How Context Shapes Category Inferences and Attribute Preference for New Ambiguous Products

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Abstract

Extant research suggests that when marketers introduce products with functions that span multiple categories, consumers tend to generate beliefs in line with only a single category. This has been regarded as a major marketing challenge because it leads consumers to ignore key attributes from the product’s supplementary category. Contrary to this prediction, the authors find that because consumers tend to classify new hybrid products by contrasting them against the competitive context, attributes from the supplementary category become more salient and thus contribute greater utility in choice. The authors pit the strength of this effect against several of the most dominant and favored category cues. The results confirm that classification inferences and attribute preference for new hybrid products are highly contextual, and as such, single category inferences need not translate directly into attribute preference.

Keywords: Hybrid Products; Nonalignable Differences; Discrete Choice; Attribute Preference; Single Category Beliefs; Context Effects
The rate of innovation in today’s market has spurred a trend in new product design towards the development of hybrid products (consumer goods with multi-product functionality). Smartphones are a good example given they serve as anything from a cellular phone to a handheld computer. Researchers have questioned how consumers make inferences and develop expectations for products that do not fit nicely into a single product category (Gill & Dubé, 2007; Gregan-Paxton, Hoeffler, & Zhao, 2005; Moreau, Markman, & Lehmann, 2001b). A common observation is that when a new product consists of properties from two or more categories, consumers tend to classify the product under a single pre-existing category, and use that category exclusively to generate inferences (Gregan-Paxton et al., 2005; Noseworthy & Goode, 2011; Rajagopal & Burnkrant, 2009). This suggests that new hybrid products are not necessarily seen as hybrid, at least not when it comes to functional expectations. Rajagopal and Burnkrant (2009) coined this, “the single category belief problem,” and identified it as a major challenge for marketers given that key attributes from the supplementary category (i.e., the category that does not frame the primary category referent) may go ignored (p. 232).

There is currently no clear consensus as to when and why certain categories tend to dominate consumer inferences for new hybrid products. The reigning explanation is that single category beliefs just happen as a result of an adaptive heuristic, which for what it lacks in accuracy it makes up for in efficiency (Murphy & Ross, 1994; 1999). Hence, people make single category inferences based on the first category that comes to mind, and as long as that category submits a viable answer, no other category is explored (Murphy & Ross, 2010). Unfortunately, as Noseworthy and Goode (2011) point out, this line of reasoning does little to predict which category will come to mind. Researchers have prescribed anything from the product’s label (Moreau et al., 2001b), to the product’s physical appearance (Gregan-Paxton et al., 2005), to
dominant associations (Noseworthy & Goode, 2011). However, despite the continued interest in identifying single category heuristics, researchers have yet to show definitive evidence linking single category inferences to attribute preference. Questioning the link between inferences and preference is important because attribute preference is often formed through relative comparison (Markman & Lowenstein, 2010). Hence, whether single category inferences lead consumers to ignore key attributes of a new hybrid product, may depend entirely on the competitive landscape.

To illustrate, consider Apple’s new iWatch concept (a wristwatch/mp3 hybrid that looks and functions like a wristwatch but also serves as an mp3 player). Does it make a difference whether Apple places the iWatch among wristwatches or among mp3 players? Will this change how consumers see the iWatch? More importantly, will this change what consumers like about the iWatch? These questions are critical because a significant amount of time and money is spent on product design, and if the competitive context can influence category inferences as well as attribute preference, then where consumers see a new hybrid product may be just as critical.

In answering these questions we make several advances. First, by accounting for the competitive context, we offer a category cue that overrides the singularity heuristic. Specifically, we find that, even when incidental (via consecutive ads or the in-store display), the competitive context can predict single category activation above and beyond a product’s perceptual identity (study 1), brand association (study 2), and category label (study 3). Second, we find that because consumers actively use the competitive context to categorize new hybrid products, they tend to see greater utility in attributes when they are nonalignable than when they align with the primary category. This finding directly challenges the fundamental prediction that single category beliefs lead consumers to ignore supplementary (nonalignable) attributes. However, when we strip away the competitive context, we find that consumers not only resort to common heuristics, but they
tend to see greater utility in attributes when they are alignable. Hence, when and how single category inferences translate into attribute preference may depend entirely on where consumers see the product and what, if anything, they see it with.

**Conceptual Background**

The principle function of categories is to allow for inductive inferences from known to novel concepts (Hayes & Newell, 2009; Ross & Murphy, 1996). Inductive inferences have proven problematic for marketers promoting new hybrid products, because these products fit multiple known concepts. The single category belief problem is simply the observation that despite multiple known concepts, consumers tend to rely only on a single concept to generate inferences and expectations (Noseworthy & Goode, 2011; Rajagopal & Burnkrant, 2009).

The growing interest in single category beliefs has led many researchers to explore when multiple category inferences can be observed or encouraged. Examples include when a marketer explicitly highlights the relationship between a hybrid product’s features and its multiple categories (Moreau et al., 2001b), when consumers are unfamiliar with the multiple categories that make up the hybrid product (Gregan-Paxton et al., 2005), when using psycholinguistic property priming (Rajagopal & Burnkrant, 2009), and most recently, when putting consumers into a rather severe negative state (Noseworthy & Goode, 2011). However, these examples constitute exceptions, not the norm. The default seems to be that, despite consumers becoming increasingly aware of new products that consolidate two or more categories, their inferences and expectations tend to align with their classification judgments. This effect has proven robust even after extensive category learning (Murphy & Ross, 1994; Noseworthy & Goode, 2011). The
prevalence of the phenomenon has now been extended to natural categories like people (Malt, Murphy & Ross, 1995) and artifacts like food (Murphy & Ross, 1999).

Given the above, there is very little debate that categorization tends to lead to category-specific inferences. Where the debate starts to get rather opaque, however, is when researchers employ the assumption that inferences predict preference (Rajagopal & Burnkrant, 2009). There is a general belief that preferences are formed and expressed only after inferences are made (Raghunathan, Naylor, & Hoyer, 2006). Indeed, if inferences did not translate directly into preference then the single category belief problem would not be much of a problem for marketers. Nevertheless, the literature on single category beliefs has relied exclusively on self-report evaluative judgments as indication of preference. Researchers have yet to examine whether single category beliefs naturally manifest in attribute preference.

Attribute preference is defined as the relative importance consumers place on the various features of a product (Scholz, Meissner, & Decker, 2010). One way to achieve a measure of attribute preference is through choice. Although preference is considered a latent construct, and choice is rather an action, the two are closely linked in that preference is widely considered the basis for choice (Savani, Markus, & Conner, 2008; Simonson, 2008; but see Drolet, Luce, & Simonson, 2009). The key characteristic of attribute preference is that it is formed through relative comparison, be it a comparison to other products in the immediate context or to other products in memory (Markman & Lowenstein, 2010). The issue of comparison presents a major challenge for marketers promoting new hybrid products because the marketer must pick which of the multiple categories presents the most optimal means of comparison.

The Role of Relative Comparison in Attribute Preference
It is generally accepted that preferences are not fixed but relative (Kahneman & Tversky, 1979). However, in order for preference to be relative, there must be some implicit or explicit comparison among items (Markman & Lowenstein, 2010). Consumers make comparisons when deciding among products of the same type (Houston, Sherman, & Baker, 1989). Consumers also make comparisons in or among advertisements (Zhang, Kardes, & Cronley, 2002). Some advertisements invoke comparisons because they explicitly contrast products (Snyder, 1992). Others invoke comparisons because the target ad is simply seen alongside competing products (Malaviya, Kisielius, & Sternthal, 1996). The reason these findings are important is because category judgments are based not only on what information comes to mind, but also on how it comes to mind (Lee, 2004). The literature on single category beliefs has yet to consider the role of relative comparison in framing the single category referent. This is surprising because consumers rarely see products in isolation from other products.

The idea that preferences are relative underscores the observation that objects can be compared on the basis of common and distinctive features (Tversky, 1977). Yet whether something is common or distinctive tends to shift with the competitive context (Dhar, Nowlis, & Sherman, 1999). Reconsider the Apple iWatch example. Should Apple place the iWatch among wristwatches or among mp3 players? Regardless of the decision, the iWatch will share common and distinctive features in accordance with its context. If, for example, consumers were to see the iWatch among other wristwatches, they would compare the iWatch to wristwatches either in memory or in the immediate context, and as a result, many of the wristwatch features would be seen as common and many of the mp3 features would be seen as distinctive. If, on the other hand, consumers were to see the iWatch among other mp3 players, and the mp3 player category
framed the relative comparison, many of the mp3 features would be seen as common and many of the wristwatch features would be seen as distinctive.

Distinctive features can be either alignable or nonalignable with a category referent. *Alignable differences* are the features of a target item that correspond with the features from the referent. Conversely, *nonalignable differences* are the features of a target item that do not correspond with the features from the referent (Markman & Gentner, 1993). As Zhang and Markman (2001) noted, a nonalignable difference constitutes “a feature mentioned in one option but not in the other (e.g., missing information about features) or as a feature uniquely associated with only one of the options (e.g., unique features)” (p. 14). For most hybrid products, it is the unique features from the supplementary category that are nonalignable.

Consider, for example, if the iWatch was placed among mp3 players, an alignable difference might be that it has 8GBs of available memory (a distinctive mp3 feature), whereas a nonalignable difference might be its kinetic windup capability (a distinctive wristwatch feature). Indeed, other mp3 players will have some type of memory storage, but maybe not 8GBs. However, other mp3 players will not have kinetic timekeeping, because they tend not to have wristwatch functionality. If, however, the iWatch was placed among wristwatches, the two features would be flipped, such that 8GBs of memory would be nonalignable (wristwatches tend not to have memory storage for mp3s) and kinetic timekeeping would be alignable (wristwatches operate on some sort of system, be it battery operated, hand-wound, or the like).

The idea that the comparison process will alter attribute preference fits with predictions of the *structural alignment approach to comparison*, which argues that in a choice scenario, peoples’ attention tends to be drawn to the base referent, granting its features particular weight (Markman & Lowenstein, 2010). This suggests that alignable differences should attract greater
attention because they are related to commonalities between items, whereas nonalignable differences should get less attention (Markman & Lowenstein, 2010). This effect has proven robust across a variety of factors, including judgments of similarity (Markman & Gentner, 1993), memory (Gentner & Gunn, 2001; Gentner & Markman, 1994), and most relevant to this discussion, preference (Kivetz & Simonson, 2000). Hence, if consumers see the iWatch among other wristwatches, the structural alignment model predicts they will have greater preference for a comparatively superior wristwatch attribute than a superior mp3 player attribute, with the converse being true if consumers see the iWatch among mp3 players. Although plausible, there is reason to question this prediction when it comes to new hybrid products.

*When Consumers Prefer Nonalignable Differences*

As Markman and Lowenstein (2010) point out, there are some important circumstances when nonalignable differences are favored over alignable differences. One of the more relevant examples comes from the literature of add-on extensions (e.g., adding an external hard-drive to an existing computer platform). Bertini, Ofek, and Ariely (2009) found that alignable add-ons tend to decrease consumers’ evaluations of a base product because these attributes indicate that the product could have been better in the first place. Conversely, positive nonalignable add-ons tend to increase consumers’ evaluations of the base product because these add-ons indicate positive latent functionality.

Like an add-on, which is an extra feature, benefit, or device that one can purchase in addition to the target product, a hybrid product offers additional benefits and features that are not traditionally associated with a single base referent. However, unlike with add-ons, the additional
features and benefits of a hybrid product are combined during product development, and as such, the base referent is often not clear once the product hits the market (Moreau et al. 2001b). This initial ambiguity is believed to result in category uncertainty (Gregan-Paxton et al., 2005; Noseworthy & Goode, 2011). The single category belief problem is believed to manifest when people use heuristics to overcome this uncertainty (Murphy & Ross, 1994; 1999; 2010).

To date, researchers exploring product ambiguity have consistently claimed that consumers will prefer attributes that align with single category beliefs over attributes from the product’s supplementary category (i.e., nonalignable attributes). In essence, the dominant prediction in the literature on product ambiguity is that category inferences correspond with alignable preference (Noseworthy & Goode, 2011; Rajagopal & Burnkrant, 2009). Yet, how do we reconcile this prediction with evidence from the literature on add-on extensions?

Arguably, the fundamental difference between a hybrid product and a nonalignable add-on is that the base referent is ambiguous in the former, whereas it is set in the latter. The finding in the literature on add-on extensions is that nonalignable attributes enhance the referent’s utility (Bertini et al., 2009). Hence, if the competitive context can set the base referent and override the singularity heuristic, it seems plausible that we may be able to shift consumers’ preference towards nonalignable attributes. This suggests that consumers would prefer a superior mp3 attribute more when the iWatch is seen among a wristwatch display rather than among an mp3 player display, but prefer a superior wristwatch attribute more when the iWatch is seen among an mp3 player display rather than among a wristwatch display. If so, this would not only imply that category inferences need not translate into alignable preference, but it would also imply that many so-called ambiguous products may not be that ambiguous in their normative context.
In making this prediction, it is important to establish why the competitive context should override the singularity heuristic. We believe the answer to this rests in the nature of hybrid products. Most hybrid products have conceptual cues (what the product is labeled as or how it functions) that are incongruent with the product’s perceptual cues (what the product looks like; Gregan-Paxton et al., 2005; Noseworthy & Goode, 2011). Researchers have shown that consumers will actively contrast incongruent products against the competitive context in an effort to classify the product; this has been shown to be a rather involved process that tends to focus peoples’ attention on what makes the product different or unique (Noseworthy et al., 2011). This finding fits with evidence that increased involvement can cause consumers to use nonalignable differences (as opposed to alignable differences) to assess brand superiority (Zhang & Markman, 2001). If single category beliefs result from an adaptive heuristic (Murphy & Ross, 1994; 1999; 2010), then putting people in a situation where they actively contrast the product in an effort to make sense of it should render the heuristic useless. Importantly, if we are correct, this will only occur when the competitive context sets the base referent. When the hybrid product is removed from the competitive context, consumers should resort to using common heuristics, and thus consistent with the single category belief problem, they should focus only on alignable attributes. The following studies were designed to test this prediction.

**Study 1**

As mentioned previously, one of the more favored heuristics in the literature on new hybrid products is that consumers make single category inferences in accordance with the product’s physical appearance (i.e., what the product looks like; Gregan-Paxton et al., 2005). We
prefer to this as *perceptual primacy*. The problem with perceptual primacy is that it tends to coincide with the practice of asking participants to classify new products in isolation from other products. Yet rarely do consumers see products in isolation from other products of contextual media, be it other ads, commercials, in-store displays, or the like. Hence, study 1 was designed to explore the prediction that the competitive context will alter single category beliefs above and beyond perceptual primacy, and in doing so, set the foundation to test whether single category beliefs manifest in attribute preference.

*Method*

*Participants and Design.* Undergraduate students (*N* = 60; 45% female) participated in this study in exchange for course credit. The product chosen was Vusix’s new mp3-sunglasses hybrid, which looks like a pair of sunglasses, but possesses features from both mp3 and sunglasses categories. The Vusix was chosen following a pre-test (*n* = 25) that revealed the Vusix brand was not significantly associated with either of its two categories (sunglasses or mp3 players; *F* < 1). This allowed us to test our initial proposition while avoiding any issues relating to brand associations informing category membership. In support of perceptual primacy, the pretest also confirmed that when seeing the Vusix in isolation, 77% of participants categorized it as a pair of sunglasses, 17% categorized it as an mp3 player, and 6% remained undecided.

*Operationalization of Advertising Context.* Researchers have argued that comparisons can guide choice even if people are only presented a single item at a time, because people can compare a current item to items learned previously (Markman & Lowenstein, 2010). Hence,
comparisons should manifest across competing advertisements. Advertising context was manipulated by altering the type of ads that appeared in an excerpt from a magazine (Malaviya et al., 1996). The ads chosen were currently in circulation. The only alteration was to photo-edit additional claims onto the ads to standardize the level of attribute information.

Researchers have shown that a context of several competing advertisements (e.g., an ad for soft drinks alongside ads for other soft drinks) encourages what is referred to as relational elaboration, which emphasizes shared comparisons among the products and focuses the consumer on the product category (Malaviya et al., 1996). Conversely, several unrelated advertisements (e.g., an ad for a soft drink alongside ads for a bike, a cello, and a food processor) encourage item-specific elaboration, which emphasizes feature information of the products in isolation from other products (Malaviya et al., 1996). A pretest was conducted to confirm this elaboration dichotomy using the two categories that make up the Vusix hybrid.

Participants ($n = 57$) were shown an advertisement for the Vusix in either a context of three other mp3 player ads, three other sunglasses ads, or an unrelated ad context (a bike, a cello, and a food processor). Participants were then asked to list their thoughts about the Vusix. Participants’ thoughts were coded by two judges who were unaware of the research hypotheses (intercoder reliability = .91). The judges were instructed to rate thoughts that relate specifically to the target product as item specific (e.g., “The Vusix has good UV protection”), and thoughts that relate to the product category (e.g., “Everyone needs a pair of sunglasses in the summer”) or usage (e.g., “mp3 players allow you to keep your music with you at all times”) as relational. An elaboration index was constructed by taking the difference between the number of item-specific thoughts and relational thoughts, divided by total number of thoughts (Malaviya et al., 1996).
Zero indicates an equal number of item-specific and relational thoughts, a positive number indicates more item-specific thoughts, and a negative number indicates more relational thoughts.

Overall, there was a main effect of advertising context, $F(2, 54) = 6.89, p < .005$. Pairwise comparisons revealed that participants engaged in more relational elaboration when the Vusix was promoted alongside competing mp3 players ($M = -.11$) and more item-specific elaboration when the Vusix was promoted alongside unrelated products ($M = .07$; Tukey’s HSD, $p < .01$). Similarly, participants engaged in more relational elaboration when the Vusix was promoted alongside competing sunglasses than alongside unrelated products ($M_{\text{Sunglasses}} = -.16$ vs. $M_{\text{Unrelated}} = .07$; $p < .005$). There were no differences in elaboration between the mp3 and sunglasses contexts ($p > .40$). Given that relational elaboration focuses consumers on the product category, it was predicted that multiple mp3 player ads versus multiple sunglasses ads would differently activate which category frames the single category belief for the Vusix.

**Procedures and Dependent Measures.** Participants were randomly assigned to view the Vusix in either a sunglasses ad context or an mp3 ad context (see Appendix B). Participants were instructed to review an excerpt from a magazine that consists of editorial content and advertisements, and once completed, they were to respond to a questionnaire. Consistent with prior work, four ads were randomly presented along with editorial material in the form of an eight-page booklet (Malaviya et al., 1996).

After viewing the booklet, participants were randomly assigned to either respond to two inference measures, followed by a classification task, or respond to the classification task followed by the inferencing measures (posttest analyses revealed no effect of order; $ps > .35$). The inferencing measures ($1 = \text{extremely poor}; 9 = \text{extremely good}$) separately captured
participants’ estimated sunglasses functionality and estimated mp3 functionality (Gregan-Paxton et al., 2005). For the classification task, participants were given the layout of a hypothetical department store with several departments, including computers and computer accessories, clothing, sunglasses and jewelry, televisions and DVD players, cell phones and mp3 players, and kitchen appliances (Moreau et al., 2001b). Participants were asked, “If you were shopping for the Vusix in the store shown below, where is the FIRST place in the store you would go to find it?” The department selected represented participants’ categorization of the device (coded: 0 = sunglasses; 1 = mp3 players; no other locations were selected). The exercise concluded by asking participants to recall as many ad claims as they can remember. This was done to test whether participants were engaging in relational elaboration to compare the target product.

Results and Discussion

Manipulation Check—Advertising Context. Researchers have shown that the clustering of similar ad claims during ad recall is indication that participants are using relational comparisons (Noseworthy et al., 2011). Two unaffiliated coders (intercoder reliability = .88) assessed the number of similar ad claims recalled in successive order for each set of advertisements. Clustering was assessed using an Adjusted Ratio of Clustering (ARC; Roenker, Thompson, & Brown, 1971). An ARC score represents the proportion of actual category repetitions above chance to the total possible category repetitions. ARC scores were calculated such that chance clustering was set to 0 and perfect clustering was set to 1. There was no difference in ad clustering between the mp3 ad context and the sunglasses ad context ($M_{\text{Mp3}} = .54$ vs. $M_{\text{Sunglasses}} = .52; F < 1$). However, both the mp3 ad context and sunglasses ad context had significantly
greater clustering than chance, $t(29) = 14.50, p < .001$ and $t(29) = 10.63, p < .001$, respectively. Hence, the ad context manipulations encouraged relational comparisons as expected.

**Single Category Beliefs.** A binary logistic regression on store layout ($0 = \text{sunglasses}; 1 = \text{mp3 players}$) revealed that participants exposed to the mp3 ad context rather than the sunglasses ad context were about five times more likely to use the store layout to identify the Vusix as an mp3 player rather than a pair of sunglasses, $B = 1.66, SE = .58, p < .01$, OR = 5.23. A functional index was then calculated by subtracting participants’ estimated sunglasses functionality from their estimated mp3 player functionality, divided by the sum of the two. A positive number indicates superior mp3 player functionality, a negative number indicates superior sunglasses functionality, and zero indicates the device was perceived as equivalent in both. The single category belief problem predicts that classification judgments will correlate with functional expectations. In line with this prediction, the correlation between classification and the functional index was positive and significant, $r = .38, p < .005$. The classification and inference results illustrate that the comparison process will dictate the single category referent above and beyond perceptual primacy. Category judgments only favored perceptual primacy when the competitive context reinforced the product’s physical appearance.

The results of study 1 support the prediction that the competitive context informs single category beliefs. Prior work has established that perceptual primacy drives functional inferences. However, prior studies have predominantly focused on new hybrid products in isolation from other products. In isolation, there really is nothing else other than the product’s physical appearance. This study extends prior work by demonstrating that single category beliefs are sensitive to contextual comparisons. Given that single category beliefs can be established by
relative comparison, and given that attribute preference is relative, there is now the question of whether single category inferences naturally manifest in preference for primary or supplementary attributes within a competitive context. Furthermore, although study 1 confirmed that the competitive context encouraged relational elaboration, we have yet to confirm whether a contrast effect is underlying the comparisons. Study 2 was designed to answer both of these questions.

**Study 2**

One of the major difficulties when exploring single category beliefs is that participants are often asked to categorize the new hybrid product. Hence, the practice forces a commitment that favors the proposition (Hayes & Newell, 2009). Indeed, it would be difficult to observe multiple category beliefs in a scenario where you are asked to commit to just one. One way to get around this is through a *Discrete Choice Experiment* (DCE). DCE is widely accepted as a stable method for preference elicitation because the point to DCE is not to infer what a product is, but to estimate preference based on what features it offers (Louviere, Hensher, & Swait, 2000). A decisive benefit of DCE is the ability to identify which attributes consumers perceive as determinant and which attributes consumers perceive as non-determinant (Scholz et al., 2010). This makes DCE quite optimal for exploring new hybrid products because it allows for the co-occurrence of multiple categories. Hence, DCE is one of the few techniques that allow one to test what happens when superior alignable and nonalignable attributes co-occur.

*Method*
**Participants and Design.** Participants ($N = 141; 47\%$ females) were recruited through newspaper advertisements and public posters, and paid $10 for participating in the study. Given the goal of this research is to offer greater clarity and realism, it was important to account for hybrid products with strong brand associations. The target product chosen for this study was Apple’s new iWatch (a wristwatch-mp3 hybrid that looks like a wristwatch, but possesses features from both mp3 player and wristwatch categories). Not surprising, a pretest ($n = 26$) revealed that participants associated the Apple brand more strongly with mp3 players ($M = 5.53$) than wristwatches ($M = 3.38$), $F(1, 24) = 34.85, p < .001$. The choice task was nested within the ad context manipulation, resulting in a $3 \times 2^7$ (choice task: seven attributes with two levels each) mixed design. Unlike study 1, the unrelated condition was included in the analysis. This not only served to offer a control condition for comparative purposes, but it also lent confidence that any observed changes in attribute preference were the result of the context manipulation, and not the method. Given recent evidence that associative heuristics can override perceptual primacy (Noseworthy & Goode, 2011), it was predicted that participants would favor brand association and thus classify the iWatch as an mp3 player rather than a wristwatch in the control.

**Procedures and Dependent Measures.** Like study 1, participants were randomly assigned to one of the three ad context conditions (mp3 ad context vs. wristwatch ad context vs. unrelated ad context; see Appendix C). In the mp3 ad context, participants viewed an ad for the target iWatch in a magazine excerpt that featured three other mp3 advertisements along with editorial content. In the wristwatch context, participants viewed the iWatch in the same excerpt but it now featured three other wristwatch advertisements. Finally, in the unrelated ad context, participants
viewed the iWatch in the same excerpt but with three ads that did not correspond to either of its two hybrid categories (ads featuring a backpack, orange juice, and a vacuum cleaner).

The procedures and dependent measures were consistent with study 1, with the addition of the choice task. The only alteration was to replace the ad recall task with a thought listing task (used in the study 1 pretest). This allowed us to clarify whether the underlying mechanism is a contrast effect. Researchers have recently made the empirical distinction between two sub-types of relational processing: (1) similarity-focused relational elaboration (identifying commonalities among objects) and (2) dissimilarity-focused relational elaboration (contrasting disparities between objects; Kim & Meyers-Levy, 2008; Noseworthy et al., 2011). Hence, in addition to coding for item-specific and relational thoughts, two judges coded whether respondents were dissimilarity-focused (e.g., “The iWatch can hold 8GBs of mp3s but the other wristwatches can’t”) or similarity-focused (e.g., “All of the wristwatches were analogue”). As in study 1, the ads chosen were real advertisements that were in current circulation. The only manipulation was to photo-edit additional claims on the ads to standardize the level of attribute information.

Estimating the Choice Model. A pre-test was conducted ($n = 40$) to determine the attributes that best represent the wristwatch and mp3 categories. Participants were asked to compare groups of attributes (collected from the internet) and to indicate which attribute is most important and which one is least important. The technique, referred to as best-worst scaling (Finn & Louviere, 1992), involves calculating the number of times each attribute is rated as most important and subtracting it from the number of times the same attribute is rated least important. The combined results lend insight into the relative importance of each attribute. The top three wristwatch attributes (water resistance, power type, and timekeeping) and the top three mp3
attributes (internal memory, battery life, and playlist functions), along with price, were subsequently chosen to frame the seven features varied in the DCE. Once the features were selected, two attribute levels (e.g., battery life: 14hrs vs. 18hrs) were adopted from the most common variations in current production (taken from retail websites such as www.bestbuy.com). For the detailed description of the attributes and their respective levels, see Table 1.

To generate the discrete choice design, we followed the procedures laid out by Green (1974). First, we generated 16 choice options from the 2^7 attribute combinations using an orthogonal main effect plan (OMEP). We then used a balanced incomplete block design (BIBD) to put the 16 choice combinations into 20 choice sets. In each choice set, participants were asked to consider four different iWatch concepts under the guise that Apple is currently testing various versions prior to release. This allowed us to hold brand and aesthetic appearance constant, and thus get at a true estimate of attribute preference. Hence, the choice context was incidental in that participants were not required to choose among the products seen in the editorial. This allowed us to test whether the mere exposure to surrounding ads altered attribute preferences. The order of the 20 choice sets was established through a Latin square design. For each of the 20 scenarios, respondents were simply asked to indicate, “Which of the iWatch models would you be most likely to choose?” We excluded the no-choice option to engage participants in more thoughtful decision making and to alleviate any identification issues that may occur if a high proportion of participants exercise not to choose (Park, Ding, & Rao, 2008; but see Dhar & Simonson, 2003).
Results and Discussion

Single Category Beliefs. Participants’ either categorized the iWatch as a wristwatch or as an mp3 player. As expected, 39 of the 47 participants (83%) who saw the iWatch in the mp3 ad context categorized it as an mp3 player, whereas only 12 of the 47 participants (25%) who saw the iWatch in the wristwatch ad context categorized it as an mp3 player, $\chi^2(1) = 34.50, p < .001$, $\phi = .49$. Of course, the inverse suggests that participants were more likely to categorize the iWatch as a wristwatch in the wristwatch ad context than in the mp3 ad context (75% vs. 17%). Consistent with the prediction that people would use the brand to reduce category uncertainty in the unrelated (control) condition, 32 of the 47 participants (68%) categorized the Apple iWatch as an mp3 player. Importantly, this did not differ from the mp3 ad context condition ($p = .16$), but did differ from the wristwatch ad context condition, $\chi^2(1) = 17.09, p < .001$, $\phi = .42$. Consistent with study 1, the correlation between participants’ classification judgments and the functional index was positive and significant, $r = .44, p < .001$. Hence, once again, participants adjusted their functional expectations in accordance with their classification judgments.

Type of Elaborative Processing. Two unaffiliated coders (intercoder reliability = .81) classified participants’ thoughts as either item-specific or relational, and if relational, they further classified the thoughts as either dissimilarity-focused or similarity-focused. Overall, there was a main effect of advertising context on type of elaborative processing, $F(2, 138) = 12.77, p < .001$. Participants engaged in more relational elaboration when the iWatch was promoted alongside competing wristwatches ($M = -.10$) and more item-specific elaboration when the iWatch was promoted alongside unrelated products ($M = .12$; Tukey’s HSD, $p < .001$). Similarly, participants
engaged in more relational elaboration when the iWatch was promoted alongside competing mp3 players than alongside unrelated products ($M_{Mp3} = -.05$ vs. $M_{Unrelated} = .12$; $p < .005$). There was no difference in elaboration between the mp3 and wristwatch ad contexts ($p > .30$).

When relational elaboration was subdivided into dissimilarity-focused and similarity-focused thoughts, the results confirmed that 81% of relational thoughts were dissimilarity-focused in nature. In fact, when dissimilarity-focused thoughts about supplementary attributes were removed from the cumulative count of relational elaboration, the influence of context on type of elaborative processing fell to non-significance ($p > .50$). These findings not only confirm that the competing ad context encouraged relational comparisons whereas the unrelated ad context did not, but more importantly, they confirm that the competing context caused people to focus on what makes the product unique (i.e., supplementary features).

**Shift in Attribute Preference.** Attribute preference coefficients for this study (and study 3) were estimated using the Generalized Multinomial Logit Model (G-MNL; see Appendix A for a discussion on choice models, as well as Fiebig et al., 2010). In the G-MNL, the utility to person $n$ from choosing alternative $j$ on the purchase occasion (or in the choice scenario) $t$ is given by,

$$U_{njt} = [\sigma_n \beta + \gamma \eta_n + (1 - \gamma)\sigma_n \eta_n] x_{njt} + \epsilon_{njt}$$

Where $\gamma$ is a parameter between 0 and 1, $\sigma_n$ is the random variable that captures scale heterogeneity, $\eta_n$ is the random variable that captures taste heterogeneity, $x_{njt}$ is a vector of observed attributes of alternative j, $\beta$ is a vector of utility weights (homogenous across

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1 Taste heterogeneity (or preference heterogeneity) is the unobserved individual differences in preferences, whereas scale heterogeneity is the variance of the unobserved component (or variation in choice outcomes) that is not explained by the systematic component or taste heterogeneity.
consumers), and $\varepsilon_{njt}$—referred to as the independent identical distributed (iid) extreme value—is the “idiosyncratic” error. G-MNL nests the multinomial logit model (MNL), the taste heterogeneity model (MIXL), the scale heterogeneity model (S-MNL), and two versions of G-MNL (GMNL-I and GMNL-II) by the parameter $\gamma$. In order to impose the restriction that $\gamma$ must lie between 0 and 1, Fiebig et al. (2010) use a logistic transform, $\gamma = \exp(\gamma^*)/[1 + \exp(\gamma^*)]$, and estimate the parameter $\gamma^*$. The parameter $\gamma$ governs how the variance of residual taste heterogeneity varies with scale heterogeneity in a model that includes both. The scale heterogeneity parameter $\sigma_n$ is positive, as it represents the consumer’s specific standard deviation of the idiosyncratic error. It is operationalized as a log normal distribution with mean 1 and standard deviation $\tau$, or LN(1, $\tau^2$). Thus, $\tau$ is the key parameter that indicates if scale heterogeneity is present in the data. By accounting for both preference (taste) and scale heterogeneity, the G-MNL offers the most optimal estimates for attribute preferences.

Before examining the effect of the advertising context on attribute preference, we used a likelihood-ratio test (LRT) to check whether the preference coefficients varied by the competitive context. Specifically, the LRT explores whether the mp3 ad context, the wristwatch ad context, and unrelated ad context share the same population parameters (i.e., whether the three contexts led to relatively consistent preferences). We compared the log likelihoods of the pooled model, Log $L = -3172.34$, param. = 16, with the separate coefficient estimates of the three ad contexts, Log $L = -3105.05$, param. = 44.\(^2\) The results revealed significant differences in perceived utility across the three ad contexts, LRT(28) = 134.58, $p < .005$. The results of the G-MNL estimates along with model fit for the various nested models are summarized in Table 2.

\(^2\) We simultaneously estimated the data from the three context conditions by stacking the design matrix (i.e. attributes) in block diagonal where off diagonal elements are zero. In this way, differences in both taste and scale heterogeneity across the three contexts were accounted for in the G-MNL. The authors thank Dr. Nada Wasi for providing access to the MATLAB program used to estimate the G-MNL model in Fiebig et al., 2010.
The model fit measures (Log Likelihood, AIC and BIC) all favor the G-MNL over its nested counterparts of MNL, S-MNL, and MIXL. The preference estimates for the superior attributes (including price) have the expected signs and most are significant. The significant scale parameter, $\tau = .98; t = 8.07$, and significant standard deviation estimates ($\eta$) imply there is a substantial amount of scale and taste heterogeneity in the data. The direction of $\gamma^*$ estimates (i.e. -.61) indicates the variance of taste heterogeneity varies with scale. Hence, we went forward to test our core predictions.

We used the Wald statistic to test whether the shift in preference for the combined attributes was statistically different from zero. Given that the iWatch possesses six functional attributes, three from the mp3 category and three from the wristwatch category, the key theoretical contrasts were to explore the combined preference for the mp3 attributes and the combined preference for the wristwatch attributes across the three ad contexts. Consider, for example, the key restriction coefficient for the mp3 attributes, $R(1 1 1 -1 -1 -1)$. The three 1s are for the combined preference of the mp3 attributes in the wristwatch ad context, and the three -1s are for the combined preference of the mp3 attributes in the unrelated ad context (i.e., the control). The null hypothesis is simply, $R\hat{\beta} = 0$.

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3 The Wald statistic was calculated as follows: $W = (R\hat{\beta} - r)'[R VCOV(\hat{\beta}) R']^{-1}(R\hat{\beta} - r) - \chi^2_q$. Where $R$ is a $q \times k$ matrix of restrictions, $q$ is the number of restrictions (here $q = 1$), $k$ is the number of parameters in the restriction, $VCOV$ is variance-covariance matrix of $\hat{\beta}$-hat, and $r$ in our case is 0.
The results revealed the combined preference for the mp3 attributes was highest when the iWatch was seen in the wristwatch ad context relative to the unrelated ad context, $R|\hat{\beta}| = .59; W = 5.65, p < .05$, or the mp3 ad context, $R|\hat{\beta}| = .70; W = 6.97, p < .01$. Conversely, the combined preference for the wristwatch attributes was highest when the iWatch was seen in the mp3 ad context relative to the unrelated ad context, $R|\hat{\beta}| = .61; W = 6.24, p < .05$, or the wristwatch ad context, $R|\hat{\beta}| = .51; W = 5.15, p < .05$. These findings confirm that as long as there is a means of relative comparison, consumers will prefer superior attributes more when they were supplementary than when they aligned with the primary category referent. As predicted, however, this only occurred when the competitive context established the base referent. In the unrelated (control) condition, the majority of people predictably used the brand association to infer the iWatch was an mp3 player (68%), and consequently, they reported greater preference for the primary (alignable) mp3 attributes than the supplementary (nonalignable) wristwatch attributes, $R|\hat{\beta}| = .66; W = 7.51, p < .01$. Hence, only in the absence of a contextual cue did this study support the notion that single category inferences lead to alignable preference. The objective of study 3 was to test the robustness of this effect.

**Study 3**

Up to this point, we have taken care to use real hybrid products in the context of real advertisements. Of course, it is common for magazines such as GQ or Fortune to feature multiple ads for competing products—sometimes back-to-back. Yet, this is not the only type of context consumers see, and it may not be the most dominant. One of the most salient contexts is the in-
store display. Given that comparisons can be generated from memory (Markman & Lowenstein, 2010), attribute preference should not require an explicit listing of comparative attributes, but require only the knowledge of a normative standard for the comparison category. Indeed, consumers have preconceived expectations for the features of well-known product concepts, and given the purpose of new hybrid products is to consolidate existing categories, these general expectations should persist. Hence, the question is: Does it matter where hybrid products are placed in a store? The goal of study 3 was to answer this question, and in doing so, account for one of the strongest category cues: the product label (Moreau et al., 2001b).

Method

Participants and Design. Participants \((N = 132; 39\% \text{ females})\) were recruited through mall intercept, and paid $10 for participating. Each participant was randomly assigned to one of three in-store context conditions (cellular display vs. headphone display vs. ambiguous display). The target product chosen was LG’s new Hifi concept (a headphone/cell phone hybrid). The LG Hifi was selected because it has the unique capability of morphing to represent the physical form of either a headphone or a cellular phone. This allowed us to depict the LG as a hybrid product without explicitly stating it was a hybrid or listing hybrid attributes on the packaging. Hence, we could examine the influence of a category label while controlling for other confounding cues.

Participants were randomly assigned research booklets. Each booklet contained a photograph of one of the three in-store displays, purportedly taken from somewhere in the mall (a guise), and a depiction of the packaging for the LG Hifi appeared on the adjacent page. The
LG was introduced as “the next innovation in Cell Phones.” Participants were asked to imagine approaching the particular display (on the left page) and seeing the new LG Hifi (on the right page). Nothing else varied across the conditions (see Appendix D).

Once participants viewed the product and contextual photos, they then transitioned to the discrete choice task followed by the questionnaire. A pre-test was conducted ($n = 50$) to determine the attributes to be used in the discrete choice task to represent the headphone and cell phone categories. Like study 2, best-worst scaling was employed to generate the most important product attributes for both product categories. The top three headphone attributes (sound quality, noise cancelling ability, and surrounding sound) and the top three cell phone attributes (camera resolution, network capability, and display type), along with price, framed the seven features to be varied in the DCE. Once the features were selected, two attribute levels (e.g., camera resolution: 6mp vs. 10mp) were chosen from the most common variations in current production (again taken from websites like www.bestbuy.com; see Table 3).

Insert table 3 about here

The choice model estimation and the dependent measures were consistent with study 2 with the exception that the store-layout classification task was replaced with similarity judgments ($1 = \text{not at all similar}; 9 = \text{extremely similar}$), which separately measured how closely participants perceived the LG Hifi fit the cell phone and headphone concepts. This was done

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4 The cellular label was reported because the cellular depiction of the Hifi was not as intuitive as the headphone depiction (see Appendix D). Nevertheless, all effects replicated when the LG Hifi was labelled a Headphone. Hence, the label reinforced the LG Hifi was hybrid while testing for the labeling effect.
because the in-store context (i.e., the photographs) could have potentially confounded the in-store classification task. Everything else remained consistent with study 2.

Results and Discussion

Single Category Beliefs. Overall, there was a main effect of context on participants’ judgments of cellphone similarity, $F(2, 129) = 12.92, p < .001$, and headphone similarity, $F(2, 129) = 18.08, p < .001$. Pairwise comparisons revealed that participants’ perceptions of cellphone similarity did not differ between the cellular display ($M = 6.07$) and the ambiguous display ($M = 5.87$; Tukey’s HSD, $p > .70$). However, participants believed the LG Hifi was more similar to the cellular concept when seen alongside the cellular display than the headphone display ($M_{\text{Cellular}} = 6.07$ vs. $M_{\text{Headphone}} = 4.52; p < .001$). Similarly, participants’ perceptions of headphone similarity did not differ between the cellular display ($M = 3.16$) and the ambiguous display ($M = 3.59$; Tukey’s HSD, $p > .80$). However, participants believed the LG Hifi was more similar to the headphone concept when seen alongside a headphone display rather than the cellular display ($M_{\text{Headphone}} = 5.16$ vs. $M_{\text{Cellular}} = 3.16; p < .001$). As expected, when participants’ similarity judgments were indexed, such the headphone similarity was subtracted from cellphone similarity and then divided by the sum of the two, the correlation between the resulting similarity index and functional index was positive and significant, $r = .22, p < .01$.

Type of Elaborative Processing. Participants’ thoughts were coded by two unaffiliated judges (intercoder reliability = .87). Overall, there was a main effect of advertising context on type of elaborative processing, $F(2, 129) = 21.10, p < .001$. The cellular display led to more
Preference for supplementary hybrid attributes

Relational elaboration ($M = -0.14$) and the ambiguous display led to more item-specific elaboration ($M = 0.08$; Tukey’s HSD, $p < .001$). Likewise, the headphone display also led to more relational elaboration ($M_{\text{Headphone}} = -0.07$ vs. $M_{\text{Ambiguous}} = 0.08$; $p < .005$). The cellular and headphone display conditions did not significantly differ ($p > .20$; though directionally favoring the cellular display, which would support the strength of the labeling effect). When relational elaboration was subdivided into dissimilarity-focused and similarity-focused thoughts, the results confirmed that 71% of relational thoughts were dissimilarity-focused in nature. Again, when dissimilarity-focused thoughts were removed from the cumulative count of relational elaboration, the influence of context on type of elaborative processing fell to non-significance ($p > .40$).

Shift in Attribute Preference. As in study 2, we compared the log likelihoods of the pooled model, $\text{Log L} = -2383.20$, param. = 16, with the separate coefficient estimates from the three display conditions, $\text{Log L} = -2274.14$, param. = 44. The results revealed significant difference in perceived utility across the three displays, LRT(28) = 218.12, $p < .001$. The results of G-MNL estimates along with the model fit for the various nested models are summarized in Table 4. As expected, the model fit criteria supported the G-MNL over the other nested versions.

As expected, the preference structures between the three in-store display conditions differed. The combined preference for the cellphone attributes was highest, when the LG Hifi was seen alongside a headphone display relative to the ambiguous display, $R|\hat{\beta}| = .90$; $W = 3.37$, ...
Preference for supplementary hybrid attributes

$p = .07$, or the cellular display, $R|\hat{P}| = 1.03; W = 5.08, p < .05$. Conversely, the combined preference for the headphone attributes was highest when the LG Hifi was seen alongside a cellphone display relative to the ambiguous display, $R|\hat{P}| = 2.26; W = 20.83, p < .005$, or the headphone display, $R|\hat{P}| = 1.69; W = 12.85, p < .01$. The effect once again did not manifest in the ambiguous (control) condition. People predictably used the product’s label to infer that the LG Hifi was more similar to a cellphone ($M = 5.87$) than a pair of headphones ($M = 3.59, p < .001$), and consequently, they reported greater preference for the product’s primary (alignable) cellular attributes, $R|\hat{P}| = 1.79; W = 17.61, p < .001$. Taken as a whole, the results of study 3 were remarkably consistent with the ad context effects observed in study 2, and were so despite that the competitive context did not explicitly list product attributes.

**General Discussion**

By accounting for the competitive context, this research offers a much-needed prediction for when and why certain categories tend to dominate consumer inferences for new hybrid products. Moreover, this research is the first to demonstrate that context transcends even the most prevalent single category heuristics: *perceptual identity* (study 1; Gregan-Paxton et al., 2005), *dominant associations* (study 2; Noseworthy & Goode, 2011), and *category label* (study 3; Moreau et al., 2001b). What is particularly important is why this occurs.

As predicted, consumers tend to actively contrast new hybrid products against the competitive context to establish a base referent. Consistent with the literature on add-on

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5 When the Hifi was labelled as a pair of headphones, participants predictably used the product’s label to infer it was more similar to a pair of headphones ($M = 6.04$) than a cellular phone ($M = 3.66, p < .001$), and consequently, they reported greater preference for the product’s primary (alignable) headphone attributes, $W = 22.01, p < .001$. 

extensions, we find that once the base referent is set, consumers refrain from using common heuristics, and thus they see more utility in the product’s supplementary (nonalignable) attributes (Bertini et al., 2009). However, consistent with the single category belief problem (Rajagopal & Burnkrant, 2009), we find that when consumers do resort to common heuristics, they are quite efficient at categorizing the product, and thus they see more utility in the product’s primary (alignable) attributes. Hence, whether single category beliefs will lead people to ignore attributes from a product’s supplementary category depends to a large extend on the external context.

Given that our design allowed us to test when the competitive context predicted the same category as the heuristic, we were able to definitively illustrate that category inferences need not translate directly into attribute preference. Moreover, given that people did not see competitive advertisements in study 3, the ability of the competitive context to augment nonalignable preference was not contingent on a listing of comparable attributes. Furthermore, the design was such that the exact same attribute was either alignable or nonalignable depending on the contextual condition. Hence, the observed differences in preference could not be due to the characteristics of the attributes themselves.

In line with the above, an additional takeaway from this study was that the context effects were incidental. Prior work has focused primarily on the choice composition as a means of eliciting context effects (Dhar et al., 2000). Researchers have yet to consider the external context, where choice is embedded. Nowhere in the current studies were people asked to choose the target hybrid from a selection of other products; they merely were asked to choose their most optimal version of the target hybrid from multiple possible versions. Hence, this research encouraged multiple category inferences using an incidental manipulation. Indeed, it would be hard to argue that the effects observed in this study are exceptions, and not the norm. In fact, the
results of this study question the robustness of the single category belief problem in a consumption environment where competition is ever present.

Marketers could benefit from this knowledge by strategically placing a new hybrid product in a comparison context that optimizes attribute preference. In a sense, this evidence qualifies the common intuition that marketers should position a product in accordance with its unique selling proposition. The current research suggests that if a new hybrid product has a superior attribute that fits one category and standard attributes that fit another, marketers may be better off placing the product in a competitive context that activates the standard category, and allow the superior attribute to standout. This is particularly noteworthy given the vast commercial use of conjoint-based techniques. Hence, the results of this study have significant implications from marketers involved in product testing and development. Marketers may want to consider testing new hybrid products in different store contexts prior to release.

Although seeing products in a competitive setting may be the norm, the question for future research may be better framed by asking when the single category belief problem will actually be a problem. With the rise of online retail, it could be that virtual consumers tend to succumb to single category heuristics because there is seldom a competitive context online that rivals physical retail. This would suggest that attribute preference online may be different than in the typical retail outlet. This could be particularly relevant to marketing managers given that in-store and virtual placement is at least somewhat under the marketer’s control.

Finally, from a methodological perspective, we offer the unique approach of embedding conjoint techniques, like DCE, within a broader experimental paradigm. This mixed approach could be used in the future to generate insight into moderators for alignable and nonalignable preference. One of the strengths of DCE is that it allows for superior alignable and nonalignable
preferences to co-occur. By using this technique we answer calls for greater realism and relevance (Reibstein, Day, & Wind, 2009). Specifically, we test emerging theory within the broader context of consumption, and we elicit preference as opposed to relying on self-report inferences. Both of these advancements address recent claims challenging the veracity of single category beliefs (Hayes & Newell, 2009). This is not to suggest that single category beliefs never manifest, but to caution that like many heuristics, they are quite pliable in the real world.
References


