The Dual Impact of Personalized Product Recommendations on Consumers’ Subjective Appraisal of Their Product Choices

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We show that decision assistance in the form of personalized recommendations affects consumers’ subjective appraisal of their product choices via two distinct pathways – a positive effect via access to better alternatives, and a negative effect via increased choice difficulty. This framework explains why consumers might fail to appreciate good choices.

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How Can I Help You (or Not)?
Choice Architecture and Consumers’ Decision Appraisal in Product Assortments

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Paper #1: The Dual Impact of Personalized Product Recommendations on Consumers’ Subjective Appraisal of Their Product Choices
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Paper #2: Purchase Quantity Decisions and Default Effects in Assortments
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Paper #3: Mixing It Up: The Influence of Unsystematic Product Arrangements on Assortment Processing, Exploratory Search, and Product Choice
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Paper #4: Label Structure, Processing Disfluency, and Consumers’ Responses to Credence-Labeled Foods
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SESSION OVERVIEW
Extensive choice research has documented that the way choices are presented can significantly affect consumer decision making (Thaler and Sunstein 2008). Choice architecture (e.g., framing, spatial arrangement of alternatives, etc.) can therefore be used to encourage choices that not only improve consumers’ objective well-being (i.e., utility), but also to enhance their subjective appraisal of the decisions (i.e., satisfaction) (e.g., Johnson et al. 2012). In the current session, we seek to explore how changes to the choice architecture of product assortments influence not only which options consumers choose, but also how they perceive the choices. We explore a variety of choice aids, including personalized recommendations, default options, display formats and label structures, and their influence on decision appraisal.

This session seeks to answer two questions: In choices from product assortments, how do various decision aids facilitate the decision making process? How does manipulating different aspects of the choice architecture influence consumers’ appraisal of their choices?

The first two papers explore the role of assortment structure on the appraisal of product choices. Häubl, Dellaert, Usta, and Ibrahim explore an ironic effect of personalized product recommendations on consumers’ satisfaction with the chosen alternative. In four studies they demonstrate that personalized product recommendations may lead to less satisfaction with their choices when greater choice difficulty outweighs the greater perceived attractiveness of the assortment. They explore the moderating role of assortment size and propose a “balanced design” to reduce the unintended negative effect. Friedman, Savary, and Dhar examine the default effect in assortments -- specifically, how the number and type of options defaulted affect the number of options chosen. In five studies they establish that due to an asymmetry between selection and rejection criteria, consumers choose more options when less attractive options are defaulted compared to when the most attractive options are defaulted. Importantly, the authors show that default options do not decrease choice satisfaction.

The latter two papers examine the role of fluency in assortment design. Walter, Hildebrand, Häubl, and Herrmann examine how perceptual fluency (vs. disfluency) of display formats influence consumers’ product choices. Evidence from three lab experiments and two large-scale field experiments suggest that when an assortment combines both familiar and unfamiliar alternatives, presenting them in an unsystematic (vs. systematic) manner stimulates an exploratory mindset in consumers, and subsequently increases the size of consideration set and promotes the choice of unfamiliar products. Finally, Parker, Rodriguez-Vila, Hamilton, Paul, and Bharadwaj demonstrate how the label structure influences consumers’ responses toward food products. In four studies they demonstrate that credence-labels (e.g., organic, gluten-free, hormone-free, etc.) generate less positive responses when applied at the product-level (e.g., organic burrito) than at the ingredient-level (e.g., burrito with organic ingredients), due to increased processing disfluency.

Using a combination of lab experiments and field studies, the four papers examine the underlying psychological mechanisms of the impact of choice architecture and decision aids on choice from product assortments. The insights from these papers may also serve as guidelines for marketers who aim to optimize consumers’ well-being both objectively and subjectively.

The Dual Impact of Personalized Product Recommendations on Consumers’ Subjective Appraisal of Their Product Choices

EXTENDED ABSTRACT
A common form of decision assistance is to provide consumers with personalized recommendations that screen the available products according to their idiosyncratic preferences. Prior work suggests that such personalized product recommendations benefit consumers by enabling them to identify better alternatives than they would without such assistance (Diehl, Kornish, and Lynch 2003; Häubl and Trifts 2000; Xiao and Benbasat 2007). Intuitively, this increase in decision quality should translate into a more favorable subjective appraisal of the product that is ultimately chosen.

However, providing consumers with a truncated set of alternatives that only includes the most attractive ones tends to also increase the difficulty of identifying the most attractive alternative, which in turn adversely affects consumers’ subjective appraisal of their chosen alternative (Dhar 1997; Liberman and Förster 2006).

These two opposing forces are at the center of our conceptual framework of how decision assistance in the form of personalized recommendations affects consumers’ subjective appraisal of their...
product choices – i.e., choice satisfaction. We present evidence from four studies that were designed to test this dual-pathway framework.

Study 1 demonstrates that personalized product recommendations can both improve objective decision quality and reduce choice satisfaction. Across two between-subjects conditions, participants chose a hotel from a set of alternatives that were described on five feature dimensions: cleanliness, facilities, location, service, and sleep quality. Participants in the unassisted condition were presented with sixteen alternatives that had been selected at random from a pool of 64. Those in the recommended condition were presented with the sixteen best alternatives (based on their 0-100 ratings of feature importance) from the same pool of 64. The order of presentation was unique and random for each participant. Consistent with prior findings, the utility of the chosen alternative was significantly higher in the recommended than in the unassisted condition \((p<.001)\). Mediation analysis (Preacher and Hayes 2008) revealed both a significant negative indirect effect of recommendation via choice difficulty \((p<.05)\) and a significant positive indirect effect via the perceived attractiveness of the presented set of alternatives \((p<.05)\), rendering the direct effect of recommendation on choice satisfaction nonsignificant \((p>.05)\).

Study 2 tests the proposed dual-pathway model that captures the opposing effects of personalized product recommendations on objective decision quality and on consumers’ subjective appraisal of their chosen alternative. Across two between-subjects conditions, participants chose a hotel from a set of alternatives that were described on five feature dimensions: sound quality, battery life, memory capacity, and weight. In the recommended condition, the alternatives varied considerably in their attractiveness and were presented in an arbitrary order. In the unassisted condition, the alternatives were closer in attractiveness than in the recommended condition and were presented in descending order of attractiveness. For each participant, the utility of each alternative was calculated based on his/her ratings (scale: 0-100) of the importance of the four features. The utility of the chosen alternative was higher in the recommended than in the unassisted condition \((p<.01)\). However, despite this positive effect of personalized recommendations on objective decision quality, participants in the recommended condition were significantly less satisfied with their chosen alternatives than those in the unassisted condition \((p<.05)\).

Study 3 examines the moderating role of the size of the presented set of alternatives. We hypothesized that choice difficulty would be lower in smaller recommended sets, which should attenuate the negative indirect effect of recommendations on choice satisfaction via choice difficulty. Participants were randomly assigned to a 2 (condition: unassisted vs. recommended) x 2 (recommendation set size: large vs. small) between-subjects design, and they were presented with the same choice task as in Study 2. Participants were presented with either sixteen or four alternatives drawn from a pool of 64 hotels. In the unassisted condition, the alternatives were selected at random from the pool. In the recommended condition, the best alternatives (based on participants’ 0-100 ratings of feature importance) were selected. As hypothesized, moderated mediation analysis (Preacher and Hayes 2008) revealed a significant negative indirect effect of recommendation via choice difficulty for the large set \((p<.05)\), but not for the small set \((p>.05)\). By contrast, the positive indirect effect of recommendation via the perceived attractiveness of the presented alternatives was significant for the small set \((p<.05)\), but not for the large set \((p>.05)\).

Finally, Study 4 examines whether it might be possible to reduce the negative effect of personalized recommendations on choice satisfaction by presenting consumers with a “balanced” recommendation set that is constructed so as to contain a combination of some attractive alternatives and some less attractive ones. Using the same basic paradigm as in Study 3, participants were presented with sixteen alternatives drawn from a pool of 64 hotels. They were randomly assigned to one of three conditions – the sixteen alternatives were drawn at random (unassisted), or they were the sixteen best alternatives (“good”), or they were a set of alternatives that covered the spectrum of attractiveness close to uniformly (balanced). The results reveal that the utility of the chosen alternative was higher in the “good” condition than in the balanced and unassisted conditions \((p<.05)\). However, perceived choice difficulty was greater in the “good” condition compared to the other two \((p<.04)\). Mediation analysis with pairwise contrasts revealed that the dual-pathway model was supported for the contrast between the “good” and unassisted conditions. However, for the contrast between “good” and balanced, the effect on choice satisfaction is mediated only by choice difficulty \((p<.05)\), whereas for the contrast between balanced and unassisted, this effect is mediated only by the perceived attractiveness of the set \((p<.05)\). The latter result suggests that the negative effect of product recommendations on choice satisfaction vanished because choice difficulty was about as low in the balanced condition as it was in the unassisted condition.

This research advances our understanding of the psychological forces that govern consumers’ subjective appraisal of the product choices they make. The findings identify a significant caveat associated with personalized product recommendations, and they have important implications for the construction of choice architectures for consumer decision assistance.

**Purchase Quantity Decisions and Default Effects in Assortments**

**EXTENDED ABSTRACT**

Although most choice research examines how consumers choose a single option from a choice set, many choices in the real world allow them to choose as many (or as few) options as they would like from an assortment or menu of goods. In contrast to the standard theory of choice where the number of options purchased from an assortment depends on the utility and price of each item, we extend the literature on default effects in single choice to explore how the number and type of options preselected or defaulted in an assortment affects the total amount chosen. While prior research has focused on how preselecting a particular option increases preference for that option over a non-defaulted option and the possible mechanisms underlying this finding (Johnson and Goldstein 2003; Choi et al. 2004; Kressel, Chapman and Leventhal 2007), past work does not make a systematic prediction about how many non-defaulted options will be chosen when certain other options are preselected.

In the current work, we explore how the number and type of default options will influence the total quantity chosen from an assortment. Consistent with past work that shows that preselecting an option increases the likelihood of choosing that option, we first show that increasing the number of defaulted options linearly increases the quantity chosen. We further research how the total number of options purchased depends on which options are defaulted, holding the total number constant. Our main proposition is that preselecting less attractive options increases the total number of items chosen compared to preselecting the most attractive items.

Our results can be explained by a documented asymmetry between selection and rejection criteria. Specifically, consumers have a higher threshold for choosing non-selected items than they do for keeping preselected items (Yaniv and Schul 1997; Levin, Hunke
and Jasper 2000; Huber, Neale and Northcraft 1987). As a result, items in an assortment that might not be attractive enough to actively select but may be sufficiently attractive to keep (or not reject) when already preselected. In contrast, the most attractive items are less likely to be impacted by defaults, because they are likely to exceed even the higher threshold. As a consequence, when less attractive items are preselected, they are more likely to be chosen than when they are not preselected, but preselecting the most attractive items does not increase the likelihood of choosing them to the same extent. As a result, consumers choose more items overall when the less attractive items are preselected than when the most attractive items are.

We test our hypotheses in five studies. Study 1 establishes that there is a significant effect of defaults on the number of items purchased. We presented participants with two assortment scenarios, each with 16 options: a party scenario where they were shopping for snacks, and a home office scenario where they were shopping for supplies. We varied between subjects whether 0, 4, 12 or 16 of the options were preselected. We find a strong and significant linear relationship between the number of preselected options and total number of items purchased for both assortment scenarios: snacks (b= .17, SE=.03, p<.001) and supplies (b=.15, SE=.03, p<.001).

Moreover, in contrast to research that suggests consumers may react negatively to a perceived attempt to manipulate their preferences with defaults (Brown and Krishna 2004), we find that consumers are no less satisfied, and may be marginally more satisfied with their choice when options are defaulted, compared to when no options are defaulted.

In studies 2A, 2B, 3 and 4 we test the hypothesis that preselecting less attractive options increases quantity chosen compared with preselecting more attractive options. In studies 2A and 2B, we again use the party snacks and supplies scenarios, with 16 options each, which were all at least somewhat attractive. We pre-tested the options to identify the most and least attractive options. We then manipulated between subjects whether the 4 most attractive or 4 least attractive options were preselected. We find that participants selected more items overall when the least attractive items were preselected compared to when the most attractive items were pre-selected (M=8.0 vs. 6.9, p<.001 for snacks; M=7.6 vs. 6.5, p=.006 for supplies). This result is driven by the number of less attractive items increasing when preselected (M = 1.7 vs. 0.6 for snacks; M = 1.8 vs. 0.4 for supplies) more than more attractive items increase when preselected (M=3.4 vs. 3.0 for snacks, p(interaction)< .001; M=3.4 vs. 2.8 for supplies, p(interaction)< .001).

In study 3, we manipulate which items are attractive by setting certain items on sale. Again we find that people choose more items on average when the less attractive (i.e. full price items) are preselected than when the more attractive (i.e. sale items) are (M=7.1 vs. 6.0, p=0.040). Again the result was driven by defaults increasing full price items (M=1.5 vs. 0.7) more than sale items (M=2.3 vs. 1.9, p(interaction)=.001). Finally, study 4 tests a charitable giving scenario in which participants could hypothetically donate $2 to any number of 10 charities. In this scenario, donations for 3 of the charities would be “matched,” making them more attractive. We varied between subjects whether the 3 matched (more attractive) charities were preselected, or whether 3 other charities were (less attractive). Again we find that preselecting the unmatched options resulted in fewer charities selected than preselecting the matched charities (M=5.2 vs. 4.4, p=.045). Donations to matched charities were not significantly increased by defaults (M=2.1 vs. 1.9), but donations to unmatched charities were (M=1.5 vs. 0.8, p(interaction)<.001).

As more retailers begin to add default options to their marketing mix with tactics such as “starter carts” or pre-loaded shopping lists, it becomes increasingly important to investigate the effect of defaults in larger assortments. Our results suggest that preselecting options may be effective in increasing basket size without reducing customer satisfaction, particularly when less attractive items are preselected.

**Mixing It Up: The Influence of Unsystematic Product Arrangements on Assortment Processing, Exploratory Search, and Product Choice**

**EXTENDED ABSTRACT**

How best to present product assortments in order to attract consumers’ interest and attention is a key challenge for retailers (Mantrala et al. 2009). A common way of arranging a product display entails presenting the most popular, and thus most familiar, alternatives in highly prominent display positions (Nowlis and Simonson 1997; Valenzuela, Raghubir, and Mitakakis 2013), resulting in consumers’ attention being directed towards specific alternatives that they tend to already be aware of (Christie and Klein 1995; Downing 2000). This is consistent with findings that greater fluency promotes simplified decision processes by selectively directing consumer attention towards familiar products (Alter et al. 2007; Janiszewski, Kuo, and Tavassoli 2012), and that fluency can reduce consumers’ motivation to explore other alternatives (Deng et al. 2016; Janiszewski 1998).

Recent work suggests that perceptual disfluency can act as a metacognitive cue that stimulates the more in-depth processing of information by eliciting a need for cognitive enrichment (Alter 2013; Alter et al. 2007; Graf and Landwehr 2015). In line with these findings, Pocheptsova, Labroo, and Dhar (2010) showed that a difficult-to-read description (i.e., such as one using a grayish font) of an individual product can create perceptions of exclusivity and heightened attractiveness, particularly when the product is unfamiliar.

Against the background of this prior research, we propose that an unsystematic (versus systematic) product arrangement promotes perceptual disfluency. Moreover, we hypothesize that perceptions of disfluency increase consumers’ motivation to engage in more exploratory search, resulting in consideration of a larger and more diverse set of products as candidates for purchase, and ultimately promoting the choice of unfamiliar alternatives. We present evidence from three studies that supports this theorizing.

Study 1 was designed to examine the effect of systematic (versus unsystematic) product arrangements on consumers’ perceptions of fluency, and to provide initial evidence on how this might affect the motivation to explore unfamiliar products. In cooperation with a large Swiss chain of grocery stores, we selected two stores that were closely matched but differed in one critical respect—whether their assortment of chocolate products was arranged systematically (by brand, flavor, and price) or unsystematically (in a seemingly arbitrary manner). A sample of shoppers (n=102) was recruited in the immediate vicinity of the stores’ chocolate displays to complete a short survey. As predicted, shoppers perceived the unsystematic product arrangement to be more disfluent than its systematic counterpart (p<.01), and expressed a greater interest in exploring unfamiliar products in connection with the unsystematic than with the systematic arrangement (p<.05). In line with our theorizing, a mediation analysis (Hayes 2013) reveals that the effect of unsystematic (versus systematic) product arrangement on consumers’ inclination to explore unfamiliar alternatives is significantly mediated by perceptions of disfluency.

Study 2 was a large-scale field experiment across 36 stores conducted in cooperation with a Swiss mobile phone retailer. All stores...
used an interactive assortment tracking technology that logged customers’ product search behavior for a total of 21 mobile phones that were arranged in a 3 (rows) x 7 (columns) product display. Each of the 36 stores was randomly assigned to one of four conditions where the 7 most familiar products (identified in a pretest) were presented either (1) according to the retailer’s original display format [systematic] (Chandon et al. 2009), (2) grouped together in the top row (salient position), (3) grouped together in the bottom row (non-salient position), or (4) dispersed randomly across the entire product display [unsystematic]. In line with our theorizing, a pretest (n=82) showed that the unsystematic product arrangement was perceived as substantially more disfluent than the systematic ones (ps<.001). Moreover, the unsystematic arrangement led to more exploratory product search (all ps<.05) and increased customers’ likelihood of choosing an unfamiliar mobile phone (all ps<.05) relative to the systematic arrangements where the familiar products were presented in salient positions or in line with the retailer’s original display format, but not relative to the systematic arrangement where the familiar products were placed in non-salient positions (ps>.7). Study 2 provides support for our theorizing based on the in-store behavior of actual shoppers. However, we cannot rule out the possibility of hidden confounding variables in this field experiment, nor the potential alternative explanation that the relocation of familiar products to less salient display positions reduced their likelihood of being chosen (Chandon et al. 2009; Drèze, Hoch, and Purk 1994).

Study 3 was designed to rule out these potential confounds by using a tightly controlled experimental setting. To eliminate the possible influence of prior product/brand familiarity, we created fictitious smart phones and made participants (n=153) familiar with a subset of these products in the initial phase of the experiment. For a subsequent consequential choice task, participants were randomly assigned to one of two conditions where the assortment of phones was arranged either in a systematic or unsystematic manner in terms of whether the (now) familiar alternatives were grouped together or dispersed across the display. After a short filler task, participants completed a quiz to assess their memory of product information. The results reveal a significantly higher choice share of unfamiliar products in the unsystematic relative to the systematic product arrangement condition (p<.05). A mediation analysis (Hayes 2013) supports our theorizing by showing that this effect is serially mediated by more extensive exploratory search and enhanced recall of information about the unfamiliar products.

This research introduces a novel theoretical perspective on how spatial arrangements of products can trigger perceptual (dis)fluency and affect consumers’ shopping behavior. It shows that the perceptual disfluency that is induced by an unsystematic product arrangement increases consumers’ motivation to explore a product assortment, ultimately promoting consumers’ choice of unfamiliar alternatives. The current work also contributes to our understanding of consumers’ reaction to, and adoption of, innovations (Alexander, Lynch, and Wang 2008; Moreau, Lehmann, and Markman 2001), as well as of individuals’ preference for unfamiliar or novel stimuli more generally (Wittmann et al. 2008).

Label Structure, Processing Disfluency, and Consumers’ Responses to Credence-Labeled Foods

EXTENDED ABSTRACT

For foods, the term credence-labeling refers to products being marketed with claims related to the sustainability (e.g., organic), healthfulness (e.g., GMO-free, gluten-free), and ethicality (e.g., free-range) of the product. Generally, credence-labels signal desirable product benefits and consumers use such labels to make quality inferences about food products. In contrast to previous research, this paper investigates the impact of how credence-labels are structured, rather than just the consequences of their mere presence or absence. Specifically, we differentiate between product-level credence-labels, which apply to the food product as a whole, and ingredient-level credence-labels, which apply to the components that constitute the food item. We predict that credence-labels will generate less positive responses when applied at the product-level (e.g., organic burrito) than at the ingredient level (e.g., burrito with organic ingredients). This prediction is based on the expectation that credence-labels applied at the product-(vs. ingredient) level will be processed more disfluently (Alter and Oppenheimer 2009), thereby resulting in less positive attitudes toward the food product.

Studies 1a and 1b demonstrated the basic effect of credence-label structure (ingredient vs. product level) on preferences for foods by measuring the likelihood of ordering a dish at a restaurant. Study 1a asked participants to imagine they were at a restaurant and then randomly assigned to one of two conditions. In the ingredient-level condition, participants were asked to imagine they found a dish called “Our Famous Burger (w/ organic ingredients).” In the product-level condition, participants were asked to imagine they found a dish called “Our Famous Organic Burger.” Participants then indicated the likelihood they would order this dish on a 1 (“very unlikely”) to 10 (“very likely”) scale. As expected, the likelihood of ordering the dish was significantly higher in the ingredient- (vs. product-) level condition (M = 7.23 vs. 5.83, p < .001). Study 1b used an identical study design except it additionally included a control condition in which the dish did not have a credence-label. Additionally, the food type was change to either a burrito or fajitas. In the control condition, the dish was called “Our Famous Burrito [Fajitas]”. A 2 (food type) x 3 (credence-label) between-subjects ANOVA revealed neither a main effect of food-type (burrito vs. fajitas) on likelihood of ordering (F<1, NS) nor an interaction between food-type and credence-label structure (F<1, NS). However, the predicted main effect of label structure (control vs. ingredient-level vs. product-level) was significant (p<.001). As in study 1, the likelihood of ordering the dish was significantly higher in the ingredient- (vs. product-) level condition (M = 6.73 vs. 5.20, p<.001). Importantly, the likelihood of ordering the dish was significantly higher in the control (vs. product-level) condition (M = 6.51 vs. 5.20, p<.005), while no significant difference was found between the control and ingredient-level conditions (F<1, NS). Thus, using product-level credence-labels for foods diminished their appeal, as opposed to ingredient-level labels increasing their appeal.

Study 2 tested the underlying process, disfluency, by directly measuring the fluency with which participants processed (i.e., the ease with which they understood) the food descriptions and used these measures to test mediation. Participants were asked to imagine they were shopping in the frozen foods section of their local grocery store and then randomly assigned to one of three conditions. In the control condition, participants were asked to imagine they found “Mozzarella Sticks.” In the ingredient-label condition, participants were asked to imagine they found “Mozzarella Sticks (all ingredients Hormone-Free, Gluten-Free, Organic).” In the product-label condition, participants were asked to imagine they found “Mozzarella Sticks, Gluten-Free, and Organic Mozzarella Sticks.” Participants then indicated how appetizing they found this food product on a 1 (“not at all”) to 10 (“very much”) scale. Next, participants were asked to indicate their agreement with four statements on 1 (“strongly disagree”) to 7 (“strongly agree”) scales: (i) I can easily visualize (mentally picture) this product, (ii) I get what this product is, (iii) This
product sounds weird to me (reverse-coded), and (iv) This product makes sense to me. Consistent with results of the previous studies, those participants exposed to the product-level credence-label found the mozzarella sticks to be significantly less appetizing than those who were exposed to the ingredient-level credence-label ($M = 7.28$ vs. $5.78, p < .001$) and those in the control (no-label) condition ($M = 7.45, p < .001$). This fluency measure was then tested as a potential mediator of the influence of credence-label structure on preferences using Hayes’s (2013) PROCESS macro for multiple mediation (95% confidence interval; 5,000 bootstrap samples) which revealed that the four-item fluency scale was a significant mediator ($b = .6229, LLCI = .3841, ULCI = .9311$).

Lastly, study 3 found that the negative influence of product-level credence-labels was mitigated when participants were asked to elaborate on the meaning of the product before evaluating it. Specifically, participants in the elaboration condition were asked to write a short response in a provided text box to the following question before evaluating the food product: Before proceeding, please describe what you think the burrito described above contains, looks like, and tastes like. In contrast, participants in the no-elaboration condition were not asked to describe the burrito. As expected, there was a significant interaction between the elaboration factor (yes vs. no) and the label-structure factor (product vs. ingredient) on how appetizing the participants found the food ($p < .05$). While no effect of label structure was found for those who elaborated before evaluating ($M = 7.40$ vs. $7.60, F < 1, NS$), the effect documented in the preceding studies was replicated for those who did not elaborate before evaluating ($M = 7.40$ vs. $6.30, p < .02$). The same fluency measures used in study 2 were collected in study 3. These revealed that disfluency mediated the above interaction.

In sum, these results demonstrate that while there may be some heterogeneity in consumer’s general responses to credence-labels, these responses become more negative overall when credence labels are applied at the product-(vs. ingredient-) level.

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