Categorization by Groups

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Abstract	Categorization is a core psychological process central to consumer and managerial decision-making. While a substantial amount of research has been conducted to examine individual categorization behaviors, relatively little is known about the group categorization process. In two experiments, we demonstrate that group categorization differs systematically from that of individuals: groups created a larger number of categories with fewer items in each category. This effect is mediated by groups' larger knowledge base and moderated by groups' ease in achieving consensus. While neither broader nor narrower categories are normatively superior, more integration or distinction among concepts may be desirable for a given objective. Thus, it is important for those relying on the outputs of categorization tasks, such as web site designers, store managers, product development teams, and product marketing managers, to understand and consider the systematic differences between group and individual categorization.
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CATEGORIZATION BY GROUPS

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Categorization is a core psychological process central to consumer and managerial decision-making. While a substantial amount of research has been conducted to examine individual categorization behaviors, relatively little is known about the group categorization process. In two experiments, we demonstrate that group categorization differs systematically from that of individuals: groups created a larger number of categories with fewer items in each category. This effect is mediated by groups' larger knowledge base and moderated by groups' ease in achieving consensus. While neither broader nor narrower categories are normatively superior, more integration or distinction among concepts may be desirable for a given objective. Thus, it is important for those relying on the outputs of categorization tasks, such as web site designers, store managers, product development teams, and product marketing managers, to understand and consider the systematic differences between group and individual categorization.

"Categorization is not a matter to be taken lightly. There is nothing more basic than categorization to our thought, perception, action, and speech" (Lakoff 1987; p. 5).

Categorization is a core psychological process (Lakoff 1987; Mervis and Rosch 1981) that is central to consumer (for a recent review, see Loken 2006) and managerial decision-making (e.g., Porac and Thomas 1990). Consumers' understanding of categorization schemes helps them navigate retail environments and websites. At a more macro level, product market structure represents a social construction based on consensual categorical knowledge between consumers and producers (Rosa et al. 1999) that coordinates transactional relationships (e.g., Day, Shocker, and Srivastava 1979). Categorization shapes consumers' product evaluations (e.g., Meyers-Levy and Tybout 1989; Sujan 1985), particularly for new products (Moreau, Markman and Lehmann 2001). Managers also rely on consumers' categorization of product requirements as an important input into new product development (Griffin and Hauser 1993) and their categorization of new products as an input into product positioning decisions (Cohen and Basu 1987).

In many of the situations described above, categorization may be performed by groups of consumers or managers (e.g., a family searching for an item at big box retailer or a product development team categorizing customer needs for a product) rather than by individual consumers or managers. This requires the integration of potentially diverse beliefs about how constructs are related across group members. While a substantial amount of research has been conducted to examine individuals' categorization behavior, much less is known about how groups categorize constructs. The goal of this paper is to understand whether and how the outputs of group categorization processes differ from the results of individual categorization

processes.

In the next section, we review previous research on categorization as well as research comparing individual and group task performance to make predictions about how group and individual categorization behavior might differ. We then report the results of two studies comparing group and individual categorizations of the same items. We find that groups and individuals systematically generate different category structures. Furthermore, we identify two factors that critically affect these differences: expertise and groups' ease of reaching consensus. We conclude by discussing the theoretical and practical implications of our findings.

COMPARING GROUP AND INDIVIDUAL CATEGORIZATION

While categories may be generally agreed upon when items have similar attributes or features, there are often multiple ways to categorize a set of items, for example, using the taxonomic approach of categorizing an apple with other fruits or using the thematic approach of categorizing it with other things to eat for lunch. Early research in cognitive psychology investigated categorization behavior as a personality trait, suggesting that some people categorize more narrowly than others, regardless of the domain (Gardner 1953). However, subsequent research has shown that categorization behavior is quite malleable and that "small differences in how subjects interact with stimuli can have large effects in how category information is acquired and represented" (Love 2005, p. 197).

Expertise

Expertise within a particular domain has been shown to systematically affect how items are categorized within that domain. While novices tend to categorize at the basic level, experts tend to identify objects at more specific, subordinate levels (Johnson and Mervis 1997). For example, experts are more likely to organize information by product subcategories relative to novices (Cowley and Mitchell 2003).

The use of more specific, subordinate categories affects not only the nature of categories used, but also the number and breadth of categories used. Given their broader knowledge of a domain, experts may use a larger number of dimensions to categorize items. Research with individuals has shown that the larger the number of dimensions used to determine category membership, the more restrictive the criteria for category membership, and the narrower the categories will be on average (Tversky 1977). A recent model of category learning, the SUSTAIN (Supervised and Unsupervised STratified Adaptive Incremental Network) model makes the same prediction (Love, Medin, and Gureckis 2004). This model is based on the notion of competition among category dimensions. Activated category dimensions are competing explanations for each subsequent item to be categorized. The larger the number of category dimensions activated, the higher the *a priori* probability of creating a new category when categorizing novel input (Love et al. 2004, p. 315, formulas 6 and 11).

One area where group and individual performance has been compared is on intellective and judgmental tasks. Intellective tasks have a demonstrably correct solution (e.g., factual or math problems) and groups systematically perform better on these tasks because groups have access to more expertise than individuals (Hinsz 1990). Although categorization might be considered more of a judgmental task, for which there exists no correct answer, it is still clear

that when individuals join together to form a group, the group will have access to a larger pool of knowledge than each individual member.

We propose that groups' greater collective expertise should have an effect similar to that of expertise on individual categorization. Group discussions about combining items should elicit categorization criteria from individual group members. The larger number of activated categorization criteria, in turn, should result in a larger number of categories being created by groups with fewer items in each category.

Consensus

Groups not only have access to a larger knowledge base than individuals on average, but group members may also differ in the categorization schemes they bring to the task. For example, landscapers and landscape architects—both experts—categorize the same trees differently because of their different interests, even though they are categorizing the same physical objects (Medin et al. 1997). Similarly, individual managers have been found to rely on a similar number of categories to describe market conditions but to differ in the nature of these categories, especially in turbulent market environments (Reger and Palmer 1996). Thus, individuals often enter a group with divergent perspectives on the objects being categorized. In fact, in the case of cross-functional teams, groups may be constructed specifically because members offer divergent perspectives.

While individuals working independently can create a category structure based on their own ideas about the similarity between concepts, multiple group members must be convinced of the relationships among concepts in order to create a shared category structure. Therefore, a

group categorization structure is, essentially, the result of individuals coming to consensus about how to integrate their individual mental representations (Carley 1986). Consider a group debating about whether a particular item should be included in a previously defined category. To maintain a category's identity, each item included in the category must be similar to the other items in the category simultaneously. The smaller the number of items in a category, the greater the probability that individual group members agree that the items are similar yet have different beliefs about what draws the items together. Because more assumptions must be made explicit rather than tacit as the group considers adding additional items to a category, we propose that the additional step of coming to consensus in the group context will encourage groups to create a larger number of smaller categories than individuals.

The additional step of coming to consensus may influence both the individual contributions of group members and the manner in which these contributions are combined (Hinsz, Tindale and Vollrath 1997). For example, the decisions of groups tend to be more reliant on easily defendable (noncontroversial) arguments than those of individuals (Irwin and Davis 1995), perhaps because individuals are more likely to offer noncontroversial arguments in a group setting. As another example, moving from a diversity of opinions to consensus can generate conflict among group members, increasing depth of information processing when combining their contributions (Sniezek 1992). Because these effects are predicated on conflict among group members, heterogeneity in group members' beliefs is likely to be a key moderator of differences between group and individual categorization behavior. If integrating individual views is perceived to be difficult, the results of group categorization should differ more from the results of individual categorization. On the other hand, if group members have shared beliefs, integrating individual views should be perceived to be easy and the results of group

categorization should be more similar to the results of individual categorization.

In summary, both greater pooled expertise in groups and the need for integrating individual views suggest that group members working together should generate a larger number of smaller categories than individuals. We tested this prediction in our first study. In our second study, we added measures of expertise and consensus among group members to examine whether expertise mediated and ease of reaching consensus moderated the results.

STUDY 1

Study 1 was designed to test the prediction that, given the same set of items to categorize, individuals will create fewer and larger categories than groups. The experimental task was described to participants as a product development task in which we were trying to understand customer requirements for food containers. It was modeled after the customer sort technique (e.g., the Vocalyst™ method), a categorization task in which customer needs for a product are divided into logically related categories (Griffin and Hauser 1993). This technique is primarily used with individuals but is also used with groups. Notably, the procedure is identical to tests that have been used in cognitive psychology to study individual differences in categorization behavior (Gardner 1953). Thus, the experimental task represents both a test of practical differences organizations might expect to realize and a theoretical test of categorization behavior.

Method

Sixty-one paid undergraduate students at a U.S. university were asked to sort customer needs for food storage containers. Participants were randomly assigned to conditions, with forty-four participants assigned to eleven groups of four participants each and seventeen participants participating individually. Following procedures developed by Griffin (1989; Griffin and Hauser 1993), participants were given instructions for the task and an envelope of cards pre-printed with the customer needs. The 48 customer needs used were a subset of the needs for food storage containers (i.e., picnic baskets) identified by Griffin (1989).

In the individual condition, participants worked by themselves to sort the cards into categories that made sense to them. They were instructed to create as many or as few categories as they felt were necessary. After they had divided the customer needs into categories, they selected an exemplar for each category (the customer need they felt was most representative of the category) and placed it on top of the pile of cards. This step minimizes the tendency to create a miscellaneous pile composed of requirements only related by the fact that they do not relate to other categories (Gardner and Schoen 1962). Participants were allowed to exclude items that they felt did not go with any of the other items. Participants paper clipped each pile of cards together before putting the piles into an envelope.

In the group condition, the process was the same except that the four participants assigned to each group worked together to sort the customer needs. Each group was given only one set of cards. After they had finished sorting the cards, participants in both conditions answered several questions about their satisfaction with the task and with the outcome, and documented the number of minutes they took to complete their sort.

Results

Across the two experimental conditions, there were no differences in participants' familiarity with the product category being evaluated ($p > .70$), their satisfaction with the process ($p > .54$), their satisfaction with the outcome ($p > .86$), or the number of needs they excluded from the categorization task ($p > .60$). While previous research has typically found that groups spend more time on tasks than individuals (Hill 1982), participants did not report spending significantly more time on the task in the group condition ($M = 20.45$ minutes) than in the individual condition ($M = 19.63$), $p > .69$.

We used four measures of category breadth: the number of categories created, the average size of categories, the size of the largest category and the size of the smallest category. A MANOVA showed that social context significantly affected these measures, Wilks' lambda = .67, $F(4, 26) = 2.90$, $p < .05$. As predicted, groups sorted the 48 customer needs into a larger number of different categories ($M = 10.36$) than individuals ($M = 8.35$), $F(1, 26) = 6.99$, $p < .05$, resulting in a smaller average number of customer needs included in each category by groups ($M = 4.49$) than individuals ($M = 5.96$), $F(1, 26) = 7.04$, $p < .05$. Moreover, the average size of the largest group was larger for individuals ($M = 12.0$) than for groups ($M = 8.18$), $F(1, 29) = 11.42$, $p < .005$, and the average size of the smallest group was directionally larger for individuals ($M = 2.76$) than for groups ($M = 2.27$), $p > .28$.

Discussion

Study 1 demonstrates that the group context significantly affects the breadth of categories created, supporting our theoretical predictions. Groups categorized less integratively, creating a

larger number of narrower categories than individuals. Moreover, because the experimental task was modeled after categorization tasks used in product development efforts, these results suggest the importance of taking the group or individual context into account when analyzing the results.

One limitation of this study is that it does not provide insight into the process that leads to these differences. Based on our theoretical framework, these differences should be mediated by the greater knowledge available to groups relative to individuals working alone, and moderated by the ease of reaching consensus among the group members about which items belonged to which categories. In study 2, we examine the categorization process in more detail by measuring expertise and perceived ease of reaching consensus among the group members.

STUDY 2

The goal of study 2 was to replicate the results of study 1 in a different domain and with measures of both expertise and consensus. To obtain greater variance in expertise among participants within the domain of items being categorized, participants categorized movies rather than customer needs in this study. This task is typical of consumer research used to analyze market structure (e.g., Day et al. 1979). Managers might use the results of this categorization task to make brand-extension decisions (e.g., Sujan 1985) or decisions about the layout of their assortments (Morales et al. 2005). More generally, the use of discrete objects instead of customer needs makes the experimental task more similar to the many categorization situations encountered by consumers in the marketplace.

Study 2 allowed an explicit assessment of the influence of expertise and consensus on categorization processes. If groups create a larger number of smaller categories because a larger number of categorization criteria are activated, then expertise should mediate the influence of social context on categorization. On the other hand, if groups categorize differently because of the limits to integration posed by groups' need to achieve consensus, an increase in the ease with which groups achieve consensus should lead groups to create a smaller number of larger categories.

Method

Design and participants. Participants were 211 paid undergraduate and graduate students at a Dutch university who were randomly assigned to work either individually or as part of a three-person group. Sixty-one individuals and 50 groups of three participants completed the categorization task. All participants were fluent in English, the language used in all experimental materials.

Procedure. Upon their arrival to the lab, participants were greeted by an experimenter and assigned to one of the two experimental conditions. The experiment was introduced as a study of students' opinion of movies. First, all participants completed an individual survey that assessed their knowledge of the movies used in the task. Participants read a list of 50 movies and rated their knowledge of each movie using a three-point scale (labels were "Know little or nothing about it," "Not seen it but know about it," and "Seen it").

Following this survey, participants were given instructions similar to those used in study 1 and an envelope containing 50 cards with the name of a movie printed on each card. The year of release was indicated below each movie's title. To ensure general familiarity with the movies among the student population, these movies were selected based on the results of a pretest. As in study 1, the dependent variables used to measure category breadth were the number of categories created by each group or individual, the average size of the categories created, the size of the largest category, and the size of the smallest category.

After participants completed the categorization task, the experimenter collected the cards and administered a follow-up questionnaire to each (individual) participant. As a measure of the number of categorization criteria used in categorization, participants were asked to identify the movie descriptors they had used as a basis for categorization using a list of seven movie descriptors ("animation", "thriller", etc.) and a series of blank spaces where they could write additional descriptors not included in the list. Participants in the group condition were asked several further questions. Two items were used to measure the ease with which groups members achieved consensus: "It was easy for us to reach consensus" and "We disagreed often on how to make the piles" (reverse coded). We also included items to measure the extent to which group members were acquainted with one another, whether all groups members contributed equally to the task, and whether unanimity was a necessary condition for categorization decisions. These variables did not moderate the categorization results and will not be further discussed.

Results

As in study 1, groups and individuals did not differ in the time they took to complete the categorization task (M_g = 13.76 minutes and M_i = 12.75, $p > .35$). However, unlike in study 1, groups and individuals differed in the number of unused items (M_g = 1.02 and M_i = 3.54, $t(109) = 3.43$, $p < .001$). This is not surprising given the difference between groups and individuals in expertise (see below). We therefore included the number of unused items as a covariate in the analyses that follow (exclusion of this covariate led to similar results).

A MANCOVA showed that social context significantly affected our four dependent measures of category breadth, Wilks' lambda = .90, $F(4, 105) = 2.76$, $p < .05$, indicating that individuals categorized more integratively than groups. Groups created more categories than individuals (M_g = 9.32 and M_i = 7.87, $F(1, 108) = 7.46$, $p < .001$); created smaller categories on average (M_g = 5.64 and M_i = 6.56, $F(1, 108) = 8.69$, $p < .001$); created a smaller largest category (M_g = 11.28 and M_i = 13.51, $F(1, 108) = 7.56$, $p < .001$); and created a smaller smallest category (M_g = 2.32 and M_i = 2.67, $F(1, 108) = 7.13$, $p < .001$). The number of unused items also affected category breadth, Wilks' lambda = .69, $F(4, 105) = 11.68$, $p < .0001$. A larger number of unused items led to smaller average category size ($\beta = -0.25$, $F(1, 108) = 8.69$, $p < .05$) and to a marginal decrease in the size of the smallest category ($\beta = -0.04$, $F(1, 108) = 3.44$, $p < .07$). No effect of this covariate was observed for the number of categories produced ($p > .5$) or the size of the largest category ($p > .15$).

Expertise. A manipulation check for expertise shows that groups drew from a larger knowledge base than individuals. Using the average rating of knowledge for the 50 movies obtained from all participants before the categorization task, we calculated a group-level measure of movie knowledge by taking the highest average score among the three group members. An

ANCOVA model similar to the multivariate one estimated for category breadth showed that groups scored higher than individuals (M_g = 2.75 and M_i = 2.36, $F(1, 108) = 32.92$, $p < .0001$). This model also highlighted a negative relationship between the number of unused items and expertise ($\beta = -0.02$, $F(1, 108) = 4.6$, $p < .05$).

To determine whether expertise mediated the effect of social context on category breadth, we added expertise to the MANCOVA for category breadth reported above. In this model, the multivariate effect of social context became nonsignificant, Wilks' lambda = 0.96, $F(4, 104) = 0.98$, $p > .4$. In contrast, the effect of expertise was significant and consistent with the theoretical framework, Wilks' lambda = 0.91, $F(4, 104) = 2.48$, $p < .05$. More knowledgeable participants created a marginally larger number of categories ($\beta = 1.51$, $F(1, 107) = 3.78$, $p < .06$); smaller categories on average ($\beta = -1.53$, $F(1, 107) = 5.46$, $p < .05$); and smaller smallest categories ($\beta = -.78$, $F(1, 107) = 9.36$, $p < .001$). Although the size of their largest categories did not significantly differ from those of less knowledgeable participants, the effect was in the expected direction ($\beta = -1.58$, $p > .2$). The analyses above were repeated with another measure of expertise where the maximization was performed at the movie, instead of person, level. This variable led to similar results.

Categorization criteria. An alternative approach to investigating category structure is to examine participants' self-reported categorization criteria. To further understand the effects of social context on categorization processes, we analyzed the number of movie descriptors participants reported using as a basis for categorizing the movies after the categorization task. The group-level measure for this analysis was the average of the group members' responses. This variable is important because it provides insight into the potential consequences of group

effects on categorization processes. This variable also reflects a verbal take-away from having participated in the categorization task. This is an important output, because categories are maintained and propagated through the use of language among consumers, and between managers and consumers (Rosa et al. 1999).

We predicted that the greater pooled expertise of groups would affect categorization behavior by activating a larger number of categorization criteria. This suggests that groups should use more categorization criteria than individuals and that expertise should mediate the effect of social context. The number of unused items did not affect the number of genres used in the task ($p > .7$) and we did not include this covariate. Groups used more genres as a basis for categorization than individuals ($M_g = 5.61$ and $M_i = 4.52$, $t(109) = 3.65$, $p < .001$). A mediation analysis suggested that expertise partially mediated this difference. Adding expertise to the regression of social context on the number of genres lowered the significance of social context to $t(108) = 2.11$, $p < .05$. A Sobel test confirmed the significance of this partial mediation, $z = 3.1$, $p < .005$. Expertise led to a marginally significant increase in the number of genres used in the categorization task ($\beta = 0.9$, $t(108) = 1.87$, $p < .07$).

Consensus. For groups, we analyzed whether the self-reported ease with which groups achieved consensus moderated category breadth. We averaged the two consensus items for each participant after reversing the second item ($r = .39$) and averaged this score across the three members of each group to obtain a group-level measure. The number of unused items did not affect category breadth in this analysis ($p > .5$) and the model below was estimated without this covariate. We computed a multivariate regression on the four category breadth measures with consensus as predictor. As hypothesized, the ease with which groups reported achieving

consensus significantly affected categorization, Wilks' lambda = .76, $F(4, 45) = 3.69$, $p < .05$. Groups that reported greater ease in achieving consensus categorized more integratively. These groups created a smaller number of categories ($\beta = -1.65$, $F(1, 48) = 5.04$, $p < .05$); created larger categories on average ($\beta = 1.21$, $F(1, 48) = 6.72$, $p < .05$); and created a larger largest category ($\beta = 2.12$, $F(1, 48) = 4.01$, $p = .05$). The size of their smallest category was not significantly larger than that of groups reporting more difficulty in achieving consensus, but the coefficient was in the expected direction ($\beta = -0.14$, $p > .5$). These results suggest that when achieving consensus among the group members was perceived to be easier, groups performed the categorization task more like individuals.

Discussion

Study 2 provides strong support for our predictions about how social context influences categorization processes. In addition to replicating the key results of study 1 in a new domain, study 2 provided direct evidence for the role of expertise and consensus in shaping differences in the number and breadth of categories created by groups and individuals. Expertise mediated the influence of social context on category breadth and categorization criteria. As their expertise increased, individuals performed the categorization task more like groups. Ease of consensus moderated the effect of social context on categorization. Groups that found it easier to achieve consensus performed the categorization task more like individuals.

GENERAL DISCUSSION

The results of our studies show that whether individuals work alone or in groups systematically affects the way they categorize the same set of items. Study 1 demonstrated that social context affects category breadth in a setting typical of product development research. Study 2 replicated the results of study 1 in a setting typical of customer research designed to assess market structure or to inform product-assortment layout decisions. Study 2 also provided direct evidence for the mechanisms responsible for the effect of social context: expertise and consensus. In both studies, groups categorized less integratively than individuals, creating a larger number of narrower categories.

Given the large amount of research on individual categorization processes, the dearth of literature comparing group and individual categorization processes is surprising. A related area of research has been the comparison of the mental representations of groups and individuals (for a review, see Hinsz et al. 1997). It is unclear whether the mental representations of groups are more, equally, or less complex than the mental representations of individuals. In one study, multidimensional scaling was used to analyze similarity ratings provided by groups and individuals for the same set of items (Hinsz et al. 1988). Group heterogeneity could lead to the identification of additional bases of similarity or to additional bases for differentiation. While the results of that study suggested that groups and individuals based their ratings on the same number of underlying dimensions (Hinsz et al. 1988), creating categories may be quite different from rating the similarity between items. The process by which individual inputs are combined can significantly affect group outcomes (Hinsz et al. 1997). When categorizing, each item in a category must be simultaneously similar to each other item in the category; in contrast, one item might be considered similar to each of two other items for different reasons. Thus, we argue that

heterogeneity across group members limits category breadth, and that this is reinforced by the need to achieve group consensus (Carley 1986).

While both the effect of expertise on individual categorization behavior (Johnson and Mervis 1997) and the greater pooled expertise of groups (Hinsz 1990) have been documented in previous research, our paper is the first to show the relationship between these two streams of research. Our second study demonstrates that expertise mediates the effect of the social context on the number and breadth of categories created. Further, we show that greater expertise is correlated with the activation of a larger number of categorization criteria. These results are consistent with cognitive models of category learning (e.g., Love et al. 2004) and provide a clear exemplification of the role of constraints in category formation (McGarty 1999).

In recent years, cognitive psychologists have stressed the importance of motivational factors in categorization (e.g., Barsalou 1991; Love 2005; Medin et al. 1997). However, the dependent variables in this research have focused on the content of categories rather than on the structure of categories. For example, the finding that landscape architects and landscapers categorize trees differently relates to the content of the categories they create rather than to the category structure (see also Ratneshwar, Pechmann and Shocker 1996). Our emphasis on category structure adds to the existing literature by highlighting effects of motivational influences that are independent of the specific experimental stimuli being categorized. From a social cognitive point of view, evidence that consensus-seeking affects category structure is especially informative because it suggests that the mechanism responsible for the contextual influence on categorization goes beyond mere stimulus applicability (Higgins 1996).

Limitations and Future Research

Although the pooled expertise of groups makes them seem more like experts than novices when we measure category breadth, we do not necessarily expect groups to mimic all of the characteristics of expert decision makers. Expertise is itself a multi-dimensional construct. While groups share one aspect of expertise, namely that they collectively bring more knowledge of the items to be grouped, experts also differ from novices in other ways, such as being more flexible in their reliance on causal relations (Shafto and Coley 2003). Moreover, in addition to category breadth and to the number of categorization criteria, there might be other qualitative differences in categorization behavior between individuals and groups, which do not necessarily reflect those of experts. The similarities and differences between experts and interacting groups in decision making and between individuals and groups in categorization behavior therefore need further investigation.

As a boundary condition to our findings, it should be pointed out that the existence of these influences is most obvious in settings where cognitive factors drive categorization. Recent research on individual categorization behavior has shown that when grouping musical excerpts in terms of the emotional reaction they elicit, trained musicians and novices do not create a different number of categories (Bigand et al. 2005). Thus, it is unclear whether and how groups might categorize emotional reactions or other affective evaluations differently from individuals.

Practical Implications

Assortment layout decisions. Product market structure represents a social construction based on consensual categorical knowledge between consumers and producers (Rosa et al.

1999), and it is this consensual categorical knowledge that helps to coordinate transactional relationships between consumers and producers (e.g., Day, Shocker, and Srivastava 1979). Congruence between the consumer's internal category structure and the retailer's external category structure (as reflected in the retailer's layout decisions) leads to greater satisfaction with the retailer's assortment (Morales et al. 2005). If individuals make decisions about store layout and groups of customers navigate the aisles of the stores, or vice versa, there is likely to be less congruence between customers' and retailers' category structures. Thus, customer research with either individual customers or groups of customers, as appropriate, should inform retailers' decisions about assortment layout.

Brand and product evaluations. Differences in the way groups and individuals categorize might affect their evaluation of brands and products, especially new products and brand extensions. Categorization is an important mediator in consumers' product evaluations (e.g., Meyers-Levy and Tybout 1989; Sujan 1985). Previous research has suggested that new products and brand extensions are evaluated more favorably when they are perceived to be more typical of a category (Aaker and Keller 1990; Carpenter and Nakamoto 1996). For high knowledge consumers, however, moderate incongruity with the parent brand's product category is optimal for brand extensions because it results in arousal and, unlike extreme incongruity, leads to satisfaction when resolved (Peracchio and Tybout 1996).

On the one hand, because groups tend to create a larger number of narrower categories than individuals, groups may be less likely than individuals to perceive new products and brand extensions as typical of a category, leading to less favorable evaluations. On the other hand, because groups also have access to a larger pool of knowledge than individuals, groups may be

better able than individuals to resolve apparent incongruities. Thus, groups may be less likely to experience the deleterious effects of being unable to resolve incongruity (Peracchio and Tybout 1996). Additional research is needed to document the unfolding of these influences.

New product development. Managers rely on consumers' categorization of customer needs for products as important inputs into new product development (Griffin and Hauser 1993). Voice-of-the-customer techniques provide information precisely because there are multiple ways to categorize the same set of items. As customers categorize customer needs, they make judgments about which needs to group together and how many needs to combine into a single category. Consider, for example, customer needs for a car such as "I don't want to hear the engine running," "very little noise from the road," "I can play my CDs," and "music should have a full, rich sound." The first two needs might be combined into a category described as "interior of the car should be quiet" while the second two might be combined into a category described as "car should have a high-quality audio system." Alternatively, all four could be combined into a single broad category described as "I want music to sound great in my car." Our findings suggest that individuals are more likely to create the broader category structure, while groups are more likely to converge on the narrower category structure.

While information about both distinctions and similarities among customer needs is likely to be valued by the product development effort, categorization forces a tradeoff between these two kinds of information. Making fine distinctions among customer needs (narrow categories) requires ignoring similarities among them, but focusing on broader similarities among the needs (broad categories) requires ignoring distinctions among them. More narrowly defined categories can provide a better basis for linking customer needs to specific product

features. If categories are defined too broadly, the product development effort can miss out on important distinctions. On the other hand, if categories are defined too narrowly, the product development effort may become focused on specific and potentially disjointed needs. As a result, product engineers might not think about exterior noise in conjunction with the car's sound system. If customer needs are grouped into broader categories, the product development effort might become more integrative. The performance of the sound system, for example, might be viewed as partially dependent on the reduction of exterior noise. Product development teams should think carefully about these tradeoffs when deciding whether to have individuals or groups categorize customer needs.

Team collaboration. When designing and evaluating new methods to facilitate team collaboration, it is important to understand the factors that make existing techniques more or less effective. The trend toward virtual teams suggests that teams within organizations, such as product development teams, may have an increasing desire to aggregate inputs from individual members in the future. As technology makes it possible for teams to collaborate in new ways, new tools may replace those currently used. Knowing that groups and individuals categorize concepts differently suggests that they may perform differently on other related tasks, such as prioritization tasks. Understanding the conditions that exacerbate and minimize this tendency will help managers evaluate the costs and benefits of new techniques.

Summary. Given the wide-ranging implications of differences between group and individual categorization behavior, it is surprising that the copious attention devoted to research on individual categorization processes has generated so little research on group categorization

processes. This article seeks to highlight differences in categorization by groups and individuals on one structural dimension, the number and breadth of categories created. While neither broader nor more narrow categories are objectively better, our discussion has highlighted that more integration or more distinction among concepts may be more appropriate for a given objective. Thus, it is important for those relying on the outputs of categorization tasks, such as web site designers, store managers, product development teams, and product marketing managers, to understand and consider the systematic differences between group and individual category structures.

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