and consider their theoretical and marketing implications.

**Review of Findings and Theoretical Implications**

We proposed that consumers would choose a greater overall amount of product and greater attribute variety when they faced a more difficult attribute trade-off in the first stage of a decision than in the second stage. Furthermore, we focused on a certain dimension of decision difficulty, attribute replaceability, that is especially relevant to the types of trade-offs we considered in this research. An attribute is more replaceable when one level of it can be directly substituted for another level, such as when two 8-ounce sizes replace one 16-ounce size. An attribute is not as replaceable when each of its levels offers unique advantages and disadvantages. For example, a cherry flavor offers characteristics that are unique compared with a coffee flavor. We
found that the flavor attribute was not as replaceable as sizes, nor were brand names as replaceable as sizes. The less replaceable attribute decision was more difficult to resolve than the more replaceable attribute decision, and consumers made the former decision by choosing more of it.

When a more replaceable attribute trade-off was faced in an earlier stage, the decision process became more discriminating in the second stage. When consumers chose sizes in the first stage, they resolved this decision by choosing fewer sizes, and this increased discrimination translated into fewer flavors chosen in the second stage, which meant that less overall was chosen. However, when flavors were chosen first, participants resolved the decision by choosing more flavors, which translated into a greater overall amount chosen.

We supported our analysis of the impact of the decision process on purchase quantity through several complementary tests. First, we found that increasing the replaceability of the attribute in the first stage made the decision easier, which then translated into fewer overall items chosen. We did this by adding taste ratings to flavor decisions, making flavors more similar, or using quality ratings instead of brand names. Second, we found that our results hold for a variety of attributes that differ in their replaceability, including flavors, brand names, and sizes. Therefore, we can generalize our findings and rule out an explanation for the results based on specific characteristics of certain attributes rather than their general replaceability. Third, we found support for the proposed process when the first stage of the decision process determined how much was chosen in the second stage or did not explicitly do so. Fourth, we found that decision difficulty mediated the effect of decision order on quantity chosen, as we anticipated. Fifth, we anticipated that consumers would resolve difficult attribute trade-offs not only by choosing more but also by deferring the choice. Thus, when a deferral option was explicitly available, there was a reduction in the effect of decision order on quantity chosen.

We believe that our findings contribute to theory in various ways. In particular, this research may be one of the first to show how the decision task and trade-off difficulty influence the amount that consumers choose. Thus, our work contributes to other research showing that preference uncertainty influences important elements of consumer decision making, such as which option is chosen (e.g., Huber, Payne, and Puto 1982). We showed that decision order has a systematic effect on the amount and variety that a consumer chooses, even though normatively, decision order might be expected to have no such effect.

In addition, this study is one of the first to explicitly consider trade-offs among flavors, brands, and sizes, even though these are commonly considered attributes in the marketplace. To examine these trade-offs, we introduced the idea of attribute replaceability. This construct is similar in nature to other constructs, but we have shown how this particular aspect of decision difficulty drives purchase quantity decisions. Our work also adds to knowledge about how the decision process in one stage can affect the decision process in a subsequent stage (e.g., Dhar, Nowlis, and Sherman 1999). We found that consumers have a tendency to become more discriminating across stages, which results in fewer options chosen in the second stage of a decision than the first stage. It might be worthwhile for further research to consider other ways that the resolution of attribute trade-offs in the first stage of a decision could affect choices in the second stage. For example, consumers resolving any type of trade-off in the first stage of a decision, such as deciding which store to visit, might be likely to choose fewer items in the second stage. This idea could be contrasted with the shopping momentum effect (Dhar, Huber, and Khan 2007), which shows that the purchase of a product in an initial stage of shopping influences what consumers purchase in a later stage.

**Marketing Implications**

Our findings have implications for the way that products should be organized, either on shelves in a store or on the pages displayed on shopping Web sites. For example, one of our studies revealed that consumers chose more overall product when the shelves were organized by sizes than by flavors. When the products were organized by sizes, the trade-off among flavors was more apparent, which resulted in a greater number of flavors chosen and a greater overall amount of product chosen. In a retail setting, products are usually organized by brands and sizes. For example, yogurts are typically separated into brands (e.g., Yoplait, store brand, Dannon) and sizes (smaller sizes placed together, larger sizes together). If the typical trade-off in yogurts is around brands and flavors, this approach makes sense. By organizing by brands, the trade-offs between flavors become more apparent, which results in a greater overall amount chosen than if the same yogurts were organized by flavors. If the trade-off were between brands and sizes, organizing by sizes would also make sense. Thus, retailers separate out larger and smaller sizes. Although the application of our understanding of the process underlying purchase quantity decisions may make sense for current displays of yogurts, there are many other categories in a store where our understanding may be at odds with current industry practice.

Our data and theory were consistent with prior research that decision difficulty can be resolved by deferring (Dhar and Simonson 2003). Accordingly, we found that when a deferral option was explicitly provided, the effect of decision order on quantity chosen diminished, because deferral provided another way to resolve choice difficulty. The deferral option is often implicitly available in many shopping situations, but the actual cost of deferral may be high, so consumers may not consider it in categories such as milk, bread, and other necessities. More generally, when the cost of not making a purchase is high, purchase decisions can be considered analogous to forced choice situations because consumers rarely exercise the deferral option (Dhar and Simonson 2003).

Another implication of our research is that trade-offs involving flavors, sizes, and brands differ in terms of how easy they are for consumers to resolve, which correspondingly calls for different types of information and decision aids from marketers. We found that the more replaceable the attribute, the easier it was to resolve that attribute trade-off. As a result, making those attribute decisions earlier in the decision process resulted in fewer products chosen, because consumers could more readily focus on fewer options. Thus, retailers should want to make the attribute trade-off more
difficult to encourage consumers to purchase more. They could do so by making sure that the different levels of an attribute, such as flavors, are unique (less replaceable). For example, retailers might try new, more unusual flavors. In addition, our research raises the question of what “natural” trade-off order a consumer might use. We tested this idea in a different study, in which we considered the brand–flavor decisions and included a condition for making these decisions simultaneously. This simultaneous decision resulted in an amount chosen that was more similar to the brand–flavor sequence (i.e., less) than the flavor–brand sequence. This finding could mean that consumers are more likely to spontaneously resolve brand names before flavors. Further research should consider such trade-offs and their potential impact on the ways retailers and manufacturers manage their product lines.

REFERENCES


