Mixing It Up:
Unsystematic Product Arrangements Promote the Choice of
Unfamiliar Products

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December 2019

Journal of Marketing Research, in press.
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ABSTRACT

This research examines how the unsystematic (vs. systematic) spatial arrangement of a set of alternatives affects consumers’ product choices. The key hypothesis is that an unsystematic product arrangement—where an assortment consisting of a number of alternatives is arranged in an apparently arbitrary manner—causes greater perceptual disfluency, which in turn triggers more extensive exploratory product search, ultimately promoting the choice of unfamiliar products. This sequence of effects is particularly pronounced when consumers do not have a strong prior preference for specific alternatives in the assortment. Evidence from five studies, including a large-scale field experiment, provides support for this theorizing across various display formats and product domains. The findings advance our understanding of how the spatial arrangement of a product assortment influences consumer choice, and they shed light on the psychological mechanism that governs this effect.

Keywords: Product Arrangement, Choice Architecture, Perceptual Disfluency, Exploratory Search, Consumer Choice, Product Familiarity, Field Experiments.
Consumers often act as creatures of habit, from buying the same brands across different shopping episodes (Seetharaman, 2004), to repeatedly eating familiar foods across their daily meals (Khare and Inman 2006), to choosing the same mode of transportation by default, neglecting to consider alternative modes (Aarts, Verplanken, and van Knippenberg 1997, 1998). Although people tend to have an intrinsic drive to explore that is present from childhood (Berlyne 1966; Ryan 1995), this drive is easily disrupted by consumers’ habitual shopping behaviors that turn consumers into cognitive misers who prefer the familiar over the unfamiliar (Aarts, Verplanken, and van Knippenberg 1997; Wood and Neal 2009). New realities in retailing such as consumers’ tendency to spend less time in stores (Nassauer and Safdar 2018; Taylor and Tyler 2018), to examine only a small fraction of the available product offerings (Chandon et al. 2009), and retail environments that further reduce and filter the range of alternatives consumers consider (Brynjolfsson, Hu, and Rahman 2013; Häubl and Trifts 2000) suggest that consumers’ willingness to explore unfamiliar alternatives in product assortments are on the decline.

Might the way in which a product assortment is presented be used to inspire greater exploration and ignite consumers’ interest in unfamiliar alternatives? Building on prior research on how environmental cues can alter individuals’ information processing and habitual responses (Wood and Neal 2007; Wood, Tam, and Witt 2005), the current work isolates the effect of the spatial arrangement of a given set of products on consumer product choice. Specifically, we examine the effect of unsystematic compared to systematic spatial product arrangements. We conceptualize a systematic product arrangement as a spatial configuration of a set of alternatives based on identifiable criteria such as a product’s brand, price, color, size, or other visually salient features. As an illustration, the set of geometric forms in the systematic arrangement in the left panel of Figure 1A is organized horizontally and vertically based on color and shape respectively
(resembling brand and price-quality tier, for instance). By contrast, the right panel of Figure 1A shows an unsystematic arrangement of the same set, with the alternatives not organized based on any identifiable criterion and instead presented in an apparently arbitrary manner.

[Insert Figure 1 about here]

We theorize that the unsystematic (vs. systematic) arrangement of a product assortment causes greater perceptual disfluency, consequently motivating consumers to explore a greater number of alternatives in the assortment, and ultimately promoting choice of unfamiliar products. Moreover, we hypothesize that this sequence of effects is particularly pronounced in settings where consumers do not have a strong prior preference for specific alternatives in the assortment. The results of a series of studies (including a large-scale field experiment) provide compelling evidence in support of this theorizing, and they show that these effects are robust across various display formats and product domains.

The present research is the first to isolate the spatial positioning of products in an assortment without confounding it with perceptions of messiness or being out-of-place (Castro, Morales, and Nowlis 2013). It reveals how the spatial arrangement of a given set of products affects the likelihood of an unfamiliar alternative being chosen. Our findings contribute to recent work on how physical properties of product displays influence consumer perceptions (e.g., Deng et al. 2016) by showing that the particular spatial arrangement of a set of alternatives induces greater perceptual disfluency, and that greater perceptual disfluency in turn motivates exploratory search, ultimately promoting consumers’ choice of unfamiliar products.
THEORETICAL FRAMEWORK

Assortment Organization, Perceptual Disfluency, and Exploratory Product Search

The way products are presented can have important consequences for how consumers experience the process of choosing from an assortment and what they ultimately end up buying. Sorting available products (even by arbitrary criteria) instead of presenting the same alternatives to consumers in random order can decrease search costs and attenuate the detrimental effects of large assortments on consumers’ satisfaction with a product choice (Diehl 2005; Mogilner, Rudnick, and Iyengar 2008; Morales et al. 2005; see Chernev, Böckenholt, and Goodman 2015 for a review). While organizing products based on an identifiable criterion can help less knowledgeable consumers to learn about and differentiate between products, an unexpected product organization can serve as a novelty cue for more knowledgeable consumers, thereby promoting learning (Poynor and Wood 2010). This suggests the possibility that product displays that are, or appear, disorganized might have a systematic impact on consumers’ product choice. Moreover, Castro, Morales, and Nowlis (2013) found that displays in which products are presented in a messy, out-of-place fashion with limited quantity remaining (relative to clean, fully stocked displays) can increase purchase likelihood for non-ingestible products (by signaling greater popularity when brands are unfamiliar), but not for ingestible ones. Finally, work by Kahn and Wansink (2004) revealed that people consumed larger quantities of food when choosing from an asymmetric compared to a symmetric information display.

These findings are linked to prior work demonstrating that environmental cues can disrupt habitual responses and stimulate a broader consideration of alternatives (Verplanken et al. 2008; Verplanken and Wood 2006). For instance, Diehl, van Herpen, and Lamberton (2015) showed that consumers expended greater effort during a choice task when complementary items from
different categories were grouped together compared to when items were grouped together by product category. This is conceptually consistent with what is known about the sources and consequences of disfluency—i.e., the subjective experience of difficulty to process information (see Alter and Oppenheimer 2009 for a review). For instance, people are able to classify dot patterns faster when these are prototypical and easier to discriminate from other patterns (Checkosky and Whitlock 1973; Posner and Keele 1968). This line of research suggests that the spatial arrangement of objects (or the context in which a target object is presented) affects the ease—or fluency—with which it is processed (Winkielman et al. 2006; see Reber, Schwarz, and Winkielman 2004 for a review). Prior work has shown that the perception of disfluency can lead to inferences of specialness (Pocheptsova, Labroo, and Dhar 2010), stimulate the need for cognitive enrichment (Graf and Landwehr 2015), ignite interest (Labroo and Pocheptsova 2016), affect inferences about the importance of a task (Sela and Berger 2012), increase effort in a subsequent task (Song and Schwarz 2008), and enhance preference for an alternative when effort is perceived to be desirable (Labroo and Kim 2009). Based on these streams of prior research, we theorize that exposure to an unsystematic (vs. systematic) product arrangement tends to disrupt consumers’ habitual search processes, cause them to experience greater perceptual disfluency, and in turn promote more extensive exploration of the set of available alternatives.

Exploratory Search and the Choice of Unfamiliar Alternatives

How might a more extensive exploration of alternatives affect consumer choice? Building on prior work on the duality of consumer search routines (Janiszewski 1998), we expect that more exploratory compared to goal-directed search influences what stimuli (or products) consumers attend to and subsequently consider for purchase. Goal-directed search is characterized by the planned acquisition of some target information (such as a particular product
attribute) using a search routine that is stored in memory (e.g., visually scanning one’s field of view for the color red to locate ketchup containers in the condiment aisle). As a consequence, in goal-directed search, individuals’ attention tends to be highly focused and limited to a small subset of the stimuli that are present in the environment (Corbetta and Shulman 2002; Posner and Petersen 1990, see also Petersen and Posner 2012). By contrast, exploratory search is a moment-by-moment activity that is less focused, and that is continuously active as a baseline visual search system (Janiszewski 1998), with a greater responsiveness to cues in the environment (Moe 2003).

These differences between goal-directed and exploratory search have important implications for the type of product consumers focus on. For example, goal-directed search routines have been found to selectively direct attention toward familiar compared to unfamiliar stimuli by effectively blocking the latter (Christie and Klein 1995; Downing 2000; Hutchinson and Turk-Browne 2012). In contrast to goal-directed search, exploratory search routines are geared to the identification of unfamiliar stimuli in the environment (Berlyne 1966; Moe 2003; Wilson et al. 2014). Thus, exploratory search entails a more extensive sampling of, and greater attention to, unfamiliar stimuli.

Just as memory-based choice is influenced by the alternatives that a consumer is able to recall (Nedungadi 1990; Posavac, Sanbonmatsu, and Fazio 1997), stimulus-based choices—such as those made from an assortment displayed in a store or a web-based shopping interface—are driven by which alternatives a consumer selectively attends to. Although people can extract a broad range of information about an object from peripheral vision (Henderson and Hollingworth 1999), limited direct attention toward a product reduces its likelihood of being chosen or purchased (Chandon et al. 2009). Thus, neglecting unfamiliar alternatives during goal-directed
search in favor of familiar alternatives should decrease the likelihood of choosing an unfamiliar alternative. Conversely, merely directing attention to an alternative renders it more likely to be chosen (Janiszewski, Kuo, and Tavassoli 2012). Based on these probabilistic regularities, in conjunction with prior evidence that exploratory search drives attention toward unfamiliar alternatives (Berlyne 1966; Moe 2003; Wilson et al. 2014), we propose that greater exploratory search increases the likelihood that consumers choose an alternative that they were initially unfamiliar with.

Taken together, the above reasoning leads to the following hypotheses about the impact of the spatial arrangement of a given set of products—i.e., either unsystematic or systematic—on consumers’ product choices, and about the psychological mechanism that governs this effect.

**H₁:** Compared to systematic arrangements, unsystematic product arrangements promote consumer choice of unfamiliar alternatives.

**H₂:** The positive effect of unsystematic product arrangements on consumer choice of unfamiliar alternatives (H₁) is sequentially mediated by (a) greater perceptual disfluency and (b) increased exploratory product search.

*The Moderating Role of Preference Clarity*

Consumers may not be universally affected by whether a product assortment is arranged systematically vs. unsystematically. In particular, the spatial arrangement of a given set of products should be less likely to affect product choices when a consumer has a clear, well-defined prior preference in favor of some of the alternatives in the assortment (e.g., those of a specific brand). Thus, we predict that high preference clarity prior to encountering a product display tends to immunize consumers against the effects of unsystematic product arrangements on their product choices.
This line of reasoning conceptually parallels the finding that the availability of an ideal point (i.e., having thought about one’s ideal product in a specific domain ahead of time) when making a choice (Chernev 2003, experiment 4). Prompting consumers to consider their preferred attribute levels or to articulate their preferences prior to being exposed to a product assortment can mitigate the otherwise negative effects of large assortments on the experience of choice difficulty (Chernev, Böckenholt, and Goodman 2015). This is also consistent with prior work showing that the use of decision aids that require consumers to articulate their preferences reduces search effort and the number of alternatives they consider for purchase (Häubl and Trifts 2000). Similarly, filtering mechanisms that impose structure on an assortment can reduce perceptions of variety and enable consumers to more easily identify their preferred products (Morales et al. 2005).

Building on these prior findings, we hypothesize that the extent to which consumers have clarity about their own preferences prior to encountering a product display mitigates the impact of the unsystematic spatial arrangement of the display on their likelihood of choosing an unfamiliar product (via increased perceptual disfluency and a greater inclination to explore the assortment).

**H3:** The positive effect of unsystematic product arrangements on consumer choice of unfamiliar alternatives (H₁) is attenuated when prior preference clarity is high.

To summarize, the key hypotheses examined in this research are as follows. Exposure to an unsystematic (vs. systematic) product arrangement increases perceptual disfluency. This greater level of disfluency in turn leads to more extensive exploration of alternatives in the assortment. Based on probabilistic regularities of how attention affects choice, this increased exploration of alternatives renders consumers more likely to (inspect and ultimately) choose an initially
unfamiliar alternative. Finally, we hypothesize that this effect is attenuated when consumers have a clear prior preference in favor of some of the alternatives in the assortment.

OVERVIEW OF STUDIES

In what follows, we present evidence from a series of studies that were designed to test these hypotheses. Studies 1a and 1b—a laboratory experiment and a large-scale nationwide field experiment—provide initial demonstrations of the overall effect of the spatial configuration of a product assortment on consumer choice by showing that unsystematic (vs. systematic) product arrangements promote consumers’ choice of unfamiliar alternatives. Studies 2 to 4 examine the psychological mechanism that drives this effect, supporting the hypothesis that it is sequentially mediated by greater perceptual disfluency associated with the product arrangement and more extensive exploration of alternatives in the assortment. In addition, Study 2 shows that, as hypothesized, greater preference clarity attenuates the effect of unsystematic product arrangements on choice of unfamiliar alternatives. Study 3 demonstrates that the effect vanishes when participants are prompted to attribute the experience of difficulty to the correct source, providing further evidence of the pivotal role of perceptual disfluency. Finally, Study 4 demonstrates the robustness of the effect across product domains and product display formats.

STUDY 1A

The primary objective of Study 1a was to provide a first test of our overarching hypothesis that an unsystematic product arrangement increases the choice share of unfamiliar alternatives.

Experimental Procedure

The study was conducted in a behavioral research lab in cooperation with a large Swiss mobile phone retailer. A total of 152 students at a Swiss university (M<sub>Age</sub> = 23.1, SD<sub>Age</sub> = 0.23, 53 women) participated in this experiment, one at a time, for monetary compensation. The task
was to choose a mobile phone. A physical product display with a built-in tracking capability was used (see Figure A-1 in the Web Appendix). Participants were randomly assigned to either a systematic product arrangement condition in which a total of 21 mobile phones were arranged systematically by brand (three rows by seven columns) or an unsystematic product arrangement condition in which the same mobile phones were arranged randomly across the display (see Figure 1B).

We used an experimental procedure to induce familiarity with a subset of the 21 alternatives. Given the well-established link between repeated exposure and familiarity, we used a repeated-exposure paradigm to induce familiarity (Carr, Brady, and Winkielman 2017; Lee 2001). All 21 alternatives had fictitious brand names. Seven of these alternatives were made familiar to participants (before condition assignment) using the following two-step procedure. First, participants were instructed to look at an image of each of the seven alternatives, one at a time (see Figure A-2 in the Web Appendix). Each image was presented twice for five seconds in random order. In a second step, participants completed a visual search task to identify the location of specific items, such as buttons or icons, on the screen of each of the seven “familiarized” mobile phones (see Figure A-3 in the Web Appendix). Following this procedure, participants’ familiarity with one phone that had been included in the set of seven (selected at random separately for each participant) and one that had not been included (and that was not part of the overall assortment of 21 phones) was measured using a 7-point scale (1 = “never seen before” to 7 = “seen very often”; Alter and Oppenheimer 2008). As expected, the alternative that had been included was more familiar ($M_{\text{Familiarized}} = 6.01$, $M_{\text{NotFamiliarized}} = 3.13$; $t(151) = 14.79$, $p < .001$), confirming that the familiarity induction was effective.
Next, participants were assigned to one of the two conditions (systematic vs. unsystematic product arrangement), presented with the assortment of 21 phones, and instructed to select their preferred alternative. The product display’s built-in interactive behavioral tracking capability was used to record participants’ product search and product choice. In order to inspect detailed information about a particular phone (on a large screen that was integrated prominently into the overall display), a participant had to remove the phone from its home position by picking it up (see Figure A-1 in the Web Appendix). The two key dependent variables were participants’ choice of an unfamiliar (coded as 1) vs. familiar (coded as 0) mobile phone and the extent of exploratory product search (in terms of the total number of mobile phones that they inspected).

Results

Choice. In support of our theorizing, a logit model with participants’ choice of an unfamiliar (vs. familiar) phone as the dependent variable reveals that, relative to the systematic product arrangement, the unsystematic arrangement caused a significant increase in participants’ probability of choosing an unfamiliar alternative—61.97% of participants selected an unfamiliar phone in the unsystematic condition compared to 42.68% in the systematic condition ($\beta_{\text{Unsystematic}} = .82, z = 2.31, p < .05$).

Exploratory product search. Also in line with our theorizing, exposure to the unsystematic relative to the systematic product arrangement caused an increase in participants’ exploration of the assortment, as indicated by a significantly greater number of inspected phones ($M_{\text{Systematic}} = 8.84, M_{\text{Unsystematic}} = 10.89; t(150) = 2.16, p < .05$). As predicted, this difference was driven by the inspection of more unfamiliar alternatives in the unsystematic arrangement condition ($M_{\text{Systematic}} = 5.92, M_{\text{Unsystematic}} = 7.62; t(150) = 2.29, p < .05$) while the arrangement
manipulation had no effect on the number of inspected familiar alternatives (M_{Systematic} = 2.92, M_{Unsystematic} = 3.18; t(150) = 0.87, p = .39).

Discussion

The results of Study 1a show that, in line with our theorizing, unsystematic (vs. systematic) product arrangements promote a greater choice share of unfamiliar alternatives and increase consumers’ tendency to explore more alternatives in the assortment.

STUDY 1B

The objectives of this study were twofold. The first was to seek to replicate the effects on choice and exploratory search observed in Study 1a in a large-scale field experiment. Second, Study 1b also examined whether consumers’ likelihood of choosing unfamiliar products might increase simply because these alternatives may have been located in more prominent (salient) display positions (and thus have been more likely to attract attention). Study1b was specifically designed to contrast the unsystematic arrangement of products against a systematic arrangement in which all unfamiliar products are located in the most prominent display positions. In the comparison between these two spatial arrangement conditions, a mere salience account (Chandon et al. 2009; Drèze, Hoch, and Purk 1994) would imply that choice of an unfamiliar alternative is more likely in the systematic than in the unsystematic condition. By contrast, our theorizing predicts the opposite—i.e., that choice of unfamiliar alternatives is more likely in the unsystematic condition (even though these alternatives tend to be located in less prominent display positions in that condition). Moreover, we hypothesize that this effect is—above and beyond any effects due to differences in salience—driven by an increased exploration of the assortment.
Data Collection and Experimental Procedure

This field experiment was conducted in cooperation with the same Swiss mobile phone retailer as Study 1a. The study ran over a period of four weeks, involving 36 stores that were randomly assigned to one of four conditions that varied the arrangement of familiar and unfamiliar phones. Specifically, the alternatives were arranged (1) systematically in line with the retailer’s standard product arrangement at the time, with six familiar phones in the top, one in the middle, and three in the bottom row [systematic-baseline], (2) systematically by brand with six familiar phones in the top, three in the middle, and one in the bottom row [systematic-top], (3) systematically by brand but with one familiar phone in the top, three in the middle, and six in the bottom row [systematic-bottom], or (4) unsystematically by arranging all mobile phones in an apparently arbitrary manner, with three familiar phones in the top, four in the middle, and three in the bottom row [unsystematic]. (The product arrangements in these four conditions are shown in Figure 1C.)

Prior to any experimental manipulation across stores, we conducted a pre-test to determine the familiarity of each mobile phone in the assortment. A sample of 81 subjects (M_{Age} = 30.00, SD_{Age} = 9.19, 30 women) rated the familiarity of each of the retailer’s 21 mobile phones on the same familiarity scale as in Study 1a. Using the median rating as the cutoff point, the alternatives were classified as either unfamiliar (M = 3.77, N = 11 phones) or familiar (M = 4.57, N = 10 phones; t(80) = 7.96, p < .001). This classification was used for the implementation of the experimental paradigm across stores, and the manager of each store received instructions on the display location of each mobile phone.

We used the same interactive tracking device as in Study 1a and measured for each of the 36 stores the amount of exploratory search per customer and the type of phone that was
purchased (unfamiliar coded as 1 vs. familiar coded as 0). In this field experiment, we collected data on a total of 51,312 mobile phone shoppers across all 36 stores.

Model

We estimated two mixed-effects models at the store level to examine the effect of unsystematic (vs. systematic) product arrangements on each of the two key dependent variables—the choice share of unfamiliar alternatives and exploratory search measured by the number of inspected alternatives. To control for unobserved but constant heterogeneity between stores and over time, we estimated random intercepts for store and day. Thus, each model predicts the choice share of unfamiliar alternatives or exploratory search with a vector of estimated fixed coefficients of the product arrangement conditions, two vectors of estimated random intercepts for store and day respectively, and a vector of residuals. We estimated these mixed-effects models using robust standard errors (robustlmm package in R; Koller 2016).

Results

Choice. As hypothesized, the type of product arrangement had a significant effect on shoppers’ choice of unfamiliar phones. While the choice share of unfamiliar alternatives in the unsystematic product arrangement condition ($P_{\text{Unsystematic}} = 17.83\%$) was significantly greater than that in both the baseline ($P_{\text{Systematic-Baseline}} = 6.62\%, t = 3.96, p < .001$) and systematic-top ($P_{\text{Systematic-Top}} = 10.68\%, t = 2.04, p < .05$) conditions, it did not differ from the systematic arrangement condition in which all familiar phones were positioned in the bottom row ($P_{\text{Systematic-Bottom}} = 16.82\%, t = 0.38, p = .70$; see Model 1.a in Table A-1 in the Web Appendix for additional model results on random effects for day and store type).

A potential candidate explanation for this pattern of results could be that shoppers in the unsystematic condition were more likely to choose unfamiliar alternatives simply because these
might have been located in more prominent display positions. To address this possibility, we conducted a series of conservative tests in which we investigated only the choice share of unfamiliar alternatives that were either in the same or less prominent display positions (such as moving from a top-center to a bottom-non-center position). These analyses confirm the significant difference between the unsystematic and baseline product arrangement

\( P_{\text{Systematic-Baseline}} = 2.65\%, P_{\text{Unsystematic}} = 5.46\%; t = 2.15, p < .05; \) for detailed results see Model 1.b in Table A-1 in the Web Appendix) and the systematic arrangement with all familiar alternatives in the top row \( P_{\text{Systematic-Top}} = 1.23\%, P_{\text{Unsystematic}} = 3.70\%; t = 2.09, p < .05; \) for detailed results see Model 1.c in Table A-1 in the Web Appendix). Finally, participants in the unsystematic arrangement condition were equally likely to choose unfamiliar alternatives that were in the same or less prominent display positions compared to systematic arrangements with all familiar alternatives in the bottom row \( P_{\text{Systematic-Bottom}} = 12.56\%, P_{\text{Unsystematic}} = 14.38\%; t = 0.84, p = .40; \) for detailed results see Model 1.d in Table A-1 in the Web Appendix). This result is not surprising due to the ceiling effect in the systematic-bottom condition in which the majority familiar (unfamiliar) alternatives were displayed in the bottom (top) row.

In sum, the results of this study show that the unsystematic product arrangement significantly increased the choice share of unfamiliar products even when these were in less prominent display positions. The fact that we did not observe any difference in choice share between the unsystematic and systematic-bottom condition might appear to be consistent with an alternative account, which is that merely moving unfamiliar products to top-center locations increases the choice share of these alternatives. However, there were fewer unfamiliar alternatives in prominent (salient) display positions in the unsystematic compared to systematic-bottom condition. Thus, the choice share of unfamiliar alternatives in the
unsystematic product arrangement condition was at least as high as (and directionally higher than) in the systematic-bottom condition even though fewer unfamiliar alternatives were available in the most prominent display positions (i.e., the top row contained 4 vs. 6 unfamiliar alternatives in the unsystematic vs. systematic-bottom condition).

*Exploratory product search.* In line with our theorizing, the type of product arrangement also had a significant impact on shopper’s exploration of the assortment. While exploration was significantly greater in the unsystematic product arrangement condition ($M_{\text{Unsystematic}} = 5.28$) than in both the systematic-baseline ($M_{\text{Systematic-Baseline}} = 3.12, t = 3.17, p < .01$) and systematic-top ($M_{\text{Systematic-Top}} = 3.54, t = 2.12, p < .05$) conditions, it did not differ from the systematic-bottom condition ($M_{\text{Systematic-Bottom}} = 4.70, t = .08, p = .94$; see Model 2.a in Table A-1 in the Web Appendix for additional model results on random effects for day and store type).

To address the potential alternative account that shoppers in the unsystematic condition attended less to familiar alternatives merely because these were located in more prominent display positions, we conducted additional analyses mirroring the previous robustness checks on choice (i.e., including only alternatives that were either in the same or less prominent display positions in the unsystematic arrangement condition). These analyses revealed that, compared to the two systematic arrangement conditions in which familiar phones were presented in the top row, shoppers in the unsystematic condition inspected both more familiar phones (both $p$ values < .05; $M_{\text{Unsystematic}} = 2.92$, $M_{\text{Systematic-Baseline}} = 1.73$, $M_{\text{Systematic-Top}} = 2.10$; for detailed results see Model 2.b in Table A-1 in the Web Appendix) and more unfamiliar phones (both $p$ values < .001; $M_{\text{Unsystematic}} = 2.35$, $M_{\text{Systematic-Baseline}} = 1.39$, $M_{\text{Systematic-Top}} = 1.44$; for detailed results see Model 2.c in Table A-1 in the Web Appendix). There was no difference in exploratory product search between the unsystematic product arrangement condition and the
condition in which all familiar phones were positioned in the bottom row (both $p$ values > .83; familiar: $M_{\text{Systematic-Bottom}} = 2.63$, unfamiliar: $M_{\text{Systematic-Bottom}} = 2.07$; for detailed results see Table A-1 in the Web Appendix).

Discussion

The findings of this study conceptually replicate those of Study 1a, providing additional support for our theorizing based on a large-scale field experiment involving consequential consumer choices in a natural setting and involving more than 50,000 consumers. Moreover, Study 1b provides a conservative test of this effect by showing that consumers in the unsystematic arrangement condition were more likely to choose unfamiliar alternatives even if these were located in less prominent display positions. Critically, this positive effect of unsystematic product arrangements on consumers’ choice of unfamiliar alternatives is not solely due to consumers attending to more prominently displayed alternatives. Yet, it is worth noting that consumers in the unsystematic arrangement condition inspected even more familiar alternatives than did those across all systematic arrangement conditions where familiar alternatives were displayed more prominently (i.e., in more salient display positions).

The results of Study 1b are consistent with those of prior work on display position effects (Chandon et al. 2009; Drèze, Hoch, and Purk 1994), showing that merely presenting alternatives in a prominent display position (i.e., unfamiliar alternatives in the systematic-bottom condition displayed in top-center positions) increases the choice share of these alternatives. The non-significant difference between the unsystematic compared to the systematic-bottom condition suggests that the effects of the unsystematic display observed here might have been due, in part, to such a salience account. However, it is important to note that there were fewer unfamiliar alternatives in the most prominent display positions in the unsystematic condition.
(e.g., top row with 4 vs. 6 unfamiliar alternatives in the unsystematic vs. systematic-bottom condition).

We also conducted a post-test to assess whether the unsystematic arrangement was indeed perceived as less systematic and more disfluent than the other three. A sample of 31 Mechanical Turk workers from the US (M_{Age} = 32.94, SD_{Age} = 10.72, 22 women) rated how unsystematic (1 = “arranged in an unsystematic manner” to 7 = “arranged in a systematic manner” and 1 = “disorganized” to 7 = “organized;” Cronbach’s \( \alpha = .95 \)) and how disfluent (1 = “difficult to process” to 7 = “easy to process;” Labroo, Dhar, and Schwarz 2008) they perceived each of the four product arrangements to be. (The numerical coding of these two measures was reversed so that higher values indicate that an arrangement was perceived to be more unsystematic and more disfluent, respectively.) As expected, the unsystematic arrangement was perceived to be more unsystematic (M_{Unsystematic} = 4.85) than the other three (M_{Systematic-Baseline} = 3.47, M_{Systematic-Top} = 2.97, M_{Systematic-Bottom} = 3.16; p values < .001). The differences between the systematic-baseline, systematic-top, and systematic-bottom arrangements were all non-significant (p values > .16). Mirroring this pattern of results, the unsystematic arrangement was also perceived to be more disfluent (M_{Unsystematic} = 4.52) than the other three (M_{Systematic-Baseline} = 3.32, M_{Systematic-Top} = 3.00, M_{Systematic-Bottom} = 3.03; p values < .001). Again, the differences between the systematic-baseline, systematic-top, and systematic-bottom arrangements were all non-significant (p values > .29). The results of this post-test verify that participants did indeed perceive the unsystematic product arrangement as less systematic, and they provide initial evidence for the role of disfluency.

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1 Following the approach recommended in a recent review article on fluency effects, we used a single-item measure of experienced disfluency (Graf, Mayer, and Landwehr 2017). While we also assessed the entire three-item scale used by Labroo, Dhar, and Schwarz (2008), we concluded that the two additional items (“not at all attractive”/“very attractive”, “not at all eye-catching”/“very eye-catching”) were not suitable in the current context.
In what follows, we present evidence from a series of experiments that were designed to provide more direct evidence on the proposed underlying psychological mechanism while ruling out potential alternative explanations.

**STUDY 2**

Study 2 had two objectives. The first was to provide a test of the proposed psychological mechanism governing the effect of the spatial arrangement of alternatives on product choice. We hypothesized that unsystematic product arrangements promote consumers’ choice of unfamiliar alternatives via an increase in perceptual disfluency that in turn triggers a more extensive exploration of the available alternatives. The second objective of Study 2 was to examine a key boundary condition of the effect of unsystematic product arrangements. According to our theorizing, the effect of unsystematic arrangements on consumers’ choice of unfamiliar products should be attenuated when consumers have greater preference clarity.

**Design and Procedure**

A total of 264 students at a major Swiss university ($M_{\text{Age}} = 22.47, SD_{\text{Age}} = 3.12; 106$ women) participated in the study in exchange for monetary compensation. The task was to choose an apartment for a weekend getaway in Paris. To ensure incentive-compatibility, two randomly selected participants received a voucher for a two-night stay in their selected apartment. Participants were randomly assigned to one condition in a $2 \times 2$ (product arrangement: systematic vs. unsystematic) × (preference clarity: low vs. high) between-subjects design.

The assortment consisted of 16 apartments offered by four different brands (four apartments per brand). One of the brands was familiar (Airbnb) and the other three were fictitious and thus unfamiliar (TravelLight, Trip Inn, and Agoda). To prevent any brand-based quality inferences, participants read an excerpt from what appeared to be a recent consumer
report indicating that the four brands had been found to provide apartments of equal quality. Each apartment was represented by a square button that contained the brand information, the average guest rating, and the nightly rate. The 16 buttons were displayed in a $4 \times 4$ table. Participants were able to access a detailed description of each apartment in terms of eight attributes by clicking on its button. To finalize their choice, participants selected their preferred apartment and then clicked the “Book” button below its description (see Figure A-4 in the Web Appendix for details). The levels of all attributes for each apartment were generated randomly within predefined, narrow ranges (quality rating: [90.1%, 97.9%]; price: [CHF 112; CHF 139]).

In the systematic product arrangement conditions, the 16 apartments were organized by brand with all four alternatives of a brand being displayed in the same row. In the unsystematic conditions, the 16 apartments were displayed in an apparently arbitrary manner (see left panel of Figure 3). To ensure a conservative test of our hypothesis that unsystematic product arrangements promote the choice of unfamiliar alternatives, this manipulation had the following properties. The display positions of the familiar alternatives were never less prominent—and on average more prominent—in the unsystematic than in the systematic conditions. Specifically, in the unsystematic conditions, the apartments of the familiar brand (Airbnb) appeared in rows 1, 2, and 3 of the product arrangements. By contrast, in the systematic conditions, none of these apartments appeared in rows 1 and 2—all were in row 3. Thus, the hypothesized increase in the choice probability of unfamiliar alternatives in the unsystematic (relative to the systematic) arrangement conditions cannot be due to familiar alternatives being displayed less prominently. The same conservative approach was used in all subsequent studies.

Preference clarity was manipulated using a procedure adapted from prior work (Chernev 2003; Huber et al. 1993). Prior to the choice task, participants in the high preference clarity
condition were asked to rank-order a set of four brands according to their preference (see Figure A-5 in the Web Appendix). This set consisted of the target brand (Airbnb) and three fictitious ones that were different from the unfamiliar brands used in the choice task. The objective of this procedure was to have participants engage with one of the brands that they would encounter in the subsequent choice task—specifically, the familiar brand—so as to induce a heightened sense of having a preference in favor of some of the alternatives that they would eventually choose among. Participants in the low preference clarity condition instead proceeded directly to the choice task.

Upon completion of the choice task, a measure of the perceptual disfluency of the product arrangement (same as in post-test presented in Discussion section of Study 1b) was obtained. The number of apartments for which a participant inspected detailed descriptions was tracked and served as our measure of exploratory product search. Finally, participants indicated their familiarity with each of the brands using the same items as in Studies 1a and 1b. As expected, participants were significantly more familiar with Airbnb compared to any of the three fictitious brands (all p values < .001; M_{Airbnb} = 6.72, M_{TravelLight} = 1.98, M_{TripInn} = 1.85, M_{Agoda} = 1.94).

Results

Choice. A logit model with participants’ choice of an unfamiliar (vs. familiar) brand as the dependent variable revealed a significant interaction between product arrangement and preference clarity in the predicted direction (β_{Arrangement×PreferenceClarity} = -1.11, z = -2.21, p < .05; see Figure 2). Consistent with our theorizing, participants were more likely to choose an unfamiliar alternative in the unsystematic than in the systematic product arrangement condition when preference clarity was low (P_{Systematic-LowClarity} = 42.25%, P_{Unsystematic-LowClarity} = 64.18%; β_{Unsystematic-LowClarity} = 0.44, z = 2.52, p < .05), but this effect vanished when preference clarity was
high ($P_{\text{Systematic-HighClarity}} = 44.62\%$, $P_{\text{Unsystematic-HighClarity}} = 39.34\%$; $\beta_{\text{Unsystematic-HighClarity}} = -0.10$, $z = -0.55, p = .58$). Finally, the main effect of the unsystematic (vs. systematic) product arrangement condition was positive and significant ($\beta_{\text{Unsystematic}} = 0.90$, $z = 2.56$, $p < .05$), such that participants were more likely to choose an unfamiliar alternative in the unsystematic than in the systematic product arrangement condition, while the main effect of preference clarity was non-significant ($\beta_{\text{HighClarity}} = 0.10$, $z = 0.28$, $p = .78$).

[Insert Figure 2 about here]

Perceptual disfluency. Mirroring the results on participants’ choice of unfamiliar alternatives, an analysis of variance (ANOVA) with perceptual disfluency as the dependent variable revealed a significant interaction between product arrangement and preference clarity ($F(1, 260) = 4.83, p < .05$). In the low preference clarity condition, participants experienced significantly greater perceptual disfluency in the unsystematic product arrangement ($M = 3.93$, $SD = 1.88$) compared to the systematic arrangement ($M = 2.90$, $SD = 1.83$; $F(1, 262) = 10.14$, $p < .01$). By contrast, in the high preference clarity condition, perceptual disfluency did not vary between the unsystematic ($M = 3.28$, $SD = 1.83$) and systematic ($M = 3.27$, $SD = 2.01$) product arrangements ($F(1, 262) = 0.01$, $p = .98$). Finally, the main effect of the product arrangement condition was significant ($F(1, 260) = 5.33, p < .05$), such that participants in the unsystematic arrangement condition experienced greater perceptual disfluency, while the main effect of preference clarity was not significant ($F(1, 260) = 0.03, p = .61$).

Moderated sequential mediation. The results of a moderated sequential mediation analysis (using 10,000 bootstrap samples; Hayes 2015) revealed that the hypothesized meditational pathway underlying the effect of the unsystematic (vs. systematic) product arrangement on participants’ choice of unfamiliar alternatives—i.e., via perceptual disfluency (first mediator)
and exploratory product search (second mediator)—was significantly moderated by preference clarity (bootstrap confidence interval of moderated mediation index \([CI_{95\%}] = [-0.001 \text{ to } -0.148]\)). To examine the nature of this moderated mediation, we estimated separate sequential mediation models (each using 10,000 bootstrap samples; Hayes (2013), Model 6) for the low and high preference clarity conditions respectively.

Under low preference clarity, the indirect effect of the sequential mediation model via disfluency and exploratory search was significant \((\beta = 0.07, \text{bootstrap confidence interval } [CI_{95\%}] = [0.002 \text{ to } 0.214])\). The unsystematic arrangement caused greater perceptual disfluency \((\beta_{\text{Unsystematic}} = 1.03, t(136) = 3.25, p < .01)\), which in turn led to greater exploration of alternatives \((\beta_{\text{Disfluency}} = 0.06, t(136) = 2.07, p < .05)\), and the latter ultimately promoted choice of unfamiliar alternatives \((\beta_{\text{ExploratorySearch}} = 0.16, z = 4.38, p < .001)\). Accounting for this indirect effect rendered the residual direct effect of the unsystematic arrangement on choice non-significant \((\beta = 0.56, z = 1.40, p = .16)\), indicating full sequential mediation. By contrast, under high preference clarity, the product arrangement did not affect disfluency \((\beta_{\text{Unsystematic}} = 0.00, t(124) = 0.01, p = .99)\), nor did the latter predict the extent of exploratory search \((\beta_{\text{Disfluency}} = 0.40, t(124) = 1.51, p = .13)\), resulting in a non-significant indirect effect \((\beta = 0.00, \text{bootstrap confidence interval } [CI_{95\%}] = [-0.04 \text{ to } 0.04])\).

**Discussion**

The findings of Study 2 provide support for our theorizing about the psychological mechanism that governs the positive effect of unsystematic (vs. systematic) product arrangements on consumers’ choice of unfamiliar alternatives. In particular, they show that this effect operates via greater perceptual disfluency of the product arrangement and a subsequent increase in exploratory product search. This study also identifies an important boundary
condition for the influence of unsystematic product arrangements on product choice such that the effect vanishes when consumers have high prior preference clarity.

**STUDY 3**

The objective of Study 3 was to more closely examine the role of perceptual disfluency. If, as we hypothesized, the effect of unsystematic product arrangements on the choice of unfamiliar alternatives is driven by perceptual disfluency, this effect should be attenuated when consumers are prompted to (correctly) attribute the difficulty they are experiencing to the unsystematic manner in which the products are displayed. That is, such an attribution should undermine the informational value of the experienced disfluency, thus diminishing its impact on behavior (Schwarz et al. 1991; see Alter and Oppenheimer 2009 for a review).

**Design and Procedure**

A total of 298 Amazon Mechanical Turk workers from the US (M\_Age = 34.87, SD\_Age = 10.38; 157 women) participated in the experiment in exchange for monetary compensation. As in Study 2, the task was to choose an apartment for a weekend getaway. Participants were randomly assigned to one of three product arrangement conditions—systematic, unsystematic, and unsystematic with source attribution. The first two of these were conceptual replications of the low preference clarity conditions of Study 2. In the source attribution condition, participants were informed prior to being presented with the product display that “the product arrangement may make it difficult to visually inspect the alternatives” (adapted from Pocheptsova, Labroo, and Dhar 2010). This additional information prompted participants to (correctly) attribute the experienced difficulty to how the alternatives were arranged, which should attenuate the impact of disfluency on product search and choice.
The experimental procedure was the same as in Study 2 (including the four brands, the conservative positioning of familiar alternatives, the measured variables, and the incentive compatibility of the task), except that participants were asked to select one of 21 US cities for their weekend getaway before being presented with the same set of 16 apartments.

[Insert Figure 3 about here]

**Results**

*Choice.* Consistent with our theorizing, participants in the unsystematic condition were significantly more likely to choose an unfamiliar alternative \( (P_{\text{Unsystematic}} = 73.53\%) \) than were those in the systematic product arrangement condition \( (P_{\text{Systematic}} = 56.38\%); \beta_{\text{Unsystematic}} = 0.77, z = 2.50, p < .05) \) and those in the unsystematic condition with the prompt to attribute the difficulty to the correct source \( (P_{\text{Unsystematic, Attrib}} = 59.80\%); \beta_{\text{Unsystematic}} = .63, z = 2.07, p < .05) \). There was no significant difference between the latter two conditions \( (\beta_{\text{Systematic}} = 0.14, z = 0.49, p = .63) \). (See the center and right panels of Figure 3 for the choice shares of individual brands and specific display positions, respectively.)

*Perceptual disfluency.* A one-way ANOVA with perceptual disfluency of the product arrangement as the dependent variable revealed a significant overall effect \( (F(2, 295) = 4.62, p < .05) \). Planned contrasts showed that there was no difference between the two unsystematic conditions \( (M_{\text{Unsystematic}} = 4.46, SD = 2.17; M_{\text{Unsystematic, Attrib}} = 4.25, SD = 2.14; F(1, 296) = 0.45, p = .51) \), but that perceptual disfluency was significantly lower in the systematic product arrangement condition \( (M = 3.55, SD = 2.22; \text{both } p \text{ values} < .05) \). This pattern of results, in combination with the choice results, suggests that while the source attribution prompt did not affect the experienced difficulty in connection with the product display, it *did* eliminate the impact of disfluency on behavior.
**Sequential mediation.** To further examine the psychological mechanism through which the unsystematic (vs. systematic) product arrangements affect the choice of unfamiliar alternatives, we first estimated a sequential mediation model (using 10,000 bootstrap samples; Hayes (2013), Model 6) for the unsystematic arrangement without source attribution condition and the systematic arrangement condition. Consistent with our theorizing, the indirect effect via perceptual disfluency and exploratory search was significant (indirect effect: $\beta = 0.05$, bootstrap confidence interval $[\text{CI}_{95\%}] = [0.01 \text{ to } 0.13]$). The unsystematic product arrangement caused greater perceptual disfluency ($\beta_{\text{Unsystematic}} = 0.91$, $t(194) = 2.89, p < .01$), which in turn increased the number of explored alternatives ($\beta_{\text{Disfluency}} = 0.48$, $t(193) = 2.72, p < .01$), ultimately promoting the choice of an unfamiliar alternative ($\beta_{\text{Exploration}} = 0.11$, $z = 3.77$, $p < .001$).

By contrast, estimation of the same sequential mediation model for the two unsystematic arrangement conditions—with and without source attribution—revealed that the indirect effect via perceptual disfluency and exploratory search was not significant (indirect effect: $\beta = 0.03$, bootstrap confidence interval $[\text{CI}_{95\%}] = [-0.09 \text{ to } 0.03]$).

**Discussion**

The results of Study 3 show that the positive effect of unsystematic product arrangements on consumers’ choice of unfamiliar alternatives can be offset by drawing consumers’ attention to the source of the experienced difficulty resulting from exposure to such an arrangement. These findings provide additional support for our theorizing about the key mediating role of perceptual disfluency.

**STUDY 4**

Study 4 had three objectives. The first was to examine whether our findings generalize across alternative product display formats. The earlier studies used upright, vertical displays that
were presented either as a physical structure (Studies 1a and 1b) or on a computer screen (Studies 2 and 3). Such vertical display formats are extremely common in retail settings.

However, product displays may also be oriented horizontally—e.g., with a set of alternatives being presented on a counter or tabletop instead of a store shelf; see also Allirot et al. 2012; Fearnbach et al. 2015). This study examines whether our theorizing also holds in the context of such horizontal displays. The second objective was to probe the robustness of the effect of unsystematic arrangements on product choice by testing our predictions in a domain where consumers select alternatives for consumption-related purposes. Finally, we wanted to test our theorizing in a field setting where product choices were consequential to all participants (rather than merely consequential in a probabilistic sense as in Studies 1a, 2, and 3).

**Stimulus Development and Pre-Test**

This study entailed consumers’ choices in the food domain (i.e., boxes of chocolates). Mirroring the experimental paradigm used in Studies 2 and 3, we used one highly familiar Swiss chocolate brand (Frey) and three fictitious additional brands (Lohr, Jantz, and Piér). A pre-test with a sample of 38 Swiss consumers (using the same scale items as in the earlier studies) confirmed that Frey was significantly more familiar than the three fictitious chocolate brands (\(M_{Frey} = 6.55, M_{Lohr} = 1.24, M_{Jantz} = 1.40, M_{Piér} = 1.16; \text{all } p \text{ values} < .001\), with the three fictitious brands being equally familiar (all \(p\) values > .26).

**Design and Procedure**

The experiment was conducted in a cafeteria at a major Swiss university. A total of 106 students (\(M_{Age} = 23.49, SD_{Age} = 6.83, 44\) women) participated. The assortment consisted of 16 small boxes of chocolates comprised of the same four types of chocolates—milk chocolate, dark
chocolate, chocolate with hazelnuts, white chocolate—by each of the four brands. The 16 boxes were displayed on a tabletop in a (horizontal) 4 × 4 layout (see the upper panel in Figure 4).

Participants were randomly assigned to either a systematic or an unsystematic product arrangement condition. This manipulation closely mirrored the approach used in Studies 2 and 3. In the systematic condition, the 16 alternatives were organized by both brand (row) and type (column). In the unsystematic condition, the same 16 alternatives were displayed in an apparently arbitrary manner with brands and chocolate types randomly distributed across the 4 × 4 display. To ensure a conservative test of our hypothesis that unsystematic product arrangements promote the choice of unfamiliar alternatives, this manipulation was implemented such that the display positions of the familiar alternatives were never less prominent—and on average more prominent—in the unsystematic than in the systematic condition. Given the horizontal (tabletop) display format, the rows that were physically closer to the participant were more prominent (see Bucher et al. 2016).

Participants were informed that they were to receive a complimentary chocolate sample, and that they were free to choose any of the 16 alternatives on display. Once they had indicated their choice by physically picking up their preferred box of chocolates, participants completed a short questionnaire that contained measures of perceptual disfluency (same as in Studies 2 and 3) and of the extent to which they explored the assortment (as a behavioral measure of exploration was not available in this setting; see Table A-3 in the Web Appendix for details).

Results

In line with our theorizing, a logit model with participants’ choice of an unfamiliar alternative (i.e., brand) as the dependent variable showed that, compared to participants in the systematic condition, those in the unsystematic product arrangement condition were significantly
more likely to choose an unfamiliar brand ($P_{\text{Systematic}} = 50.00\%, P_{\text{Unsystematic}} = 71.15\%$; $\beta_{\text{Unsystematic}} = 0.90, z = 2.20, p < .05$). (See the lower panel of Figure 4 for the choice shares of specific alternatives by display position.)

A sequential mediation analysis (using 10,000 bootstrap samples; Hayes (2013), Model 6) provided support for our theorizing about the underlying psychological mechanism, revealing that the effect of the unsystematic (vs. systematic) product arrangement on participants’ choice of unfamiliar alternatives was significantly mediated by greater perceptual disfluency ($M_{\text{Systematic}} = 2.22, M_{\text{Unsystematic}} = 4.80; t(104) = -7.77, p < .001$), which in turn stimulated a more extensive exploration of the assortment ($\beta_{\text{Disfluency}} = 0.22, t(103) = 2.20, p < .05$), ultimately promoting the choice of unfamiliar alternatives ($\beta_{\text{ExploratorySearch}} = 0.89, z = 4.96, p < .001$).

Accounting for this indirect effect ($\beta = .50$, bootstrap confidence interval $[CI_{95\%}] = [0.09 \text{ to } 1.10]$) rendered the residual direct effect of product arrangement on choice non-significant ($\beta = 0.94, z = 1.52, p = .13$), indicating full sequential mediation.

Discussion

The findings of Study 4 show that the effect of unsystematic (vs. systematic) product arrangements on consumers’ likelihood of choosing unfamiliar alternatives holds in a setting where product choices are consequential. Moreover, they demonstrate that this effect generalizes across product domains (including food products) and display formats (including horizontal product displays).

To ensure a conservative test of our theorizing, the display positions of the familiar alternatives (i.e. brands) in Studies 2 to 4 were on average more prominent in the unsystematic than in the systematic conditions. However, in all of these studies, brand was both an organizing
criterion for the systematic product arrangement and the feature that distinguished familiar from unfamiliar alternatives. While conflating these two aspects is ecologically valid, it does represent an impurity in experimental design. To fully disentangle arrangement organization and product familiarity, and to definitively rule out the possibility of intractable, idiosyncratic display position effects on consumers’ choice of unfamiliar alternatives, we ran a variant of Study 4 (see Study A-1 in the Web Appendix for details) with the following modifications. Brand was used solely to distinguish between familiar (one well-known brand) and unfamiliar (three fictitious brands) alternatives. The four display positions of each brand were scattered arbitrarily across the 4 × 4 display and—critically—held constant across conditions. Instead of brand, chocolate type (milk, dark, hazelnut, white) was now used as the organizing criterion for the systematic product arrangement. In the systematic condition, the 16 alternatives were organized such that all alternatives of a given type were in the same row (see Figure A-6 in the Web Appendix). By contrast, in the unsystematic condition, the same 16 alternatives were displayed in an apparently arbitrary manner with chocolate types randomly distributed across the 4 × 4 display. A total of 341 Amazon Mechanical Turk workers from the US (M_{Age} = 38.36, SD_{Age} = 12.81, 224 women) completed this experiment in exchange for monetary compensation. Consistent with our theorizing, participants in the unsystematic product arrangement condition were again significantly more likely to choose an unfamiliar alternative (P_{Unsystematic} = 58.42%) than were those in the systematic product arrangement condition (P_{Systematic} = 47.68%; β_{Unsystematic} = 0.43, z = 1.97, p < .05), this time with all unfamiliar alternatives having been presented in exactly the same display positions across conditions.
GENERAL DISCUSSION

The current research demonstrates that an unsystematic relative to a systematic arrangement of products causes greater perceptions of disfluency, greater disfluency in turn increases consumers’ tendency to explore a greater range of alternatives, which ultimately makes consumers more likely to inspect and choose (initially) more unfamiliar products. We provide evidence on these effects based on a series of controlled studies in both lab and web-based settings as well as a large-scale nationwide field experiment, across different measures of exploration (both objective measures of exploration as well as subjective perceptions), across different product display formats (from horizontal to vertical displays), across both online and offline product displays, and across product domains (from high involvement products such as mobile phones or vacation bookings to low involvement products such as snacks). Finally, we also provide critical boundary conditions showing how to offset the effect on unfamiliar product choice (i.e., when consumers have a clear prior preference in favor of some of the alternatives in the choice set or when they can attribute the experienced difficulty to the correct source).

Theoretical Implications

The current findings make a series of unique contributions to three distinct areas of research: (1) prior work on assortment organization effects, (2) research on how attentional shifts affect consumer search routines, (3) and research on how disfluency affects information processing and consumer choice.

First, the current work provides a new look on the largely negative effects of more disorganized assortments that were reported in prior research (Argo, Dahl, and Morales 2006, 2008; Castro, Morales, and Nowlis 2013). A predominant finding in this stream of literature on disorganized assortment effects is that such product arrangements can cause lower preference for products due to contamination effects despite their sometimes positive impact on perceived
product popularity. The current research is the first that isolates the spatial arrangement of products in an assortment (such that products are arranged either systematically or unsystematically) — without confounding the spatial arrangement of products with perceptions of messiness or being out-of-place (Castro, Morales, and Nowlis 2013), and we provide evidence that the spatial arrangement can systematically alter consumers’ search routines such that unsystematic product arrangements increase consumers’ tendency to engage in greater exploratory product search. Importantly, we show that this greater engagement in exploratory product search ultimately increases consumers’ likelihood of choosing more unfamiliar alternatives.

Second, our findings also contribute to recent work that started to integrate attentional shifts in information processing and the organization of product displays (see Deng et al. 2016). The current findings contribute to this prior work by showing that even without changing the physical property of the display (such as horizontal versus vertical product displays), the spatial arrangement of alternatives can trigger similar effects on perceptual disfluency, which ultimately affects consumers’ tendency to engage in greater exploratory search. Thus, instead of changing the physical properties of a product display (which can be difficult to implement in reality), we show that merely altering the spatial arrangement of alternatives instead can produce conceptually consistent effects on consumers’ basic search routines due to the attentional shifts as shown in the current work. We also provide evidence for a critical boundary condition by showing that greater preference clarity (i.e., being aware of one’s preferences prior to exposure to a product arrangement) inhibits both the experience of perceptual disfluency and the downstream consequences on choice. These findings have implications for prior work on contamination effects in the context of assortment organization research (Castro, Morales, and
Even when product displays appear to be messy (Morales et al. 2005; Reynolds-McIlney, Morrin, and Nordfält 2017), or more unsystematic (as in the current work), greater ex-ante preference clarity can inhibit consumers’ tendency to explore alternatives in the assortment.

Third, the current research also contributes to prior research on perceptual (dis)fluency (Alter 2013; Labroo and Pocheptsova 2016; Schwarz 2004). Although effects of disfluency are widely documented across diverse contexts such as goal pursuit (Labroo and Kim 2009), expected effort to complete a task (Sela and Berger 2012; Song and Schwarz 2008), self-customization (Wilcox and Song 2011), or a more positive evaluation of special-occasion products (Pocheptsova, Labroo, and Dhar 2010), the current work provides novel insight that perceptual disfluency can also systematically affect consumers’ basic search routines. Thus, while previous work revealed that disfluency can increase the positive evaluation of special-occasion products by highlighting their uniqueness (Pocheptsova, Labroo, and Dhar 2010), the current findings reveal that greater perceptual disfluency can also trigger more exploratory search routines and thereby promote the choice of previously not considered, unfamiliar alternatives.

Practical Implications

The current findings have important implications for marketing practitioners and managers seeking to optimize the presentation of their firms’ product assortments. In particular, the evidence we have presented suggests that companies can achieve desirable outcomes—such as increased exploration of their assortments and a greater choice share of specific alternatives—without changing their assortment, pricing, or other marketing variables. All the effects shown in the current research are driven entirely by changes in the spatial arrangement of the product assortment.
We see three major implications for companies based on the current findings. First, unsystematic product arrangements are an unexplored marketing tactic to disrupt habitual consumer search processes and increase consumers’ tendency to explore a greater range of alternatives. Exploration can be critical in situations where consumers by default select familiar instead of more unfamiliar alternatives. Retailers interested in promoting unfamiliar products, from underdog products to product innovations, can benefit from unsystematic product arrangements to distribute attention more evenly across all alternatives in a product display.

Second, the findings are critical for those companies for whom exploration is a critical business objective. Think of media companies for example. Video streaming platforms such as Netflix have obvious incentives to maximize exploration (to keep consumers engaged) but also consumers on these platforms tend to benefit from greater exploration of content (to identify an interesting new series or movie for example). In contrast, systematic product arrangements should be the preferred display format when habituation tendencies directly affect critical shopping convenience dimensions for consumers or when consumers might have pre-existing shopping goals (think of grocery shopping for example). Third, retailers should realize that they do not have to decide between one or the other type of product arrangement. Retailers might strategically decide to alter the spatial product arrangement only within pre-selected categories or for a subset of alternatives for which exploration might be beneficial.

To further illustrate the positive effect studied in the current work even for a subset of products (while all other products or categories may remain constant in terms of how they are presented to consumers), we conducted an additional field study in cooperation with a large Swiss chain of grocery stores (see Study A-2 in the Web Appendix for full details). Specifically, we identified two stores in the same region that were matched on average daily revenue, store
size, and visitor frequency, but that differed in one critical characteristic—in one of the stores, a total of 55 chocolate bars were arranged systematically by brand, type/flavor, and price. In the other store, the same alternatives were arranged in an apparently arbitrary, unsystematic manner. A research assistant approached shoppers who had stopped in close proximity to the chocolate display, asking them to inspect the chocolate display for 10 seconds and then assessing the extent of perceptual disfluency and interest in exploring the retailer’s assortment of chocolates. The findings of this field study revealed that shoppers were significantly more likely to explore the assortment of chocolate brands when exposed to a more unsystematic product display ($M_{\text{Systematic}} = 3.44, M_{\text{Unsystematic}} = 4.22; t(100) = 2.01, p < .05$). Mirroring our earlier process evidence, this effect was significantly mediated by greater perceptions of disfluency (indirect effect: $\beta = .39$, bootstrap confidence interval [CI$_{95\%}$] = [0.11 to 0.86]), rendering the residual direct effect of product arrangement non-significant ($\beta = 0.38, t = 0.99, p = .32$). These findings illustrate that unsystematic spatial arrangements are a simple and effective assortment organization tactic to increase consumers’ motivation to explore a greater range of alternatives and that this effect prevails even in settings of relatively low product involvement.

Despite these implications for retail organizations and manufacturers, future work may further examine the short-term versus long-term consequences for both consumers and firms. For example, it is well known that disfluency can be detrimental for consumers—from reducing choice satisfaction (Sela and Berger 2012) to increasing choice deferral (Novemsky et al. 2007). The opposite hypothesis is equally plausible building on prior work on effort-justification (Anderson, Engledow, and Becker 1979; Cardozo 1965; Festinger 1957; Norton, Mochon, and Ariely 2012), suggesting that expending greater effort in a task can also lead (or spill over) to the selected alternative. Future work may examine under which conditions exploration might ignite
interest and when it creates frustration or even deferral. Yet, greater exploration might also be beneficial and help consumers in situations where the motivation to explore is critical (such as financial decision making or in the medical domain). Future work may further investigate these long-term consequences on consumer welfare.

Consumers often act as creatures of habit, unwilling to search for alternatives other than what is already known. The current work shows that merely changing the spatial arrangement of alternatives is an effective means of motivating consumers to explore and ultimately choose alternatives they were (initially) not familiar with.
REFERENCES


Morales, Andrea, Barbara E. Kahn, Leigh McAlister, and Susan M. Broniarczyk (2005),


Taylor, Kate and Jessica Tyler (2018), “Black Friday Saw Empty Stores and Fewer Shoppers,


FIGURE 1A.
ILLUSTRATIVE PRODUCT ARRANGEMENTS

<table>
<thead>
<tr>
<th>Systematic Arrangement</th>
<th>Unsystematic Arrangement</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Systematic Arrangement Image]</td>
<td>![Unsystematic Arrangement Image]</td>
</tr>
</tbody>
</table>

Note: Illustration of the product arrangements in Study 1a. Familiarized alternatives are indicated by a red border.

FIGURE 1B.
PRODUCT ARRANGEMENTS (STUDY 1A)

<table>
<thead>
<tr>
<th>Systematic Arrangement</th>
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</thead>
<tbody>
<tr>
<td>![Systematic Arrangement Image]</td>
<td>![Unsystematic Arrangement Image]</td>
</tr>
</tbody>
</table>

Note: Illustration of the product arrangements in Study 1b. Each square represents an alternative. Familiar alternatives are indicated by squares with a grey background color.
FIGURE 2. HIGH PREFERENCE CLARITY ATTENUATES THE EFFECT OF UNSYSTEMATIC PRODUCT ARRANGEMENTS ON CHOICE OF UNFAMILIAR ALTERNATIVES (STUDY 2)
FIGURE 3. PRODUCT ARRANGEMENTS (LEFT PANEL), CHOICE SHARES BY ALTERNATIVE (CENTER PANEL), AND CHOICE SHARES BY BRAND (RIGHT PANEL) (STUDY 3)

Note: The left panel shows example product arrangements by condition. The percentage of positive reviews (min: 90.1%, max: 97.9%) and the price (min: $112; max: $139) of each alternative varied randomly (for details, see the Table A-2 in the Web Appendix). The circle size in the center panel is scaled proportionally to the choice share of each alternative.
FIGURE 4.
PRODUCT ARRANGEMENTS (STUDY 4)

Systematic Arrangement

Unsystematic Arrangement

Note: Participant perspective of the assortment. In the unsystematic arrangement condition (right panel), familiar alternatives were, on average, closer to the participant (i.e., in more salient display positions) than in the systematic arrangement condition.

Systematic Arrangement

Unsystematic Arrangement

Note: Percentages indicate choice shares in the systematic (left panel) and unsystematic (right panel) product arrangement conditions.
TABLE 1.
SUMMARY OF RESULTS: CHOICE SHARES OF UNFAMILIAR ALTERNATIVES

<table>
<thead>
<tr>
<th>Study 1a (N = 152; M_Age = 23.10, SD_Age = 0.23; 53 women)</th>
<th>Systematic Arrangement</th>
<th>Unsystematic Arrangement</th>
</tr>
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<tbody>
<tr>
<td>Unfamiliar Brand</td>
<td>42.7%</td>
<td>62.0%</td>
</tr>
<tr>
<td>Main Finding</td>
<td>Test of baseline effect, showing that unsystematic (vs. systematic) product arrangements increase choice share of unfamiliar alternatives.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Study 1b (51,312 shoppers across 36 stores)</th>
<th>Systematic Baseline</th>
<th>Systematic Top</th>
<th>Systematic Bottom</th>
<th>Unsystematic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfamiliar Brand</td>
<td>6.6%</td>
<td>10.7%</td>
<td>16.8%</td>
<td>17.8%</td>
</tr>
<tr>
<td>Main Finding</td>
<td>Large-scale field experiment replicating findings of Study 1a.</td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Study 2 (N = 264; M_Age = 22.47, SD_Age = 3.12; 106 women)</th>
<th>Low Clarity Systematic</th>
<th>Low Clarity Unsystematic</th>
<th>High Clarity Systematic</th>
<th>High Clarity Unsystematic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfamiliar Brand</td>
<td>42.2%</td>
<td>61.2%</td>
<td>44.6%</td>
<td>39.3%</td>
</tr>
<tr>
<td>Main Finding</td>
<td>Provides evidence that effect of product arrangement on choice is driven by disfluency and exploratory search. Effect vanishes when preference clarity is high.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Study 3 (N = 298; M_Age = 34.87, SD_Age = 10.38; 157 women)</th>
<th>Systematic</th>
<th>Unsystematic</th>
<th>Unsystematic + Source-Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfamiliar Brand</td>
<td>56.4%</td>
<td>73.5%</td>
<td>59.8%</td>
</tr>
<tr>
<td>Main Finding</td>
<td>Effect is offset by drawing consumers’ attention to the source of the perceptual disfluency.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Study 4 (N = 106; M_Age = 23.49, SD_Age = 6.83; 44 women)</th>
<th>Systematic Arrangement</th>
<th>Unsystematic Arrangement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfamiliar Brand</td>
<td>50.0%</td>
<td>71.1%</td>
</tr>
<tr>
<td>Main Finding</td>
<td>Generalizes findings across product domains and display formats.</td>
<td></td>
</tr>
</tbody>
</table>
Mixing It Up:
Unsystematic Product Arrangements Promote the Choice of Unfamiliar Products

Web Appendix

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FIGURE A-1.
PRODUCT DISPLAY WITH TRACKING FUNCTION (STUDY 1A, B)
FAMILIARIZATION PROCEDURE (STUDY 1A)

>> Observe

The following part contains an automatic presentation of mobile phone pictures and names. Please look carefully at all of the presented products. Some may appear twice. To ensure you pay attention, you will randomly be asked to push a button. After the presentation, you will also be asked some questions about the presented mobile phones.
FIGURE A-3.
SEARCH TASK (STUDY IA)

>> Take a closer look

Please specify whether you can detect any of the following app logos on the display of the presented mobile phones.

Please pay attention to the following logos:

1. Google Toolbar:
2. Chrome Browser:
3. Google Maps:
4. Mail:

Can you recognize one of the presented logos?

Yes  No
FIGURE A-4.
SAMPLE PRODUCT DISPLAY (STUDIES 2 AND 3)
FIGURE A-5.
PREFERENCE RANK-ORDERING TASK (STUDY 2)

Please rank the displayed apartment booking websites according to your preferences. Start with the brand you like most.
FIGURE A-6.
PRODUCT ARRANGEMENTS (STUDY A-1)
### TABLE A-1.
**MIXED EFFECTS MODELS (STUDY 1B)**

**Model 1.a: Choice Share of Unfamiliar Phones**

\[
\text{Choice of Unfamiliar}_{t,i} = \beta_1(\text{Product Arrangement}_{t,i}) + b_{1i}(\text{Day}_t) + b_{2i}(\text{Store}_t) + e_{t,i}
\]

<table>
<thead>
<tr>
<th>Random Effects</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
<td>0.02</td>
</tr>
<tr>
<td>Store</td>
<td>0.06</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>β</th>
<th>SE</th>
<th>t-value</th>
<th>p</th>
<th>CI95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic Baseline vs. Systematic Top</td>
<td>0.009</td>
<td>0.007</td>
<td>1.21</td>
<td>p = .23</td>
<td>-0.01 to 0.02</td>
</tr>
<tr>
<td>Systematic Baseline vs. Systematic Bottom</td>
<td>0.025</td>
<td>0.007</td>
<td>3.34</td>
<td>p &lt; .001</td>
<td>0.01 to 0.04</td>
</tr>
<tr>
<td>Systematic Baseline vs. Unsystematic</td>
<td>0.029</td>
<td>0.007</td>
<td>3.96</td>
<td>p &lt; .001</td>
<td>0.01 to 0.04</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Planned Contrast</th>
<th>β</th>
<th>SE</th>
<th>t-value</th>
<th>p</th>
<th>CI95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic Top vs. Unsystematic</td>
<td>0.013</td>
<td>0.006</td>
<td>2.04</td>
<td>p &lt; .05</td>
<td>0.001 to 0.025</td>
</tr>
<tr>
<td>Systematic Bottom vs. Unsystematic</td>
<td>0.002</td>
<td>0.006</td>
<td>0.38</td>
<td>p = .70</td>
<td>-0.01 to 0.02</td>
</tr>
</tbody>
</table>

**Model 1.b: Choice Share of Unfamiliar Phones in the Same or Less Prominent Display Positions—Systematic Baseline vs. Unsystematic Arrangement**

<table>
<thead>
<tr>
<th>Random Effects</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
<td>0.00</td>
</tr>
<tr>
<td>Store</td>
<td>0.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>β</th>
<th>SE</th>
<th>t-value</th>
<th>p</th>
<th>CI95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic Baseline vs. Unsystematic</td>
<td>1.98</td>
<td>0.92</td>
<td>2.15</td>
<td>p &lt; .05</td>
<td>0.17 to 3.79</td>
</tr>
</tbody>
</table>

**Model 1.c: Choice Share of Unfamiliar Phones in the Same or Less Prominent Display Positions—Systematic Top vs. Unsystematic Arrangement**

<table>
<thead>
<tr>
<th>Random Effects</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
<td>0.00</td>
</tr>
<tr>
<td>Store</td>
<td>0.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>β</th>
<th>SE</th>
<th>t-value</th>
<th>p</th>
<th>CI95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic Top vs. Unsystematic</td>
<td>1.25</td>
<td>0.60</td>
<td>2.09</td>
<td>p &lt; .05</td>
<td>0.08 to 2.43</td>
</tr>
</tbody>
</table>

**Model 1.d: Choice Share of Unfamiliar Phones in the Same or Less Prominent Display Positions—Systematic Bottom vs. Unsystematic Arrangement**

<table>
<thead>
<tr>
<th>Random Effects</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
<td>0.002</td>
</tr>
<tr>
<td>Store</td>
<td>0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>β</th>
<th>SE</th>
<th>t-value</th>
<th>p</th>
<th>CI95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic Bottom vs. Unsystematic</td>
<td>0.0004</td>
<td>0.0001</td>
<td>0.84</td>
<td>p = .40</td>
<td>-0.001 to 0.001</td>
</tr>
</tbody>
</table>
### Model 2.a: Exploratory Search—Number of Inspected Phones

\[ \text{Inspected Phones}_{t,i} = \beta_1 (\text{Product Arrangement}_{t,i}) + b_1t (\text{Day}_t) + b_2i (\text{Store}_i) + e_{t,i} \]

<table>
<thead>
<tr>
<th>Random Effects</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
<td>1.16</td>
</tr>
<tr>
<td>Store</td>
<td>1.59</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>(\beta)</th>
<th>SE</th>
<th>t-value</th>
<th>(p)</th>
<th>CI_{95%}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic Baseline vs. Systematic Top</td>
<td>0.27</td>
<td>0.64</td>
<td>0.42</td>
<td>(p = .67)</td>
<td>-0.98 to 1.51</td>
</tr>
<tr>
<td>Systematic Baseline vs. Systematic Bottom</td>
<td>1.94</td>
<td>0.64</td>
<td>3.05</td>
<td>(p &lt; .01)</td>
<td>0.70 to 3.18</td>
</tr>
<tr>
<td>Systematic Baseline vs. Unsystematic</td>
<td>2.01</td>
<td>0.64</td>
<td>3.17</td>
<td>(p &lt; .01)</td>
<td>0.77 to 3.26</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Planned Contrast</th>
<th>(\beta)</th>
<th>SE</th>
<th>t-value</th>
<th>(p)</th>
<th>CI_{95%}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic Top vs. Unsystematic</td>
<td>0.85</td>
<td>0.40</td>
<td>2.12</td>
<td>(p &lt; .05)</td>
<td>0.07 to 1.63</td>
</tr>
<tr>
<td>Systematic Bottom vs. Unsystematic</td>
<td>0.07</td>
<td>0.75</td>
<td>0.08</td>
<td>(p = .94)</td>
<td>-0.88 to 0.95</td>
</tr>
</tbody>
</table>

### Model 2.b: Exploratory Search—Number of Inspected Familiar Phones

\[ \text{Inspected Familiar Phones}_{t,i} = \beta_1 (\text{Product Arrangement}_{t,i}) + b_1t (\text{Day}_t) + b_2i (\text{Store}_i) + e_{t,i} \]

<table>
<thead>
<tr>
<th>Random Effects</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
<td>0.37</td>
</tr>
<tr>
<td>Store</td>
<td>0.44</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>(\beta)</th>
<th>SE</th>
<th>t-value</th>
<th>(p)</th>
<th>CI_{95%}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic Baseline vs. Systematic Top</td>
<td>0.17</td>
<td>0.34</td>
<td>0.50</td>
<td>(p = .62)</td>
<td>-0.50 to 0.83</td>
</tr>
<tr>
<td>Systematic Baseline vs. Systematic Bottom</td>
<td>1.21</td>
<td>0.34</td>
<td>3.31</td>
<td>(p &lt; .001)</td>
<td>0.46 to 1.79</td>
</tr>
<tr>
<td>Systematic Baseline vs. Unsystematic</td>
<td>1.09</td>
<td>.34</td>
<td>3.21</td>
<td>(p &lt; .01)</td>
<td>0.42 to 1.75</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Planned Contrast</th>
<th>(\beta)</th>
<th>SE</th>
<th>t-value</th>
<th>(p)</th>
<th>CI_{95%}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic Top vs. Unsystematic</td>
<td>.44</td>
<td>.22</td>
<td>2.00</td>
<td>(p &lt; .05)</td>
<td>0.01 to 0.87</td>
</tr>
<tr>
<td>Systematic Bottom vs. Unsystematic</td>
<td>-0.01</td>
<td>0.26</td>
<td>-0.06</td>
<td>(p = .95)</td>
<td>-0.52 to 0.49</td>
</tr>
</tbody>
</table>

### Model 2.c: Exploratory Search—Number of Inspected Unfamiliar Phones

\[ \text{Inspected Unfamiliar Phones}_{t,i} = \beta_1 (\text{Product Arrangement}_{t,i}) + b_1t (\text{Day}_t) + b_2i (\text{Store}_i) + e_{t,i} \]

<table>
<thead>
<tr>
<th>Random Effects</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
<td>.23</td>
</tr>
<tr>
<td>Store</td>
<td>.38</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>(\beta)</th>
<th>SE</th>
<th>t-value</th>
<th>(p)</th>
<th>CI_{95%}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic Baseline vs. Systematic Top</td>
<td>0.12</td>
<td>0.31</td>
<td>0.38</td>
<td>(p = .70)</td>
<td>-0.49 to 0.73</td>
</tr>
<tr>
<td>Systematic Baseline vs. Systematic Bottom</td>
<td>0.79</td>
<td>0.31</td>
<td>2.53</td>
<td>(p &lt; .05)</td>
<td>0.18 to 1.39</td>
</tr>
<tr>
<td>Systematic Baseline vs. Unsystematic</td>
<td>0.89</td>
<td>0.31</td>
<td>2.86</td>
<td>(p &lt; .01)</td>
<td>0.28 to 1.50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Planned Contrast</th>
<th>(\beta)</th>
<th>SE</th>
<th>t-value</th>
<th>(p)</th>
<th>CI_{95%}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic Top vs. Unsystematic</td>
<td>0.40</td>
<td>0.18</td>
<td>2.09</td>
<td>(p &lt; .05)</td>
<td>0.02 to 0.74</td>
</tr>
<tr>
<td>Systematic Bottom vs. Unsystematic</td>
<td>0.04</td>
<td>0.20</td>
<td>0.21</td>
<td>(p = .83)</td>
<td>-0.36 to 0.44</td>
</tr>
</tbody>
</table>
### TABLE A-2.
**RANGE OF PRODUCT ATTRIBUTES (STUDIES 2 AND 3)**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Step Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Price</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(“CHF” in Study 2 and “$” in Study 3)</td>
<td>112</td>
<td>139</td>
<td>1</td>
</tr>
<tr>
<td>Following prices were excluded: 120, 122, 130, 133</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Quality Rating</strong></td>
<td>90.1%</td>
<td>97.9%</td>
<td>0.1%</td>
</tr>
<tr>
<td><strong>Number of Guests</strong></td>
<td>2</td>
<td>2</td>
<td>---</td>
</tr>
<tr>
<td><strong>Beds</strong></td>
<td>1</td>
<td>1</td>
<td>---</td>
</tr>
<tr>
<td><strong>Size in</strong></td>
<td>450 Sq. Feet</td>
<td>550 Sq. Feet</td>
<td>1 Sq. Feet</td>
</tr>
<tr>
<td><strong>Distance to Center</strong></td>
<td>1.1</td>
<td>1.3</td>
<td>0.1</td>
</tr>
<tr>
<td>(“km” in Study 2 and “miles” in Studies 3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Distance to Transport/ Beach</strong></td>
<td>0.1</td>
<td>0.6</td>
<td>0.1</td>
</tr>
<tr>
<td>(“km” in Study 2 and “miles” in Studies 3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Facilities</strong></td>
<td>Free parking, TV, Elevator in building, WiFi, Washer, Pool, Hair dryer, Gym, Laptop workspace, Essentials, Air conditioning</td>
<td>Three facilities were randomly selected per apartment.</td>
<td></td>
</tr>
</tbody>
</table>
**Exploratory Search**

7-point scale (1: do not agree at all, 7: fully agree)

\[ \alpha = .77 \]

<table>
<thead>
<tr>
<th>Item</th>
<th>Reverse Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Even though many chocolates from different brands were available, I always tend to focus on the same ones.</td>
<td>(reverse item)</td>
</tr>
<tr>
<td>During the task, I looked at chocolate brands I didn’t know before.</td>
<td></td>
</tr>
<tr>
<td>During the task, I inspected unfamiliar or different chocolates.</td>
<td></td>
</tr>
<tr>
<td>When I browsed through the assortment, I felt that it is safer to focus on chocolates from a brand I am familiar with.</td>
<td>(reverse item)</td>
</tr>
<tr>
<td>I enjoyed discovering different brands of commonplace chocolate brands for the sake of comparison.</td>
<td></td>
</tr>
<tr>
<td>I stuck with chocolate brands I usually buy rather than try something I am not very sure of.</td>
<td>(reverse item)</td>
</tr>
<tr>
<td>In the assortment, I noticed new chocolate brands somewhat different from the ones I already know.</td>
<td></td>
</tr>
<tr>
<td>During my search experience, I investigated only well-established chocolate brands.</td>
<td>(reverse item)</td>
</tr>
</tbody>
</table>
FOLLOW-UP STUDY A-1

This study was designed to further rule out potential display position effects. In this study, the display position of familiar and unfamiliar alternatives are held constant and organized based on an organizing criterion other than the familiarity of a brand.

Design and Procedure

A total of 341 Amazon Mechanical Turk workers from the US (M_{Age} = 38.36, SD_{Age} = 12.81, 244 women) participated in the experiment in exchange for monetary compensation. The task was to choose a chocolate snack for themselves. Mirroring the experimental paradigm used in Study 4, the assortment consisted of 16 boxes of chocolates with four brands and four types. One of the brands was a highly familiar chocolate brand (Cadbury) and the other three were the same fictitious brands as in Study 4 (i.e., Lohr, Jantz, and Piér).

Participants were randomly assigned to either a systematic or unsystematic product arrangement condition. In contrast to Studies 2 to 4, the alternatives in the systematic arrangement condition were organized by chocolate type (instead of brand). In particular, in the systematic arrangement condition, all alternatives of the same type were presented in the same row. In the unsystematic arrangement condition, all chocolate types were arranged randomly across the product display. Critically, the display position of familiar and unfamiliar alternatives (i.e., brands) was held constant across both product arrangement conditions (see Figure A-6 in the Web Appendix).

Results

Consistent with our theorizing, participants in the unsystematic condition were significantly more likely to choose a chocolate from an unfamiliar (vs. familiar) brand (P_{Unsystematic} = 58.42%) than were those in the systematic product arrangement condition (P_{Systematic} = 47.68%; β_{Unsystematic} = 0.43, z = 1.97, p < .05).
A sequential mediation analysis (using 10,000 bootstrap samples; Hayes (2013), Model 6) provided support for the proposed psychological mechanism that drives this effect, revealing that the effect of the unsystematic (vs. systematic) product arrangement on participants’ choice of unfamiliar alternatives was significantly mediated by first increasing perceptual disfluency of the product arrangement (M\text{Systematic} = 2.31, M\text{Unsystematic} = 3.56; \text{t}(339) = 6.16, p < .001), which led to an increase in greater exploratory product search (β\text{Disfluency} = 0.11, \text{t}(339) = 2.07, p < .05), and greater exploratory product search subsequently increasing the choice share of unfamiliar alternatives (β\text{ExploratorySearch} = 0.69, z = 8.61, p < .001). Accounting for the indirect effect (β = 0.10, bootstrap confidence interval [CI\text{95\%}] = [0.01 to 0.23]) led to a non-significant direct effect of product arrangement on the choice of unfamiliar alternatives (β = 0.49, z = 1.78, p = .08), indicating a significant sequential mediation.

Discussion

This study replicates the findings of Studies 2 to 4 in a tightly controlled setting, showing that effect on unfamiliar product choice holds even when familiar and unfamiliar alternatives were in exactly the same display position.
**FOLLOW-UP STUDY A-2**

The objective of this study was twofold. First, this study was designed to examine the base effect of having products arranged either systematically (by brand and price) or unsystematically (in an apparently arbitrary manner) on consumers’ experiences of perceptual disfluency in a field setting. Second, this study also examines whether the way how products are arranged (i.e., systematically vs. unsystematically) affects consumers’ motivation to explore unfamiliar products of an assortment.

*Design and Procedure*

In cooperation with a large Swiss chain of grocery stores, we identified two stores in the same region that were matched on average daily revenue, store size, and visitor frequency, but that differed in one critical characteristic—the arrangement of chocolate products. In both stores, the assortment consisted of a set of 55 alternatives that differed in terms of brand, type/flavor, and price, and these were presented in a 12 (rows) by 30 (columns) product display. In one of the stores, the products were arranged systematically by brand, type/flavor, and price. In the other store, the same alternatives were arranged in an apparently arbitrary, unsystematic manner.

A research assistant approached shoppers who had stopped in close proximity to the chocolate display in one of the two stores, inviting them to participate in a short survey. Those who agreed were asked to visually inspect the chocolate display for 10 seconds. After that, participants were asked to indicate their subjective difficulty in processing the presentation of chocolates in the product display as a measure of perceptual disfluency (“What is your first impression of how the chocolate products are presented in this store?” 1 = “difficult to process” to 7 = “easy to process”; Labroo, Dhar, and Schwarz 2008). To aid an intuitive interpretation, we inversed the coding of the perceptual fluency measure for all subsequent analyses, i.e. a higher score reflects higher perceptual disfluency. Next, shoppers were asked to indicate their interest in
exploring the retailer’s assortment of chocolates (“I wanted to find some products that I had not seen before.” 1=”strongly disagree” to 7 = ”strongly agree”; Menon and Kahn 1995). A total of 102 shoppers, participated in this study (M_Age = 45.34, SD_Age = 10.56, 71 women). There were no significant differences in either shoppers’ age or gender between stores (all p values > .1).

Results

In line with our theorizing, shoppers experienced significantly greater difficulty in processing the unsystematic vs. systematic product assortment (M_{Systematic} = 2.46, M_{Unsystematic} = 3.46; t (100) = 3.07, p < .01). Moreover, the unsystematic assortment also induced a greater motivation to explore more unfamiliar chocolate brands (M_{Systematic} = 3.44, M_{Unsystematic} = 4.22; t (100) = 2.01, p < .05). The results of a mediation analysis (using 5,000 bootstrap samples; Hayes (2013); Model 4) reveal that the effect of the unsystematic (vs. systematic) product arrangement on shoppers’ inclination to explore unfamiliar alternatives is indeed significantly mediated by greater processing difficulty (indirect effect: β = 0.39, bootstrap confidence interval [CI_{95%}] = [0.11 to 0.86]). Accounting for this indirect effect renders the residual direct effect of product arrangement non-significant, indicating full mediation (β = 0.38, t = 0.99, p = .32).

Discussion

This study provides additional evidence in a field setting that an unsystematic arrangement of products increases consumers’ experience of perceptual disfluency and, consequently, promotes greater exploratory search of alternatives in the product assortment. However, the findings of this study are based on self-reports only and are correlational by nature.
REFERENCES

