Variety Seeking Behavior in Bundle Construction: Choice Myopia and Combinatorics
Contribution Statement

Understanding when consumers seek out variety has long been of interest to consumer researchers. Given consumers typically purchase bundles (e.g., six-packs of beer) for consumption over multiple future episodes (e.g., the following six evenings), much previous research has looked at difficulties faced by choosers as they attempt to forecast their future desires. More recently, Mittelman, Andrade, Chattopadhyay, and Brendl (2014) suggested that consumer researchers consider the process by which bundles themselves are selected. In four studies, they found that when consumers construct bundles themselves (e.g., by adding one item at a time), they display more variety seeking than when choosing among pre-packaged bundles. Although these authors offered no mechanistic evidence to explain this effect, JCR published these finding as they were truly intriguing.

We set out to understand how and why the bundle selection process influences variety seeking behavior. But in doing so, we realized it was extremely difficult to develop plausible theoretical accounts that could explain all of the studies conducted on this topic. This paper therefore documents a risky, but ultimately fruitful approach. We identified a seemingly plausible theoretical account—one rooted in a quality of decision makers (choice myopia) and combinatorics (the different number of pathways to variety offered by the two bundle selection processes. More specifically, we draw on research highlighting that decision makers tend to be hyper-focused on the present, failing to carefully consider the long-term (or even medium-term) implications of their local choices. Such myopia means that those constructing bundles sequentially may be influenced by a combinatoric property of much sequential choice—the greater number of choice pathways leading to varied bundles. We disentangle the bundle selection process from the number of possible choices or choice pathways that lead toward
varied bundles. We show that consumers are actually sensitive to this variability in pathways to variety, not the bundle selection process per se. But crucially, we find that published evidence inconsistent with our account is artifactual or not replicable.

More generally, we hope this paper can serve as one model that illustrates the importance of distinguishing robust, artifactual, and non-replicable evidence in building cumulative knowledge.
Abstract

When consumers select a bundle of goods, they may construct those sequentially (e.g., adding one flower at a time to a bouquet) or make a single choice of a prepackaged bundle. Previous research suggests that the sequential construction of bundles encourages variety seeking, but no explanation has been offered. The present research revisits this claim and offers a theoretical explanation for a modified one. We draw on a psychological feature of decision makers (choice myopia, a short-sighted tendency to consider immediate decision contexts and neglect their medium-term implications) and a combinatoric feature of the two choice processes. In considering different ways to construct a bundle, one is considering different choice permutations. In considering different prepackaged bundles, one is considering unique choice combinations. We show that variety is typically overrepresented among permutations instead of combinations and empirically demonstrate this prompts decision makers to select more variety. Although this explanation does not parsimoniously account for the published literature, we find that the inconsistent evidence is not replicable or stems from participant misunderstanding. We discuss the importance of avoiding dichotomous thinking—either unquestioningly embracing or reactively rejecting—about published work in seeking to build a robust corpus of consumer research.

Keywords: Variety-seeking behavior, choice, offer-framing effect, set-fit effects
Even when consumers have favorites, they may still want to mix things up. Taco Tuesday is the highlight of some consumers’ week, but few of them eat tacos for every meal. With repetition, consumers experience diminished marginal utility; this is why people tend to find less satisfaction in the twenty-first Swedish Fish than the first (e.g., Redden 2007). Anticipating this, consumers add variety to what they consume.

Consumption and choice are frequently separated in time (Read and Loewenstein, 1995). For example, grocery store purchases are essentially choices for eating later in the week. Two psychological mechanisms can lead consumers to prefer more variety at the time of choice than what they would ultimately prefer at the time of consumption. One mechanism rests on the phenomenon that two points in the future seem subjectively closer to each other today than they ultimately will feel. Due to this time contraction, people overestimate how long it will be before they will be ready to consume their most preferred option again (Simonson, 1990). Taco Tuesday fans underestimate how ready they will be for Taco Thursday. Second, when choosing multiple options at a single point in time, people fail to appreciate that although they are considering all of these selections at a single time when choosing, they will actually consume them in distinct, individual episodes. This is a demonstration of broad choice bracketing (Read, Loewenstein, and Rabin 1999): When all the choices are considered together, the same psychology that discourages people from consuming too much of the same item at once may encourage people to seek more variety for consumption down the road. But given that one’s entire grocery cart will not be consumed in one sitting, broad choice bracketing may encourage more diversity of choice than is ultimately desired at the time of consumption.

Although choice and consumption are often temporally separated, we credit Mittelman, Andrade, Chattopadhyay, and Brendl (2014) for noting how even the choice itself can occur all
at once (as when a consumer selects a preassembled six-pack of beer) or sequentially and thus with small temporal separations (as when a consumer builds that six-pack herself). Mittelman and colleagues reasonably argue that neither time contraction nor choice bracketing can explain why consumers may differ in their preference for variety in these two contexts. Across four experiments Mittelman et al (2014) provided evidence that constructing bundles through multiple, sequential choices (like the shopper building her own six-pack) prompts more of a selection of variety than single choices of a prepackaged bundle (like the shopper choosing among preassembled six-packs). Although their work was intriguing, the authors provided no evidence of why this offer framing effect occurs.

Choice Myopia

Numerous lines of research depict humans as remarkably short-sighted decision-makers. For example, people seem to have surprisingly high discount rates, which imply that they greatly undervalue future states relative to immediate outcomes (Mischel, Shoda, & Rodriguez, 1989; Loewenstein & Thaler, 1989; for a review see Urminsky & Zauberman, 2014). Milkman, Rogers, and Bazerman (2008) discussed how decision-makers are likely to prioritize want options over should options when making short-term decisions. Seeking to explain the prevalence of gambling, impulsivity, and risky sexual behaviors, Loewenstein (1996) noted that visceral factors aroused in these contexts (e.g., sexual desire) encourage people to satisfy immediate goals at the expense of future goals. Furthermore, Laibson (1997) has explained that the increased liquidity of financial assets has allowed consumers’ truly short-sighted preferences to emerge, which has led to a rise in immediate spending and a reduction in the savings rate. Taken together, these findings depict human decision makers as myopic—considering what the immediate, and not the long-term, effects of their choices will be.
This tendency to focus on what is immediately in front of the self and not to give full thought to how the present relates to a fuller, longer-term picture can be observed over much short time scales. Consider a function as basic as linguistic sentence processing. The horse raced past the barn fell. Many readers will need to read that sentence more than once. This is because the mind does not wait until completing the sentence to assign grammatical roles to each word. Instead, most first decide that “raced” is the verb long before the word “fell” is encountered. Psycholinguists would say the reader got garden-pathed: He preemptively committed to a single interpretation of the sentence before learning that this led to a dead-end (Bever, 1970; Ferreira & Henderson, 1991).

Consider again the construction of bundles sequentially (choosing each item one by one) or simultaneously (choosing among prepackaged bundles). Simultaneous choosers are directly selecting the end-product they would like. In contrast, the choices made by sequential choosers constrain the set of final bundles they may form. But if sequential choosers are myopic, then they may make choices in the present that keep them from achieving bundles that—were they more forward-looking in their decision approach—they would prefer. For example, a dozen roses are a “bouquet of roses,” whereas eleven roses and one tulip seem more like a mistake. But the chooser who is indifferent between roses and tulips can garden paths himself from building a bouquet of either the moment he adds the second type of flower to his bundle. Of course, the eager listener had no choice but to wait until the end of the ambiguous sentence or guess (perhaps incorrectly) prematurely. But those constructing bundles myopically do not have the same excuse; they may simply be shortsightedly misled by failing to think through the full implications of their decisions. How should we expect such extreme choice myopia to influence consumers’ bundle construction?
Pathways to Variety

In the casino dice game craps, players take turns shooting (throwing) two dice. If a player throws a 1 and a 3, this is called an “Easy 4.” But when a player throws a 2 and a 2, this is called a “Hard 4.” It is quite literally easier (twice as easy, in fact) to achieve a 4 by throwing two different numbers than it is to throw the same number twice. This is because there are multiple pathways to variety (the first throw can be either a 1 or a 3), but only a single way by which a no-variety 4 can be achieved.

Building a bundle sequentially is analogous to throwing dice one at a time. If one wishes to build a bouquet of two tulips and two roses, there are six different ways to achieve that outcome. In the language of combinatorics, there are 6 unique permutations of 2 tulips and 2 roses: $4! / (2! \times 2!)$. But achieving a bouquet with no variety—much like achieving a hard 4—can occur in fewer ways. One must either repeatedly select tulips or repeatedly select roses. This means that when choosing sequentially, there are many distinct pathways that produce a high-variety bundle, but many fewer that produce an unvaried bundle. As craps jargon anticipates, sequential choice quite literally makes it easier to achieve variety.

In contrast, when selecting among prepackaged bundles, one typically observes unique combinations, not all of the possible permutations that could define them. That is, a florist might have on display the five different combinations of tulips and roses that could compose a set of four such flowers. But it’s extremely unlikely that the florist would show the 256 unique permutations ($4^4$) that could emerge. This means variety is relatively overrepresented among the permutations that choosers of prepackaged bundles see. And because sequential choosers are likely to be myopic—not predetermining the bundle they would like and then making the choices
to get them there—we begin to see why sequential and simultaneous choosers may differ in their choices of variety.

The fact that sequential choice offers more pathways to variety may be sufficient to explain why consumers will choose more variety when constructing bundles in this way. More generally, previous work has found that as the composition of a response set changes—even in arbitrary ways—judgments and decisions shift to spread across them (Benartzi and Thaler 2001; Fox, Ratner and Lieb 2005). In a classic example, survey respondents reported vastly slimmer TV-watching habits when selecting their daily viewing patterns from among shorter options (under 1/2 hour, ½ to 1 hour, 1 to 1.5 hours, 1.5 to 2 hours, 2 to 2.5 hours, or over 2.5 hours) instead of longer options (under 2.5 hours, 2.5 to 3 hours, 3 to 3.5 hours, 3.5 to 4 hours, 4 to 4.5 hours, or over 4.5 hours; Schwarz, Hippler, Deutsch, and Strack, 1985). Following a shift in the partitions along the response continuum, judgments spread across those (artificial) categories.

Some evidence extends this phenomenon to choice. Benartzi and Thaler (2001) identified how it applied to investment decisions. As retirement providers offered different sets of funds that skewed toward riskier vs. safer options, they found investors continued to spread their money relatively evenly across the available choices. This meant that investors seemed to follow something of a 1/n rule, placing 1/n of their money in each of n funds. Such decisions did not reflect stable attitudes about risk, but instead a tendency for choices to conform to the distributions of available choices. Of course, by changing the available funds, the actual set of constructible portfolios shifted as well. We extend beyond these phenomena by arguing that (sequential) choosers will show more variety in their choices merely because they have more pathways to reach such outcomes, even though the actual final bundles they and simultaneous choosers are selecting among are identical.
Does this solve the mystery of why the offer framing effect emerges?

Mittelman et al. (2014) offer four studies in support of the idea that people prefer more variety when constructing bundles sequentially than when selecting among prepackaged bundles. Let us consider how the present ideas could explain their Study 3. In that study, participants selected a three-flower bouquet that could be composed of some combination of red and orange flowers. When participants constructed the bundles sequentially, 70% of them selected a varied bundle (two flowers of one color, one of another). When participants selected among prepackaged bundles, a slim majority (52.7%) actually selected flowers of only one color. If choosers were not myopic—i.e., if sequential choosers were simply selected among which final bundle they wanted—it would be difficult to imagine why the decision structure would matter. But also, because more pathways in sequential choice produce variety (6 of 8; 75%) than in simultaneous choice (2 of 4; 50%), our account correctly anticipates sequential choosers’ interest in variety.

Readers with more knowledge of Mittelman et al.’s (2014) other three studies would be right to be skeptical of our account. In fact, combining choice myopia with pathways to variety cannot anticipate the remaining three findings in that paper. Of course, Mittelman et al.’s effects could be multiply determined, though this makes our above arguments suspect on grounds of parsimony. That said, we identify an artifact that we suspect may account for two of Mittelman et al.’s studies. We test whether that is the case in Studies 1a and 1b. For the third study, we considered the possibility that the original findings—which we had trouble explaining—might not be robust. We conducted several direct replications of it to determine whether the findings should guide the field’s thinking on the topic.
In this way, the present paper follows something of an unusual approach. We are motivated by a previous paper published in these pages whose effect was documented but incompletely explained. We offer that explanation. But through gaining this mechanistic understanding, we come full circle by showing that the originally documented effect was mis-specified. We hope this cycle can offer one guide by which scientific findings can inspire follow-up work, which ultimately leads to revisions to the motivating work.

**Studies 1a and 1b: A Misunderstood Measure?**

In Mittelman et al. (2014, Experiment 1) participants had to select a two-soda bundle of Coke and/or Sprite. As predicted, those who constructed these bundles sequentially were more likely to choose a varied bundle (one Coke, one Sprite) compared to those who selected among prepackaged bundles. But notably, choice myopia combined with pathways to variety cannot anticipate this result. For participants who selected among prepackaged bundles, the authors were careful to show both permutations of high-variety bundle: one Coke, one Sprite; one Sprite, one Coke. In other words, there were just as many pathways to variety for sequential choosers (2 of 4; 50%) as simultaneous choosers (2 of 4; 50%).

Instead, we considered whether participants in the sequential choice condition may have been confused about what the experimenters were asking. In that condition, participants specified their “first choice” and their “second choice.” Although participants were permitted to select either soft drinks at each decision point, it seemed possible that some fraction of them may have misinterpreted the question as asking for their favored soda (first choice) and their disfavored one (second choice). But even if there was some confusion, could it have been enough to explain the impressively large effect the authors observed? In their study, while only 34% of simultaneous choosers selected a bundle of one Coke and one Sprite, 62% constructed this
variety bundle when making two separate choices. Mittelman et al.’s Experiment 2 was conceptually identical but involved creating two-item bundles of Snickers and Twix.

In Studies 1a and 1b, we directly replicate Mittelman et al.’s (2014) Experiments 1 and 2. That is, participants constructed bundles of soda (Study 1a) or candy (Study 1b) through two, sequential choices or by directly selecting among prepackaged bundles. Half of participants saw Mittelman et al.’s original measures. Half saw measures that clarified the potentially confusing wording by making it explicit that participants could choose either two of the same item or two different items. This would allow us to test whether some or even all of the originally documented effect was due to this measurement artifact.

Method

*Participants and design.* We *a priori* decided to collect data from 200 participants per condition. This compares to two hundred and eighty-nine participants in total in Experiment 1 and one hundred eleven in total in Experiment 2 of Mittelman et al. (2014). Eight hundred twelve participants were recruited from Amazon’s Mechanical Turk (MTurk) for Study 1a. Eight hundred eight, for Study 1b. Participants were required to be Americans with an approval rating greater than or equal to 95% for all MTurk Human Intelligence Tasks (HITs) completed prior to ours. In both studies, participants were randomly assigned to one of four conditions in a 2 (Instructions: original or clarified) × 2 (Bundle: prepackaged or constructed) full-factorial design.

*Procedure.* All participants were asked to consider going to a convenience store (Study 1a) or a supermarket (Study 1b) to buy two cans of soda (Study 1a) or two candy bars (Study 1b). In Study 1a, participants were told the convenience store sells only Coke and Sprite. In Study 1b, participants were told the supermarket sells only Snickers and Twix.
**Original.** Those in the original instructions condition saw prompts that were copied from Mittelman et al. (2014). In the prepackaged bundle condition, participants selected among four prepackaged bundles: Coke-Coke, Coke-Sprite, Sprite-Coke, Sprite-Sprite (Study 1a) or Snickers-Snickers, Snickers-Twix, Twix-Snickers, Twix-Twix (Study 1b). Each bundle was represented by a unique image of two soda cans or two candy bars side-by-side. Those in the constructed bundle responded to the prompt “My first choice would be,” before also responding to “My second choice would be.” Following each prompt were the two unique soda cans (Study 1a) or the two unique candy bars (Study 1b).

**Clarified.** Those in the clarified instructions condition first received additional information designed to clarify that they were free to choose “any combination” of drinks (Study 1a) or candy bars (Study 1b). We clarified this meant “two different drinks [candy bars] or two of the same drink [candy bar].” Just to make sure this was perfectly clear, we added, “Feel free to choose two of the same soda [candy bar] or, if you like, two different sodas [candy bars].” In this way, it should have been clear to everyone that participants could choose two of the same sodas or one of each. Keep in mind that our worry about ambiguity in the wording applied only to the constructed bundle condition, not the prepackaged bundle condition. That said, if the clarification (unintentionally) pushed choosers toward the low-variety or high-variety bundle, then this should have been the same for both clarified instructions conditions. Instead of asking sequential choosers for their “first choice” and “second choice,” we instead said, “Please choose one of your two beverages…” and “Please choose the second of your two beverages…”

Results and Discussion

We began by coding all selections for whether they reflected a varied bundle (one soda or one candy bar of each type) or not. Using Mittelman et al.’s (2014) original instructions, we
replicated their effects. In Study 1a, 66.17% of participants (133 / 201) constructed a varied bundle, but only 41.06% (85 / 207) selected a prepackaged bundle of both Coke and Sprite, $\chi^2 (1, N = 408) = 24.80, p < .001$. In Study 1b, 67.49% of participants (137 / 203) constructed a bundle with both Snickers and Twix, but only 49.75% (100 / 201) choose a prepackaged bundle of that composition, $\chi^2 (1, N = 404) = 13.10, p < .001$. These numbers are similar to Mittelman et al. (2014), wherein 62.1% of participants selected variety in Experiment 1 (which corresponds to Study 1a) and 73.6% of participants selected variety in Experiment 2 (which corresponds to Study 1b). Given participants in both conditions had the same number of pathways to variety, these findings cannot be explained by simple combinatorics.

Nevertheless, neither difference persisted with the clarified phrasing. With this clarification in Study 1a, only 33.83% of those constructing the bundle sequentially (68 / 201) chose two different sodas, a proportion quite similar to those who chose among prepackaged bundles: 37.43% (76 / 203). And in Study 1b, 53.69% of participants (109 / 203) constructed a bundle of two different candy bars, which was no greater than the 52.74% (106 / 201) who selected a prepackaged bundle of both Snickers and Twix. In both studies, addressing the measurement concern eliminated the connection between how the bundle was selected and a preference for variety, $\chi^2 < 1$.

Given this pattern of results, we tested for the interaction between bundle condition and instructions. We found that the Instructions X Bundle interaction was significant in both Study 1a, $z = 4.00, p < .001$ (see Figure 1a), and Study 1b, $z = 2.72, p = .007$ (see Figure 1b). The clarified instructions completely eliminated the difference in apparent preference for variety between the simultaneous and sequential choice conditions.
Having found that both of Mittelman et al.’s (2014) first two experiments stemmed from measurement confusion, not a greater preference for more variety when constructing bundles sequentially, it is actually easier to interpret other unusual features of their results. In their Experiment 1, participants who had a strong preference for one soda over the other chose both bundles only when constructing the bundle sequentially (i.e., when they were likely confused about what they were asked to do). In their Experiment 2, coders read participants’ thought-listing protocols in which they described their thoughts when choosing their bundles. Coders could relatively easily identify who had selected two of the same candy bars. But coders frequently misidentified who was selecting two different candy bars, but only when they constructed those bundles sequentially. Coders presumably had trouble because many of these participants actually had no interest in selecting two different candy bars.

Mittelman et al. (2014) interpreted these (then-)cryptic findings as demonstrating the power of the offer framing effect: It pushed people to sequentially construct high-variety bundles even when their true preferences seemed incompatible. But in light of our findings, these findings are now more easily understandable. Many sequential choosers who sought variety did not realize that is what they were doing. They believed they were indicating their favored and their disfavored item, explaining why their choices did not follow from their preferences. Mittelman et al. (2014) report that one participant who selected a Snickers and a Twix bar stated, “I don’t care for Snickers.” Presumably this participant did not realize what he or she was selecting when indicating Snickers as the “second choice” candy bar.
Figure 1a. Proportion choosing variety (i.e., different soft drinks) in Mittelman et al. (2014) Experiment 1 and the present manuscript's Study 1a by condition.
Figure 1b. Proportion choosing variety (i.e., different candy bars) in Mittelman et al. (2014) Experiment 2 and the present manuscript's Study 1b by condition

**Study 2a: Expanding Pathways to Variety**

Studies 1a and 1b demonstrated that the previously published understanding of how the bundle selection process changes a preference for variety is wrong, but it is not yet time to be fatalistic. After all, the theoretical account we advance anticipated those effects. In Study 2, we move to a more direct test of our model. We move to a context—one tested in Mittelman et al. (2014)—in which there actually are more pathways to variety when constructing bundles sequentially instead of choosing among prepackaged bundles. We then make a minimal change that eliminates this difference in order to see if it eliminates the different preference for variety as well.

In Mittelman et al. (2014, Experiment 3) participants constructed a bouquet of flowers from a large supply of yellow and orange roses. For those who selected among prepackaged bouquets, they saw four such bundles (OOO, OOO, OYY, YYY), 50% of which contained variety. But for those who constructed the bundles sequentially, they confronted 8 unique pathways, 75% of which led to variety. Only 2 (25%) of the pathways led to an unvaried bundle: OOO, YYY.

Note that this difference is a property of the choice architecture, not a difference in the psychological orientation of the choosers themselves. But when combined with the property of choice myopia—suggesting those constructing a bundle sequentially are not far-sighted enough to merely preemptively select which bundle they are building toward—this can lead to different apparent preferences for variety. More generally, when there is less redundancy (i.e., more
variety) in a bundle, there will be more unique pathways by which that bundle could be constructed. That said, this structural confound can be corrected for experimentally.

We accomplished this by adding a third condition in which we offered a prepackaged bundle for each unique permutation, not merely each unique combination. For example, instead of merely offering a prepackaged bouquet of two yellows and one orange (as in the standard prepackaged condition), we offered YYO, YOY, and OYY. In this expanded prepackaged condition, we retained the crucial choice process feature of the prepackaged condition (i.e., selecting among prepackaged bundles), but increased the pathways to variety (from 50% to 75%) to match the constructed bundle condition. If our pathways to variety account is accurate, we should find: 1) those in the constructed bundle condition select more varied bundles than those in the prepackaged condition, and 2) those in the expanded prepackaged condition select less variety than those in the (standard) prepackaged condition. See Figure 2 for a visualization of the pathways to variety available to participants in each condition.
Figure 2. An illustration of how Study 2a’s constructed bundle participants (those who made three distinct choices) faced more unique pathways to variety than did prepackaged bundle participants (those who selected directly from the four boxed bundles), but the same number as expanded prepackaged participants (those who selected directly from all eight bundles).

Method

Participants and design. We decided a priori to collect data from 200 participants per condition. This compares to one hundred seventy-nine participants in total in Experiment 3 of Mittelman et al. (2014). Eight hundred six Americans were recruited from Amazon Mechanical Turk. All were required to have an approval rating of at least 95%. Each participant was randomly assigned to one of four conditions. Three of these were crucial for testing our ideas: constructed, prepackaged, or expanded prepackaged. Merely in an effort to include all three conditions that Mittelman et al. (2014, Experiment 3) did, we also included a fourth unbalanced constructed condition. We give brief discussion to it below.

Procedure. All participants were asked to consider “shopping for flowers.” Their task would be “to select a bouquet of roses.” Those in the constructed bundle condition constructed their bundle sequentially. They saw an array of 6 yellow and 6 orange roses, the supply from which they would construct their bouquets. Participants had to select three roses from this set of twelve in order to construct a bundle. Note that because there were only two colors of roses, and because we did not ask for a “second choice” or “third choice” rose, there is not the same possibility of misinterpretation that Studies 1a and 1b addressed. Participants in the unbalanced constructed condition confronted a nearly equivalent choice. But the array from which they chose had 8 yellow and 5 orange roses. Our account does not anticipate that this imbalance in supply should matter.
In contrast, those in the (original) prepackaged bundle condition selected from the four unique combinations of roses. However, those in the (new) expanded prepackaged condition selected directly from every unique permutation of roses. This meant that when choosing a bouquet with two roses of one color and one rose of another, participants in the prepackaged condition could select the lone rose to be in the left, middle, or right position. Note that this more closely parallels the experience of those constructing a bundle: They could select the one different-colored flower first, second, or third.

Results and Discussion

We began by coding participants’ chosen or constructed bundles for whether they contained variety—i.e., two roses of one color and one of the other. Participants’ likelihood of selecting a varied bundle strongly differed across the four conditions, $\chi^2(3, N = 806) = 44.60, p < .001$, see Figure 3. We proceeded to test targeted pairwise comparisons that would permit us to test the role of pathways to variety in partially or fully explaining the preference for variety when constructing bundles sequentially instead of selecting among prepackaged bundles.

First, we found that those who constructed the bouquet themselves were more likely to put together a varied bouquet (74.38%; 151 / 203) than those who chose among the standard set of prepackaged bouquets (44.55%; 90 / 202), $\chi^2(1, N = 806) = 37.39, p < .001$. This directly replicates the pattern observed by Mittelman et al. (2014, Experiment 3), but still leaves us with no evidence as to why this pattern emerges. Did the difference in pathways to variety play a role? We compared the expanded prepackaged condition to the (original) prepackaged condition. And indeed, those in the expanded prepackaged condition were more likely to select a varied bundle (59.59%; 118 / 198) than those who considered the standard set of prepackaged bouquets, $\chi^2(1, N = 400) = 9.06, p = .003$. In other words, those considering among prepackaged bundles
displayed a lower preference for variety in part because the choice context offered them fewer pathways to variety. Note that those who constructed the bundle sequentially did show more of a preference for variety than those who considered the expanded set of prepackaged bundles, $\chi^2 (1, N = 401) = 9.93, p = .002$. This could suggest that choice myopia combined with pathways to variety only partially explains the observed effect. We return to this question in later studies.

Before continuing, let us also consider the unbalanced constructed condition—those who drew from a supply of flowers that skewed yellow. These participants selected just as much variety (69.46%; 141 / 203) as those who constructed bundles from the color-balanced supply, $\chi^2 (1, N = 406) = 1.22, p = .27$. Mittelman et al. (2014) mentioned including this condition as a way to explore an idea that has superficial similarities to our own pathways to variety account. That is, they noted that if participants selected their roses randomly from the total available supply, then participants would create more varied bouquets. The authors hoped to rule out this account by showing that by skewing the supply toward yellow roses, that this would not increase the selection of yellow roses. Just like Mittelman et al. (2014), we also found no significant increase ($M = 1.33, SD = 0.91$) compared to when participants drew from the unskewed supply ($M = 1.21, SD = 0.84$), $t(404) = 1.36, p = .17$. But note that this test fails to consider how to determine whether pathways to variety plays a role in the offer framing effect. The claim is not that randomness influences people’s selections from the source array—the bed of orange and yellow flowers from which one chooses. Instead, the claim is that there is some haphazardness in how people make each local choice of either an orange or a yellow flower (irrespective of how many such identical flowers exist in the source array). The present study indicates that the greater number of pathways to variety does play a role.
Study 2b: Restricting Pathways to Variety

Whereas Study 2a expanded the number of pathways to variety in the prepackaged bundle condition to match the (sequentially) constructed bundle condition, Study 2b takes the reverse approach to offer a convergent test of our theoretical account. But Study 2b adds a new condition in which we retain the key choice process feature of the constructed bundle condition (i.e., putting together the bundle sequentially) but eliminates the key element that we hypothesize promotes variety-seeking (i.e., the increased number of pathways to variety). This means that even myopic choosers should no longer be led to more varied bundles.
We accomplish this reduction by exploiting a simple fact about the two-color, three-flower bouquet paradigm: All bouquets must have at least two flowers of the same color. Thus, in a new restricted constructed bundle condition, we first had participants select two roses of the same color. In this way, when participants were selecting their third and final rose, they were making a choice that would create a high-variety bundle (by selecting the opposite color) or a low-variety bundle (by selecting the same color again). In other words, just as in the prepackaged bundle condition, only 50% of pathways led to variety (instead of 75% as in the original constructed bundle condition). See Figure 4 for a visualization of the pathways to variety available to participants in the restricted constructed bundle condition.

Finally, we once again included our expanded prepackaged bundle condition—our key addition in Study 2a. In that study, we found that expanding the pathways to variety for those choosing among prepackaged bundles increased their choice of variety, but not so much that it matched sequential choosers’ choice of variety. Because in Study 2b we had access to a much larger sample, we could determine whether that difference was robust. Stated differently, we could: 1) attempt to replicate Study 2a’s finding and 2) have a clearer understanding of whether pathways to variety only partially or instead fully accounts for the present effects.
**Figure 4.** An illustration of how Study 2b’s restricted constructed bundle participants (those who made two distinct choices) faced an identical number of pathways to variety as those in the prepackaged bundle conditions.

Method

*Participants and design.* One thousand eight hundred seventy-one participants were recruited to complete the study online by Luth Research. Luth collects large online samples that are demographically representative of the United States adult population. Participants completed this study as one of several unrelated studies that composed a 20-minute research session. Each participant was randomly assigned to one of four conditions. Three of those bundle conditions were identical to three of the conditions used in Study 2a: constructed, prepackaged, and expanded prepackaged. We added a restricted constructed condition.
Procedure. Participants considered a similar choice scenario to the one used in Study 2a. How participants selected their three-flower bouquets of orange and/or yellow roses varied by condition. As before, those in the constructed bundle condition added flowers one-by-one by drawing from a supply of yellow and orange roses. Those in the prepackaged bundle condition selected among the four unique combinations of yellow and/or orange roses that can form three-flower bouquets. And those in the expanded prepackaged bundle condition saw all eight possible permutations of bouquets.

In the restricted constructed bundle condition, participants made two choices. First, participants were told, “We will now have you choose your first two roses. What would you like your first two roses to be?” They could select two orange roses or two yellow roses. Crucially, because every final bouquet has at least two roses of one color, this restricted choice does not foreclose the ability to reach any of the possible bouquets. These two roses moved to a box that said, “Your bouquet so far.” Participants then selected either an orange or a yellow rose to complete their bouquet. Participants were able to see what the final bouquet would look like (in order to match the experience of participants in the other condition) before confirming their final selection. If they were not pleased, they could return to the first step. In this way, restricted constructed bundle condition had two (out of four) pathways to variety (50%), the same as those in the prepackaged bundle condition.

Results and Discussion

As before, we began by classifying participants’ selection in terms of whether they selected a high-variety bouquet (two of one color, one of the other) or a low-variety bouquet (all the same color). A chi-square analysis revealed that participants’ preferences for variety significantly differed among the four conditions, \( \chi^2 (3, N = 1,871) = 98.56, p < .001 \), see Figure
5. We began by testing pairwise comparisons that would allow us to potentially replicate Study 2a’s results. First, those in the standard constructed bundle condition were more likely to choose a varied bundle (66.26%; 324 / 489) than those who selected among the four prepackaged bouquets (47.45%; 242 / 510), \( \chi^2(1, N = 999) = 35.96, p < .001 \). Second, we found that by expanding the number of prepackaged bundles that displayed variety, we increased choice of variety (64.02%; 274 / 428), \( \chi^2(1, N = 938) = 25.81, p < .001 \). With a much larger sample than that used in Study 2a (meaning we had even greater power to test for real differences), we found no difference between the constructed bundle and expanded prepackaged bundle conditions, \( \chi^2(1, N = 917) < 1 \). This lends support to the idea that our proposed theoretical account (choice myopia combined with different pathways to variety) fully accounts for the observed effect of the choice process on preference for variety. But before embracing this conclusion too strongly, it is useful to move to the new test that Study 2b offers.

With the pathways to variety restricted, sequential choosers (in the restricted constructed bundle condition) were relatively unlikely to choose a varied bundle (38.51%; 171 / 444). That is, this restriction prompted a diminished interest in variety compared to the standard constructed bundle condition, \( \chi^2(1, N = 933) = 71.92, p < .001 \). But did pathways to variety fully or only partially explain our basic effect? In actuality, restricting sequential choosers’ pathways to variety led to even less of a preference for variety than those in the (standard) prepackaged bundle condition, \( \chi^2(1, N = 954) = 7.72, p = .005 \). This offers an independent confirmation that different pathways to variety explained the entirety of the effect of the bundle choice process on a selection of variety.

In summary, participants’ interest in variety was predicted by the number of pathways to variety they could encounter, not whether they constructed their bundle sequentially or chose
among prepackaged bundles. When people have more opportunities to choose variety, their myopic decision-making leads them to select bundles that contain more variety without consideration for the outcome. That is, in the two conditions in which 75% of participants’ choice pathways led to variety (constructed; expanded prepackaged), their selection of variety was high. In the two conditions in which only 50% of participants’ choice pathways led to variety (prepackaged; restricted constructed), their selection of variety was much lower. Furthermore, this appeared to account for the entirety of the effect, even in a very well-powered study that had the potential to detect even small, lingering effects.

Figure 5. Proportion choosing variety (i.e., a multi-colored bouquet) in Study 2b by condition (Study 2b).

Studies 3a-3c: A Lingering Conundrum or a False Positive?
Our studies suggest that the choice procedure can influence the choice of variety, but it does so through offering more pathways to variety and not through a change in preferences. With that identified, it is worth returning to the original evidence presented by Mittelman et al. (2014). They presented three demonstrations that seem to contradict our account. Two of those seem to be explained by participant confusion with measurement wording (as demonstrated in our Studies 1a and 1b). Their third demonstration needs an explanation.

In their Experiment 4, participants either constructed a bundle of six candies or chose among two prepackaged six-candy bundles. When participants constructed a bundle themselves, they first received three different-flavored candies (ABC). They could then complete their bundle by adding the same three candies (low-variety choice) or by adding three more A’s (high-variety choice). Note that Mittelman et al. defined variety by variability in what was chosen (ABC and then AAA) instead of variability in the outcome (the bundle ABCAAA is predominately an A bundle). Other participants merely indicated whether they preferred ABCAAA or ABCABC. When choosing sequentially, participants showed an increased interest in ABCAAA, the bundle created by showing variety in one’s choices (63.3% of participants selected ABCAAA in the sequential choice condition, compared to 33.3% of participants who directly selected their bundle).

Our theoretical account rooted in choice myopia combined with pathways to variety cannot account for this result. Does this signal that our theoretical account is incomplete? Before embarking on such a search, we first wanted to determine whether those results were replicable. We conducted three replications, all with more than three times the sample size of the original study (Mittelman et al. 2014, Experiment 4).
We describe these efforts briefly below. To foreshadow, we never replicated the originally reported findings. Because we did not start out knowing that the original result would not replicate, each effort included additional conditions that had the potential to help us make sense of the effects. Given the basic effects never replicated, these conditions became moot; the datasets including these additional conditions and the associated study materials are included on the Open Science Framework page for this project.

Studies 3a and 3b: Replications with Original Stimuli

We *a priori* decided to collect data from 100 participants per condition. This compares to sixty participants in total in Experiment 4 of Mittelman et al. (2014). Participants ($N_{3a} = 205; N_{3b} = 200$; Mechanical Turk) considered the three candy flavors used in Mittelman et al. (Experiment 4). In these bundles, A = cherry, B = grape, and C = apricot. For those constructing a bundle, they began with ABC and then had to decide whether to add AAA or ABC. Those choosing among prepackaged bundles selected either ABCAAA or ABCABC.

*Study 3a.* Among those constructing a bundle, participants were relatively unlikely to make a varied choice by selecting AAA (31.07%; 32 / 103). Among those participants who selected directly between the two prepackaged bundles there was a directional, but not statistically significant increase in participants selecting ABC + AAA. The proportion who selected ABCAAA directly was 41.18% (42 / 102). This did not significantly differ from the sequential choice condition, $\chi^2(1, N = 205), = 2.27 \ p = .13$.

*Study 3b.* Study 3a suggested that the original result was not replicable, but we did not want to dismiss it just yet. We conducted a second direct replication with a sample drawn from the same population. This time, we found an effect in the opposite direction of the original finding. That is, those constructing bundles themselves were relatively unlikely to make a varied
choice by selecting AAA (36%; 36 / 100), a percentage that was actually smaller than the proportion who selected ABCAAA directly (52%; 52 / 100), \( \chi^2(1, N = 200) = 5.19, p = .02 \).

Study 3c: Conceptual Replication

Studies 3a and 3b provided no support for the possibility that constructing a bundle sequentially would increase the varied nature of participants’ choices. We considered that perhaps this was related to the fact that Mittelman et al.’s study was conducted in Argentina, where candy flavor preferences likely differ from those of the American sample. We showed 100 Americans from American Turk 12 candy flavors and asked them to rate their liking for each (1 = not at all, 7 = very much). We selected the 5\(^{th}\) (lemon), 6\(^{th}\) (peach), and 7\(^{th}\) (apple) ranked candies to be A, B, and C. In our main study, which we decided to power with 2.5 times the sample size of Studies 3a and 3b, \(N = 503\), those first endowed with ABC were again relatively unlikely to make a varied choice by selecting AAA (27.09%; 68 / 251). This percentage was similar to the percentage of prepackaged bundle participants who chose ABCAAA directly (27.78%; 70 / 252), \( \chi^2(1, N = 503) = .03, p = .86 \). Once again, we find no differences in varied choice when the pathways to variety were equated.

**General Discussion**

We both revisited and built upon past literature on how the bundle selection process influences a preference for variety. Previous researchers argued that when consumers construct bundles sequentially (instead of selecting among prepackaged bundles), they prefer more variety (Mittelman et al., 2014). In seeking to offer the first explanation for this effect, we instead found that the original claim needed to be revised. That is, we found that three of the four studies purporting to show the effect should not factor into our theorizing. Two studies’ results could be chalked up to participant misunderstanding of measures (Mittelman et al. 2014, Experiments 1
and 2). One study did not replicate in three high-powered direct and conceptual replications (Mittelman et al 2014, Experiment 4). Crucially, we propose setting aside these findings not in an effort to dismiss the importance of the bundle selection process, but to allow us to focus on those findings that are robust and thus amenable to theoretical explanation.

We argue that by appreciating the short-sightedness of decision makers—a quality we call choice myopia—we can understand why those who construct bundles sequentially sometimes arrive at different bundles than those who choose among prepackaged bundles. As decision makers construct a bundle themselves, they often have more choice pathways by which to arrive at a high-variety than a low-variety bundle. As an example, consider the construction of a six-pack of beer. A low-variety bundle (e.g., 6 Chimay Blues) can be constructed in one way: the selection of a Chimay Blue six times in a row. If the bundle had just a touch of variety (e.g., 5 Chimay Blues, 1 Chimay White), the consumer now has six unique pathways to arrive at such a bundle; the lone Chimay White could be selected first, second, third, fourth, fifth, or sixth. When looking at a prepackaged bundle, the all-Blue bundle and the five-blue, one-white bundle are merely two options on equal footing; it does not matter that there were many more pathways by which the latter bundle could have been constructed. Simply because variety can be more easily achieved through the sequential construction of a bundle, it more frequently is. By experimentally disentangling the process by which bundles are selected from the number of pathways to variety these choice processes offer, we showed that it is the latter feature that explains when and why sequential choosers construct more varied bundles.

The present research is the first to recognize the importance of choice architecture in producing different numbers of pathways to variety and thus variety-seeking behavior, we earlier drew parallels to previous research that has examined how judgments and decisions tend to
spread over decision sets. Our work offers two primary advances. First, we hold the possible set of final bundles constant, in contrast to research that has examined what happens when the set of available options expands (Benartzi and Thaler 2001). Second, we did not unpack superordinate categories into subordinate categories, a move that could signal the relative importance or scope of those subcategories (Fox et al. 2005). In contrast, our work focuses on the role of choice architecture not in modifying the choice outcomes themselves, but merely in affecting the pathways to get to them.

Choice Myopia Revisited

In considering the role of choice myopia, we focused on a mechanism (pathways to variety) that enhances variety seeking among those constructing bundles sequentially. But might there also exist a mechanism that encourages the selection of low variety among those considering the prepackaged bundles? That is, we have argued that sequential choosers are myopic (i.e., not carefully envisioning the final bundles toward which they are heading). Are they missing something that their prepackaged-considering counterparts find appealing about low-variety bundles?

One possibility is suggested by research on set-fit effects (Evers, Inbar, and Zeelenberg 2014). That research stresses that utility offered by whole bundles is distinct from the utility granted by the sum of its parts. More specifically, people prefer bundles that are all-different (i.e., including all distinct elements) or all-same (e.g., a single-color bouquet) over less gestalt-pleasing bundles (i.e., those that include only some repetition of elements). Bundles with the least variety (i.e., all-same bundles) necessarily benefit from set fit.

Myopic sequential choosers may not be forward looking enough to identify and move toward this unique value. For example, those selecting among prepackaged bouquets may more
easily identify the simple beauty of a three-orange bouquet; those constructing bundles sequentially may be too shortsightedly focused on their next choice instead of on whether they are moving toward a final bundle with the most pleasing gestalt. In the present paper, we focused on testing the pathways to variety account given previous research has already established the importance of set-fit to choice. Whether pathways to variety still encourages more choice of variety even when the bundles’ resonance with set fit is held constant (e.g., the selection of 3-orange, 2-yellow vs. 4-orange, 1-yellow bouquets—two bundle compositions that differ in their pathways to variety but are similar in their lack of resonance with the rules of set fit) is a more nuanced question that awaits empirical investigation.

Implications for Marketing Practice

Consider the decision of how to structure the bundle choice process. Taking the perspective of the consumer, we can ask whether one structure is likely to lead to better choices than the other. This is of course a difficult question. By one perspective, we might think it best to consider which choice process unfolds most similarly to how the actual consumption episodes ultimately will. Through this lens, it might seem that decision makers should construct their bundles sequentially. After all, the beer drinker will ultimately consume those beers in sequence. Just as pathways to variety are exaggerated when constructing the bundle sequentially, the sequential unfolding of reality actually offers the same elevated opportunity for variety in consumption. On the other hand, previous research has suggested that decision makers select more variety for their future than their future selves ultimately would prefer (Ratner, Kahn, and Kahneman 1999; Read and Loewenstein 1995). For this reason, pushing decision makers to select among prepackaged bundles (at least when those bundles restrict pathways to variety) may nudge them toward more optimal choices.
Marketers themselves may have their own incentives for wanting consumers to select more or less variety. Consider the beer manufacturer who is attempting to promote sales of a new varietal. To encourage trial, the manufacturer may wish to include the beer in certain bundled offerings. The seller may have more luck getting customers to add the new varietal to their bundles when they construct their own six-packs (thereby offering six chances for the new varietal to be chosen) instead of having them select among prepackaged bundles. Furthermore, this approach may prove economically savvy, especially compared to a more traditional approach like an introductory price promotion. Examination of this possibility awaits relevant field research.

Conclusion

Even when scientists work in isolation, they take part in a collaborative enterprise. Researchers look to the efforts of others for guidance on what questions need asking, and which answers are most plausible. As the behavioral sciences have aimed to understand which of its own published literature is robust and replicable (Open Science Collaboration, 2015; Dreber et al., 2016), it can be easy to slip into a certain dichotomous thinking: Is a finding real or not? We hope the present paper offers a more nuanced answer to this question. A single paper may contain some findings which are seemingly not replicable, others that are perhaps artifactual, but still others that are novel, important, and yet imperfectly understood.

We greatly benefited from Mittelman et al.’s (2014) recognition that the bundle selection process is an interesting but otherwise neglected topic in consumer research. But surprisingly, moving the theoretical and empirical understanding forward required recognizing that some of the original evidence needed to be reconsidered and others challenged more directly. The published literature involves a mix of replicable, artifactual, and non-replicable findings. Only by
carving out these three categories could we identify the most vital of the previous contributions and lay a foundation for others to now build further.
References


