Order or Disorder: The Matching Effect of Display Arrangement and Product Attributes

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Abstract

This study investigates the matching effect between product attributes and display order and its impact on consumer product preferences. Grounded in associative learning theory, four series of experiments reveal a matching relationship between product attributes and display order: products' natural attributes are more closely associated with disordered displays, whereas products' artificial attributes are more closely associated with ordered displays. Based on these findings, we propose consumers' naive beliefs of "natural-disordered" and "artificial-ordered." These naive beliefs subsequently influence consumer product preferences—when products exhibit natural attributes (vs. artificial attributes), consumers demonstrate higher preference for products under disordered displays (vs. ordered displays), and vice versa—with perceived processing fluency serving as a mediator. Furthermore, valence cues are found to moderate this relationship; the presence of valence cues significantly enhances consumers' product preferences and perceived processing fluency for "natural-ordered" and "artificial-disordered" combinations. These results underscore the close relationship between product attributes and display order, offering important practical implications for retailers' strategic decisions in merchandise display and advertising marketing.

Full Text

Order of Disorder: The Matching Effect Between Display Order and Product Attribute

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Abstract

This study investigates the matching effect between product attributes and display order and its impact on consumer product preferences. Grounded in associative learning theory, four serial experiments reveal a systematic relationship: products with natural attributes are more closely associated with disorderly displays, whereas products with artificial attributes are more closely associated with orderly displays. This pattern gives rise to two consumer naive beliefs—"natural-disorder" and "artificial-order." These beliefs subsequently influence consumer preferences such that when a product emphasizes natural (vs. artificial) attributes, consumers exhibit higher preference for the product under disorderly (vs. orderly) display conditions, and vice versa. Processing fluency mediates this effect. Furthermore, valence cues moderate the relationship: the presence of valence cues significantly enhances consumer preferences and fluency perceptions for "natural-order" and "artificial-disorder" combinations. These findings demonstrate a robust link between product attributes and display order, offering important practical implications for retailers' merchandising and advertising strategies.

Keywords: product attributes, display order, fluency perception, consumer naive beliefs, valence cues

1. Problem Statement

In the science fiction film *Prometheus*, Dr. Holloway's team discovers a "non-natural" straight line on an alien planet's surface, confirming the existence of creators. This reflects a fundamental intuition: in pristine natural ecosystems untouched by human intervention, perfectly straight lines do not exist naturally. Human presence creates straight lines because we constantly impose order on our environment (Tullett et al., 2015). Human society generally values neatness and order as aesthetically pleasing (Palmer et al., 2013), with straight lines and order visible everywhere—from urban planning to store layouts to product arrangement. These uniform configurations often evoke a sense of "orderly beauty." In contrast, nature is appreciated for its spontaneity and irregularity (Wohlwill, 1983), as seen in mountain topography, plant distribution, and animal patterns, which present a form of "disorderly beauty." How do these seemingly contradictory aesthetics coexist in human cognition? We propose that people hold two distinct naive beliefs: a "natural-disorder" belief that natural creations are inherently scattered and disordered, and an "artificial-order" belief that human creations are systematically organized. Based on associative learning theory, this research explores these beliefs in consumption contexts and applies them to marketing practice, deepening understanding of spatial order preferences while providing insights for natural product marketing strategies.

We classify products as natural or artificial based on whether they have undergone human processing or contain additives (Scott et al., 2020; Scekic & Krishna, 2020; Kumar et al., 2021; Scott & Rozin, 2017). Natural attribute products are unprocessed and additive-free, whereas artificial attribute products have been processed or contain added substances. Display order refers to whether identical products are dispersed without clear differentiation or boundaries (Chae & Zhu, 2014; Wang & Jiang, 2022), distinguished by the presence of "straight lines" and "symmetry" (Kotabe et al., 2016). Specifically, displays featuring straight lines and symmetry constitute orderly displays, while those lacking these features constitute disorderly displays. Independent of display context, this study examines the relationship and matching effect between product attributes and display order. We posit that natural attributes align more closely with disorderly displays, while artificial attributes align more closely with orderly displays. Building on this foundation, we investigate how this matching relationship influences consumer preferences: when products exhibit natural (vs. artificial) attributes, do consumers show higher preference for products under disorderly (vs. orderly) display, and vice versa? We further propose and test the mediating role of processing fluency and the moderating role of valence cues.

This research makes three primary theoretical contributions. First, it introduces novel consumer naive beliefs—"natural-disorder" and "artificial-order"—and confirms the existence of contradictory naive beliefs using valence as a cue, offering new theoretical insights for naive belief research. Second, it provides new evidence for the dual-process mechanism of associative learning. Finally, by demonstrating the association between display order and product attributes, it expands research on antecedents of natural product preferences and provides new evidence that "disorder can be beneficial."

1.1 The Matching Relationship Between Product Attributes and Display Order

Associative learning theory posits that repeated exposure to paired stimuli leads individuals to internalize these associations (Wilson & Stevenson, 2006). When two elements become linked, associative learning occurs, such that the presentation of one activates the mental representation of the other (Janiszewski & van Osselaer, 2000). Through long-term observation and experience (Haws et al., 2017; Raghunathan et al., 2006), consumers form naive beliefs by associating different product characteristics. For example, consumers typically link food price with health, forming a "healthy = expensive" belief (Haws et al., 2017), and associate food weight with health, forming a "healthy = light" belief (Li et al., 2022).

Natural and man-made environments exhibit distinct visual differences. Natural environments—non-human products comprising inorganic and organic matter such as deserts, forests, and mountains—are characterized by irregular lines, curved edges, and rough textures (Wohlwill, 1983; Hartig & Evans, 1993). Man-made environments—comprising towns, houses, factories, and human-designed facilities—feature regular lines, straight edges, and smooth textures (Wohlwill, 1983; Hartig & Evans, 1993). Thus, natural and man-made environments differ fundamentally in the presence of rules and order, determined by the relative positioning of objects within each environment.

Through accumulated life experience, people internalize associations between natural/man-made environments and display order. Individuals actively interpret visual information spontaneously (Biliciler et al., 2022), and through repeated exposure, they link natural environments and natural objects with visual irregularity and disorder, while linking man-made environments and artificial objects with visual regularity and order. We propose that consumers transfer these associations to the visual relationship between product attributes and display order, forming a "natural-disorder" naive belief for natural products and an "artificial-order" naive belief for artificial products.

H1: Consumers hold "natural-disorder" (H1a) and "artificial-order" (H1b) naive beliefs. Specifically, natural attributes are more strongly associated with disorder than order, while artificial attributes are more strongly associated with order than disorder.

Products carry the attributes of their originating environments. When making purchases, consumers select products based on salient and comparable attributes (Coupey et al., 1998), with natural and artificial attributes being particularly prominent. Natural attributes reflect unprocessed, additive-free origins (Scott & Rozin, 2017; Scott et al., 2020; Rozin, 2005), whereas artificial attributes result from human processing or additive inclusion. Product characteristics are not inherent properties but are constructed by consumers (Voss et al., 2003); identical products can possess either natural or artificial attributes depending on processing history (Rozin, 2005; Rozin et al., 2009). For example, wild oranges are perceived as natural, while cultivated oranges are seen as artificial, despite identical content.

When encountering products with different attributes, consumers' associative memory networks activate, linking natural attributes with disorderly displays and artificial attributes with orderly displays. When product presentation matches these mental representations, consumers exhibit higher preference (Biliciler et al., 2022; Lee et al., 2017; Chae & Hoegg, 2013). Therefore, for natural products, consumers prefer disorderly over orderly displays; for artificial products, they prefer orderly over disorderly displays.

H2: Display order and product attributes interact. When products emphasize natural attributes, consumers prefer disorderly displays (H2a); when products emphasize artificial attributes, consumers prefer orderly displays (H2b).

1.2 The Mediating Role of Processing Fluency

Associative learning theory suggests that learned associations vary in strength (Gluck & Bower, 1988). Processing fluency—the subjective ease of mental processing (Graf et al., 2018)—reflects this strength. When stimulus-mental representation overlap increases, external stimulus processing is facilitated, yielding higher fluency (Biliciler et al., 2022; Yang & Chen, 2019). Thus, when product attribute-display order combinations align with "natural-disorder" and "artificial-order" beliefs, fluency increases. Mismatches decrease fluency; for instance, Walter et al. (2020) found that disorderly displays of artificial products like phones and chocolate increased perceived disfluency. For natural products, display order negatively affects fluency—more disorder aligns better with the "natural-disorder" belief. For artificial products, display order positively affects fluency—more order aligns better with the "artificial-order" belief.

Fluency processing is automatic and typically unconscious (Reber et al., 2004), and easier-to-process stimuli receive more positive evaluations (Novemsky et al., 2007; Schwarz, 2004). Thus, when stimuli match mental representations, enhanced fluency influences consumer preferences (Chae & Hoegg, 2013; Lee et al., 2017).

H3: Processing fluency mediates the interactive effect of product attributes and display order on consumer preference. For natural products, disorderly (vs. orderly) displays increase fluency, thereby enhancing preference (H3a). For artificial products, orderly (vs. disorderly) displays increase fluency, thereby enhancing preference (H3b).

1.3 The Moderating Role of Valence Cues

Associative learning involves dual processes: exemplar-based learning, which requires minimal cognitive resources, operates passively and automatically, and relies on stored experiences; and adaptive learning, which demands more cognitive resources, activates only under specific conditions, and requires individuals to construct predictive expectations when encountering new stimuli (van Osselaer et al., 2004). Under external cues, consumers mobilize more cognitive resources to independently construct predictive relationships without retrieving past experiences, potentially forming judgments different from exemplar-based learning (van Osselaer, 2008). We propose that valence serves as a contextual cue triggering adaptive learning.

Valence beliefs reflect how positively or negatively consumers perceive objects. Regarding product attribute valence, consumers associate natural products with positive traits—safer (Scott et al., 2020), healthier (Rozin et al., 2004), and tastier (Dominick et al., 2018)—making natural products more positively valenced than artificial ones. Regarding display order valence, consumers perceive orderly displays more positively than disorderly ones (Palmer et al., 2013; Ye et al., 2017), as order aligns with cognitive tendencies (Tullett et al., 2015), while disorder undermines perceived control (Du et al., 2017) and triggers impulsive consumption (Chae & Zhu, 2014).

Under valence cues, consumers form different matching relationships: through positive valence, they link the more positive natural attributes with orderly displays, forming a "natural-order" belief that increases preference for natural products in orderly displays; through negative valence, they link the more negative artificial attributes with disorderly displays, forming an "artificial-disorder" belief that increases preference for artificial products in disorderly displays.

H4: When valence cues are present, consumers activate "natural-positive-order" associations, increasing preference for natural products in orderly displays (H4a), and "artificial-negative-disorder" associations, increasing preference for artificial products in disorderly displays (H4b).

H5: When valence cues are present, consumers activate "natural-positive-order" associations, increasing processing fluency for natural products in orderly displays (H5a), and "artificial-negative-disorder" associations, increasing processing fluency for artificial products in disorderly displays (H5b), thereby enhancing preferences.

The overall theoretical model is presented in Figure 1 [Figure 1: see original paper].

Experiment 1

2.1 Design and Participants

Experiment 1 employed a 2 (product attribute: natural vs. artificial) × 2 (display order: orderly vs. disorderly) within-subjects design, measuring consumers' implicit associations through an Implicit Association Test (IAT). Using G*Power 3.1 (Faul et al., 2009), we determined that a two-factor repeated-measures ANOVA with medium effect size (f = 0.25), $\alpha = 0.05$, and 90% power required at least 30 participants. We recruited 34 participants (Mage = 28.77, SD = 8.40; 18 male, 16 female) who received modest compensation.

2.2 Materials

Food contexts dominate research on natural/artificial product choices (Rozin et al., 2012; Rozin, 2005; Rozin et al., 2004). We selected five whole foods and five processed foods from the FoodPics database (Blechert et al., 2019) to represent natural and artificial products. Natural product words included: pineapple, cauliflower, mushroom, nuts, corn. Artificial product words included: chips, bread, cake, dumplings, yogurt.

For display order, we created ten words for each category with one-to-one correspondence. Orderly display words: neat, organized, regular, systematic, tidy, unchaotic, uncluttered, unscattered, ordered, non-random. Disorderly display words: chaotic, cluttered, scattered, random, disordered, untidy, unsystematic, unsystematic, untidy, irregular. To validate these terms, 45 participants (Mage = 30.98, SD = 9.86; 25 female, 20 male) rated them after reading definitions. Orderly display words received significantly higher ratings (M = 5.85, SD = 0.48) than disorderly display words (M = 1.88, SD = 0.46), $F(1, 44) = 1048.85$, $p < 0.001$, confirming their validity.

2.3 Procedure and Measures

Participants viewed instructions on a black background and completed a seven-step IAT (Greenwald et al., 2003). The compatible task required categorizing natural products with disorderly display words and artificial products with orderly display words; the incompatible task reversed these pairings. Task order was counterbalanced. Finally, participants reported demographic information.

2.4 Results

Following IAT data processing guidelines (Greenwald et al., 2003), we excluded participants with: (1) >10% of trials with reaction times <300ms, (2) error rates $ $35%, or (3) mean reaction times beyond $±$3 SD from the overall mean. No participants met exclusion criteria. We then excluded trials with reaction times >10,000ms or <300ms, replacing error trials with the participant's mean correct reaction time plus 600ms.

Preliminary analyses revealed no gender or order effects. Using data from the critical blocks (steps 4 and 7), we calculated D-scores to assess implicit association strength. A one-sample t-test confirmed $D = 0.16 > 0$, $t(33) = 3.41$, $p = 0.002$, indicating stronger associations for congruent pairings and supporting H1.

A 2 (product attribute) × 2 (display order) repeated-measures ANOVA on mean reaction times revealed non-significant main effects for product attribute, $F(1, 33) = 0.72$, $p = 0.402$, and display order, $F(1, 33) = 1.80$, $p = 0.189$, but a significant interaction, $F(1, 33) = 7.88$, $p = 0.008$, $^2 = 0.19$. Post-hoc LSD tests showed participants responded faster to natural product words when sharing a key with disorderly (M = 1229.03ms, SD = 463.60) versus orderly display words (M = 1352.82ms, SD = 580.70), $F(1, 33) = 5.28$, $p = 0.028$, $^2 = 0.14$, supporting H1a. Conversely, they responded faster to artificial product words when sharing a key with orderly (M = 1237.05ms, SD = 454.14) versus disorderly display words (M = 1350.02ms, SD = 556.10), $F(1, 33) = 5.48$, $p = 0.025$, $^2 = 0.14$, supporting H1b.

2.5 Summary

Experiment 1 provided evidence for the association between display order and product attributes at the implicit level. As hypothesized, participants responded faster to natural products paired with disorderly displays and artificial products paired with orderly displays, indicating stronger implicit associations for "natural-disorder" and "artificial-order."

Experiment 2

Experiment 2 examined whether these associations persist at the explicit level when consumers make conscious judgments about product attribute-display order relationships.

3.1 Design and Participants

Using a single-factor (product attribute: natural vs. artificial) within-subjects design, we conducted a chi-square test. G*Power 3.1 (Faul et al., 2009) indicated that detecting a medium effect (w = 0.5) at $\alpha = 0.05$ with 90% power required 117 participants. We recruited 280 participants online (Mage = 28.55, SD = 8.58; 105 male, 175 female) who received modest compensation.

3.2 Procedure and Measures

Participants first read definitions of product attributes and display order (identical to Experiment 1). They then evaluated the match between attributes and display order by answering: "How are natural products typically displayed?" and "How are artificial products typically displayed?" with forced-choice responses of "disorderly display" or "orderly display."

3.3 Results

Chi-square analyses revealed significant differences in matching patterns, $^2(1) = 419.08$, $p < 0.001$, $\phi = 0.87$. As shown in Table 1 , 91.1% of participants associated natural products with disorderly display versus 8.9% with orderly display, $^2(1) = 188.93$, $p < 0.001$, $\phi = 0.82$. Conversely, 95.4% associated artificial products with orderly display versus 4.6% with disorderly display, $^2(1) = 230.41$, $p < 0.001$, $\phi = 0.91$. These results support H1, confirming that natural products are explicitly linked with disorder and artificial products with order.

3.4 Summary

Experiment 2 demonstrated that when explicitly asked to match product attributes with display order, consumers reliably associate natural products with disorderly displays and artificial products with orderly displays, supporting our hypotheses at the conscious level. Experiment 3 extends this by examining how these associations influence consumer preferences in realistic consumption contexts.

Experiment 3

Experiment 3 tested the effects of display order and product attributes on product preferences and the mediating role of processing fluency.

4.1 Design and Participants

Using a 2 (product attribute: natural vs. artificial) × 2 (display order: orderly vs. disorderly) between-subjects design, we determined through G*Power 3.1 (Faul et al., 2009) that detecting a medium effect (f = 0.25) at $\alpha = 0.05$ with 90% power required 171 participants. We recruited 200 participants (Mage = 29.01, SD = 9.14; 70 male, 130 female) who received modest compensation.

4.2 Materials

We selected whole foods and processed foods from the FoodPics database (Blechert et al., 2019) to represent natural and artificial products. Using DALL-E-2 and Dreamstudio AI platforms, we generated four display images (600$×$600 pixel PNG format) showing natural and artificial products in both orderly and disorderly arrangements. Figure 2 [Figure 2: see original paper] presents these materials.

A validation study with 45 participants (Mage = 25.04, SD = 4.73; 29 male, 16 female) confirmed the materials' effectiveness. After reading definitions, participants rated the images on product attribute (1 = natural to 7 = artificial), display order (1 = disorderly to 7 = orderly), and familiarity. Results showed significant differences: artificial product images were rated higher on artificiality (M = 6.52, SD = 0.71) than natural product images (M = 1.92, SD = 1.54), $F(1, 44) = 251.94$, $p < 0.001$; orderly displays were rated higher on orderliness (M = 6.36, SD = 0.86) than disorderly displays (M = 2.28, SD = 1.62), $F(1, 44) = 176.56$, $p < 0.001$. Familiarity did not differ across conditions, $F(3, 132) = 0.39$, $p = 0.761$, confirming the images' suitability.

4.3 Procedure and Measures

Participants were randomly assigned to view one of the four product images. Following Biliciler et al. (2022), they rated product liking (1 = not at all to 9 = very much), purchase intention (1 = not at all to 9 = very strongly), and attractiveness (1 = not at all to 9 = very strongly), which were averaged to form a preference index ($\alpha = 0.94$). Processing fluency was measured using three items adapted from Deng et al. (2016): "The product image was easy to process," "The product image processed smoothly," and "The product image processed comfortably" (1 = strongly disagree to 7 = strongly agree; $\alpha = 0.82$). Demographic information was also collected.

4.4 Results

A 2 × 2 ANCOVA on product preference (controlling for demographics) revealed non-significant main effects for display order, $F(1, 193) = 1.04$, $p = 0.31$, and a significant main effect for product attribute, $F(1, 193) = 6.98$, $p = 0.009$, $^2 = 0.035$, with higher preference for natural (M = 6.97, SD = 1.64) versus artificial products (M = 6.27, SD = 2.02). Critically, the interaction was significant, $F(1, 193) = 23.30$, $p < 0.001$, $^2 = 0.108$. Post-hoc LSD tests showed that for natural products, preference was higher in disorderly (M = 7.44, SD = 1.32) versus orderly displays (M = 6.50, SD = 1.81), $F(1, 193) = 7.20$, $p = 0.008$, $^2 = 0.036$, supporting H2a. For artificial products, preference was higher in orderly (M = 6.97, SD = 1.40) versus disorderly displays (M = 5.58, SD = 2.30), $F(1, 193) = 16.78$, $p < 0.001$, $^2 = 0.080$, supporting H2b.

Mediation Analysis. Using SPSS Process 3.5 (Model 7, 5000 bootstrap samples; Hayes, 2017; Preacher et al., 2007), we tested whether product attribute moderated the indirect effect of display order on preference through fluency. The interaction between display order and product attribute significantly predicted fluency (β = 1.30, SE = 0.35, 95% CI: [0.605, 1.996]), which in turn predicted preference (β = 0.96, SE = 0.08, 95% CI: [0.808, 1.115]). The index of moderated mediation was significant (1.25, SE = 0.39, 95% CI: [0.527, 2.063]). Specifically, for natural products, display order had a significant negative indirect effect on preference through fluency (indirect effect = -0.55, SE = 0.22, 95% CI: [-1.003, -0.130]), supporting H3a. For artificial products, display order had a significant positive indirect effect (indirect effect = 0.70, SE = 0.29, 95% CI: [0.174, 1.311]), supporting H3b.

4.5 Summary

Experiment 3 demonstrated that in consumption contexts, product attributes and display order interact to influence preferences, with processing fluency serving as a mediator. Natural products received higher preference in disorderly displays, while artificial products received higher preference in orderly displays. Experiments 1-3 consistently validated the "natural-disorder" and "artificial-order" naive beliefs and their effects. Experiment 4 examines whether these matching relationships shift under different contextual conditions, specifically when valence cues are present.

Experiment 4

Experiment 4 tested the moderating role of valence cues, investigating whether naive beliefs about natural attributes and display order change when valence cues (e.g., natural is positive, artificial is negative, order is positive, disorder is negative) are present, while controlling for potential health perception effects.

5.1 Design and Participants

Using a 2 (valence cue: present vs. absent) × 2 (product attribute: natural vs. artificial) × 2 (display order: orderly vs. disorderly) between-subjects design, G*Power 3.1 (Faul et al., 2009) indicated that 171 participants were needed for 90% power. We recruited 240 participants (Mage = 31.58, SD = 10.03; 98 male, 142 female), with 30 per cell, who received modest compensation.

5.2 Procedure and Measures

Participants were randomly assigned to valence cue or control conditions. Following Zestcott et al. (2017), we activated valence cues through textual prompts: "Additionally, some people notice differences in positivity/negativity between product attributes (natural vs. artificial) and between display orders (orderly vs. disorderly)." The control group received no such prompt.

Participants then viewed product images (as in Experiment 3) and rated liking, purchase intention, attractiveness, goodness, pleasantness, and quality (1-9 scales), averaged to form a preference index ($\alpha = 0.94$). Fluency was measured as in Experiment 3 ($\alpha = 0.85$). Health perception was assessed (1 = very unhealthy to 9 = very healthy). Manipulation checks included: "I was told that valence differences exist between products and displays" (1 = strongly disagree to 7 = strongly agree) and direct valence ratings for natural/artificial products and orderly/disorderly displays (1 = very negative to 7 = very positive). Demographics were also collected.

5.3 Results

Manipulation Check. The valence cue group (M = 6.03, SD = 1.10) agreed more strongly with the manipulation check statement than the control group (M = 4.03, SD = 1.82), $t(238) = 10.31$, $p < 0.001$, $d = 1.28$, confirming successful activation.

Product Preference. A 2 × 2 × 2 ANCOVA (controlling for health perception, valence ratings, and demographics) revealed significant main effects for valence cue, $F(1, 224) = 13.86$, $p < 0.001$, $^2 = 0.058$, with higher preference in the valence cue condition (M = 7.27, SD = 1.08) versus control (M = 6.67, SD = 1.74). The display order × product attribute interaction was significant, $F(1, 224) = 12.11$, $p = 0.001$, $^2 = 0.051$. The three-way interaction was also significant, $F(1, 224) = 20.96$, $p < 0.001$, $^2 = 0.086$.

In the control condition, natural products received higher preference in disorderly (M = 7.09, SD = 0.93) versus orderly displays (M = 5.95, SD = 1.87), $p < 0.001$, supporting H2a. Artificial products received higher preference in orderly (M = 7.43, SD = 1.01) versus disorderly displays (M = 6.22, SD = 2.08), $p < 0.001$, supporting H2b.

In the valence cue condition, for natural products, preference was marginally higher for orderly (M = 7.48, SD = 0.57) versus disorderly displays (M = 6.95, SD = 1.23), $p = 0.061$. For artificial products, preference did not differ between orderly (M = 7.49, SD = 0.91) and disorderly displays (M = 7.17, SD = 1.25), $p = 0.393$. Further analysis showed valence cues significantly increased preference for natural products in orderly displays ($p < 0.001$) and artificial products in disorderly displays ($p = 0.001$), while not affecting preference for natural products in disorderly displays ($p = 0.432$) or artificial products in orderly displays ($p = 0.949$). These results support H4.

Moderated Mediation. Using SPSS Process 3.5 (Model 11, 5000 bootstrap samples; Hayes, 2017; Preacher et al., 2007), we tested whether valence cues and product attributes moderated the indirect effect of display order on preference through fluency. The three-way interaction significantly predicted fluency (β = -2.08, SE = 0.53, 95% CI: [-3.116, -1.038]), which predicted preference (β = 0.53, SE = 0.06, 95% CI: [0.407, 0.661]). The index of moderated moderated mediation was significant (-1.11, SE = 0.38, 95% CI: [-1.911, -0.459]).

In the control condition, for natural products, display order had a significant negative indirect effect on preference through fluency (indirect effect = -0.37, SE = 0.13, 95% CI: [-0.656, -0.139]). For artificial products, display order had a significant positive indirect effect (indirect effect = 0.58, SE = 0.22, 95% CI: [0.198, 1.049]).

In the valence cue condition, for natural products, display order had a significant positive indirect effect (indirect effect = 0.47, SE = 0.17, 95% CI: [0.161, 0.844]). For artificial products, display order also had a significant positive indirect effect (indirect effect = 0.31, SE = 0.15, 95% CI: [0.031, 0.610]). These results support H5.

5.4 Summary

Experiment 4 demonstrated that valence cues moderate the matching relationship. Without valence cues, results supported "natural-disorder" and "artificial-order" beliefs. With valence cues, consumers formed "natural-positive-order" and "artificial-negative-disorder" associations, increasing fluency and preference for natural products in orderly displays and artificial products in disorderly displays, without diminishing original beliefs. This pattern aligns with dual-process models where exemplar-based learning remains active while adaptive learning operates independently under specific conditions (van Osselaer, 2008).

The differential effects for natural versus artificial products may stem from valence properties. Positive valence linking natural attributes with order further enhances preference, whereas negative valence linking artificial attributes with disorder, while increasing fluency, simultaneously damages preference, resulting in weaker overall enhancement.

General Discussion

This research, grounded in associative learning theory, investigated consumers' naive beliefs about product attributes and display order, examining their impact on preferences with processing fluency as mediator and valence cues as boundary condition. Four experiments revealed that consumers hold both implicit (Experiment 1) and explicit (Experiment 2) "natural-disorder" and "artificial-order" naive beliefs. In consumption contexts, natural (vs. artificial) products elicit higher preference under disorderly (vs. orderly) display, with processing fluency mediating this effect (Experiments 3-4). Valence cues as contextual stimuli prompted consumers to reconsider these relationships, forming contradictory yet coexisting naive beliefs that enhanced preference and fluency for natural products in orderly displays and artificial products in disorderly displays, without affecting preferences for the original matching combinations (Experiment 4).

6.1 Theoretical Contributions

First, this research expands consumer naive belief literature by identifying and validating novel beliefs about product attribute-display order matching. Prior work has examined beliefs like "healthy = expensive" (Haws et al., 2017), "light = healthy" (Li et al., 2022), and "unhealthy = tasty" (Raghunathan et al., 2006). We reveal objective visual perception-based beliefs from consumers' environmental observations, demonstrating that natural attributes align with disorder and artificial attributes with order.

Second, we contribute to associative learning theory by demonstrating contradictory naive beliefs. People can hold multiple, conflicting naive beliefs about the same context (Deval et al., 2013). Valence cues triggered adaptive learning, forming "natural-positive-order" and "artificial-negative-disorder" beliefs that contradicted the original "natural-disorder" and "artificial-order" beliefs. These contradictory beliefs coexisted, likely because exemplar-based learning remains continuously active while adaptive learning activates only under limited conditions (van Osselaer, 2008), providing new evidence for dual-process mechanisms.

Third, we advance natural product research. Previous studies often emphasized natural products' superiority (Carocho et al., 2015; Galati et al., 2019) and their association with positive traits (Rozin, 2005; Rozin et al., 2012; Scott et al., 2020). Our research identifies display order as a factor influencing natural product preferences and shows that disorderly displays enhance natural product preference, while valence cues boost preference for natural products in orderly displays. This supports the view that "natural is neutral" (Scott & Rozin, 2020)—nature is not inherently service-oriented to humans, and visual disorder may align with nature's inherent logic.

Finally, we enrich product display literature by providing new evidence that "disorder can be beneficial." Previous findings on order/disorder effects have been fragmented, showing that disorder enhances creativity, cognitive flexibility, new product acceptance (Chen et al., 2013; Vohs et al., 2013; Walter et al., 2020), variety-seeking (Wang & Jiang, 2022), and preference for bounded brand logos (Du et al., 2017). We identify a novel condition where disorderly displays increase preference for natural products.

6.2 Practical Implications

Our findings offer actionable guidance for retailers. Current supermarkets maintain strict order for all products, which benefits artificial products but not natural ones. Retailers should relax arrangement requirements for natural products, allowing disorderly displays, while maintaining strict order for artificial products. For advertising, when multiple similar products appear, marketers should arrange them according to their natural/artificial attributes to enhance processing fluency and preference.

6.3 Limitations and Future Directions

First, our operationalization of order/disorder focused solely on visual stimuli. However, nature's apparent visual disorder may contain underlying orderly patterns (e.g., natural cycles; Koole & van den Berg, 2005). Future research could examine how such inherent regularities affect the "natural-disorder" belief, potentially through contamination effects (Meng et al., 2022; Rozin et al., 1986).

Second, environmental cues may activate different mindsets (Li et al., 2023; 2022; 2018). Our display order manipulation focused only on product arrangement, not background context or product shape. Future studies should examine how environmental order, display boundaries, and product shapes (e.g., triangles, circles, hexagons) interactively influence naive beliefs, potentially using field experiments to investigate real purchase behaviors.

Third, individual differences in personality and cognitive preferences may moderate these effects (Li et al., 2022). Consumers with stronger needs for order or stronger overall preferences for natural products might be less influenced by attribute-display order matching. Future research should explore such individual traits.

Finally, consumer decision-making involves pre-purchase, purchase, and post-purchase stages with different influencing factors (He et al., 2021; Li et al., in press). Future research should investigate how "natural-disorder" and "artificial-order" beliefs manifest across these stages.

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Note: Figure translations are in progress. See original paper for figures.