CONSUMER CATEGORIZATION AND EVALUATION OF AMBIGUOUS PRODUCTS

DISSERTATION

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the Degree Doctor of Philosophy in the Graduate
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ABSTRACT

This dissertation examines how evaluations of ambiguous products can be influenced by controlling the categorization of such products. Ambiguous products refer to products that may be categorized into alternative categories (e.g. crossover vehicles such as the Chevy Avalanche and Pontiac Aztec). Little is known about how consumers categorize and evaluate these products. We combine two different streams of literature – traditional categorization and psycholinguistics – to examine (1) how categorization of ambiguous products can be controlled, (2) how categorization impacts evaluations and (3) how evaluations can be increased. One of the contributions of this research will be to show that consumer acceptance can be controlled simply through the control of consumer categorization processes rather than through traditional persuasion techniques.

From a theoretical standpoint, this dissertation will contribute to the categorization literature by providing a better understanding of the linkages between categorization, inferences and evaluation. Further, the finding that product inferences are not restricted to a single category, but can be induced across multiple categories will be a radical departure from traditional categorization literature, which predicts that inferences are derived only from within a category. From a managerial perspective, the findings of this dissertation will allow marketers to develop cues that can control product
categorization which will impact the inferences made about the product and ultimately influence consumer evaluations of the new product.
Dedicated to the memory of Rohan Subramanium
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CHAPTER 1
INTRODUCTION

Many new products that are launched in today’s marketplace are ambiguous with respect to the product categories that they belong to and possess features of multiple categories. This is particularly evident in the case of high technology products and consumer electronics wherein functionalities and features of different products are merging (Prahalad 1995). For example, Casio recently showcased products that combine the functions of a watch with those of a camera, a MP3 player and a GPS system. Sony has launched a product in Japan that is both a laptop computer and a digital camera. “Crossover” vehicles (e.g. the Chrysler Pacifica which combines features of a minivan and SUV) are becoming increasingly popular in Europe and the United States and are predicted to account for as much as a third of the US auto industry in a few years (GM President Richard Wagoner as quoted in www.s-t.com).

From a consumer perspective, an ambiguous product provides consumers with a choice in terms of the category in which they can place these products, i.e. is the Chrysler Pacifica a SUV or a minivan or is it some combination of both? The selection of a product category is very important since categorization impacts the expectations that consumers will hold about the product and these expectations in turn will determine how the product is evaluated. For example, if the Pacifica is categorized as a minivan,
consumers may evaluate it based on their current set of expectations about a typical minivan and may expect it to possess large storage and seating capacity with removable rear seats. On the other hand, if the Pacifica is categorized as a SUV, consumers may expect it to be large in size, provide poor fuel economy, have a powerful engine and offer superior off-road driving capabilities. Thus, categorization of a product will influence people’s beliefs about the product. Currently stored beliefs about different categories will operate as “frames of reference” to assess the new product that is seen to be a member of a particular category (Keller, Sternthal, and Tybout 2002).

Despite the prevalence of ambiguous products and the criticality of the categorization decision for these products, little research has examined how consumers categorize ambiguous products. Even less research has examined how categorization impacts the set of beliefs that consumers hold about these products and how these product beliefs drive product evaluations. As stated above, ambiguous products differ from other products in that their possession of multiple category features provides consumers with a choice of categories in which to place these products. How do consumers reconcile the possession of multiple category attributes in a single product? Do they select one category to place the product into and ignore the second category’s attributes, or do they create a new category for the ambiguous product and ascribe all its attributes to this new category or do they use some other cognitive process to understand and evaluate these products? How can marketers influence the categorization and subsequent evaluation of their ambiguous products? These questions are particularly important to address in the context of the high and rising costs of new product launch (e.g., a new car model costs approximately $500 million to develop – Kerwin and Welch 2002). Further, the
performance of ambiguous products launched in the marketplace has been mixed with some successes and some failures and a lack of understanding of the underlying reasons for these successes and failures. Hence, a better understanding of how consumers evaluate ambiguous products is called for.

MARKETPLACE PERFORMANCE OF AMBIGUOUS PRODUCTS

At present, there appears to be little consensus on how ambiguous products perform in the marketplace. One viewpoint is that ambiguous products inherently compromise the performance of multiple categories and hence, would not be acceptable to consumers who would prefer to either choose one category or buy both categories separately for better performance (Crockett 2001). For example, a PDA/Cell phone combination offers consumers features of a PDA (data entry, calendar, scheduler, memo pad etc) and a cell phone (voice messaging, caller id, call waiting etc), but is typically larger and bulkier in size than either a PDA or a cell phone. Further, it is unlikely to be the best performing PDA or cell phone on the market. Hence, while delivering the functionalities of two categories, it may not offer the best of either, a fact that would lower consumer evaluations of the product. This viewpoint suggests that consumers would follow one of two different approaches to evaluating ambiguous products. They would benchmark the ambiguous product against both frames of reference (PDAs and cellphones in the above example) and find it lacking against both frames, leading to lowered evaluations of the product. Alternatively, they would select one category as the frame of reference and find the product lacking against this frame, leading to lowered
evaluations. Thus, two different processes could both result in a similar outcome. A lack of distinction between the two processes precludes an understanding of how the product can be designed and positioned to enhance consumer perceived performance and acceptance. If consumers select one category as the frame of reference, then an understanding of which category they would pick would enable marketers to tailor their product design to be at least comparable to current products on this category dimension. On the other hand, if consumers truly assess the product against both frames of reference, then the product has to be designed to be competitive against extant products in both categories or at least offer something unique that differentiates it from products in both categories.

A second viewpoint that exists in the marketplace is that ambiguous products offer consumers the best of two or more worlds and may function to fulfill very specific consumer needs that are not satisfied by any of the existing categories. Indeed, the success of multifunctional devices such as the printer-fax-scanner device and crossover vehicles is testament to this view. For example, automakers believe that consumers are seeking the benefits associated with two different categories of vehicles in a single vehicle. Thus, they would like the performance of a sports car, the practicality of a SUV and the driving comfort of a sedan (Wright and Sedgwick 2001). However, there is also acknowledgement of the fact that the absence of a well defined category can lead to market fragmentation and a proliferation of automobile categories which would render comparison and evaluation of different vehicles difficult (Kerwin and Welch 2002). This view suggests that consumers create new categories for each new ambiguous product that they encounter. However, such new category creation would not be cognitively
economical from the consumer’s perspective. Further, this view fails to explain the processes underlying consumer category creation and hence is not diagnostic in terms of product design or positioning.

Hence, at present, marketers do not appear to have a good understanding of how consumers process and evaluate ambiguous products. The success of some ambiguous products and the failure of others have added to the confusion surrounding these products and consumer reactions to them. In the absence of a clear understanding of the processes that consumers adopt to understand and evaluate ambiguous products, there may be little that marketers can do to increase their chances of product success. This dissertation therefore aims at examining the issues associated with consumer understanding and evaluations of ambiguous products and to suggest ways by which marketers can render consumer evaluations of their ambiguous products more favorable.

THE LITERATURE

Past research in marketing has studied the drivers of categorization (Ratneshwar and Shocker 1991; Ratneshwar and Pechmann 1996; Sujan 1985) and the implications of categorization for consumer preference and judgments (Sujan and Dekleva 1987; Loken and Ward 1990). At present, there exists substantial knowledge of the processes consumers use to determine the product category to which a product belongs (Cohen and Basu 1987; Basu 1993) and how consumers reconcile information that is discrepant with extant categories (Meyers-Levy and Tybout 1989; Sujan and Bettman 1989). However, the bulk of this research has dealt with single category structures and is not informative...
on the issues associated with multiple categories as related to ambiguous products. Thus, this research studies how objects that are similar to a single category are categorized and evaluated, while ambiguous products are similar to multiple categories.

For example, perceived typicality of a new object to an existing category has been shown to be an important predictor of categorization (Rosch and Mervis 1975). The greater the typicality of a new object to an existing category, the higher is the likelihood of the object being categorized as a member of that category. Typicality has been defined as the degree to which an item represents a category (Loken and Ward 1990) and is determined by factors such as the number of attributes that an object shares with other objects in a category and the frequency of instantiation of the object. While the above research has shown that consumers use perceived typicality to categorize a new product, it is not clear how consumers make typicality judgments about an ambiguous new product that is typical of more than one category.

The work on incongruity resolution has focused on how consumers reconcile inconsistencies within a product category. Incongruity has been operationalized as the presence of attributes that are inconsistent with a category’s attributes (Meyers-Levy and Tybout 1989). An example of an incongruity would be a soft drink which is “all natural”. Since soft drinks are usually not “all-natural”, the presence of this attribute is inconsistent with the category “soft drink”. In order to make sense of the product, this incongruity would need to be resolved and research finds that moderate levels of incongruity yield successful resolution of the incongruity and evoke more favorable evaluations of the product than low or high levels of incongruity.
However, incongruity is determined after a product has been categorized. In the example stated above, only if the product is categorized as a soft drink will the attribute “all-natural” become incongruous. If the product is categorized as a fruit juice, then the “all-natural” attribute is no longer incongruous. For ambiguous products then, the literature on incongruity resolution may be insufficient to understand how consumers categorize such products prior to making incongruity inferences and resolving such incongruities.

Some recent work by Moreau and her colleagues (Moreau, Markman, and Lehman 2001) has examined how a single product can be understood with respect to two different categories. In one of their studies, (Moreau, Markman, and Lehmann 2001), a new product (digital camera) was explained to consumers by using two alternative categories (e.g. camera and scanner). Since a digital camera possesses attributes or features of both categories (e.g. it can take pictures like a camera but also can store images like a scanner), the researchers considered how consumers react to two sequential category cues about the product. They find that when consumers are provided with two sequential and different category labels about the same product (e.g. “works like a camera” followed by “works like a scanner”), consumers tend to categorize the product into the first category that is cued to them. Hence, the order of category labels appears to be an important determinant of categorization for ambiguous products.

While the above research provides insight into one variable (label order) that is an influencer of the categorization of ambiguous products, it does not consider the distinction between different types of cues in terms of their impact on categorization. Marketers often use non-label cues in their communications. An example of a non-label
cue would be a product attribute such as “possesses a 4x optical, 6x digital zoom lens”. How would such product attributes function in terms of their impact on categorization? The research by Moreau and colleagues also does not examine the linkages between product categorization, product inferences and product evaluations in detail. Product inferences refer to the set of expected beliefs about the product. Expected beliefs are important since they drive product evaluations. Hence, an understanding of the interactions between categorization, inferences and evaluations is critical.

Literature in cognitive psychology has found that people make inferences about ambiguous products based solely on the categories into which these products are categorized and will not make any inferences based on the possible categories into which the product could have been categorized (Murphy and Ross 1994; Ross and Murphy 1996). For example, if a product could have been categorized as a phone or a PDA and the phone is the category selected, then inferences about the product will be based solely on the phone category and no inferences about the PDA category will be made. However, this research (Murphy and Ross 1994; Ross and Murphy 1996) is restricted in scope to natural objects (people and animals), which precludes the possibility of the creation of a new hybrid category (e.g. an animal that barks and meows). The creation of hybrid categories is a very real possibility for products and hence, the ambiguous categorization literature in psychology offers some useful but insufficient insights into the inference-making processes of ambiguous products.
PURPOSE OF DISSERTATION

Given the unanswered questions associated with consumer categorization and evaluations of ambiguous products that have been outlined above, this dissertation aims at providing an understanding of the cognitive processes underlying consumer response to ambiguous products. Specifically, we consider how consumers categorize ambiguous products, make inferences about these products and how these inferences affect product evaluations. Based on an understanding of these cognitive processes, we then suggest ways by which marketers can enhance consumer acceptance of ambiguous products by providing appropriate communication cues to influence consumer categorization. Hence, we contend that understanding the way consumers categorize ambiguous products will allow marketers to affect the evaluations of these products. This use of categorization to affect attitude change is a particularly important contribution because it suggests a route to persuasion that is quite different from the standard attitude change models that have been applied in the marketing and consumer research literatures.

APPROACH OF THE DISSERTATION

The dissertation begins by identifying the issues surrounding consumer categorization of ambiguous products using traditional categorization literature. We explore how marketing cues can impact categorization of and inferences about an ambiguous object. We then draw on research in the psycholinguistics literature to advocate a way by which marketers can enhance product inferences and evaluations.
Three empirical studies are reported that test our research propositions. Study 1 extends the research conducted by Moreau et al (2001) by examining the interaction of cue type (labels versus non-label attributes) and cue order on product categorization and inferences. Study 2 examines the impact of product inferences on product evaluations and the underlying processes by which inferences influence evaluations. Study 3 draws on literature in psycholinguistics to evoke more positive product inferences and more favorable product evaluations.

The remaining chapters in this dissertation are organized as follows. Chapter 2 provides a detailed literature review of the different streams of research that are germane to the categorization and evaluation of ambiguous products. Chapters 3, 4 and 5 each outline in detail the logic, hypotheses, conduct and findings of Studies 1, 2 and 3 respectively. Chapter 6 summarizes the findings of this dissertation and concludes by providing an overview of the contributions that the dissertation makes to the marketing and psychology literatures.
CHAPTER 2
LITERATURE REVIEW

In this chapter, we examine the literatures in categorization and psycholinguistics, which are relevant to the categorization and evaluation of ambiguous products. The approach of the review is to examine the key theories and findings in each research area, assess their implications for the categorization and evaluation of ambiguous products, and list their critical limitations and the importance of these limitations to the topic at hand. We will then integrate the findings to summarize the key implications for ambiguous products, discuss ways by which the identified limitations may be overcome and present our conceptual framework on the categorization and evaluation of ambiguous products. We begin by examining the functions of categorization and the importance of categorization for ambiguous products.

CATEGORIZATION

Categorization refers to the act of categorizing or classifying. Hence, categorizing objects implies grouping objects together on some basis. Categorization serves a number of functions that are critical to everyday cognitive functioning including classification, prediction and communication (Medin, Ross, and Markman 2001).
Classification: Categories enable us to discriminate between objects and at the same time, allow us to treat discriminably different objects as equivalent. For example, we are able to distinguish between cats and dogs as being two different types of animals, yet are able to acknowledge that they are both living animals that are different from inanimate objects. Classification thus enables flexibility in our view of the world such that we are able to view any given object as a member of many different categories depending on our context. Classification therefore enables us to be adaptive to our environment.

Prediction and reasoning: A key function of categorization is that it enables us to make predictions concerning the future. Having categorized an object into a category, we are able to utilize our category knowledge to make inferences about the attributes that the object will possess. Categories thus enable us to utilize past experiences and bring our acquired knowledge to bear on a new situation. For example, we are able to recognize that snakes are dangerous and should be avoided based on our category knowledge of snakes, without having to personally experience snakebite. The predictive function of categorization permits us to be cognitively economical. That is, the ability to classify objects into pre-existing categories and make inferences about it saves us the effort of having to judge each object on an individual basis.

Communication: Categories allow us to communicate with one another in terms of a common language. We are able to learn from others’ experiences due to a shared category language.
As can be seen from the above section, categorization is a pervasive aspect of everyday life and can have important consequences for consumer behavior since it enables consumers to classify and understand products. The predictive function of categorization implies that consumers are able to form beliefs about product attributes and performance based on the product’s category (Sujan and Dekleva 1987). Thus, they expect ice cream to be sweet and fattening while yogurt may be sweet but not as fattening. Product beliefs have been shown to impact product evaluations (e.g. Fishbein and Ajzen 1972). It is therefore important to study categorization for all products, but especially so for ambiguous products since these products offer consumers a choice in terms of the category in which they can place the product. Given the consequences of categorization for product beliefs and evaluations, understanding what drives the categorization of ambiguous products becomes critical. We will now review some key categorization theories and outline their predictions and limitations for ambiguous products.

CATEGORIZATION THEORIES

While many different theories have been proposed to account for categorization, the underlying premise of most of these theories is that similarity between the object to be categorized and some mental representation of a category is the determinant of categorization. It is the definition of the mental representation that differs between
different categorization theories. Thus, prototype theories (e.g. Rosch and Mervis 1975) suggest that all categories have a *prototype*, which is the set of average attributes that most members of the category possess and the degree of similarity to this prototype determines category membership. The general notion is that based on experience with the category, people abstract out a summary mental representation of the category, which is then used as the reference point to determine category membership. For example, people may hold an abstract mental representation of a typical bird as one that has feathers, wings, two legs and a beak and can fly. Compared to this prototype of a bird, a robin may be a more typical bird than an ostrich.

On the other hand, exemplar theories (Medin and Schaffer 1978; Estes 1986; Nosofsky 1988) posit that objects are compared to *specific examples* of a category in memory and similarity to such exemplars determines categorization. These theories predict that category examples that are most similar to the item to be classified will have the greatest impact on categorization. For example, people may perceive robins as being typical examples of the bird category. Compared to robins, ostriches may be less typical of the bird category than sparrows.

A key difference between prototype theories and exemplar theories is the comparison or reference point; under prototype theories, it is the category prototype while, under exemplar theories, it is a specific exemplar. However, both theories posit similarity-based categorization, either similarity to a prototype or similarity to an exemplar. Hence, overall, current categorization theories are all based on the notion of similarity to some reference point as being the determinant of categorization.
Limitations of similarity based theories

Similarity-based theories provide good insights into the categorization of objects that are similar to only one reference point, but they do not clearly articulate how objects that may be similar to more than one reference point are categorized. For example, if an encountered animal is similar to both a cat and a dog, how do people categorize the animal? Do they select one category only and if so, what is the basis for such selection? Alternatively, do they categorize it as a hybrid or a mix of both categories? If so, how do they make inferences about the properties of the object? Such questions are important to understand in the context of ambiguous objects but have not been addressed effectively in this literature.

One stream of research that may be pertinent to the above questions would be the categorization studies on how people process information that is discrepant or incongruent with extant category information. We therefore, review the literature on incongruity resolution in the next section.

INCONGRUITY RESOLUTION

Past research posits two alternative ways by which information inconsistent\(^1\) with a category is incorporated into the category (Weber and Crocker 1983). Which of these

\(^1\) The terms inconsistent, discrepant and incongruent are treated synonymously in our review.
two processes are adopted depends on the degree of incongruity of the new information. The first process is assimilation wherein low to moderately incongruous information is assimilated into the category. Assimilation involves transferring all the category attributes from the category representation to the representation of the new object so that the new object is not perceived as being different from other category members. From a memory perspective, the memory for the consistent aspects of the new information is superior to the memory for the inconsistent aspects of the new information because the inconsistent information is not as strongly linked to the object representation in memory as the consistent information. In essence, the new object is perceived as being another category member and the original category structure does not undergo any change.

The second process is sub-typing wherein extremely discrepant information cannot be assimilated into the schema and needs to be treated differently. In this case, the new object is sub-typed such that it is acknowledged as belonging to the original category but at the same time, its inconsistent elements differentiate it from other category members. For extremely incongruous new objects then, memory for the inconsistent attributes is superior to memory for the consistent attributes since it is the inconsistent attributes that differentiate the object from the remaining category members and are strongly linked with the object representation in memory. Further, these new objects are perceived as belonging to the category, but retain a special status in that their inconsistent attributes are also remembered simultaneously.

Sujan and Bettman (1989) studied incongruity resolution in a marketing context and found support for the assimilation and sub-typing processes. They studied how new cameras that had either no or moderately or extremely incongruent values on a particular
attribute dimension were processed. In their study 1 (page 458), they manipulated the sturdiness of a new camera to be either congruent (“can be used in a drizzle”, “has a camera case for protection”, “has a lens shield”) or moderately incongruent (“can be used in the rain”, “sturdy body construction”, “scratch-resistant lens”) or extremely incongruent (“can be used in water”, “shatterproof body construction”, “shatterproof lens”) with existing camera category beliefs.

They found that when there was no or moderate incongruity, the new camera was assimilated into extant camera schemas, but when the level of incongruity was extremely high, the new camera was sub-typed. Hence, in all cases, the new camera was still perceived to be a camera; however, the degree to which it was differentiated from other cameras depended on the degree of incongruity associated with it. While examining the impact on incongruity on product evaluations, they found that the incongruent attributes were rated as being significantly more important under extreme levels of incongruity as compared to low or moderate levels of incongruity. These incongruent features were also significantly correlated with product evaluations only in the extreme incongruity condition. Hence, the degree of incongruity had a significant effect not only on the category structure, but also on the determinants of product evaluations.

In other research on incongruity resolution, Meyers-Levy and Tybout (1989) examined the implications of resolving incongruity on product evaluations. Based on research by Mandler (1982), they predicted that novel or incongruous objects would prompt arousal and lead to cognitive elaboration to resolve the incongruity. While extreme incongruity cannot be resolved leading to the generation of negative affect, moderate incongruity can be resolved leading to the generation of positive affect. Low
incongruity does not require any resolution, thus leading to no task induced affect. The
task-induced affect in the moderate and extreme incongruity conditions will transfer to
the product thus resulting in more favorable evaluations for the product under moderate
as compared to low or extreme incongruity. They also posited that moderate incongruity
could be resolved through sub-typing while extreme incongruity could not be resolved at
all. While their studies did not specifically test for sub-typing, their stimuli were designed
to elicit sub-typing under moderate incongruity.

They provided empirical support for their predictions in the context of a new
drink. They labeled the drink either as a “beverage” or as a “soft drink”. Further, one of
the attributes possessed by the drink was manipulated to be either “all-natural” or “high
preservative”. If the drink was labeled as a soft drink, then the attribute “high
preservative” would be congruent with the category while the attribute “all-natural”
would be moderately incongruent with the category. If the drink was labeled as a
beverage, then the attribute “all-natural” would be extremely incongruent with the
category and the attribute “high preservative” would be moderately incongruent with the
category. As predicted, they found that moderate incongruity resulted in more favorable
evaluations for the product than either low or extreme incongruity.

At first glance, the prediction of sub-typing under moderate incongruity by
Meyers-Levy and Tybout (1989) appears inconsistent with the demonstration of sub-
typing under extreme incongruity by Sujan and Bettman (1989). However, it is important
to note the differences in the way incongruity is operationalized in the two research
studies. While Meyers-Levy and Tybout (1989) operationalize extreme incongruity as the
presence of a discrepant attribute that cannot be resolved, Sujan and Bettman (1989)
operationalize extreme incongruity as an extremely atypical value of some feature. In their studies, the feature itself (e.g. sturdiness of the camera) was not incongruous with the camera category, but the value of the feature was (e.g. “shatterproof”). In the studies by Meyers-Levy and Tybout (1989) the feature itself (all-natural) was incongruous with the soft drink category. The difference in operationalization may explain the apparent inconsistency in the predictions on sub-typing.

Implications of incongruity resolution for ambiguous products

The research on incongruity resolution provides interesting insights into how people reconcile inconsistencies and the impact of such inconsistencies on product evaluations. This research suggests that ambiguous products may be amenable to sub-typing, given that they possess attributes that are inconsistent with any one category. For example, a PDA cell phone has attributes of a PDA and a cellphone. If the product is categorized as a PDA, its cell phone attributes could be viewed as inconsistent with the attributes of the PDA category. Alternatively, if it is categorized as a cell phone, its PDA attributes may be viewed as inconsistent with the attributes of the cell phone category. In such a case, it is possible that consumers may categorize the product as either a PDA or a cell phone and then based on the set of inconsistent attributes, sub-type the product as a special type of PDA or cell phone. Hence, sub-typing is one mechanism by which consumers may reconcile the presence of multiple category attributes in a single ambiguous product. Further, the inconsistent attributes of the product have greater weight in product evaluations than the consistent attributes.
Limitations

The literature on incongruity resolution however does not explain how consumers make the categorization decision with respect to ambiguous products. Ambiguity has to be resolved prior to incongruity, that is, incongruity emerges only after the product has been categorized. For example, if a drink is categorized as a soft drink, then the attribute “all natural” is an incongruous attribute, requiring resolution. However, if the same drink is categorized as a fruit juice, then the “all natural” attribute is no longer incongruous. Thus, incongruity is determined only after categorization. Therefore, the literature on how incongruity is resolved does not offer insight into how ambiguity is resolved. In all the research studies referred to above, the researchers provided the category for the incongruous product. In the studies conducted by Sujan and Bettman (1989), the product was labeled as a camera while in the studies conducted by Meyers-Levy and Tybout (1989), the product was labeled as a soft drink or as a beverage. Thus, the researchers did not explore how categorization decisions are made for incongruous products in the absence of category labels. Since ambiguous products are by definition capable of being placed into more than one category or a new category may be created for them, the current literature does not adequately explain how ambiguous products can be categorized. Only recently has some work considered some of these questions and we review this research in the next section.
Recently, researchers have considered how the potential for multiple categorizations can impact the inferences that people make about objects. Given that a particular object may be capable of being categorized into more than one category, what are the implications for the inferences that people make about the object? There are two views on this issue. One view was posited by John Anderson (1991) through his Rational Model of Cognition approach. According to this view, the main function of categorization is to help people make predictive inferences about an object and the model posits that people will take into consideration all the possible different categories that an object could have been categorized into while making inferences about that object.

Hence, Anderson proposed that the derivation of inferences about categories would follow a Bayesian rule wherein all possible categories that an object could belong to would be taken into account while making inferences about that object such that:

\[ P (j/F) = \sum_k P (k/F) P (j/k) \]

In other words, the probability that the object has the feature ‘j’ given that it possesses the set of features ‘F’ is the sum (over all the possible ‘k’ categories that the object could belong to) of the probabilities that the object is in the category times the probability that any object in that category has feature ‘j’. This rule implies that people make allowances for the uncertainty in categorization when multiple categorizations are present. Hence, if an animal could be either a dog or a cat, then the probability that it will bark will be adjusted to allow for the probability that it could be a cat. Hence, the model posits a very rational approach to making predictive inferences.
An alternate view is proposed by the literature on heuristics in judgment and decision making (e.g. Kahneman, Slovic and Tversky 1982). This view posits that people often make judgments without a great deal of rational deliberation. Hence, they may take only the most likely category into account while making inferences about an object. In the example of the cat versus the dog animal, this view predicts that the probability that the animal will bark will be determined by its most likely category only and will not be adjusted to allow for the alternative category. Hence, if people categorize the animal as a cat, their probability estimate of the animal barking is likely to be very low.

Empirical evidence in this area favors the second view – the heuristic view, with research finding that people do not make adjustments for the probability that an object could belong to a number of different categories while making predictive inferences about that object. For example, Murphy and Ross (1994) tested whether people followed the Bayesian rule and took alternative categories into account while making predictive inferences. They presented their respondents with stimuli such as colored geometric shapes, schematic faces and lines in various orientations. The stimuli were identified as members of categories of drawings by various children (e.g. John’s set of drawings versus Ed’s set of drawings) and respondents were asked to categorize a new stimulus (e.g. a triangle) and list the probability that the new stimulus would possess a particular property (e.g. it would be shaded black). Murphy and Ross found that respondents did not alter their judgments of the probability of a feature as a function of its occurrence outside the most likely category. Hence, they did not make any adjustments in their predictive inferences for alternative categories.
Malt, Murphy and Ross (1995) extended the above findings to more real-world stimuli (e.g. people in situations) and also allowed participants to retrieve categories from memory instead of providing the categories to them as Murphy and Ross (1994) did. In a series of three experiments, they asked participants to think about familiar categories embedded in different meaningful situations. For example, two of the versions of one of the stories presented to their participants in experiment 1 are reproduced below (Malt, Murphy, and Ross 1995 – Table 1, Page 649):

**Cable worker (Burglar) version**

Mrs. Sullivan was getting more and more upset. She was in a bad mood to begin with because she had read in the morning paper that a man from the cable company would be surveying properties to begin digging for installation of cable service (about a burglar who was hitting nearby houses). Now the rest of her day was turning into a disaster. Her grandchildren were due for a visit at 2:00. She really needed to run out to the grocery store to get some milk in order to make the chocolate chip cookies that both the children loved. She also had wanted to vacuum the rug in the library, since that’s where the children always played with their toys. And she was trying to put together a new plastic gas station that she had bought for them. First, she discovered that the vacuum motor was overheating and making odd noises, so she didn’t dare leave it on long enough to clean the rug. Then as she was getting ready to leave for the store, she noticed a man walk up her driveway and into the back yard. She suddenly remembered that the realtor had told her he might stop by sometime that day to appraise her home for its impending sale, and she needed to speak to him. She also thought that there was a small chance that the man was the man from the cable company looking over the wiring situation (the burglar casing the premises). Either way, she thought she’d better stay home, even though time was getting tight. Finally, as she went back to putting together the gas station, she found that one of the support pieces was missing and the thing wouldn’t stand up straight. She knew the grandchildren wouldn’t really care about whether the rug was vacuumed, but she thought that without the cookies and a new toy, the visit wouldn’t be much fun. She really hated the thought that their beloved “grammy” might let them down.

After reading the story, participants were asked to rate the probability that the man walking to the backyard would ring the doorbell in the next fifteen minutes and the probability that the man would pay attention to the sturdiness of the doors of the house. The differences in the probability judgments to the two questions would provide a measure of the categorization of the man and the consideration of alternative categories while making inferences. Thus, if the man were categorized as the realtor (the most likely
category), then the probability of ringing the doorbell would be very high. If either of the alternative categories were taken into account, then the probability of the man checking the sturdiness of the doors would be different across the burglar and cable worker conditions. Since burglars are far more likely to check for sturdiness of doors of a house than are cable workers, the probability of checking for sturdiness would be higher in the burglar condition than in the cable worker condition. This difference in probabilities was not found, leading the researchers to conclude that alternative categories are not taken into account while making predictive inferences.

Similar results were found in two other experiments as well. The researchers therefore concluded that once an object is categorized into a category, then the alternative categories that may have been considered prior to the categorization decision would not be used while making predictive inferences about the object. Hence, inferences about an ambiguous object follow from its most likely category alone and people tend not to make inferences outside of categories. To summarize, given an ambiguous object, people appear to select one category to place the object into and make inferences about the object based solely on that category.

Processes underlying lack of multiple category inferences

Malt et al (1995) also examined the reason for the lack of multiple inference making under ambiguity. In one of their studies, they had participants recall the most likely and alternative categories listed in the stories presented to them. They found that participants were able to recall both categories equally well. This finding was taken as
evidence of the fact that people paid attention to both categories, but selectively utilized only one category while making inferences about the object. Thus, it is not lack of attention to alternative categories that appears to restrict inferences to a single category.

However, in the study conducted by Malt et al (1995), only two alternative categories were provided to respondents (e.g. realtor and burglar) and no other category information was provided. The low level of information may have resulted in a “floor effect” wherein most respondents were able to recall both categories since there is very little constraint on cognitive processing. On the other hand, in the context of ambiguous products, a large number of different attributes are usually presented while describing the product. Given a larger set of attributes to process, people may restrict their attention to category-consistent attributes alone, leading to a restriction on inferences to be category consistent. The exact process underlying the restriction of inferences to a single category is therefore not yet clear.

Implications for ambiguous products

The above research suggests that ambiguous products will be placed into a single category that will be selected from all the categories cued by the product. Once the product has been categorized, either due to selective attention or due to selective retrieval of category information, inferences about the product will be made based predominantly on the category chosen. Inferences that are not consistent with this category will not be made. Extending this point, it follows then that if an ambiguous object possesses features of multiple categories, inferences about features that are not consistent with the category
chosen for the product are unlikely to be made. For example, in the case of a PDA-cell phone, where the product possesses features of both a PDA (To do list, memo pad, scheduler) and a cell phone (ring tones, caller id), people who categorize the product as a PDA will be less likely to believe that the product possesses the features of a cell phone and people who categorize the product as a cell phone will be less likely to believe that the product possesses the features of a PDA. This pattern of low category inconsistent inferences is sub-optimal from a marketer’s perspective since marketers would ideally want consumers to hold strong beliefs about both categories thereby increasing the perceived value of the product. Hence, the lack of multiple category inference making may be a problem for marketers of ambiguous products.

Inducing multiple inferences

Moreau, Markman, and Lehmann (2001) explored how consumers can be induced to make multiple category inferences about a single product. In a set of two studies, they explore the role played by category labels and category mappings on the categorization and evaluations of a new product. The product selected was a digital camera. The product was selected since it could be positioned as belonging to two different categories - a camera (it takes pictures) and a computer scanner (it helps store digital images on a computer).

In their first study, they presented participants with two sequential labels for the product and varied the order of labels between participants. Hence, some participants saw an ad with a picture of the product and a label that stated, “works like a camera” followed
by a second ad with the same picture and a label that stated, “works like a scanner” while the remaining participants saw the ads in reverse order. The results indicated that the order of labels determined categorization of the product such that participants who saw the camera label first categorized the product as a camera and participants who saw the scanner label first, categorized the product as a scanner\(^2\). Further, performance expectations which were measured by having participants select one of a set of three images purportedly generated by a digital camera as their expected level of image quality, were correlated with categorization such that when the product was categorized as a camera, performance expectations were higher than when the product was categorized as a scanner. Finally, product evaluations were correlated with performance expectations such that higher expectations resulted in higher evaluations. Thus, study 1 demonstrated that the order of category cues that are presented to respondents is a critical factor determining categorization of an ambiguous product. The results also appear to show that inferences about a product are consistent with categorization such that only when the product is categorized as a camera, will respondents be likely to infer that its image quality will be high.

Study 2 attempted to overcome the lack of multiple inferences by presenting respondents with detailed information on how exactly the product was similar in

\(^2\) The research did not allow for the selection of a hybrid category- the categorization measure was a forced choice measure wherein respondents could either select camera or scanner or some other category but not both camera and scanner simultaneously.
functionality to both categories. Hence, in study 2, respondents again saw two sequential labels (camera and scanner) but were also given more information (e.g. “You can take pictures with the DX-250 in the same way you would with a camera” versus “You can process pictures with the DX-250 in the same way you would with a scanner” – Moreau et al, 2001, Page 495). The results of study 2 replicated study 1 in terms of categorization in that categorization was consistent with the first label provided and there was no effect of the explicit mappings on categorization. Hence, explaining to respondents how the product was similar to both categories did not have any impact on how they categorized the product.

However, there was some effect of the mappings on performance expectations such that the set of respondents to whom explicit mappings were provided showed low correlations between performance expectations and categorization. Hence, when explicit mappings were provided, whether the product was categorized as a camera or as a scanner had little impact on the product’s performance expectations. However, when explicit mappings were not provided, respondents who categorized the product as a camera had higher expectations than respondents who categorized the product as a scanner.

Implications for ambiguous products

The above research provides three important implications for the categorization and evaluation of ambiguous products. First, it suggests that the order of category cues presented to respondents is an important determinant of categorization. Hence, having
categorized the product into one category, respondents did not seem willing to consider the alternative category while making their categorization and performance expectations judgments. This finding is consistent with the research by Murphy and colleagues (1994, 1995) in that ambiguous objects are placed into single categories. Second, the results suggest that even providing additional and detailed information about exactly how the product is similar to alternative categories may not induce people to consider the alternative categories during categorization. Thus, people are resistant to viewing a product as belonging to two different categories simultaneously. Third, the results suggest that categorization impacts the performance expectations that people hold about a product and these expectations in turn, impact people’s evaluations of the product.

Limitations

While the evidence provided by the work on categorization under ambiguity appears conclusive in terms of its case against the Rational Model of Cognition suggested by Anderson (1991), there are a few limitations of this research that are important to address in order to gain a more complete understanding of the categorization and evaluation of ambiguous products. First, the possibility of a hybrid category is not allowed in this research. Hence, in the studies by Murphy and Ross (1994), participants could not categorize a stimulus as being a drawing by both John and Ed, but had to choose one category. In the stories presented by Malt et al (1995), participants could not rate the man walking down the driveway as both a burglar and a realtor. In another story from Experiment 3 in the same research, participants had to rate the probability that a
black, furry animal that streaked across a room in a story would chew slippers (a trait that is associated more with a dog than a cat). In this case, participants could not categorize the animal as both a dog and a cat. The studies by Moreau et al (2001) did not allow participants to categorize the product as both a camera and a scanner. Hence, in all the studies presented in these research papers, there was no possibility of categorizing the target object as a hybrid, i.e. as belonging to multiple alternative categories. If such a possibility were allowed, then it is possible that people would have made inferences about multiple categories for a single object.

In the context of ambiguous products however, hybridization is not only a very real possibility, but also may be a desired outcome from a marketer’s perspective. Many marketers launch ambiguous products in the marketplace in the hope that the dual (or multiple) functionality of their products will be recognized and valued, thus positioning their products apart from all other products in these categories. But since the literature on inferences under ambiguity does not allow for hybridization, its ability to predict inferences made about ambiguous products is limited to instances where the ambiguous product is categorized into a single category.

A second important limitation of this research is the lack of focus on inferences about both categories. There are no measures for product beliefs or inferences about both categories in the studies by Murphy and colleagues (1994, 1995) and Moreau et al (2001). For example, Malt et al (1995) measure a single predictive inference (e.g. probability of the person checking the sturdiness of the doors of the house) which is closely associated with one (burglar) but not the second (cable worker) category. Similarly, Murphy and Ross (1994) measure only single predictive inferences (e.g.
probability of the triangle being shaded black) that is closely associated with one category alone. In the studies by Moreau et al (2001), the performance expectation measure is a single measure and is restricted to a single dimension, namely image quality generated by the product. Given that product categories have multiple features that are considered in the evaluation decision, it is important to understand the impact that categorization has on these multiple features. Measuring a single attribute does not adequately capture the true impact of categorization on product structures.

For example, in the studies by Moreau et al (2001), knowing that the image quality is perceived to be higher when the product is categorized as a camera does not provide any insight into the beliefs about scanner properties such as ease of uploading into computers. A lack of understanding of the inferences about both categories leads to an incomplete understanding of how consumers evaluate the product. It is possible that consumers consider the product to be high on camera attributes and simultaneously high on scanner attributes, which would also explain the high correlation between performance expectations and evaluations in the camera label condition. On the other hand, it is possible that consumers view the product as being high on the attributes of only one category. In such cases, how do they make evaluations based on high expectations regarding one product and low expectations regarding the second product? These questions cannot be answered in the absence of knowledge of consumer ratings of both categories. Hence, it is important to understand the effect of categorization on sets of attributes of both categories in order to understand the implications of categorization and inferences on evaluations.
An important limitation of the research in cognitive psychology is the fact that evaluations are not considered as a dependent measure. Thus, in the studies by Murphy and Ross (1994, 1996) and Malt et al (1995), evaluations of the target object (e.g. the drawing or the man walking down the driveway) are not measured. However, in the context of marketing ambiguous products, evaluations are extremely important to consider. It is important for marketers to understand if their products are being evaluated differently based on the categorization of these products and the inferences made about them. For example, would a PDA-cell phone be evaluated differently if it is categorized as a PDA or a cell phone or as a hybrid of the two categories? Further, if inferences about only one category were made versus inferences about both categories being made, would there be any change in evaluations?

The research by Moreau et al (2001) considers only one type of category cue, namely category labels. However, there are many ambiguous products that are launched without clearly defined category labels. For example, many crossover vehicles are launched with only brand names and no category labels such as the Chrysler Pacifica or the Nissan Murano. The Handspring Treo is the brand name for a range of PDA cell phone products, while the Sony Clie is the brand name for a range of ambiguous products including a cell phone – PDA, MP3 player – PDA and camera-PDA. Hence, it is important to understand how products without category labels are categorized.

In the absence of category labels, it is possible that product attributes function as category cues. For example, an attribute such as “possesses 32 MB of Address Book capacity” may function as a cue to the PDA category. Would the same order effect that was found for the category labels be found for category attributes as well? Would
attributes be as strong as labels in terms of their impact on categorization? There is some
evidence (Yamauchi and Markman 2000) supporting the view that category labels are
different from other category attributes and are stronger predictors of categorization and
inferences. Hence, it would be interesting to empirically test the effect of product
attributes as category cues.

Another important limitation of the research by Moreau et al (2001) is the absence
of an experimental condition where two category cues were simultaneously presented to
respondents. This is an important issue to consider since theoretically, the processes
following simultaneous versus sequential cues are likely to be different. Categorization is
usually a rapid response to all perceived stimuli. Thus, perceiving a product usually
implies categorizing it as well. Under the presence of sequential cues, consumers are
therefore likely to categorize the product into the category suggested by the first cue
when they perceive the first cue and only after such categorization will they be exposed
to the second cue. A final categorization decision therefore implies categorizing the
product based on the first cue and later making adjustments to the categorization based on
the second cue. Hence, their categorization decision is usually driven by only the first
cue. Under simultaneous cues however, consumers will be exposed to both cues and will
be forced to consider both categories prior to making their categorization decision.
Hence, it is likely that both cues would influence categorization in this case. Marketing
communications such as product advertisements often present all details about the
product to consumers simultaneously. What would be the impact of simultaneously
differing category cues on categorization and inferences?
SUMMARY OF FINDINGS IN THE CATEGORIZATION LITERATURE

We now summarize the key implications for ambiguous products from the literatures in categorization. A key finding is that categorization drives product inferences and importantly, inferences appear to be limited to the category into which the product is placed. Hence, multiple category inferences do not appear to be made. That is, inferences about the product are restricted to the category into which the product is placed. This suggests that inferences about ambiguous products will be restricted to only one of the categories that comprise the product. For example, for a PDA cell phone, consumers may be likely to believe that it possesses PDA features or cell phone features, but not both.

While the research on categorization under ambiguity did not allow for hybridization of the product, the pattern of product inferences implies that people place products into single categories rather than either create new categories for new products or simultaneously categorize the products into two different categories. Even if explicitly informed about how a product is similar to two different categories, people resist placing the product into both these categories. The research on incongruity resolution finds that even when faced with products containing extremely discrepant attributes, people do not create new categories for these products. Instead, they sub-type these products, thus changing their current category structures to be more fine-grained. These results imply that ambiguous products will be placed into a single category. However, the variables determining the selection of the category have received limited attention. A single variable that has been identified is category label order; the first label that is perceived by consumers appears to be the category into which they place the product.
Third, inferences appear to affect product preferences although the process underlying the impact of inferences on preferences has not been explored in detail. Thus, it is not clear whether the lack of inferences about both categories has any impact on product evaluations. For example, in the example of a PDA cell phone, if consumers make PDA inferences but not cell phone inferences or if they make cell phone but not PDA inferences, will there be any difference in evaluations? That is, will the lack of inferences about one of the categories impact evaluations in any way?

As stated earlier, the finding that inferences for ambiguous products are restricted to a single category is sub-optimal for marketers who would want inferences about multiple categories to be made for their products. How can such multiple category inferences be induced? While the research by Moreau et al. (2001) suggests that explicit mapping of the functionalities of both products may lead to multiple inferences, their finding is limited by the fact that they do not in fact measure inferences about both categories. Given the importance of multiple category inferences, we turn to the psycholinguistics literature to derive a means by which such multiple category inferences may be induced. The literature on conceptual combinations in the psycholinguistics literature (e.g. Hampton 1987; Wisniewski 1997, 1998) provides a number of interesting and relevant findings that are germane to the present research. Since ambiguous products are those that possess salient features of more than one category, the literature on how people interpret combinations of two different categories is highly relevant in understanding how consumers may process ambiguous products that possess features of two or more product categories.
The literature on conceptual combinations focuses on how people interpret novel noun-noun combinations such as ‘whiskey-beer’ and ‘dancer-musician’. A focus on such novel combinations allows for an understanding of the processes by which people interpret such combinations and the different strategies used in such processing. An understanding of these different interpretation strategies is important since these strategies impact categorization of the combination as well as the inferences made about the combination. Different interpretation strategies are used under different circumstances and result in different inferences about the combination.

Research in this area has found four different types of interpretation strategies: property interpretations, relational interpretations, conjunctive or hybrid interpretations and known-concept interpretations (Costello and Keane 2001). Prior to detailing each of these interpretation strategies, it is important to distinguish between the head category and the modifier category in a combination. The head category is the second category in a combination while the modifier category is the first category in a combination. Thus, for the combination “book magazine”, “magazine” is the head category while “book” is the modifier category. A detailed explanation of each type of interpretation strategy is provided below.

In property interpretations, a particular property or attribute of the modifier category maps to the head category such that a “book magazine” is a magazine that is thick like a book. In relational interpretations, a relation is posited between the modifier and head categories such that a “book magazine” is a magazine about books. Under
relational interpretations, no property of the modifier category is transferred to the head category. Hybrid interpretations are akin to a special case of property interpretations, wherein attributes are transferred from both the constituents to the combination. Hence, a “book magazine” is thick like a book and has glossy pages like a magazine. Under known concept interpretations, people use their everyday general knowledge to interpret the combination. Thus, a “horse house” would be interpreted as a stable.

Interpretation strategies are important to understand since they influence both the categorization of the combination and the inferences that are made about the combination.

Categorization: The type of interpretation strategy influences the categorization of the combination. Under property and relational interpretations the combination is likely to be categorized as the head category (e.g. a book magazine is a magazine that is either thick like a book or a magazine about books), while under hybrid interpretations, the combination could be categorized as either of the constituents (e.g. a book or a magazine) or a new category could be created for the combination.

Attribute transfer: The inferred attributes of a combination depend on the type of interpretation strategy using in interpreting that combination. Thus, under property interpretations, some property of the modifier category is transferred to the head category while under hybrid interpretations, properties of both the modifier and head categories are transferred to the combination. Under relational interpretations, no properties from the modifier are transferred to the combination. Hence, despite categorizing the combination as the head category under both property and relational interpretations, the attributes of the combination can differ based on the type of interpretation strategy used.
This is a very important finding since it indicates that simply categorizing a combination may not fully explain all the attribute inferences made about that combination. The finding runs counter to the findings in the categorization literature which show that inferences about an object are restricted to a single category. Under property interpretations, inferences may be extended to incorporate attributes of the modifier category. Thus, it is important to understand attribute inferences over and above categorization. That is, given that an object is placed into a category, inferences about the object may flow from other categories as well. Hence, categorization may not be the only determinant of inferences.

While there is debate over the relative incidence of these interpretations, with some researchers claiming that relational interpretations are predominant with a very limited number of property interpretations (e.g. Gagne 2000) and others stating that property interpretations are substantial (e.g. Wisniewski and Love 1998), there is some evidence that similarity of the constituents plays a key role in the type of interpretation made about the combination (Wilkenfeld and Ward 2000). Similar combinations usually produce property interpretations while dissimilar combinations usually produce relational interpretations (Hampton 1988; Wisniewski and Love 1998).

When people process combinations, they compare the head and modifier nouns. When there is a high degree of similarity between the head and modifier nouns (e.g. whiskey beer), they are able to detect a larger number of commonalities between the two nouns (e.g. both are alcoholic, both are colored liquids etc), which enables them to
transfer attributes. On the other hand, when comparing two dissimilar nouns (e.g. monkey beer), due to limited commonalities between the two categories, there is limited scope to transfer properties from one to the other.

While similarity has been show to play a role in determining the type of strategy used, research has shown that it may be possible to prime interpretation strategies for ambiguous combinations (Wisniewski and Love 1998). In one of the studies in this research, participants were primed with ten noun-noun combinations that had either predominantly property or relational interpretations. For example, one of the property primes was “butcher surgeon” (a surgeon who operates like a butcher) while a relation prime was “kidney surgeon” (a surgeon who operates on kidneys). After interpreting all ten primes, participants interpreted a set of ten ambiguous noun-noun combinations (e.g. whale boat, book magazine, dinosaur scientist, snake spear etc.). The target ambiguous combinations had both property and relational interpretations and hence, could be interpreted using either strategy. The results of the study indicated that the type of prime had a significant effect on the interpretation strategy used to interpret the ambiguous combinations. Specifically, when property primes were used, 67% of the ambiguous combinations were interpreted using property interpretations, but when relational primes were used, 62% of the ambiguous combinations were interpreted using relational interpretations. Hence, it may be possible to prime people to use one type of interpretation strategy as compared to the other. This finding implies that interpretation strategies may not be solely determined by characteristics of the combination, but also by the processing context.
Wisniewski (1998) has presented research examining the selection of properties for transfer under property interpretations and finds that alignable properties are usually selected for transfer. Alignable properties refer to dimensions that are shared by the categories and which may have similar or differing values on these dimensions. For example, when comparing a car and a motorcycle, people may consider that both categories have tires. However, a car has 4 tires while a motorcycle has 2 tires. Thus, possessing tires is a common dimension for cars and motorcycles and hence the categories are alignable on this property. On the other hand, cars have doors while motorcycles do not. Hence, doors would be a non-alignable property for cars. Research has shown that highly alignable categories usually belong to the same taxonomic categories (Markman and Wisniewski 1997) while non-alignable categories belong to categories that are thematically linked (e.g. dining, baseball game, Bower, Black, and Turner 1979).

It is easy to understand why alignable properties would be selected for transfer under property interpretations. The process of interpreting a combination necessitates comparing the two categories in the combination. Research has shown that alignable properties receive greater processing attention during comparison than non-alignable features (Markman and Gentner 1993). If the categories are highly alignable, then a number of common dimensions emerge on which properties can be mapped between categories. Further, this extra attention may result in better memory for the alignable
features (Zhang and Markman 1998) as compared to non-alignable features. Superior memory for the alignable features may result in greater importance being attached to them during evaluation (e.g. Chattopadhyay and Alba 1988).

Implications for ambiguous products

To summarize the research discussed on psycholinguistics, people can use different types of interpretation strategies while interpreting new product combinations and the selection of such strategies is determined by the similarity of the constituents but can also be primed. The choice of strategy is important since the attributes that will be transferred to the combination product and the categorization of the combination product are determined by the strategy. The findings on inferences under property interpretations suggest that inferences about a category can be influenced by inferences from other categories, in opposition to the findings in the categorization literature (e.g. Malt et al 1995). Hence, we posit that it may be possible for marketers to prime property interpretation strategies among respondents such that the inferences about the ambiguous product will include inferences about alternative categories. This implies that ambiguous products will be categorized into a single category, but inferences about both the categories will be made. Thus, the psycholinguistics literature may offer a way to overcome the issue of lack of multiple inferences for ambiguous products. That is, by priming respondents to use a property interpretation strategy, inferences about both categories of an ambiguous product may be induced. This is because properties of the modifier category will be transferred to the head category.
Limitations

While the research on interpretation strategies is very useful in providing insights into the ways by which people interpret new information, it has one critical limitation. It does not offer any insight into the processes underlying various interpretations. Thus, while properties are transferred from the modifier to the head category under property but not relational interpretations, it is not clear why these properties are transferred only under property interpretations. While Wisniewski (1997) offers some understanding of the kind of properties that are transferred and the conditions under which they are transferred, his research does not delve into the cognitive processes such as attention and memory that underlie such transfer. For example, his results show that similar combinations result in greater property transfer due to the greater alignability of the properties of the two categories. However, there are numerous instances where the categories are not similar and yet result in property interpretations (e.g. zebra tablecloth is used as a property prime in his research, but the categories zebra and tablecloth are not similar and would not possess any alignable features). Hence, the processes underlying various interpretations have not yet been completely explored.

In this regard, the research on categorization offers some clues. Malt et al (1995) found that their respondents were able to recall both the target and alternative categories that were presented to them, but did not apparently use the alternative category while making predictive inferences about the target object. This finding suggests that people utilize information stored in their memories selectively while making predictive inferences, thereby supporting a selective retrieval rather than a selective attention
explanation for differences in predictive inferences. That is, the predictive inferences about the target category are not adjusted for the alternative categories not because people do not have the alternative categories in memory while making their inferences, but because they selectively use only the target category.

However, it must be noted that there were only two categories cued to the respondents in each of the studies conducted by Malt et al (1995). Further, there was no other information about each of the categories that was presented to the respondents. Thus, there was very little information in total for the respondents to process, which may have led to a floor effect on recall. In the context of ambiguous products, usually, respondents will have access to not just the category labels, but also information about each category. In this context, it would be useful to examine whether people do not pay attention to the category-inconsistent features or in fact, pay equal attention to both sets of features, but selectively use only one set in their inference judgments.

Extending the above discussion to interpretation strategies raises an important question regarding why property interpretations result in properties being transferred while relational interpretations do not. This question is important to address in order to render a complete understanding of how interpretations work. Knowledge of underlying processes is useful in controlling the effects of those processes. For example, if it is found that property interpretations focus people’s attention on the modifier category features, then alternative means of focusing such attention should yield results similar to using property interpretations. Thus, the scope of solutions to the problem of multiple inferences can increase significantly. We therefore include measures to test for process explanations in our studies.
An important aspect of the research on interpretation strategies is the fact that the stimuli in research studies in this area are restricted to noun-noun combinations with no other information being provided to respondents. Hence, respondents are asked to simply interpret new combinations in isolation, without any information on features about the categories being provided. Marketing communications about ambiguous products are different in that consumers often have access to a lot of information about the product with or without the category label. Hence, the research on interpretations in the psycholinguistics arena deals with a relatively information scarce environment, while the research on ambiguous products will necessarily have to deal with an information-rich environment. This difference in the amount of information provided to respondents is important to note since it may result in different judgment processes. Under the information scarce environment, consumers will make predictive inferences based solely on their memory of the attributes of each of the two categories provided while under the information rich environment, consumers will make predictive inferences based both on their memories about the attributes of each category as well as the attribute information that is provided to them. Hence, under the information rich environment, consumers may be forced to acknowledge that the product does in fact possess features of more than one category. It would be interesting to empirically observe the effects of such processing differences under information rich versus scarce environments.

A final limitation of the work on interpretation strategies is the lack of measurement of evaluations. All of the research on interpretations considers the categorization of different combinations and the properties that are attributed to the combination, but does not consider how evaluations of the combination may be different
across different interpretations. As stated earlier, the work on inferences under ambiguity suffers from a similar limitation. Product evaluations are extremely important in marketing with a key marketing objective being to increase evaluations or render them more favorable. Hence, it is important to include evaluations as a dependent measure and understand how such evaluations may change under property versus relational interpretations. A priori, it is possible that since properties are transferred to the combination under property interpretations, these properties become important in determining overall evaluation of the combination. Thus, the presence of stripes may become critical in determining evaluations of a zebra tablecloth. Under relational interpretations however, since no properties are transferred between categories, the combination may be evaluated as just another member of the head category. Alternatively, the relation between the head and modifier categories may influence evaluations. For example, a holiday tablecloth may be evaluated on the basis of its attributes as a tablecloth like any other, but the context of holidays may result in some positive feelings associated with the tablecloth leading to higher evaluations. Thus, it is possible that different interpretations may yield different evaluations.

SUMMARY

We will now summarize the key implications of our review of the literatures in categorization and psycholinguistics and attempt to assimilate the findings from each of these literatures to identify and solve issues in the context of ambiguous products.
A consistent finding across all the literatures reviewed is that people tend to select a single category in which to place an object rather than create new categories for objects that appear inconsistent with current categories. Thus, when presented with alternative categories, people tended to select one category as the most likely category in the series of studies by Malt, Murphy and colleagues (1994, 1995). In the work on incongruity resolution, Sujan and Bettman (1989) find that consumers categorize extremely atypical new products as sub-types of extant categories. Hence, they do not create new categories for atypical products but attempt in a fashion to relate them to existing categories. Work in psycholinguistics finds that when provided with noun-noun combinations, people tend to categorize the combination as a member of the head category and rarely consider the combination to be a hybrid or a member of both categories. Thus, one consistent finding across all the three areas of review is the fact that people tend to resist creating new categories for atypical or ambiguous objects. As stated earlier however, this finding is necessarily limited to either noun-noun combinations in the absence of any feature information or to cases wherein hybridization is not possible or to instances where the object is labeled as a member of a particular category but is stated to have features that are atypical of the category. Thus, while the finding is consistent, it certainly bears further investigation in the context of ambiguous products where consumers are provided attribute information about each category or when consumers may not be provided with a category label or where consumers have an opportunity to hybridize the product. We propose to carry out such an empirical investigation in our research.

A second important finding is that people appear to restrict their predictive inferences about an object to a single category alone. Hence, they do not appear to
consider alternative categories (Malt et al 1995). Moreau et al (2001) demonstrated a partially contrary finding when explicit mappings between alternative categories and the ambiguous product were provided to consumers. However, their measure of multiple inferences was a weak measure since they did not measure inferences about both categories. Thus, it is a matter of speculation as to whether multiple inferences were truly induced in their study.

It is also important to note that an understanding of why people do not generate multiple inferences is as yet lacking. While Malt et al (1995) suggest that people selectively retrieve information about categories from memory while making predictive inferences, the fact that only two categories (and no other category information) was provided in their studies may have resulted high levels of recall. If additional information about both categories is provided then the amount of information may result in selective attention being paid to only a single category’s features. Hence, we contend that either selective attention or selective retrieval or both processes may explain the lack of multiple category inferences.

The finding on lack of multiple inferences is critical in the context of ambiguous products since marketers would desire to overcome the lack of such multiple inferences. The literature on noun-noun interpretations provides useful insight into how such multiple inferences may be achieved. This literature indicates that by priming property interpretations amongst consumers, they should transfer properties between categories and make inferences about both categories comprising the ambiguous product. Hence, the psycholinguistics literature may offer a solution to the problem posed by the lack of multiple category inferences.
A key limitation of all the three research streams discussed is the lack of focus on the linkage between categorization and evaluations. While the inferences under ambiguity and interpretation literatures do not even measure evaluations, the research by Moreau et al (2001) does not consider the linkage between categorization, inferences and evaluations in detail. This relationship is crucial to consider since a major marketing objective is to generate favorable evaluations of a product and to understand what attributes or beliefs about the product determine evaluations.

OUR CONCEPTUAL FRAMEWORK

Figure 1 outlines the conceptual framework for this dissertation. The key objective is to understand the impact of ambiguity on categorization, inferences and evaluations of products. We specifically attempt to address the following questions:

1. How do different marketing communication variables, specifically cue order and cue type (labels versus non label attributes), interact to affect categorization and inferences for ambiguous products?

2. How do product inferences affect product evaluations for ambiguous products?

3. How can inferences about multiple categories be induced?

4. What is the impact of inducing inferences about multiple categories on product evaluations?

Hence, our focus is on providing a better understanding of the factors that determine categorization of ambiguous products and how categorization of these products
impacts product inferences and product evaluations. We attempt to discover how inferences about more than one category can be induced for ambiguous products by utilizing the literature on psycholinguistics. Our contention is that priming property interpretation strategies prior to exposure to information on ambiguous products should result in multiple category inferences.

Our framework significantly extends past research in two key ways. First, we attempt to resolve a significant problem that is likely to exist for ambiguous products – namely, the restriction of inferences about the product to a single category. By incorporating findings from the psycholinguistics literature, we hope to demonstrate that priming a property interpretation strategy will induce inferences about multiple categories. This will be a significant departure from previous research findings that have consistently found only single category inferences.

Second, we consider product evaluations as our key dependent measure and focus on understanding how categorization and inferences affect evaluations. Given the importance of product evaluations for marketers and the limited focus on evaluations in past research, an understanding of what drives evaluations for ambiguous products is critical.

Thus, overall our framework is an attempt to identify and resolve issues associated with the categorization and evaluation of ambiguous products. Not only do we provide a better understanding of the cognitive processes underlying the categorization of ambiguous products, but also suggest ways to leverage this understanding to control consumer evaluations of the products.
Our approach also addresses the limitations of past research that have been outlined in the previous sections. We specifically allow for the possibility of hybridization by examining conditions where no category labels, but cues about two different categories are presented simultaneously to respondents (Study 1). We will then explore whether multiple inferences are generated and the processes underlying inference patterns for ambiguous products. We will also examine how these inference patterns...
affect evaluations of the ambiguous product (Studies 2 and 2A). We then explore the processes underlying different interpretation strategies and empirically test the effects of priming property versus relational interpretations on inferences and evaluations (Study 3). We thus combine research from two different literature streams – categorization theories and psycholinguistics – to examine how inferences about one category can be influenced by inferences from other categories. The finding that all product inferences are not derived solely through categorization, but also from the type of interpretation strategy used will be a radical departure from traditional categorization theory findings, which predict that inferences are derived from categorization.

Overall, this dissertation will provide a better understanding of the comprehension processes of ambiguous products by consumers and suggest ways by which marketers can promote acceptance of their products.

In the next chapter, we will examine the first part of our framework. Specifically, we will consider how different communication cues such as category cue type and cue order interact to affect product categorization and product inferences.
CHAPTER 3
CATEGORIZATION AND INFERENCE MAKING FOR AMBIGUOUS PRODUCTS

In this chapter, we examine the role played by different types of marketing communication cues on the categorization and evaluation of ambiguous products. Specifically, we consider category labels versus non-label product attributes as two different types of category cues and explore their role in categorization and inference making. We begin by formulating our hypotheses based on relevant past research and subsequently present results from an empirical study conducted to test these hypotheses.

ROLE OF CATEGORY LABELS AND NON-LABEL ATTRIBUTES IN CATEGORIZATION

Category Labels

Category labels have been shown to predict categorization better than other category features (Yamauchi and Markman 2000). Labels are different from other category features in that labels refer to a whole object (e.g. chair), while features refer to only parts of objects (e.g. legs). While labels use class inclusion relations to (e.g. this object is a table), features use partonomic relations (this object has 4 legs). These differences have been used to explain why labels play a greater role in categorization and induction as compared to other features.
For example, in one study, when the category labels were designed so as to refer to only parts of an object (“bugs tagged with monek have poisonous needles”) rather than the entire object (e.g. “bugs that are poisonous are named monek”), there was no difference in induction between the label and non-label attributes (Yamauchi and Markman, 2000, Page 790).

Yamauchi and Markman (2000) find that predicting the value of a feature given either a category label or the value of other features can lead to very different results. In their studies, respondents were presented with two different types of fictitious bugs – moneks and plaples. They were given schematic drawings of five instances of each type of bug with five key features included in the drawings (e.g. type of horn = long vs. short, legs = four vs. eight etc). They were then shown a new instance of a bug and either asked to categorize it as a monek or plaple or were given the category label for the bug and asked to infer a missing value on one of its five features (e.g. type of horn). The results indicated that when respondents had access to the category labels (e.g. this bug is a monek), the feature inferences were made strictly according to the category label, even when the remaining features were inconsistent with the category label. Only when the respondents did not have access to the category label were inferences made that were consistent with the other features that the bug possessed. Thus, when the similarity of an object to the features of a category and to the category label were placed in opposition, respondents were more likely to select infer a feature value for the object that was consistent with the category label than the value consistent with the other features. Hence, category labels appear to be stronger drivers of categorization than other category features.

These findings suggest that when the category membership of an object is known, people make inferences about a feature based on the typical value of the feature amongst
members of that category. Thus, category labels may influence people to make label consistent inferences. From a consumer perspective, the provision of category labels should influence the inferences drawn about the attributes of the product. Given a label, consumers should tend to restrict their inferences to the features associated with the label categories and should be unlikely to make inferences that are consistent with features of other categories.

Cue order

Even when category labels are provided, the order of their presentation has been found to affect categorization. Research by Moreau et al (2001) found that if exposed to a new product (e.g. a digital camera) that could be cued using more than one existing category (e.g. a “scanner” or a “camera”), respondents tended to categorize the object into the first category that was cued using a category label (e.g. “works like a scanner”). Hence, order of category labels had a significant impact on categorization with the first label provided determining categorization.

Non-label attributes

While the importance of category labels in categorization has been established, there is no research in marketing that has explored the role of non-label attributes relative to labels on categorization. Many ambiguous products are launched without category labels and consumers are merely exposed to different attributes of the products in the absence of a category label (e.g. “good voice clarity” and “good appointment scheduling capabilities” as
attributes of a PDA-cell phone product). It is therefore important to understand how consumers use such product attributes in their categorization decisions. Based on the research by Moreau et al (2001), we suggest that non-label cues will demonstrate order effects on categorization that are similar to the order effects for labels. Thus, in the absence of category labels, the order of the non-label cues should determine categorization with the product being categorized into the category of the first cue provided. This is because product attributes can also function as category cues although they may be weaker cues than category labels. Hence, the order effects that have been shown for labels should also apply to non-label attributes.

Labels versus non-label attributes

When both category labels and non-label categories are provided, then we suggest that category labels will have stronger effects on categorization than non-label attributes (Yamauchi and Markman 2000). Hence, categorization will be determined by the label provided regardless of the ordering of other attributes provided.

The above discussion has identified two variables that could have an impact on categorization of ambiguous products – category cue type (labels versus non-label attributes) and category cue order. Cue order and labels are particularly important to study given that both of them are within the control of the marketer. Based on the above discussion, we hypothesize that:
H1: If a category label is provided for an ambiguous product, categorization of the product will be based on the category cued by the label regardless of the order of the categories cued by other attributes.

H2: When no category label is provided, categorization of the product will be based on the order of categories cued through attributes.

CATEGORY INFERENCES

Category inferences are deduced from the category in which an object is placed (e.g. Malt et al 1995; Yamauchi and Markman 2000). Hence, inferences about an ambiguous product will be consistent with the attributes of the category into which the product is placed. That is, if category labels and/or cue order determine categorization of an ambiguous product, then they will also determine the inferences that are made about the product. Thus, we hypothesize that:

H3: If a category label is provided for an ambiguous product, inferences about the product will be based on the category cued by the label regardless of the order of the categories cued by other attributes.

H4: When no category label is provided, inferences about the product will be based on the order of categories cued through attributes.

We conducted an empirical study to test the above four hypotheses and present the design, methodology and findings of this study in the next section.
Prior to conducting the main study, we conducted a series of pretests in order to select a suitable ambiguous product as the target product in the study. We first compiled a list of ambiguous products from a survey of magazines including Business Week and Scientific American and by conducting an online search using the search engine “Google”. Our search revealed a set of 95 new ambiguous products and we selected 11 products from this list for our pretests (Appendix A).

Pretest 1

The first pretest using 385 undergraduate students from an introductory marketing class was conducted to assess knowledge, familiarity and usage of the 11 selected products among undergraduate business students who comprise the population for our study. The objective of this pretest was to identify products about which students were equally familiar and knowledgeable. This was done in order to rule out any differences in categorization based on prior knowledge (Sujan 1985). The pretest was conducted as part of a routine survey that all students of an introductory marketing class filled out along with other unrelated measures at the beginning of an academic quarter. The questionnaire used in the pretest is presented in Appendix B. Students were given the list of 11 products and asked to rate each of these products on three different scales. The first scale measured familiarity with the product (How familiar are you with this product? 1 = Very unfamiliar, 7 = Very familiar). The second scale measured frequency of usage for the product (How often do you use this
product? 1 = Not at all often, 7 = Very often). The third scale measured knowledge levels for the product (How knowledgeable are you about this product? 1 = Not at all knowledgeable, 7 = Very knowledgeable).

Based on this pretest, 2 products (SUV-Pick up truck, and Digital camera-Electronic organizer) were selected since students did not differ in their knowledge, familiarity and usage levels for these products. The mean ratings on each of the three scales for these two products are presented in Table 1 below.

<table>
<thead>
<tr>
<th></th>
<th>SUV</th>
<th>Pick up truck</th>
<th>Electronic organizer</th>
<th>Digital camera</th>
</tr>
</thead>
<tbody>
<tr>
<td>Familiarity</td>
<td>5.11</td>
<td>4.19</td>
<td>3.87</td>
<td>4.73</td>
</tr>
<tr>
<td>Usage</td>
<td>2.72</td>
<td>2.16</td>
<td>1.98</td>
<td>2.93</td>
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<tr>
<td>Knowledge</td>
<td>4.52</td>
<td>3.71</td>
<td>3.16</td>
<td>4.19</td>
</tr>
<tr>
<td>Overall</td>
<td>4.11</td>
<td>3.35</td>
<td>2.99</td>
<td>3.94</td>
</tr>
</tbody>
</table>

Table 1: Results of Pretest 1

Pretest 2

The objective of the second pretest was to select ambiguous pictures of the two products that were selected in pretest 1 (SUV – Pick up truck and PDA – Camera). That is,
we wanted to select pictures that could be perceived as being either of the two products in each combination or as a hybrid of the two products. For example, a picture of the PDA Camera needed to be perceived as being that of a PDA or both a PDA and a camera when labeled a PDA and perceived as being a camera or both a camera and a PDA when labeled a Camera. The two products selected from pretest 1 were therefore subjected to a second pretest in which different pictures of these products were shown to a separate sample of undergraduate students. The stimuli used in the pretest are presented in Appendix C. A sample of 20 undergraduate students from the same introductory marketing class rated 12 pictures that included 6 different pictures of these 2 products (3 of each product) and 6 filler pictures of other products using two different measures. First, they were asked to look at the picture and write down the product that was shown in the picture. After all the pictures were shown, the same pictures were shown again and subjects were asked to indicate which of the two products the picture resembled more. For example, for the Digital camera – PDA, subjects were asked to indicate on a 5-point scale if the picture was more like a digital camera or like an PDA (1 = cell phone, 5 = PDA).

The second pretest yielded one picture of an Electronic Organizer-Camera that was ambiguous, but no pictures of the SUV-Pickup truck that were ambiguous. Each of the pictures of the SUV-Pick up truck was rated as being predominantly that of either a SUV or a pick up truck, but not as both. Hence, based on the results of the first two pretests, a camera organizer was selected as the target ambiguous product. Students had low prior knowledge on both cameras and organizers and a suitably ambiguous picture was available. The picture selected for the study was rated as being that of an organizer by 16% of the respondents, a camera by 21% of the respondents, a combination of the two products by 32% of the
respondents and some other category (e.g. an electronic device) by 31% of the respondents. For the scaled measure, the average rating for the picture was a 3 on the 5-point scale indicating that respondents considered the product to resemble a camera and an organizer about equally.

Pretest 3

A third pretest was conducted with 31 undergraduate students to obtain typical attributes of digital cameras and electronic organizers, which would be used in the target advertisements. Students were given a list of thirteen different products including an electronic organizer and a digital camera and asked to list as many important features of the product as they could. The questionnaire used in the pretest is presented in Appendix D. All attributes used in the main study were selected from these lists of attributes. A frequency analysis of the attributes listed was conducted to select the final list of attributes. The final list of attributes included date book/Calendar, address book, to do list, internet, email and stylus for the electronic organizer and zoom, auto focus, flash, preview pictures, viewfinder and resolution/megapixels for the digital camera.
STUDY 1

Design

The objective of this study was to test the relative impact of cue type and cue order on categorization and inferences of ambiguous products. The study was designed as a three (label: None, Digital camera, Electronic organizer) x two (cue order: Digital camera, Electronic organizer) between subjects study. Hence, a total of six experimental conditions were tested and subjects were randomly assigned to one of these six experimental conditions. The stimuli used in the study are presented in Appendices E, F and G.

In the previous chapter, we had stated that one of the limitations of past research in categorization of ambiguous products has been the absence of the possibility of hybridization of the products. By examining a no-label condition wherein attributes of two different categories are presented simultaneously, we attempt to overcome this limitation. Another limitation that we identified in past research was the sequential nature of category cues provided to respondents (Moreau et al. 2001). By presenting our category cues simultaneously in a single advertisement, we overcome this limitation as well. Finally, by providing sets of attributes about both categories to our respondents, we provide an information-rich context rather than an information-impoverished context as has been provided in past research (Malt et al. 1995, Moreau et al. 2001). For example, Malt et al (1995) provided only a category label to respondents (e.g. cable worker or burglar) with no
attribute information. We believe that the information-rich context is a more realistic setting than the information-impoverished context for ambiguous products, since most marketing communications would contain attribute information about both products.

Based on hypotheses 1-4, we expected to find an interaction between cue type and cue order on categorization such that when a label was provided, the product would be categorized as the category mentioned in the label irrespective of the cue order, but when no label was provided, the cue order would determine categorization. Similarly, an interaction was expected for product inferences such that when a label was provided, inferences would be consistent with the category mentioned in the label irrespective of the cue order, but when no label was provided, the cue order would determine inferences.

Procedure

One hundred and fifty undergraduate students participated in the study in return for course credit. They were informed that the study was an advertising evaluation study. They were given a booklet that contained a set of four advertisements (three filler advertisements and the target advertisement) with the target advertisement always in the fourth position. The respondents read through these advertisements at their own pace and then were given a second booklet that contained the dependent measures. They were not allowed to refer back to the advertisement while providing their responses.
Stimuli

The target advertisement was for a fictitious brand called Xircom. A two-page advertisement was used with the first page containing a picture of the product with a headline containing the label manipulation. In the no category label condition, the name DX-1500 was used as the product name. The headline was “Introducing the revolutionary new Xircom (Digital camera / Electronic organizer / DX-1500)…” The second page contained the same product picture with two sets of attributes listed underneath in bullet form. The attributes for the organizer were “has a Date Book, an improved Address Book and To Do List” while the camera attributes were “has a 3X optical/6X digital zoom lens with a built-in intelligent flash and Optical Viewfinder.” The order of presentation of these two sets of attributes was varied as the cue order manipulation. Thus, in the organizer cue first condition, organizer attributes were presented ahead of the camera attributes while in the camera cue first condition, camera attributes were presented ahead of the organizer attributes.

Dependent variables

_Categorization._ Three different measures were used to capture categorization of the product. The first measure was an open-ended measure wherein respondents were asked to write down the product category to which they felt the product belonged. Responses to this measure were coded into one of five categories – digital camera, electronic organizer, digital camera and electronic organizer (hybrid category), some abstract category (e.g. electronic device) and neither camera nor organizer (e.g. cell phone or computer).
The second measure was a forced choice measure wherein respondents were provided the layout for a typical electronics store and asked to choose the first department they would go to in order to find the product. This measure was similar to the categorization measure used by Moreau et al (2001). A total of six different departments were listed including cameras and organizers.

The third measure used was a fuzzy set measure of categorization (Viswanathan and Childers 1999). A fuzzy set measure attempts to capture the degree of membership of a product in a particular category by measuring the average difference in attribute ratings between a typical category member and the target object. The closer this difference is to zero, the higher the degree of category membership. A fuzzy set measure was computed by having respondents rate the same attributes that they rated for product beliefs for the target product and for a typical category member. The ratings for the typical category member were obtained after they had finished responding to all other measures. For example, respondents rated how likely it was that Xircom would possess a to do list and then rated how likely it was that a typical electronic organizer would possess a to do list.

The difference between the two ratings is an indicator of the extent to which Xircom is perceived as being a typical organizer and this rating used to compute the fuzzy set measure of categorization. An average difference between the target product and the typical member was computed across all the attributes rated as follows:

\[
I_j = \left[ \frac{\sum_{i=1}^{M} |C_{ij} - P_{ij}| / M}{n} \right]^{1/n}
\]
where \( P_i \) is the level of the \( i^{th} \) attribute for the product, \( C_{ij} \) is the level of the \( i^{th} \) attribute for the \( j^{th} \) category and \( M \) is the number of attributes measured. Separate fuzzy set measures for the camera category and the organizer category were computed.

**Product beliefs**\(^3\). Two different measures were used to assess product beliefs. The first measure was an open-ended measure asking respondents to list all the features that they expected the product to possess (Sujan and Dekleva 1987). The number of organizer features and camera features listed was the belief measure.

The second measure was a scaled measure where beliefs were captured on 7-point scales. Two different types of beliefs were measured – beliefs about attributes stated in the advertisement (e.g. will have an address book) and beliefs about attributes not stated in the advertisement (e.g. will come with a pen that allows data entry into the product). Two inferred beliefs and two stated beliefs for each product were measured resulting in a total of eight beliefs. Respondents were asked to rate how likely it was that the product possessed each attribute. A scale reliability analysis indicated that the Cronbach’s alpha for the set of organizer beliefs was 0.66 and for the set of camera beliefs was 0.69. Hence, a product belief measure for each product was obtained by averaging across the four beliefs for each product.

**Involvement.** A four-item, seven-point scale (Miniard, Bhatla, and Rose 1990-Cronbach’s alpha = 0.76) was used to capture respondents’ involvement levels while reading the advertisement. The average involvement across all respondents was 5.27. No differences in involvement were found across conditions and this measure is not discussed further.

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\(^3\) In order to distinguish inferences about attributes stated in the advertisement and unstated attributes, the term product beliefs is used instead of product inferences.
RESULTS

Seven respondents were dropped from the analysis due to wrong categorization of the product into one of the filler advertisement products (e.g. vacuum cleaner). The results for the remaining one hundred and forty three respondents are presented below.

Categorization

*Open-ended category measure.* A chi-square analysis revealed the predicted interaction between cue type and cue order for the category listed ($\chi^2 (15) = 79, p < .01$). Specifically, a main effect of label was found in the labeled conditions such that a significantly larger percentage of respondents categorized the product as a camera (organizer) when labeled a camera (organizer), supporting H1. As expected, a relatively low percentage of respondents categorized the product as a hybrid (14%) or as an abstract product (e.g. electronic device – 8%) across both the camera and the organizer label conditions. Hence, respondents tended to categorize the product into a single category (either a camera or an organizer) in the presence of a label, despite the presence of other category cues.

In the non-labeled conditions, a main effect of cue order was not found for the category listed ($\chi^2 (3) < 1, p > .1$) and H2 was therefore not supported. A majority of respondents categorized the product as an organizer regardless of the cue order. This finding is unexpected, particularly given the results of the second pretest where the product picture was rated as being ambiguous with regard to a camera and an organizer. Hence, the picture
should not have influenced categorization as an organizer. A possible post-hoc explanation for dominance of the organizer category could be that an organizer that contains a camera is easier to imagine or appears more plausible than a camera that contains an organizer. However, this explanation is necessarily speculative and additional measures would be needed to understand the basis for finding in detail.

An interesting finding is that while the percentage of respondents who categorized the product as a hybrid (20%) or as an abstract product (13%) was higher in the unlabeled conditions than the labeled conditions, these percentages were still relatively low when compared to the percentage of respondents who selected a single category. Hence, even in the absence of a label, a product with stated typical features of two different categories was categorized into a single category and not hybridized. The results for the open ended measure are presented in Table 2 below.

<table>
<thead>
<tr>
<th>Cue</th>
<th>Organizer Label</th>
<th>Camera Label</th>
<th>No label</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Organizer</td>
<td>Camera</td>
<td>Organizer</td>
</tr>
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<td>Org.</td>
<td>72</td>
<td>64</td>
<td>13</td>
</tr>
<tr>
<td>Camera</td>
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<td>8</td>
<td>75</td>
</tr>
<tr>
<td>Both</td>
<td>20</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>Abstract</td>
<td>8</td>
<td>12</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 2: Results for the open ended categorization measure (Percentage respondents)
Department selected. A chi-square analysis revealed the predicted interaction between cue type and cue order for the department selected ($\chi^2 (10) = 69, p < .01$). Specifically, a main effect of label was found in the labeled conditions such that a significantly larger percentage of respondents selected the camera (organizer) department when the product was labeled a camera (organizer), supporting H1. Similar to the results for open ended measure, there was no effect of cue order on department selected ($\chi^2 (2) < 1, p > .1$) in the unlabeled conditions. Hence, H2 was not supported for the department store measure. The results for the department measure are presented in Table 3 below.

<table>
<thead>
<tr>
<th>Cue →</th>
<th>Organizer Label</th>
<th>Camera Label</th>
<th>No label</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Organizer</td>
<td>Camera</td>
<td>Organizer</td>
</tr>
<tr>
<td>Org.</td>
<td>96</td>
<td>92</td>
<td>21</td>
</tr>
<tr>
<td>Camera</td>
<td>4</td>
<td>8</td>
<td>79</td>
</tr>
<tr>
<td>Neither</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 3: Results for the department measure (Percentage of respondents)

Fuzzy set measure. Univariate analyses of variance were run on the fuzzy set measures using cue type and cue order as the independent variables. While the cue type x cue order interaction was not significant for either of the fuzzy set measures ($F_{Organizer}(2, 135) < 1, p > .1$; $F_{Camera}(2, 135) = 1.98, p > .1$), there was a main effect of label on both fuzzy set
measures ($F_{\text{Organizer}}(2, 135) = 3.36, p < .03$; $F_{\text{Camera}}(2, 135) = 4.24, p < .01$). The means for these measures were also in the expected direction. The product possessed higher membership in the organizer category when labeled an organizer (1.03) than a camera (1.48, $t = 2.33, p < .02$) and higher membership in the camera category (1.04) than the organizer category (1.33) when labeled a camera ($t = 2.91, p < .01$). Interestingly, the fuzzy set measures are significantly different from zero across all experimental conditions. Hence, the product does not appear to be viewed as either a typical organizer or a typical camera. Instead, the relative difference in measures indicates that the product is viewed more as one category than the other. Similar to the results in the earlier two categorization measures, there was no effect of cue order on the fuzzy set measures in the unlabeled conditions. Hence, H2 was not supported for the fuzzy set measures. Thus, overall, H1 is supported for all three categorization measures, but H2 is not supported for any of the three measures.

\[4\] Scores closer to zero indicate higher degree of membership in the category.
Figure 2: Fuzzy set measures in the labeled conditions in Study 1

Figure 3: Fuzzy set measures in the unlabeled conditions in Study 1
Effect Results

<table>
<thead>
<tr>
<th>Effect</th>
<th>F</th>
<th>Degrees of freedom</th>
<th>p&lt;</th>
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</thead>
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<tr>
<td>Cue type</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Organizer</td>
<td>3.36</td>
<td>2</td>
<td>.03</td>
</tr>
<tr>
<td>Camera</td>
<td>4.25</td>
<td>2</td>
<td>.02</td>
</tr>
<tr>
<td>Cue order</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizer</td>
<td>.03</td>
<td>1</td>
<td>.86</td>
</tr>
<tr>
<td>Camera</td>
<td>.13</td>
<td>1</td>
<td>.72</td>
</tr>
<tr>
<td>Cue type X Cue order</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizer</td>
<td>.54</td>
<td>2</td>
<td>.58</td>
</tr>
<tr>
<td>Camera</td>
<td>1.98</td>
<td>2</td>
<td>.14</td>
</tr>
</tbody>
</table>

Table 4: Analysis of variance results for the fuzzy set measures

Product beliefs

The two belief measures were each subjected to a multivariate analysis of variance using cue type and cue order as the independent variables.

*Number of features listed.* A multivariate analyses of variance revealed that the interaction between cue order and cue type was not significant for the number of features listed ($F_{Organizer}(2, 137) < 1, p > .1$, $F_{Camera}(2, 137) < 1, p > .1$). However, the pattern of means was in the expected direction. A larger number of organizer features were reported when the label was organizer versus camera (1.86 vs. 1.27, $t (141) = 2.25, p < .02$) while a larger number of camera features were reported when the label was a camera versus an organizer (1.45 vs. 1.06, $t (141) = 2.10, p < .03$).
In the no label conditions, there was no effect of cue order on product beliefs. Hence, H4 was not supported. Across both the no-label conditions, the number of organizer features listed was directionally higher than the number of camera features listed (1.49 vs. 1.15, \( t = 1.44, p > .1 \)), consistent with the dominant categorization of the product as an organizer.

Figure 4: Number of features listed in Study 1

**Scaled belief measures.** A multivariate analysis of variance revealed no significant interaction between cue type and cue order for the scaled belief measures (\( F_{\text{Organizer}}(2, 137) = 1.01, p > .1 \), \( F_{\text{Camera}}(2, 137) < 1, p > .1 \)). However, similar to the number of features listed, the pattern of means was in the expected direction. Thus, organizer beliefs were higher when
the product was labeled an organizer than when it was labeled a camera (Label_organizer = 5.65, Label_camera = 5.25, \( t (140) = 1.99, p < .05 \)). On the other hand, camera beliefs were higher when the product was labeled as a camera than as an organizer (Label_organizer = 5.04, Label_camera = 5.64, \( t (140) = 2.77, p < .05 \)).

When no label was provided, there was no effect of cue order on either organizer or camera beliefs. Thus, H4 was again not supported. Across both the no-label conditions, organizer beliefs were significantly higher than camera beliefs (Beliefs_organizer = 5.77, Beliefs_camera = 5.27, \( t = 2.39, p < .02 \)). This pattern of beliefs is consistent with the categorization of the product as an organizer in the no-label conditions. Thus, even though there was no cue order effect, product beliefs were consistent with product categorization.

Figure 5: Scaled belief measures in Study 1
DISCUSSION

The results of Study 1 provide support for H1 and H3 while H2 and H4 are not supported. The findings indicate that consumers tend to interpret ambiguous new products in light of extant categories. The percentage of respondents who categorized the new product as a hybrid or abstracted the product to a super-ordinate category (e.g. electronic device) was low, even in the absence of a category label. Hence, significant levels of hybridization were not observed. This finding suggests that if marketers do not provide cues to control consumer categorization of their products, consumers will pick one category to place the product in and marketers will no longer control the choice of such category. Hence, providing category cues to affect categorization is important and category labels appear to be strong cues that drive categorization.

The results also indicate that labels dominate other category attributes in terms of their impact on categorization and product beliefs. Hence, ambiguity may be resolved by providing strong category cues such as labels. However, the provision of non-label cues did not appear to have any significant effects on categorization or inferences. Whether organizer or camera attributes were presented first did not make a difference in the way the product was categorized. This finding is rendered even more puzzling due to the fact that the product was categorized as an organizer in both conditions. Hence, we are unable to support cue order effects and are also unable to offer an explanation for the lack of such effects. As stated earlier, the lack of effects may be due to the greater plausibility or ease of imagining of an organizer which also possesses camera features as compared to a camera that possesses organizer features, but such speculation is necessarily post hoc.
While category labels appear to resolve ambiguity and direct categorization to be label-consistent, categorization in the presence of a label yields stronger product beliefs about the label consistent as compared to inconsistent category. Hence, consumers appear more likely to make inferences about label consistent categories as compared to label-inconsistent categories. While respondents did make inferences about both categories, label consistent inferences were significantly more likely than label inconsistent inferences. Thus, despite apparently credible information on both product categories, category inferences were more likely for the label consistent category than the inconsistent category.

We overcome three specific limitations of past research with regard to the categorization of ambiguous products in study 1. First, we allow for the possibility of hybridization of the product. Second, we present substantially greater information about the product and its alternative categories than has been presented in past research. Finally, we present information on alternative categories simultaneously rather than sequentially in order to evoke a more realistic setting for our stimuli. Despite these differences in our study methodology, we still do not find high levels of hybridization or multiple category inferences.

To summarize, the results of study 1 provide useful insights into the linkages between category cues, categorization and product beliefs. The results indicate that people tend to categorize an ambiguous product into a single category and are likely to restrict their inferences about the product to attributes that are consistent with the category into which they place the product. The results also suggest that labels are stronger cues than other non label attributes in determining categorization and product inferences.
LIMITATIONS AND WAY FORWARD

One limitation of Study 1 is the lack of cue order effects in the non-labeled conditions. We did not find any impact of cue order on either categorization or product inferences in the non-labeled conditions and are unable to explain this null result. As stated earlier, one possibility is that an electronic organizer with some camera features is more plausible or easier to conceive of than a camera with some organizer features, but this explanation is necessarily post hoc and speculative.

A limitation of Study 1 is the fact that if the category label is considered as a category attribute, then the amount of information provided about the label-consistent category (label + three attributes = four attributes) is greater than the amount of information provided about the label-inconsistent category (three attributes). This also implies that the amount of information in the labeled conditions is greater than the in the non-labeled conditions. This difference in the amount of information, as opposed to the interaction of cue type and cue order offers an alternative explanation for the categorization and inference effects found in the study. Hence, this limitation is addressed in Study 2 where we equate the amount of information provided across all conditions.

Study 1 also does not provide any insights into the impact of differential product beliefs on product evaluations. A logical question would be to consider if the differential beliefs found in study 1 have any impact on product evaluations. If beliefs about both categories are used while evaluating the product, then evaluations under both label (camera or organizer) conditions should be no different. However, if only beliefs about a single category drive product evaluations, then the implications of categorization would be much
stronger. That is, evaluations would be dependent on only one category’s attributes and it
would therefore be critical for marketers to understand which category consumers select to
make these inferences. Study 2 was therefore conducted to examine the linkage between
categorization and product evaluations.
CHAPTER 4

THE EFFECT OF INFERENCES ON EVALUATIONS OF AMBIGUOUS PRODUCTS

In this chapter, we examine the impact of inferences on product evaluations for ambiguous products. The results of Study 1 indicated that categorization of ambiguous products is in line with the category label provided and further, that inferences about these products are consistent with categorization. Thus, there is a significant difference in the inferences made about label-consistent and label-inconsistent categories such that label consistent category inferences are more likely to be made than label inconsistent category inferences. We now address the question of whether and how these differential inferences impact product evaluations. We also wanted to equalize the amount of information provided to respondents in all the experimental conditions to see if the effects obtained in Study 1 would be found under equal information conditions.

INFERENCES AND EVALUATIONS

Past research in categorization has found that people tend to retrieve category consistent information as opposed to category-inconsistent information while making inferences about objects (Malt et al 1995). As outlined in the literature review, respondents were provided only the category labels (e.g. cable worker versus burglar) as
part of the study stimulus and were thus required to retrieve very little information during recall. The high levels of recall may therefore be attributed to a floor effect, wherein the small number does not impose any constraints on cognitive processing and hence, it is easy to recall both categories. If the amount of information provided to respondents was larger, it is possible that cognitive constraints would have been imposed leading to a differential amount of attention paid to category consistent versus inconsistent information. Hence, one study cannot rule out differences in attention paid to category consistent versus inconsistent information as an explanation for the tendency of inferences to be category-consistent. Further research is needed to explore whether the likelihood of category consistent inferences being higher than category inconsistent inferences would hold under conditions where information other than merely the category labels is provided to respondents.

But, whether the process underlying the tendency of inferences to be category consistent is selective attention or selective retrieval or both, all of these explanations suggest that the memory for category consistent attributes should be superior to the memory for category inconsistent attributes.

Superior memory for product information has been shown to influence product evaluations. For example, Chattopadhyay and Alba (1988) found that the order in which brand attributes were recalled had a significant effect on brand evaluations such that the attributes that were recalled earlier had a greater effect on evaluations than attributes that were recalled later. In research dealing with attitude accessibility, Fazio and his colleagues (1995, 2000) have found that attitudes that are recalled more easily are stronger (last longer and are more resistant to change) than attitudes that are recalled less
easily. Hence, memory can have a significant impact on evaluations. Given that memory for category consistent information should be superior to the memory for category inconsistent information and given the effect of memory on evaluations, we therefore predict that category consistent attributes will have a stronger effect on product evaluations for ambiguous products than category inconsistent attributes.

Specifically,

H5: Category consistent inferences will have a stronger effect on product evaluations than category inconsistent inferences.

Whether the underlying process for the lack of use of category inconsistent attributes is selective attention or selective retrieval, both explanations would predict that there would be limited use of category inconsistent attributes during product evaluations. This is because under a selective attention process, limited attention will be paid to the category inconsistent attributes rendering them less accessible during product evaluations. Under a selective retrieval process, category inconsistent attributes will not be thought relevant to the product evaluation process and hence will be less likely to be retrieved. Therefore, the quality of category inconsistent attributes should have little impact on product evaluations. For example, if a phone – PDA is categorized as a phone, then the quality of PDA attributes – whether strong or weak – should have little effect on product evaluations. The product will be evaluated primarily on the phone attributes.

Hence, we further predict that evaluations of the product will be more sensitive to the quality of category consistent attributes than the quality of category inconsistent attributes. Thus,
H6: Product evaluations will be more sensitive to the quality of category consistent inferences than the quality of category inconsistent attributes. This hypothesis also suggests that good performance on category inconsistent attributes cannot compensate for poor performance on category consistent attributes. In other words, category consistent and category inconsistent attributes are non-compensatory in terms of their effect on product evaluations. We conducted study 2 to test the above two hypotheses.

STUDY 2

Design

Study 2 was designed to determine the impact of the pattern of product inferences on product evaluations under ambiguity. Based on the results of Study 1, we used category labels to manipulate categorization. The study was a two (label: digital camera versus electronic organizer) x 2 (performance: strong for camera and weak for organizer versus strong for organizer and weak for camera) between subjects design. There were thus a total of four experimental conditions. The product used was the camera organizer used in Study 1. However, in study 2, the product was designed to perform strongly on one but not the other category. For example, if the product was a good performing camera, then it was a weak-performing organizer. This differential performance was designed to test H6, i.e. to test the sensitivity of product evaluations to category consistent and inconsistent attributes.
A significant interaction between label and performance was predicted such that only when performance was strong on the label consistent category attributes would brand evaluations be high. Hence, product performance on label-inconsistent category attributes would have no effect on brand evaluations. For example, if the product performed strongly on the camera attributes but weakly on the organizer attributes, then brand evaluations would be high only if the product was labeled as a camera, but not when it was labeled as an organizer. The stimuli used for the study are presented in Appendices H and I.

Manipulations

The Xircom camera organizer was retained as the target product in Study 2. The advertisement used and the label manipulations were also similar to Study 1. However, the number of attributes presented in the ad was varied so as to be equal for the two categories after including the label. This was designed to overcome the limitation of study 1 where differential amounts of information may have been provided to respondents, thus constituting an alternative explanation for the results. In study 2, the total amount of attribute information provided was equal across all experimental conditions. For example, when the product was labeled as an organizer, two attributes of the organizer (address book capacity and installed software) along with three camera attributes (flash range, zoom capability and optical viewfinder) were presented to respondents. This ensured that a total of 3 pieces of information (including the label) were presented for each category.
Product performance was manipulated by varying the quality of the attributes presented. For example, weak (strong) performance on the camera was manipulated by presenting the product with a flash range of 2 feet (12 feet) and a small 1x optical/2x digital (large 4x optical/6x digital) zoom lens. Performance was varied on only the two attributes that were common across all experimental conditions. Thus, for the camera, performance was manipulated by varying the flash range and the zoom capability while the optical viewfinder was treated as a neutral attribute with no claims made about its performance. The neutral attribute used for the organizer was processing speed of 100 mhz.

Procedure

The procedure was identical to Study 1. One hundred and sixteen undergraduate students participated in the study in return for extra course credit.

Dependent variables

*Brand attitude.* The primary dependent measure was brand attitude, which was measured using a five-item, nine-point scale. The items used were bad-good, desirable-undesirable, awful-nice, attractive-unattractive and low quality-high quality in that order. Items 2 and 4 were reverse coded. A scale reliability analysis indicated that the Cronbach’s alpha for the five-item scale was 0.79 and the five items were averaged to form a brand attitude measure.
*Purchase intention.* Intention to purchase was measured as a single item “How likely are you to purchase Xircom if you were considering purchasing a product in Xircom’s category?” (1 = Not at all likely, 9 = Very likely).

*Categorization.* Two of the three categorization measures from study 1 (category listed and department selected) were used in study 2. The categorization measure was included to ensure that the label manipulation was successful in determining categorization.

**RESULTS**

Twenty four respondents were dropped from the analysis either due to wrongly categorizing the product as a product from one of the filler ads (e.g. vacuum cleaner) or for not following instructions (e.g. referring back to the advertisement while answering the questions). The results for the remaining ninety-two respondents are presented below.\(^5\)

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\(^5\) There was missing data on the belief measures for some respondents. We did not drop these respondents for any of the analyses. Hence, the number of respondents varies across analyses for different measures.
Categorization

A chi square analysis revealed the expected main effect of label on both categorization measures with a larger percentage of respondents categorizing the product as a camera (organizer) when it was labeled as a camera (organizer). There was no effect of performance on either categorization measure. The results for the categorization measures are presented in Tables 5 and 6.

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<thead>
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<th>Category listed</th>
<th>Organizer label</th>
<th>Camera label</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Organizer</td>
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Table 5: Categorization results for Study 2 (Percentage respondents)
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<th>Categorization measure</th>
<th>Chi-square value</th>
<th>Degrees of freedom</th>
<th>p&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label</td>
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<td></td>
<td></td>
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<tr>
<td>Category listed</td>
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<td>3</td>
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<td>Department selected</td>
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<td>2</td>
<td>0.00</td>
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<td>Performance</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Category listed</td>
<td>2.30</td>
<td>3</td>
<td>0.51</td>
</tr>
<tr>
<td>Department selected</td>
<td>1.77</td>
<td>2</td>
<td>0.41</td>
</tr>
</tbody>
</table>

Table 6: Chi-square analysis for categorization measures (Percentage respondents)

Product evaluation

A multivariate analysis of variance revealed the expected interaction between label and performance for brand attitudes and purchase intent ($F (2, 87) = 4.38, p < .01$). H6 was therefore supported. There were no main effects of either label ($F (2, 87) < 1, p > .2$) or performance ($F (2, 87) < 1, p > .2$) on brand attitudes or purchase intention.

Separate univariate analyses of variance for brand attitudes and purchase intention revealed the expected interaction of label and performance for each measure (Brand attitude: $F (1, 88) = 5.66, p < .01$; Purchase intention: $F (1, 88) = 6.59, p < .01$). Planned contrasts were further used to examine the pattern of means of evaluations. The pattern of means was consistent with our expectations.

*Brand attitude.* When the product was labeled as an organizer, brand attitudes were significantly higher when performance on organizer attributes was strong (6.97)
versus weak (6.20, $t = 2.52, p < .01$). When the product was labeled as a camera, brand attitudes were higher when performance on camera attributes was strong (6.84) versus weak (6.54), although this difference was not significant ($t < 1, p > .2$).

*Purchase intention.* A similar pattern of results was observed for purchase intention. When the product was labeled as an organizer, purchase intentions were significantly higher when performance on organizer attributes was strong (5.88) versus weak (4.71, $t = 2.09, p < .04$). When the product was labeled as a camera, purchase intentions were higher when performance on camera attributes was strong (4.90) versus weak (4.71), although this difference was not significant ($t = 1.56, p < .12$).

Thus, overall, both brand attitudes and purchase intentions were sensitive to the quality of label consistent attributes but not label inconsistent attributes in accordance with H6. The results are summarized in Figures 5 and 6 and Table 7.
Figure 6: Brand attitudes in Study 2

Figure 7: Purchase intentions in Study 2
Table 7: Analysis of variance results for product evaluations in Study 2

<table>
<thead>
<tr>
<th>Effect</th>
<th>F</th>
<th>Degrees of freedom</th>
<th>p&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brand attitude</td>
<td>0.21</td>
<td>1</td>
<td>0.64</td>
</tr>
<tr>
<td>Purchase intention</td>
<td>0.04</td>
<td>1</td>
<td>0.83</td>
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<tr>
<td>Performance</td>
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<tr>
<td>Brand attitude</td>
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<td>0.30</td>
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<tr>
<td>Purchase intention</td>
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<td>0.79</td>
</tr>
<tr>
<td>Label X</td>
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<td></td>
<td></td>
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<tr>
<td>Performance</td>
<td>5.66</td>
<td>1</td>
<td>0.01</td>
</tr>
<tr>
<td>Brand attitude</td>
<td>6.59</td>
<td>1</td>
<td>0.01</td>
</tr>
<tr>
<td>Purchase intention</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Regression analysis

A regression analysis was run to further explore the pattern of effects on brand evaluations (Table 8) and to test for H5. The results are supportive of the hypothesis. We conducted separate analyses for each of the categorization measures and the results are presented below.

Category listed. When the product was listed as belonging to the organizer category, organizer attributes were better predictors of brand attitudes than camera attributes ($\beta_{\text{organizer}} = 0.27, p < .12$, $\beta_{\text{camera}} = 0.20, p > .2$), although both attributes were not significant predictors. When the product was categorized as a camera, camera attributes were significantly better predictors of brand attitudes than organizer attributes.
(βorganizer = 0.15, p > .2, βcamera = 0.47, p < .00). This partially supports the contention that category-consistent attributes are significantly better predictors of product evaluations than category-inconsistent attributes.

*Department selected.* The pattern of effects was similar when department selected was used as the categorization measure. When the product was placed in the organizer department, only organizer attributes predicted brand attitudes (βorganizer = 0.28, p < .09), but not camera attributes (βcamera = 0.16, p > .2). When the product was placed in the camera department, only camera attributes predicted brand attitudes (βcamera = 0.43, p < .01) with no effect of organizer attributes (βorganizer = 0.12, p > .2). Hence, overall H5 was supported. Brand attitudes were significantly predicted by only label consistent category attributes.
### Table 8: Regression results for Study 2

<table>
<thead>
<tr>
<th>Categorization</th>
<th>Dependent variable</th>
<th>Predictor variables</th>
<th>$\beta$</th>
<th>Significance</th>
<th>Overall regression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category listed</td>
<td>Organizer</td>
<td>Brand attitude</td>
<td>Organizer beliefs</td>
<td>0.27</td>
<td>$p &lt; .12$</td>
</tr>
<tr>
<td></td>
<td>Camera</td>
<td>Brand attitude</td>
<td>Organizer beliefs</td>
<td>0.20</td>
<td>$p &gt; .20$</td>
</tr>
<tr>
<td></td>
<td>Camera</td>
<td>Brand attitude</td>
<td>Camera beliefs</td>
<td>0.15</td>
<td>$p &gt; .20$</td>
</tr>
<tr>
<td></td>
<td>Camera</td>
<td>Brand attitude</td>
<td>Camera beliefs</td>
<td>0.47</td>
<td>$p &lt; .00$</td>
</tr>
</tbody>
</table>

| Department selected | Organizer | Brand attitude | Organizer beliefs | 0.28 | $p < .09$ | $R^2 = 0.11$ |
|                     | Camera | Brand attitude | Organizer beliefs | 0.16 | $p > .20$ | $F(2, 43) = 3.93, p < .02$ |
|                     | Camera | Brand attitude | Camera beliefs | 0.12 | $p > .20$ | $R^2 = 0.15$ |
|                     | Camera | Brand attitude | Camera beliefs | 0.43 | $p < .01$ | $F(2, 30) = 3.88, p < .03$ |

Product beliefs

A multivariate analysis of variance with label and performance as the independent variables revealed a main effect of label ($F(2, 76) = 11.27, p < .00$) and performance ($F(2, 76) = 6.63, p < .00$) on organizer and camera beliefs. These main effects were qualified by a marginally significant interaction of label and performance ($F(2, 76) = 3.97, p < .06$). Separate univariate analyses were conducted for the organizer beliefs and camera beliefs.
Label effect. Organizer beliefs are significantly higher when the product is labeled as an organizer (6.68) than when it is labeled as a camera (5.21, $F(1, 79) = 19.69, p < .00$). While camera beliefs are higher when the product is labeled as a camera (6.38) than as an organizer (6.00), this difference is not significant ($F(1, 79) = 1.16, p > .2$).

Performance effect. Organizer beliefs are also sensitive to the performance of organizer attributes in the advertisement and are higher when organizer performance is strong (6.5) than weak (5.60, $F(1, 79) = 6.33, p < .01$). A weaker effect was found for camera beliefs such that camera beliefs were higher when camera performance was strong (6.43) versus weak (5.86, $F(1, 79) = 2.62, p < .10$). Hence the manipulation of performance appears to have been successful.

Interaction of label and performance effect. The interaction of label and performance was significant for the organizer but not the camera beliefs. The interaction for the organizer attributes appears to be due to a greater sensitivity to the differences in organizer performance in the camera label conditions as compared to the organizer label conditions. This finding is unexpected, but since the regression analysis indicates that brand attitudes are sensitive to the quality of organizer attributes in the organizer label conditions and camera attributes in the camera label conditions, we do not discuss this finding further. Results for the belief measures are presented in Tables 9 and 10.
<table>
<thead>
<tr>
<th>Beliefs</th>
<th>Organizer label</th>
<th>Camera label</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Organizer</td>
<td>Camera</td>
</tr>
<tr>
<td></td>
<td>performance</td>
<td>performance</td>
</tr>
<tr>
<td>Organizer</td>
<td>6.82</td>
<td>6.55</td>
</tr>
<tr>
<td>Camera</td>
<td>5.90</td>
<td>6.09</td>
</tr>
</tbody>
</table>

Table 9: Product belief results for Study 2

<table>
<thead>
<tr>
<th>Effect</th>
<th>F</th>
<th>Degrees of freedom</th>
<th>p&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizer beliefs</td>
<td>17.39</td>
<td>1</td>
<td>.00</td>
</tr>
<tr>
<td>Camera beliefs</td>
<td>0.67</td>
<td>1</td>
<td>.41</td>
</tr>
<tr>
<td>Performance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizer beliefs</td>
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<tr>
<td>Camera beliefs</td>
<td>2.65</td>
<td>1</td>
<td>.10</td>
</tr>
<tr>
<td>Label X Performance</td>
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</tr>
<tr>
<td>Organizer beliefs</td>
<td>2.92</td>
<td>1</td>
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</tr>
<tr>
<td>Camera beliefs</td>
<td>1.20</td>
<td>1</td>
<td>.27</td>
</tr>
</tbody>
</table>

Table 10: Analysis of variance for product beliefs
DISCUSSION

The results of Study 2 provide support for H5 and H6 and suggest that category consistent attributes are significantly better predictors of brand evaluations than category inconsistent attributes. Further, brand evaluations and purchase intentions are more sensitive to the quality of category consistent than category inconsistent attributes. Hence, when the product was labeled as a camera (organizer), respondents were more likely to make camera (organizer) inferences and to evaluate the product as a camera (organizer) alone, without taking into account the organizer (camera) attributes stated in the advertisement. The analysis of variance results for brand evaluations and purchase intentions suggest that category inferences are indeed non-compensatory. That is, poor performance on the category consistent attributes cannot be compensated by superior performance on the category inconsistent attributes.

The results of the regression analysis suggest that only category consistent attributes are predictors of brand evaluations and that category inconsistent attributes play no significant role in determining product evaluations. Hence, ambiguous products appear to be evaluated primarily on the basis of single categories.

PROCESSES UNDERLYING THE BELIEF-EVALUATION LINK

While the findings of Study 2 suggest that beliefs about category consistent attributes have a stronger effect on product evaluations than category inconsistent attributes, the process underlying this effect of beliefs on evaluations is not clear. There
could be two possible explanations for this effect. One is an *encoding or attention explanation* wherein greater attention is paid to category consistent attributes than category inconsistent attributes, leading to quicker retrieval of consistent attributes during evaluations. In such a case, category inconsistent attributes do not impact evaluations because they are less likely to be attended to as well as the category consistent attributes and hence cannot be retrieved easily during evaluations. A second explanation for this effect is a *selective retrieval explanation* (Malt et al 1995) wherein, category inconsistent attributes are not retrieved at the time of making evaluations despite being attended to as well as category consistent attributes. In such a case, both sets of attributes are attended to, but only consistent attributes are retrieved during evaluations. The selective retrieval explanation implies a conscious decision on part of consumers to treat the category inconsistent attributes as irrelevant during evaluations.

While Malt et al (1995) support the selective retrieval explanation, as stated earlier, their experimental procedure precluded the testing of differential attention effects. Given that the stimuli for ambiguous products usually contain information in addition to just the category labels, it is possible that the greater amount of information results in an increased cognitive load and focusing attention on category relevant aspects of the information may be one way to reduce this load. Research in the area of social cognition and impression formation (e.g. Fiske and Pavelchak 1982) has found that attention to stereotype consistent attributes is greater than attention to stereotype inconsistent attributes. Further, the differences in attention lead to superior memory for stereotype consistent attributes as compared to stereotype inconsistent attributes. Taken together, the results from the categorization under ambiguity literature and the stereotyping literature
suggest that both attention and retrieval processes could be operating simultaneously. Hence, not only will greater attention be paid to category consistent attributes, but also these attributes will demonstrate greater accessibility during retrieval, i.e. they will be faster to retrieve than inconsistent information.

The results of Study 2 do not enable us to delineate between these two explanations and hence a follow up study was conducted to test for these two explanations. Hence, we predict that:

H7: Greater attention will be paid to category consistent attributes than category inconsistent attributes during encoding of information about ambiguous products.

H8: Category consistent information will demonstrate higher accessibility during retrieval than category inconsistent information.

COMPENSATORY INFERENCES

The follow up study also aimed at exploring the effects of strong performance on both category consistent and inconsistent attributes on product evaluations. It would be interesting to test whether strong performance on the inconsistent category adds any value to strong performance on the consistent category. It is feasible that consumers may hold intuitive beliefs with respect to product performance such that they believe that a single product cannot perform well on both product dimensions. This may lead them to depress their belief ratings of the inconsistent category even when the performance on this category is strong, i.e. they may make compensatory inferences in line with their intuitive beliefs (Chernev and Carpenter 2001). That is, strong performance on one
product dimension may lead to a compensatory lowering of beliefs about the performance on the second product dimension in order to maintain an intuitive belief that a single product cannot deliver strong performance on two different product dimensions. The follow up study tested for such compensatory inferences by including a strong organizer – strong camera condition.

Given our hypotheses regarding the processes underlying the restriction of inferences to a single category, it is unlikely that people are making compensatory inferences about category consistent and inconsistent attributes. That is, if people pay less attention to the category inconsistent than consistent attributes, then the issue of consciously making compensatory inferences about these attributes should not arise. Hence, we predict that compensatory inferences are not likely to be made. Specifically,

H9: There will no difference in evaluations between an ambiguous product that performs strongly on both category dimensions and an ambiguous product that performs well on only the category-consistent dimension.

Study 2B

Design

Study 2B was designed to determine the processes underlying the effect of categorization on product evaluations under ambiguity and to test for the presence of compensatory inferences. The study was a single factor (performance: strong for camera and weak for organizer versus strong for organizer and weak for camera versus strong for
organizer and camera) between subjects design. There were three experimental conditions in total. The product was labeled as an electronic organizer in all three conditions. The stimuli used in the study are presented in Appendices J and K.

Manipulations

The ad used, the label manipulation and the performance manipulation were similar to the stimuli for the organizer used in Study 2.

Procedure

Seventy-two undergraduate students participated in the study in return for extra course credit. The study was a computer-based study with all instructions and study material provided on the computer so that reading times and response times could be easily measured. The filler ads and order of information were identical to Study 2. A Visual Basic program was used to conduct the study.

Dependent variables

The brand evaluation and purchase intention measures were identical to Study 2. A single measure of categorization – the department selected measure – was used. The process measure used for attention was the time spent on category consistent versus inconsistent attributes (attention), measured in milliseconds.
Several techniques have been employed in psychological research to measure accessibility. One of the popular techniques used as a measure of accessibility is response latency (see Fazio et al. 2000 for a review). Response latency refers to the time taken to retrieve the construct from memory with shorter response times indicating higher levels of accessibility. If an object is easily accessible in memory, it should enable faster response to its presentation than an object that is not as easily accessible in memory. Response latency is generally measured in milliseconds using computer-based studies and is operationally defined as the elapsed time between an event occurring on the computer screen and the press of a button to exit that event onscreen (e.g., Glucksberg, Brown, & McGlone 1993; MacLeod and Campbell 1992). Thus, response latency is viewed as a measure of accessibility (or ease with which the concept comes to mind) of a concept. We therefore used response time as one of our measures for category accessibility.

Another technique that has been employed to measure accessibility of information in memory is to consider the order in which information is retrieved. Order of recall has been used to measure accessibility with items that are highly accessible appearing ahead of less accessible items in recall responses. Hence, accessible items exhibit primacy in recall. Order of listing as a dependent measure has been used by researchers in cognitive psychology (Underwood and Schulz 1960), personality (Higgins, King, and Mavin 1982) and social networks (Burt 1986). Hence, the first feature listed about the product was our second measure of accessibility.

*Accessibility measures.* There were three different accessibility measures used – one ordered recall measure and two response time measures. The first measure (order of recall) used was an open-ended question similar to the ones used in Studies 1 and 2.
Respondents were asked to list all the features that they expected the product to possess. The first feature listed was used as a measure of accessibility (Underwood and Schulz 1960; Burt 1986).

The second measure (response time) was an agree-disagree type measure wherein participants responded to statements about the possession of organizer and camera attributes (e.g. “The Xircom will possess a To Do list”, “The Xircom will possess a Flash feature”). The time taken between exiting two consecutive statements served as the response time measure (in milliseconds).

The third measure (response time) measured the response time to the belief statements by respondents. The belief statements were identical to Study 2 (e.g. “The Xircom will possess an excellent Address book feature”) and measured on 9-point scales. Again, the time taken between exiting two consecutive beliefs served as the dependent measure for response time (in milliseconds).

*Attention measure.* The information about the organizer was split into three different screens. Participants were first shown a picture of the product along with the label on the first screen. They were then shown the attributes for the organizer on the second screen and finally the camera attributes on the third screen. The time taken between clicking on a button to exit two screens served as the reading time measure (in milliseconds). Thus, for example, the time taken between clicking on a button to exit the first screen and clicking on a button to exit the second screen served as the reading time measure for organizer attributes. Since the number of attributes for each category was different in each condition (similar to Study 2), an average reading time per character was used as the attention measure.
Covariates. The times taken to read each of the three filler ads were used as covariates while analyzing the reading time data. This was done in order to exclude individual differences in reading speed.

Participants also responded to two questions of the agree-disagree format and two questions with scaled (9-point) responses as practice questions at the beginning of the study prior to exposure to any of the study materials. The times taken to respond to these questions were used as covariates while analyzing the attribute and belief response time data. This was done in order to exclude differences in typing speed between the respondents.

Product beliefs. There were two different measures of product beliefs used. The first measure was a set of agree-disagree statements and the second was a set of scaled product belief statements. Both these measures are the same that were described in the previous section on accessibility. The response times to these two measures formed two of our measures of accessibility. To measure product beliefs, the number of statements about the organizer and camera that respondents agreed with was counted and averaged to form the belief measure. That is, the average number of statements agreed with was the measure of product beliefs.

The second measure was the same measure used in Study 2. Respondents were given a set of statements and asked to indicate their agreement to the statements on a 9-point scale (1 = Strongly disagree, 9 = Strongly agree). The ratings on the five statements were averaged to form the product belief measure.
RESULTS

Planned contrasts were used in analyzing the evaluation and belief measures. The two contrasts used were:

Contrast 1: Between the organizer strong-camera weak and organizer weak-camera strong conditions. This contrast was expected to be significant with the organizer strong condition yielding higher evaluations than the organizer weak condition indicating sensitivity to performance on the label-consistent category.

Contrast 2: Between the organizer strong-camera weak and organizer strong-camera strong conditions. This contrast was not expected to be significant providing further support for the lack of value placed on the category inconsistent attributes.

Further, paired t-tests were used to test the attention and retrieval measures. Table 11 summarizes the results.
<table>
<thead>
<tr>
<th></th>
<th>Organizer strong</th>
<th>Camera strong</th>
<th>Both strong</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
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<td>6.80</td>
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<td>6.56</td>
<td>6.46</td>
</tr>
<tr>
<td>Purchase intention</td>
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<td>4.52</td>
<td>5.32</td>
<td>5.15</td>
</tr>
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<td>Agree-disagree beliefs</td>
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<td></td>
<td></td>
</tr>
<tr>
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<td>Scaled Beliefs</td>
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<td>7.25</td>
<td>6.77</td>
</tr>
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<td>Camera</td>
<td>6.44</td>
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<tr>
<td>Reading time (milliseconds)</td>
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</tr>
<tr>
<td>Organizer</td>
<td>62.35</td>
<td>66.81</td>
<td>52.62</td>
<td>60.92</td>
</tr>
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<td>Camera</td>
<td>50.98</td>
<td>45.23</td>
<td>58.19</td>
<td>51.19</td>
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<tr>
<td>First feature listed (% respondents)</td>
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<td></td>
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<tr>
<td>Organizer</td>
<td>52</td>
<td>36</td>
<td>45</td>
<td>44</td>
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<td>17</td>
</tr>
<tr>
<td>Other</td>
<td>24</td>
<td>8</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Agree-disagree time (milliseconds)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizer</td>
<td>3501.51</td>
<td>3500.61</td>
<td>3816.97</td>
<td>3597.59</td>
</tr>
<tr>
<td>Camera</td>
<td>4236.27</td>
<td>3747.31</td>
<td>3684.94</td>
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</tr>
<tr>
<td>Scaled belief retrieval time (milliseconds)</td>
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<td></td>
</tr>
<tr>
<td>Organizer</td>
<td>4581.60</td>
<td>4989.85</td>
<td>4746.78</td>
<td>4773.82</td>
</tr>
<tr>
<td>Camera</td>
<td>5238.25</td>
<td>5153.32</td>
<td>5255.63</td>
<td>5214.07</td>
</tr>
</tbody>
</table>

Table 11: Means of dependent variables for Study 2B
Categorization

82.6% of the respondents selected the organizer department as the department in which they would first search for the product. A chi-square analysis revealed no difference between the departments selected across the three experimental conditions ($\chi^2 = 6.83, p > .1$). Hence, the label manipulation was successful in influencing categorization as an organizer.

Product evaluation

As expected, contrast 1 was significant. That is, there was a significant difference in the brand attitudes between the organizer strong-camera weak and organizer weak-camera strong conditions ($t = 2.42, p < .05$), indicating sensitivity to the performance on the organizer attributes. Also as expected, contrast 2 was not significant. Thus, there was no difference in attitudes between the organizer strong-camera weak and organizer strong-camera strong conditions ($t < 1$).

A similar pattern of effects was found for purchase intent. There was a marginally significant difference in purchase intentions between the organizer strong-camera weak and organizer weak-camera strong conditions ($t = 1.91, p < .06$). As expected, contrast 2 was not significant. That is, there was no difference in intentions between the organizer strong-camera weak and organizer strong-camera strong conditions ($t < 1$). These results indicate that even strong performance on the category-inconsistent attributes does not add any value to product evaluations in conjunction with strong performance on the
consistent attributes. Thus, even if an organizer performed well on both its organizer and camera dimensions, it was not evaluated more favorably than an organizer that performed well only on its organizer dimensions.

Product beliefs

A pattern of effects similar to brand attitudes and purchase intentions was found for the scaled product beliefs. Beliefs about the organizer in the organizer strong-camera weak condition were stronger as compared to the camera strong-organizer weak condition ($t = 3.12, p < .01$) but not significantly different from the organizer strong-camera strong condition ($t < 1$).

The pattern of camera beliefs did not reveal any support for compensatory inferences since there were no significant differences between any of the three conditions. If compensatory inferences were indeed being made, then the camera beliefs in the strong-strong condition should have been lower than the camera beliefs in the camera strong-organizer weak condition. The lack of difference supports the attention explanation in that the camera attributes may be paid much less attention than the organizer attributes. Hence, respondents did not appear to have depressed their evaluations of the camera even when performance on both categories was strong. Thus, H9 was supported.

The results for the agree-disagree measure of product beliefs did not reveal any differences between organizer and camera beliefs in any of the three experimental conditions. Thus, both contrasts 1 and 2 were not significant. However, a paired t-test
revealed that across all conditions, the average number of organizer statements agreed with was significantly higher than the average number of camera statements agreed with (Mean\textsubscript{organizer} = 3.16, Mean\textsubscript{camera} = 2.76, t = 2.26, p < .02). This is consistent with the effect of the label, that is, since the product was labeled as an organizer, respondents believed that the product was likely to possess a larger number of organizer attributes than camera attributes. Further, this measure was a less sensitive measure of the valence of product beliefs since it simply asked respondents to judge whether the product would possess certain features and did not have them rate how good or bad these features were likely to be. Thus, performance of the product features was not measured in this measure.

Attention

Participants spent significantly longer times reading the organizer attributes (60.92 milliseconds) than the camera attributes (51.19 milliseconds, t = 2.31, p < .05), supporting the attention explanation. Hence, consistent with H7, category consistent attributes get greater attention than category inconsistent attributes.

Accessibility

44% of the respondents listed an organizer feature as the first feature. A chi-square analysis revealed that there was no difference in the first feature listed across the three experimental conditions (\(\chi^2 = 10.46, p > .1\)). This indicates that the organizer category was more accessible than the camera category, supporting H8. An analysis of
the average number of features listed across the three experimental conditions revealed that a significantly larger number of organizer features (1.52) were listed than camera features (1.0, $t = 2.28, p < .02$). This is consistent with the greater accessibility of the organizer category and provides further support for H8.

Contrary to expectations however, there was no significant advantage for organizer attributes during retrieval of the agree-disagree items (organizer = 3597 milliseconds, camera = 3898 milliseconds, $t = 1.49, p > .1$). However, participants were significantly faster at responding to the belief statements about the organizer (4773 milliseconds) than the camera (5214 milliseconds, $t = 2.55, p < .05$) partially supporting the retrieval advantage explanation. Thus, H8 was partially supported for two of the three retrieval measures. That is, the results for the first feature listed and the response times to the belief statements were consistent with H8 but the results for the response times to the agree-disagree statements were not.

Regression analysis

A regression analysis was run to further explore the pattern of effects on brand evaluations (Table 12). As predicted, only organizer attributes were significant predictors of brand evaluations. This supports the contention that only category-consistent attributes are relevant during product evaluation.
Table 12: Regression results for Study 2B

<table>
<thead>
<tr>
<th>Categorization</th>
<th>Dependent Variable</th>
<th>Predictor Variables</th>
<th>β</th>
<th>Significance</th>
<th>Overall Regression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizer</td>
<td>Brand attitude</td>
<td>Organizer beliefs</td>
<td>0.29</td>
<td>p &lt; .05</td>
<td>R² = 0.10</td>
</tr>
<tr>
<td>Organizer</td>
<td></td>
<td>Camera beliefs</td>
<td>0.07</td>
<td>p &gt; .1</td>
<td>F(2, 74) = 4.43, p &lt; .02</td>
</tr>
</tbody>
</table>

DISCUSSION

The results of Study 2B indicate that greater attention is paid to category consistent attributes leading to the faster retrieval of these attributes during product evaluations. Hence, categorization impacts product evaluations through a differential attention and differential retrieval process. The findings on differential attention are inconsistent with previous research (Malt et al, 1995). This research found no difference in recall of categories and posited that the lack of difference in recall was an indicator that respondents paid attention to and encoded all categories, but selectively retrieved categories while making inferences. As we suggested earlier, the high levels of recall may have been due to the limited number of categories to recall and given a higher amount of information to recall, differences in attention and encoding may be found. This is what our results suggest. Given attribute information on consistent and inconsistent categories, our respondents tended to pay greater attention to the information that was
category consistent than information that was category inconsistent. This difference in attention led to an advantage for the category consistent information during retrieval at the time of product judgments.

The results replicate the findings of study 2 with regard to consistent attributes being significantly better predictors of product evaluations than inconsistent attributes. Further, the lack of significant difference between the organizer strong-camera weak and organizer strong-camera strong conditions is not consistent with the notion of compensatory inferences. Thus, even if strong camera performance is offered in a product, consumers may not pay attention to this performance and hence evaluate the product solely on it organizer features.

Studies 2 and 2B provide support for H5, H6, H7, H8 and H9 and demonstrate that categorization activates the set of attributes that drive evaluations. Hence, it is category-consistent attributes that predominantly determine product evaluations and purchase intent. The results also indicate that category consistent and inconsistent attributes are non-compensatory in that poor performance on category consistent attributes cannot be overcome by superior performance on category inconsistent attributes. Overall, the results of Study 2B suggest that multiple category inferences are not made. Thus, inferences about category consistent attributes are more likely to be made than inferences about category inconsistent attributes and are better predictors of product evaluations. The reason for the lack of multiple category inferences is the lack of attention paid to category inconsistent attributes, rendering these attributes less accessible during retrieval for product evaluation judgments.
From a marketer’s perspective, this is sub-optimal given that all product attributes require resource investment. Hence, the investment in label-inconsistent attributes appears to be wasted. Further, the results indicate that inferences about different product categories are non compensatory, i.e. poor performance on one category’s attributes will not be compensated by strong performance on another category’s attributes. How can marketers overcome this problem? Study 3 will demonstrate how inferences about multiple categories can be induced through the priming of different interpretation strategies and how such multiple inferences can impact product evaluations.
CHAPTER 5
MULTIPLE INFERENCES

In this chapter we explore how multiple category inferences can be induced using the literature from psycholinguistics to develop our hypotheses. The previous chapter demonstrated that in general, multiple category inferences are not made when people are faced with ambiguous products. And the reason for the lack of multiple inferences was identified as the greater accessibility of category consistent attributes as compared to category inconsistent attributes during product judgments. Hence, consumers appear to categorize an ambiguous product into a single category and appear to place little value on the attributes of the product that do not belong to the category into which they have placed it. This is however a problem for marketers who would like to have consumers attend to and value both sets of attributes – category consistent and category inconsistent – during product evaluations. We now suggest how this may be possible using insights from the psycholinguistics literature.

PSYCHOLINGUISTICS

As reviewed earlier, the literature on psycholinguistics suggests that priming property interpretations may lead to inferences being made about both categories in a
combination (e.g. Wisniewski and Love 1998). For example, a book magazine may be interpreted as book with some magazine properties such as a glossy cover, thin, containing advertisements etc. However, the process underlying the transfer of properties from the modifier category to the head category is not clear. The findings from Study 2B indicate that one reason multiple category inferences are not made is because less attention is paid to category inconsistent aspects as compared to category consistent aspects. In order to resolve this problem then, property interpretations must be able to direct greater attention to category inconsistent aspects of the product. We begin by examining whether property interpretations do in fact render this desired result. In order to do so, we conducted a pretest wherein we induced either property or relational interpretations amongst respondents and examined the effects of making these two types of interpretations on the accessibility of the two categories and the beliefs about the two categories. While prior literature in psycholinguistics has examined how property and relational interpretations have different effects in terms of properties transferred, this literature has not focused on the processes underlying these effects. We explore the underlying process in order to determine how property and relational interpretations result in different effects.

Accessibility

Property interpretations induce the transfer of properties from the modifier category to the head category (e.g. a book magazine is a magazine that is thick like a book), while relational interpretations induce linking the head and modifier categories.
through some relation (e.g. a book magazine is a magazine about books). Thus, it is likely that the head and the modifier categories are processed under both types of interpretations. Hence, accessibility to both the categories should be no different under property and relational interpretations.

While modifier categories are accessed under both types of interpretations, the way in which these categories are accessed is different under property and relational interpretations. Property interpretations focus attention on the properties of the modifier category during a comparison process of the head and modifier categories in order to select the set of properties that will be transferred from the modifier category to the head category. Relational interpretations, on the other hand, focus attention on the modifier category as a whole during a comparison process of the head and modifier categories to determine a suitable relation between them. Relational interpretations do not therefore focus attention on the properties of the modifier category. Hence, we expect that while the accessibility to the modifier category will be no different under property and relational interpretations, accessibility to the modifier category’s properties or attributes will be significantly higher under property interpretations as compared to relational interpretations. The difference in accessibility is thus fine grained, such that it exists only at the level of category attributes, but not at the level of the categories themselves. By accessibility to the categories, we refer to accessibility to the category names or labels.

In the context of ambiguous products, the modifier category is either the category that is inconsistent with the label provided (e.g. camera would be the modifier category for a product that is labeled an organizer, but possesses some camera attributes) or the first label in a dual label product (e.g. camera organizer). The above discussion suggests
that property interpretations will focus attention on the attributes of the inconsistent category and this should result in the greater accessibility of the inconsistent category’s attributes as compared to relational interpretations. But, there should be no difference in the accessibility of the consistent and inconsistent categories at the name or the label level. Hence,

H10: There will be no difference in the accessibility of the consistent and inconsistent category labels.

H11: Accessibility to the attributes of the inconsistent category will be higher under property as compared to relational interpretations.

H11 suggests that multiple category inferences may be possible under property interpretations, since accessibility to category consistent and inconsistent category attributes will be high. Hence, category inconsistent attributes can be retrieved and used during product evaluations.

RESULTS FROM STUDIES 1 AND 2

While the discussion in the previous section makes the case for an induction of multiple category inferences under property interpretations, an important question arises regarding the type of processing that may have been undertaken by respondents in our three studies reported in the previous chapters. Since across all three studies, no multiple category inferences were made, it appears that relational interpretations were the type of strategy used. However, in the absence of process measures to actually measure the interpretation strategy, we are unable to substantiate this speculation with empirical
evidence. Further, since our respondents were not at any time exposed to the noun-noun combination “camera organizer” or “organizer camera”, a post hoc test wherein respondents are asked to interpret the above combinations may not be indicative of the actual processing of the advertisement content in our research studies. We therefore explore the type of strategy used from the viewpoint of similarity between the two categories.

Past research has found that dissimilar combinations induce relational interpretations (Wisniewski 1997; Wisniewski and Love 1998). Therefore, if a digital camera and electronic organizer are perceived as being dissimilar, one could expect their combination to be processed relationally based on the results of this past research. We therefore conducted a test to measure similarity between these two categories.

SIMILARITY TEST

Design and procedure

Eighteen undergraduate students from an introductory marketing course participated in the study in return for extra course credit. They were informed that the purpose of the study was to understand how people make similarity judgments. They were given a list of 16 different pairs of words and asked to rate the similarity between the two words in each pair using a 7-point scale (1 = Very similar and 7 = Very dissimilar). One of the pairs contained our target words camera and organizer. The ordering of the words in any pair was counterbalanced across respondents. Thus, half the
respondents saw “camera” at the left end of the similarity scale and “organizer” at the right end of the similarity scale while half the respondents saw “organizer” at the left end of the scale and “camera” at the right end of the scale. The counterbalancing was undertaken to prevent any order effects on similarity. Previous research (Tversky 1977) has shown that the order in which two objects are compared can impact their similarity ratings. For example, the rating provided to the question “How similar is the USA to China?” may be different than the rating provided to the question “How similar is China to the USA?” The reason for the difference is that the dimensions on which the two objects are compared and rated as being similar or dissimilar are evoked by the first category. Thus, in one case the dimensions are based on attributes salient to the USA while in the second case, the dimensions are based on attributes salient to China. Counterbalancing the order in which our categories were presented eliminated such order effects on similarity ratings.

RESULTS

The average similarity rating between a camera and an organizer was 5.43, indicating that the two categories were perceived as being rather dissimilar. The minimum similarity rating provided was a 3 on the 7-point scale indicating that no respondent perceived the two categories as being very or even somewhat similar. The average ratings for the other word pairs ranged from 2.8 to 6.0 and the range of values for these pairs ranged from 1 to 7, indicating that respondents did make use of the entire range of the scale.
DISCUSSION

The results of our similarity test indicate that a camera and an organizer are perceived as being quite dissimilar. Thus, based on past research, it is reasonable to expect that a product combining these two categories would be interpreted using relational interpretations rather than property interpretations. This is consistent with our findings regarding the lack of transfer of properties between the two categories in studies 1, 2 and 2B. Under relational interpretations, since no properties are transferred between categories, multiple category inferences will not be made and the results of our three studies are consistent with this expectation.

Given this result, we contend that in the absence of any priming of interpretation strategies, a camera-organizer combination will be interpreted using a relational interpretation and hence, no properties will be transferred between the two categories. We now examine the impact of property and relational interpretations on category and attribute accessibility.

PRETEST 4

A study was designed to test hypotheses 10 and 11, that is, to test for differences in the accessibility to the inconsistent categories and inconsistent category attributes under property and relational interpretations. Forty-three undergraduate students from an
introductory marketing course participated in the study in return for course credit. They were informed that the study aimed at understanding how people learn new English words.

Design

The study was designed as a single factor (type of prime: property vs. relational) study. Hence, there were two experimental conditions in the study and half the respondents were primed with property interpretation primes and half were primed with relational interpretation primes.

Procedure

The study was run as a computer based study in order to capture the accessibility measures that are described later. A Visual Basic program was used to present all information and questions on a computer monitor. The entire study was presented as three separate studies to the respondents with the priming task constituting the first study, the category accessibility task constituting the second study and the attribute accessibility task constituting the third study. All three studies were run on the computer in the same sequence. After finishing the attribute accessibility task, respondents were thanked and allowed to leave. The entire study was self-paced. The stimuli used in the study are presented in Appendix L.
Manipulations and dependent measures

*Priming task.* Respondents were first asked to interpret a set of 14 different combinations or word pairs. Of these 14 pairs, 9 were the prime pairs and 5 were target pairs. That is, 9 of the combinations were selected such that they had predominantly either property or relational interpretations and would hence induce respondents to process further combinations consistent with the prime. This is similar to the manipulation used by Wisniewski and Love (1998). The head categories for the property and relational primes were identical, only the modifier categories were varied to induce the appropriate interpretations. For example, one of the property primes used was a ‘bus truck’ (a truck that is big like a bus or carries passengers like a bus), while one of the relational primes used was a ‘clothing truck’ (a truck that carries clothing).

The 5 target combinations were identical across both experimental conditions (PDA camera, book magazine, whale boat, dinosaur scientist and painter photographer) and were selected so as to have both relational and property interpretations. For example, a ‘whale boat’ could be interpreted as ‘a boat to watch whales’ in the relational interpretation condition, but as ‘a large boat’ in the property interpretation condition. Similarly, a ‘dinosaur scientist’ could be interpreted as a ‘scientist who researches dinosaurs’ in the relational interpretation condition, but as ‘an old scientist’ in the property interpretation condition. Hence, the target combinations were expected to be processed either using property or relational interpretations depending on the prime condition. The percentage of target interpretations that were interpreted using property versus relational interpretations was used as the measure of priming.
Accessibility. We used response time as a measure for both category accessibility and attribute accessibility.

Category accessibility. After interpreting all 14 combinations, respondents undertook a lexical decision making task. That is, they were shown a string of letters, which were either words (e.g. boat) or non-words (e.g. kangs) and asked to judge if the string was a word or a non-word. They were informed that the time taken to respond to each string as well the accuracy of response would be measured and that both speed and accuracy were important goals. A total of seventy five strings were used in the task.

Each of the head and modifier categories for all the primes and the target combinations were included in the list of strings along with a set of filler words and non-words. The words were ordered such that the head categories always immediately preceded the modifier categories. For example, for the combination “whale boat”, the word “boat” always immediately preceded “whale”. This was done in order to maximize the linkage between the head and modifier categories. The time taken to respond to these categories in milliseconds was used as a measure of category accessibility. The exact measure used was the time taken by the respondent between clicking on the ‘agree’ or ‘disagree’ button for one letter string and the time taken to click on the ‘agree’ or ‘disagree’ button for the next letter string. If the respondent attempted to move to the next word without responding to a word, an error message was displayed on the screen, prompting the respondent to respond to the current word. We did not expect to find any difference between the prime conditions on category accessibility (H10).

Attribute accessibility. Following the lexical decision making task, respondents were shown one statement each about the head and modifier categories for the target
combinations that they had been exposed to in the priming task and were asked to either agree or disagree with each of the statements. For example, one of the target pairs shown to the respondents was “whale boat” and two of the statements shown to them were “Boats have sails” and “Whales are large in size”. The time taken to agree or disagree with the statement was used as a measure of accessibility of the attribute. One salient belief about each of the head and modifier categories was used. These beliefs were elicited from a group of 20 undergraduate students in a pretest prior to this study. As in the category accessibility task, if the respondent attempted to move to the next belief without responding to a given belief, an error message was displayed on the screen, prompting the respondent to respond to the current belief.

We expected to find a significant difference between the property and relational prime conditions in terms of attribute accessibility such that attributes of the modifier categories were more easily retrieved in the property prime conditions as compared to the relational prime conditions (H11). We used only the target categories and did not include statements about any of the prime categories. This is because all respondents had been exposed to these target categories, while the modifier categories for the primes were different across the two conditions. For example, all respondents had been exposed to “whale boat” as a target, but while respondents in the property prime conditions had been exposed to “bus truck”, respondents in the relational prime conditions had been exposed to “clothing truck”.

*Practice questions.* Prior to undertaking the category accessibility task, respondents were asked to respond to a set of 5 practice strings. These comprised 3 non-words and 2 words and the response times to these practice strings were used as
covariates while analyzing the category accessibility measure in order to rule out individual differences in typing speed. Similarly, prior to undertaking the attribute accessibility task, respondents were asked to respond to a set of 3 different statements that were called practice statements. These statements were unrelated to any of the categories used either as primes or targets and the response times to these statements were used as covariates while analyzing the attribute accessibility measure in order to rule out individual differences in reading and typing speeds.

RESULTS

Seven respondents were dropped from the analysis for failing to follow instructions (e.g. failing to complete the priming task prior to the accessibility tasks) and the results for the remaining thirty-six respondents is presented below.

Priming manipulation

The prime and target combinations were coded into one of three different categories – property, relational or other. The ‘other’ category comprised interpretations that were neither property nor relational (e.g. a bus truck is a vehicle).

An examination of each of the target combinations revealed that the combination ‘dinosaur-scientist’ was interpreted by most respondents (94%) as an anthropologist (using their real world knowledge). Thus this combination was interpreted as a ‘known
concept’ interpretation (Costello and Keane 2001) rather than either a property or relational interpretation. Hence, we dropped this item and ran all analyses on the remaining four target combinations.

A multivariate analysis of variance revealed a significant difference between the percentage of property interpretations and relational interpretations for the target combinations ($F(2, 33) = 13.35, p < .00$). A higher percentage of property interpretations (88.2%) than relational interpretations (39.4%) were made in the property prime condition and a univariate analysis of variance revealed that this difference was significant ($F(1, 34) = 24.76, p < .00$).

As expected, this pattern was reversed in the relational prime condition with a higher percentage of target combinations being interpreted using relations (75%) than properties (23.5%). A univariate analysis of variance indicated that this difference was significant ($F(1, 33) = 26.42, p < .00$).

There was no significant difference between the prime conditions on the percentage of other interpretations ($\text{Percentage}_{\text{property}} = 13.2$, $\text{Percentage}_{\text{relational}} = 10.5$, $F(1, 33) < 1, p > .6$). These results indicate that the priming manipulation was successful at inducing either property or relational interpretations amongst respondents in accordance with the prime.

Category accessibility

A univariate analysis of variance was run with the average response time to all the prime and target modifier categories as the dependent variable and the type of prime as
the independent variable. The dependent measure therefore was the average response times to the thirteen different modifier categories. For example, for the combination “whale boat”, the response time to “whale” was included in the dependent measure. The response times to the five practice strings were included as covariates in the analysis. Response times to words where the respondents had attempted to move to the next word without responding to a given word were excluded from the analyses (1.3% of total responses) since these times included the time taken to read and respond to the error message.

As expected, no significant differences emerged between property and relational prime conditions on the category accessibility measure (Mean_{property} = 1006.93 milliseconds, Mean_{relational} = 937.7 milliseconds, $F(1, 29) = 1.2$, $p > .28$). Hence, the modifier categories were equally accessible across both property and relational interpretation conditions, providing support for H11.

A separate analysis of the response times to the head categories revealed no significant differences between the prime conditions (Mean_{property} = 1022.06 milliseconds, Mean_{relational} = 1003.46 milliseconds, $F(1, 23) < 1$, $p > .71$). Hence, neither the head nor the modifier categories exhibit differential accessibility across the property and relational prime conditions. Thus, H11 is supported.
<table>
<thead>
<tr>
<th>Modifier category</th>
<th>Property prime</th>
<th>Relational prime</th>
<th>t-value</th>
<th>p &lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Book</td>
<td>789.69</td>
<td>793.47</td>
<td>&lt; 1</td>
<td>0.96</td>
</tr>
<tr>
<td>Whale</td>
<td>938.77</td>
<td>1004.11</td>
<td>&lt; 1</td>
<td>0.55</td>
</tr>
<tr>
<td>PDA</td>
<td>2134.31</td>
<td>1564.11</td>
<td>3.12</td>
<td>0.08</td>
</tr>
<tr>
<td>Painter</td>
<td>956.69</td>
<td>920.29</td>
<td>&lt; 1</td>
<td>0.64</td>
</tr>
<tr>
<td><strong>All modifier categories</strong></td>
<td><strong>1006.93</strong></td>
<td><strong>937.7</strong></td>
<td><strong>1.2</strong></td>
<td><strong>0.28</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Head category</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Magazine</td>
<td>821.00</td>
<td>916.21</td>
<td>&lt; 1</td>
<td>0.43</td>
</tr>
<tr>
<td>Boat</td>
<td>1031.15</td>
<td>956.47</td>
<td>1.34</td>
<td>0.25</td>
</tr>
<tr>
<td>Camera</td>
<td>1101.15</td>
<td>1110.05</td>
<td>&lt; 1</td>
<td>0.94</td>
</tr>
<tr>
<td>Photographer</td>
<td>1165.77</td>
<td>1072.31</td>
<td>&lt; 1</td>
<td>0.45</td>
</tr>
<tr>
<td><strong>All head categories</strong></td>
<td><strong>1022.06</strong></td>
<td><strong>1003.46</strong></td>
<td><strong>&lt; 1</strong></td>
<td><strong>0.71</strong></td>
</tr>
</tbody>
</table>

Table 13: Mean category response times (in milliseconds)

Attribute accessibility

A univariate analysis of variance was run with the average response time to the modifier category attribute statements as the dependent measure and the type of prime as the independent variable. The response times to the three practice statements were used as covariates in the analysis. Response times to words where the respondents had attempted to move to the next statement without responding to a given statement were excluded from the analyses (0.4% of total responses) since these times included the time taken to read and respond to the error message.

As expected, the average response times to the statements about the modifier categories was marginally lower in the property prime condition (1641.68 milliseconds)
as compared to the relational prime conditions (2026.21 milliseconds, $F(1, 32) = 3.74, p < .06$), thus providing support for H10. An analysis of the response times to the statements about the head categories (e.g. the boat in ‘whale boat’) showed no significant differences between the property and relational prime conditions ($F(1, 33) < 1, p > .2$). Table 14 summarizes these results.

<table>
<thead>
<tr>
<th>Modifier category</th>
<th>Property prime</th>
<th>Relational prime</th>
<th>t-value</th>
<th>p &lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Book</td>
<td>1827.00</td>
<td>2286.16</td>
<td>2.05</td>
<td>0.16</td>
</tr>
<tr>
<td>Whale</td>
<td>1845.87</td>
<td>2373.37</td>
<td>1.39</td>
<td>0.24</td>
</tr>
<tr>
<td>PDA</td>
<td>1315.67</td>
<td>1655.53</td>
<td>4.20</td>
<td>0.04</td>
</tr>
<tr>
<td>Painter</td>
<td>1578.20</td>
<td>1789.79</td>
<td>&lt; 1</td>
<td>0.36</td>
</tr>
<tr>
<td><strong>All modifier categories</strong></td>
<td><strong>1641.68</strong></td>
<td><strong>2026.21</strong></td>
<td><strong>3.74</strong></td>
<td><strong>0.06</strong></td>
</tr>
<tr>
<td>Head category</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magazine</td>
<td>2423.00</td>
<td>2363.42</td>
<td>&lt; 1</td>
<td>0.83</td>
</tr>
<tr>
<td>Boat</td>
<td>2057.44</td>
<td>2437.47</td>
<td>2.0</td>
<td>0.16</td>
</tr>
<tr>
<td>Camera</td>
<td>1961.75</td>
<td>2218.00</td>
<td>&lt; 1</td>
<td>0.48</td>
</tr>
<tr>
<td>Photographer</td>
<td>2051.44</td>
<td>2240.21</td>
<td>&lt; 1</td>
<td>0.68</td>
</tr>
<tr>
<td><strong>All head categories</strong></td>
<td><strong>2123.40</strong></td>
<td><strong>2314.77</strong></td>
<td><strong>&lt; 1</strong></td>
<td><strong>0.43</strong></td>
</tr>
</tbody>
</table>

Table 14: Mean attribute statement response times (in milliseconds)
DISCUSSION

The results of the pretest provide support for H10 and marginal support for H11. Hence, we find that property and relational interpretations induce marginally significant differences in the accessibility of modifier category attributes, but no differences in the accessibility of the category names. This is an important finding since it suggests that property interpretations can not only result in a transfer of properties from the modifier to the head category, but also increase the accessibility of these attributes significantly as compared to relational interpretations. Hence, given the results of study 2b where lack of attention and hence lowered accessibility to the modifier categories were found to result in the lack of property transfer and the lack of multiple category inferences, the results of our pretest indicate that property interpretations may be a route to overcoming the accessibility issue. If indeed, property interpretations increase accessibility to the attributes of the modifier categories, then these attributes should be more accessible at the time of product evaluations and hence, should attain greater weight during evaluations as compared to under relational interpretations.

Hence, based on the results of the above pretest, we contend that priming respondents to interpret ambiguous information using property interpretations should lead to the increased accessibility of the attributes of the inconsistent category and hence, should result in these attributes being accessed and used during product evaluation. This also implies that beliefs about the attributes of both the consistent and inconsistent categories are likely to be held and hence, multiple category inferences will be made. However, accessibility to the attributes of the modifier category will be lower under
relational interpretations than property interpretations, and hence these attributes are less likely to be accessed and used during product evaluations under relational interpretations. Hence, multiple category inferences are less likely to be made under relational interpretations. Specifically,

H12: Inferences about both the consistent and inconsistent category are more likely under property interpretations as compared to relational interpretations.

H13: Inferences about both the consistent and inconsistent category will be significant predictors of product evaluations under property interpretations.

H14: Inferences about only the consistent category will be significant predictors of product evaluations under relational interpretations.

Given that inferences about both categories are more likely under property interpretations and that these inferences will predict brand evaluations, it is logical to expect that brand evaluations will be more favorable under property as compared to relational interpretations. Hence,

H15: Product evaluations will be more favorable under property than relational interpretations.

The above set of hypotheses (H12-H15) extends the findings from the psycholinguistics literature by demonstrating the impact of different interpretation strategies on product evaluations. Prior research in psycholinguistics has not considered evaluations as a dependent measure. We also test the effects of property and relational interpretations in an information rich environment (labels and attribute information) as compared to past research which has typically provided very little information to respondents (only category labels). Finally, our hypotheses are based on the difference in
the processes underlying property and relational interpretations rather than merely the effects of these interpretation strategies. We now test these hypotheses in an empirical study.

STUDY 3

Design

Study 3 was designed to induce product beliefs about both categories and to render the inclusion of both sets of category attributes during brand evaluation. To this end, respondents were primed to process information about the Xircom camera organizer using either a property interpretation or a relational interpretation strategy. The study was designed as a 2 (priming: property vs. relational interpretation) x 2 (label: camera vs. organizer) between subjects study. There were thus a total of four experimental conditions. Our expectation was that respondents in the property priming conditions would be more likely to hold beliefs about both the camera and organizer categories while respondents in the relational priming conditions would be more likely to hold beliefs about only the label consistent category attributes. This called for an interaction of the label and the prime variables on product beliefs. Further, we anticipated a main effect of prime type on product evaluations such that evaluations would be more favorable under property as compared to relational priming. The stimuli used for the study are presented in Appendices M and N.
Manipulations

*Priming manipulation.* The priming manipulation was adapted from the manipulation used in the pretest. The only difference was that no target combinations were used. Hence, only the nine prime combinations from the pretest were used.

Thus, respondents were asked to interpret nine different novel combinations that were selected so as to have predominantly either property or relational interpretations. For example, ‘bus truck’ and ‘dolphin vase’ were property primes (a truck that carries passengers like a bus or a vase shaped like a dolphin) while ‘clothing truck’ and ‘coin vase’ were relational primes (a truck that carries clothing and a vase that holds coins).

*Category labels were used to direct categorization of the product.*

Dependent variables

The dependent measures for brand evaluation, purchase intention and product beliefs were the same as used in Study 2. A scale reliability analysis for the brand scale indicated low scale reliability (Cronbach’s alpha = .69). An examination of the individual scale items indicated that the two reverse coded items had low item-total correlations (desirable-undesirable = .45 and attractive-unattractive = .35). Eliminating these two items from the scale resulted in an increase in scale reliability to .77. Hence, a reduced three-item brand scale was used for all analyses. Purchase intention was measured as a single item on a 9-point scale. Two different measures of product beliefs were used. The
first was a set of 5 attributes each of the organizer and camera categories of the style agree-disagree. This was a count measure with the average number of attributes in each category agreed with forming the belief measure. For the second measure, respondents were asked to indicate how much they agreed with 5 statements each about the organizer and camera attributes of the product on a 9-point scale. A scale reliability analysis indicated that the set of organizer beliefs exhibited a reliability of 0.61 and the set of camera beliefs exhibited a reliability of 0.77. Hence, the set of 5 organizer statements was averaged to form an organizer belief measure and the set of 5 camera statements was averaged to form a camera belief measure.

A single measure for categorization was used. This was the department store layout measure that was used in studies 1 and 2. This measure was coded as either organizer or camera or other.

We also included a self-reported measure for expertise in order to account for any differences between respondents in terms of their knowledge and usage of the two categories – organizer and camera. Respondents were asked how knowledgeable they were about cameras and organizers and how often they used cameras and organizers. Their responses were measured on 9-point scales. There were no significant main or interactive effects of knowledge or usage on any of the dependent measures and these measures are therefore not discussed further.
Procedure

Respondents were 81 undergraduate students who participated in the study in return for course credit. They were informed that they would be participating in two separate studies. The first study was the priming task and the second study was the advertisement evaluation task. This was done in order to reduce the possibility of respondents linking the study priming manipulation and the processing of the advertisement. Respondents were told that the objective of the priming task was to examine how people interpret new words while the objective of the advertising evaluation task was to examine their responses to advertisements for different new products. They were given two separate sets of materials – one contained the priming task and the second contained a set of three different ads with the target ad always in the first position. Respondents were not allowed to refer back to the advertisement while answering questions. The study was a computer based study and all study materials and questions were presented on a computer using a Visual Basic program.

RESULTS

9 respondents interpreted four or more of the nine primes without using either property or relational interpretations (e.g. a bus truck is an object) and were dropped from the analysis. The results for the remaining 72 respondents are presented below.
Manipulation checks

*Priming.* The priming manipulation was successful with 91.7% of primes being interpreted using property interpretations in the property priming condition versus 0.58% being interpreted using relational interpretations ($F(1, 71) = 2049.66, p < 0.00$). As expected, this pattern reversed in the relational priming conditions with 85.5% of primes being interpreted using relational interpretations versus 0.65% of the primes being interpreted using property interpretations ($F(1, 71) = 2376.89, p < 0.00$).

*Categorization.* A chi-square analysis indicated that categorization of the product was in accordance with the label ($\chi^2 = 35.19, p < 0.01$). 88% of the respondents selected organizer as the department in the organizer label condition while 55% selected camera as the department in the camera label condition.

Product beliefs

*Agree-disagree measure.* A multivariate analysis of variance revealed a significant main effect of label ($F(2, 67 = 6.02), p < .00$) and a marginal main effect of prime ($F(2, 67) = 2.56, p < .08$) on the number of organizer and camera beliefs agreed with. A larger number of organizer (camera) features were agreed with when the label was an organizer (a camera). And, a larger number of total features were agreed with when the prime was property as compared to relational. As expected however, these main effects were qualified by a significant interaction between label and prime for organizer and camera beliefs ($F(2, 67) = 3.66, p < .03$). Planned contrasts revealed that in the
property prime conditions, there was no significant difference in the number of organizer features agreed with ($t < 1, p > .56$) regardless of the category label. Thus, respondents agreed with an equal number of organizer features in the property prime conditions despite the differences in the category label. As expected, under relational priming, a significantly larger number of organizer features than camera features was agreed when the label was an organizer than when the label was a camera.

As expected, the number of camera features agreed with was not significantly different between the camera and organizer label conditions under property priming ($t < 1, p > .96$). However, contrary to expectations, under relational priming, the number of camera features was not significantly higher than the number of organizer features agreed with ($t < 1, p > .35$), although the means were in the right direction. Hence, priming property interpretations appeared to induce multiple category inferences as opposed to relational priming, at least for the organizer beliefs. This provides partial support for H12.

<table>
<thead>
<tr>
<th>Label</th>
<th>Property prime</th>
<th>Relational prime</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Organizer</td>
<td>Camera</td>
</tr>
<tr>
<td>Organizer beliefs</td>
<td>4.33</td>
<td>4.15</td>
</tr>
<tr>
<td>Camera beliefs</td>
<td>3.67</td>
<td>3.65</td>
</tr>
</tbody>
</table>

Table 15: Study 3: Mean agree-disagree product beliefs
**Table 16: Analysis of variance for agree-disagree product beliefs**

<table>
<thead>
<tr>
<th>Effect</th>
<th>F</th>
<th>Degrees of freedom</th>
<th>p&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Label</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizer beliefs</td>
<td>10.32</td>
<td>1</td>
<td>.00</td>
</tr>
<tr>
<td>Camera beliefs</td>
<td>.40</td>
<td>1</td>
<td>.52</td>
</tr>
<tr>
<td><strong>Prime</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizer beliefs</td>
<td>4.30</td>
<td>1</td>
<td>.04</td>
</tr>
<tr>
<td>Camera beliefs</td>
<td>1.91</td>
<td>1</td>
<td>.17</td>
</tr>
<tr>
<td><strong>Label X Prime</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizer beliefs</td>
<td>5.83</td>
<td>1</td>
<td>.01</td>
</tr>
<tr>
<td>Camera beliefs</td>
<td>.49</td>
<td>1</td>
<td>.48</td>
</tr>
</tbody>
</table>

*Scaled measure.* A multivariate analysis of variance revealed a main effect of label on camera and organizer beliefs ($F (2, 67) = 8.15, p < .00$). There was no main effect of prime on camera and organizer beliefs ($F (2, 67) < 1, p > .2$). However, as expected there was a marginally significant interaction between label and prime on camera and organizer beliefs ($F (2, 67) = 2.50, p < .08$).

Planned contrasts indicated a pattern of means similar to the pattern found for the agree-disagree belief measure. That is, under property priming, the average ratings for organizer beliefs were no different when the product was labeled as an organizer ($t < 1, p > .40$) or as a camera ($t = 3.60, p < .00$). While the means for the camera beliefs
exhibit the same direction, the differences between these means were not significant for either the property or relational prime conditions. Hence, H12 is supported for organizer, but not for camera beliefs.

<table>
<thead>
<tr>
<th>Label</th>
<th>Property prime</th>
<th>Relational prime</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Organizer</td>
<td>Camera</td>
</tr>
<tr>
<td>Organizer beliefs</td>
<td>6.54</td>
<td>6.20</td>
</tr>
<tr>
<td>Camera beliefs</td>
<td>5.93</td>
<td>6.37</td>
</tr>
</tbody>
</table>

Table 17: Study 3: Mean scaled product beliefs

<table>
<thead>
<tr>
<th>Effect</th>
<th>F</th>
<th>Degrees of freedom</th>
<th>p&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizer beliefs</td>
<td>10.19</td>
<td>1</td>
<td>.00</td>
</tr>
<tr>
<td>Camera beliefs</td>
<td>2.17</td>
<td>1</td>
<td>.14</td>
</tr>
<tr>
<td>Prime</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizer beliefs</td>
<td>0.18</td>
<td>1</td>
<td>.67</td>
</tr>
<tr>
<td>Camera beliefs</td>
<td>0.31</td>
<td>1</td>
<td>.57</td>
</tr>
<tr>
<td>Label X Prime</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizer beliefs</td>
<td>4.16</td>
<td>1</td>
<td>.04</td>
</tr>
<tr>
<td>Camera beliefs</td>
<td>0.10</td>
<td>1</td>
<td>.74</td>
</tr>
</tbody>
</table>

Table 18: Analysis of variance for scaled product beliefs
Product evaluations

There were no interactive or main effects of label and prime on brand evaluations or purchase intentions. Hence, the higher beliefs about both categories under property interpretations did not result in increased product evaluations. Thus, H15 was not supported. The finding that brand attitudes and purchase intentions did not increase despite the high inferences made about both label consistent and label inconsistent categories is a puzzling finding. Given that inferences predict brand evaluations, and given the higher level of inferences made under property priming, brand attitudes should have shown some increase in the property priming conditions as compared to the relational priming conditions.

However, this effect was not found and we examine the patterns of effects of both category attributes on brand evaluations to understand this lack of effect. We conducted regression analyses to explore this lack of effect.

<table>
<thead>
<tr>
<th>Label</th>
<th>Property prime</th>
<th>Relational prime</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Organizer</td>
<td>Camera</td>
</tr>
<tr>
<td>Organizer</td>
<td>6.88</td>
<td>6.85</td>
</tr>
<tr>
<td>Camera</td>
<td>5.67</td>
<td>5.65</td>
</tr>
<tr>
<td>Both</td>
<td>6.62</td>
<td>7.25</td>
</tr>
<tr>
<td>Organizer</td>
<td>6.62</td>
<td>7.25</td>
</tr>
<tr>
<td>Camera</td>
<td>5.35</td>
<td>6.12</td>
</tr>
</tbody>
</table>

Table 19: Mean product evaluations
A regression analysis was conducted with the brand attitude as the dependent variable and the organizer and camera attributes as the independent variables. When all the property priming conditions (organizer as well as camera label conditions) were combined, both organizer and camera beliefs predicted brand attitudes. Hence, as expected property priming appears to induce consideration of the label-inconsistent category attributes in addition to the label-consistent category attributes during product evaluations. However, separate regression analyses for the camera and organizer label conditions reveal unexpected results. When the product is categorized as a camera, only organizer attributes are significant predictors of brand evaluations ($\beta_{\text{organizer}} = .47, p < .04; \beta_{\text{camera}} = .01, p > .10$), while when the product is categorized as an organizer, only camera attributes are significant predictors of brand evaluations ($\beta_{\text{camera}} = .70, p < .01; \beta_{\text{organizer}} = .24, p > .10$). Hence, under both label conditions, only one set of category attributes predict brand evaluations, contrary to our expectations that both sets of attributes should predict evaluations. This may explain the lack of increase in brand evaluations under property priming, since even under property priming, only one set of attributes drives evaluations.

The pattern of results for study 3 is the reverse of the pattern that we found in our previous studies wherein category consistent attributes alone were significant predictors of brand evaluations. In study 3, we find that category inconsistent attributes alone are significant predictors of brand evaluations. Since this pattern of effects was not predicted, any explanation for it is necessarily post hoc and speculative.
One possibility is that the product was sub-typed in the property priming conditions. That is, given that property priming led to increased accessibility of the inconsistent attributes, it is possible that these attributes differentiated the product from other products in the same category, leading to sub-typing (Weber and Crocker 1983; Sujan and Bettman 1989). Past research in sub-typing has found that the inconsistent attributes of the sub-typed product become more important in product evaluations than the consistent attributes of the product (Sujan and Bettman 1989). Extending the sub-typing literature to our results, this would suggest that when the product is categorized as an organizer (camera) under property priming, it is considered to be a special type of organizer (camera) and hence, the camera (organizer) attributes of the product will become more important than the organizer (camera) attributes of the product. While this explanation is consistent with our results, it still does not explain why the consistent attributes are not at all significant in predicting brand evaluation. Hence, further research is required to explain our results.

Under relational priming, organizer beliefs were not significant predictors of brand attitudes while camera beliefs were marginally significant as predictors of brand attitudes. Given our expectation that only category consistent beliefs should predict brand attitudes under relational priming, we conducted separate regression analyses for the organizer and camera label conditions under relational priming. In accordance with H14 and the results from our previous studies, we expected to find category consistent beliefs driving brand attitudes with no effect of category inconsistent beliefs. However, we did not find any significant predictors for brand attitudes under relational priming in either the organizer or the camera label conditions. Thus, H14 was not supported.
This finding is unexpected and one potential reason for the lack of significance may be the smaller sample size in this study as compared to the sample sizes in studies 2 and 2B. The sample size for each label condition in Study 3 was 17 whereas the sample sizes per label condition in Study 2 were 42 and 50 for the organizer and camera label conditions respectively. The sample sizes per label condition were 24 in Study 2B. Hence, the smaller sample size may account for the lack of results in Study 3. However, as the explanation for the results under the property priming conditions, this explanation is necessarily post hoc and therefore speculative.

<table>
<thead>
<tr>
<th>Prime</th>
<th>Dependent variable</th>
<th>Predictor variables</th>
<th>β</th>
<th>Significance</th>
<th>Overall regression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property</td>
<td>Brand attitude</td>
<td>Organizer beliefs</td>
<td>0.35</td>
<td>*p &lt; .02</td>
<td>*R² = 0.21</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Camera beliefs</td>
<td>0.31</td>
<td>*p &lt; .04</td>
<td>*F (2, 37) = 6.05</td>
</tr>
<tr>
<td></td>
<td>Relational attitude</td>
<td>Organizer beliefs</td>
<td>-</td>
<td>*p &gt; .10</td>
<td>*R² = 0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Camera beliefs</td>
<td>0.18</td>
<td>*p &lt; .08</td>
<td>F (2, 33) = 1.87</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.31</td>
<td></td>
<td>*p &gt; .10</td>
</tr>
</tbody>
</table>

Table 20: Study 3 regression analysis by priming condition
### DISCUSSION

The results of Study 3 demonstrate that multiple category inferences can be induced through property priming prior to exposure to product information. This is a significant finding since it is contrary to the findings of the literature on categorization under ambiguity, which predicts that inferences are restricted to a single category. This finding is also significant since it demonstrates a way by which marketers can control consumer categorization while simultaneously inducing high beliefs about both the combining categories. Hence, it is possible for ambiguous products to be viewed as truly possessing characteristics of multiple categories rather than a single category.

However, study 3 also provides some unexpected findings with regard to the pattern of effects of product beliefs on brand attitudes. That is, brand attitudes are

<table>
<thead>
<tr>
<th>Category</th>
<th>Dependent variable</th>
<th>Predictor variables</th>
<th>$\beta$</th>
<th>Significance</th>
<th>Overall regression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizer</td>
<td>Brand attitude</td>
<td>Organizer beliefs</td>
<td>0.04</td>
<td>$p &gt; .10$</td>
<td>$R^2 = 0.12$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Camera beliefs</td>
<td>0.40</td>
<td>$p &gt; .10$</td>
<td>$F(2, 16) &lt; 1, p &gt; 0.20$</td>
</tr>
<tr>
<td>Camera</td>
<td>Brand attitude</td>
<td>Organizer beliefs</td>
<td>0.08</td>
<td>$p &gt; .10$</td>
<td>$R^2 = 0.05$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>$p &gt; .10$</td>
<td>$F(2, 33) = 1.87, p &gt; 0.20$</td>
</tr>
</tbody>
</table>

**Table 21: Regression analyses by label condition under relational priming**
predicted by the inconsistent category’s beliefs under property priming, while there are no significant predictors of brand evaluations under relational priming. Both of these results are surprising and contrary to our predictions. We had expected that beliefs about both categories would drive evaluations under property priming and hence, evaluations would be higher under property than relational priming. What is surprising is that though beliefs about both categories are high under property priming, only one set of beliefs predicts evaluations. While this result may be on account of the sub-typing of the product under property priming, we do not include measures for sub-typing and hence, our explanation is necessarily speculative.

Hence, while the results of study 3 with respect to product beliefs are consistent with our predictions, further work is required to explain the pattern of effects of product beliefs on brand attitudes.

SUMMARY OF CHAPTER

In this chapter, we present a number of interesting findings. First, we show that the interpretation strategy likely to have been used in our studies 1 and 2 is relational interpretations, based on the similarity ratings between a camera and an organizer. Given that these two products are rated as being relatively dissimilar, we use the relationship between similarity and interpretation strategy identified in past research to posit that a camera organizer product would be interpreted relationally in the absence on the priming of any specific interpretation strategy. The relational interpretation would have resulted in
a lack of transfer of properties between the two categories, resulting in the higher
likelihood of category consistent than inconsistent beliefs that were found in Studies 1, 2
and 2B.

Second, we examine the processes underlying the transfer of properties between
categories under property priming. We test for two alternate explanations – differential
attention and differential retrieval – and find support for both explanations. That is, when
faced with an ambiguous combination, people appear to pay more attention to category
consistent aspects of the combination and this increased attention leads to greater
accessibility of the category consistent attributes and reduced accessibility of the category
inconsistent attributes. The differential accessibility results in a failure to use the
inconsistent attributes while making product judgments. This is the reason why multiple
category inferences are not made. An interesting finding is that the difference in
accessibility is limited to the attributes of the categories rather than the categories
themselves, i.e. there is no difference in the accessibility to the category labels or names,
only to the category attributes.

Using the above two findings, we demonstrate that priming property
interpretations result in inferences about both – label consistent and label inconsistent –
categories being made for ambiguous products. Hence, we are able to induce multiple
category inferences in people – a result that has not been shown till date in the
psychology and marketing literatures. This is a very important finding since not only is it
counter to the prevailing theoretical contentions of categorization theory, but also because
it holds tremendous implications for marketing practice. Priming consumers to process
information on ambiguous products using property interpretations offers a route for
marketers to influence consumers to use all product attributes during evaluations. This should result in greater product differentiation as compared to a situation where only category consistent aspects are considered during product evaluation.

While we expected an increase in product evaluations on account of inferences about both categories being made under property priming, our results did not support our expectations. The finding that category inconsistent attributes of the product predict evaluations under property priming is an intriguing finding which necessitates further research to understand and explain. If indeed, drawing attention to the category inconsistent aspects of a product leads to sub-typing of the product and results in the inconsistent attributes becoming significant predictors of brand evaluations, then property priming may not be an optimal solution for marketers. However, as stated earlier, this finding requires further exploration.
CHAPTER 6

CONCLUSIONS

In this chapter, we will review the objectives, findings, contributions and limitations of this dissertation. We will then present avenues for future research in this area.

OBJECTIVES OF THE DISSERTATION

This dissertation aimed at providing an understanding of how consumers categorize and evaluate ambiguous products. Ambiguous products were defined as products that possess features of more than one category and hence, provide consumers with a choice of categories in which to place these products. While the number of ambiguous products launched in the marketplace has increased in recent years, marketers hold little understanding of how consumers process these products. Hence, we specifically aimed at understanding how consumers categorize ambiguous products and draw out and empirically test the implications of categorization on product evaluations.
OUR APPROACH

We reviewed the relevant literature in categorization and found that traditional categorization theories which are based on the principle of similarity between the object to be categorized and some reference point, were not equipped to deal with the categorization of ambiguous products that are similar to more than one reference point. Other research that considered aspects of ambiguity (e.g. Malt et al 1995) provided some useful starting points for our research (people restrict inferences to a single category), but also possessed a number of limitations (lack of hybridization, lack of evaluation measures, limited information etc.) The tendency of product beliefs to be more likely to be held for category consistent as compared to inconsistent attributes is an important problem in marketing since marketers would want consumers to value all aspects of an ambiguous product and place some value on both sets of category attributes while evaluating the product. Hence, we examined the literature in psycholinguistics for insights on how to resolve this problem. This literature revealed that the priming of different interpretation strategies in consumers might be a way to induce multiple category inferences. Specifically, priming property interpretations may lead to a transfer of properties between categories, leading to the induction of beliefs about both categories in an ambiguous product. If people do hold beliefs about both categories, then their evaluations of the product ought also to be more favorable.

Based on the above theorizing, we formulated fifteen hypotheses and conducted three empirical studies to test these hypotheses. Our key findings are presented in the next section.
KEY FINDINGS

1. Consumers categorize ambiguous products into a single category. The choice of categories is driven by the cues provided to the consumers. Some cues such as category labels are stronger than other cues such as product attributes in influencing categorization (H1). Hence, consumers do not spontaneously hybridize the ambiguous product or create a new category for it. Rather, they utilize their current knowledge about different products to place the ambiguous product into an extant category.

2. Having categorized the product into one category, consumers tend to make product inferences that are consistent with the category and do not make inferences that are inconsistent with the category (H3). Hence, inferences about a product are more likely to be made for a single category and inferences from outside that category are not made. This implies that multiple category inferences are not likely to be made.

3. While we had predicted that cue order would determine categorization and product inferences when no category labels were provided, we did not find support for this prediction (H2 and H4) in Study 1. The lack of effect of cue order is puzzling and may have been driven by our selection of the product picture or the product combination (camera organizer), but these explanations are only speculative and more research is needed to address this issue.

4. The reason consumers do not make multiple category inferences is because they pay less attention to category inconsistent aspects of the product than category consistent aspects (H7). This lack of attention results in an inability to easily retrieve these aspects.
inconsistent aspects during product evaluations (H8). An inability to retrieve the information leads to the lack of this information being used while making the evaluations.

5. Hence, category consistent inferences are significantly better predictors of brand attitudes than category inconsistent inferences (H5). That is, if a product is categorized as one category, then it is evaluated as a member of that category alone, despite the product possessing features of other categories. In a way, the features of other categories are ignored while making product judgments. Product evaluations are therefore more sensitive to changes in the quality of category consistent product aspects than the inconsistent aspects (H6). Any change in the category inconsistent aspects has no impact on product evaluations. That is, holding performance on the category consistent dimension constant, even when the product performs strongly on the inconsistent category dimension, product evaluations are no different from when the product performs weakly on the inconsistent dimension (H9).

6. Property interpretations focus attention on the set of properties possessed by the inconsistent category as compared to relational interpretations that focus attention on the possible relations between the two categories. Hence, properties or attributes of the inconsistent category are more accessible under property interpretations, which allow these properties to be accessed and used during product evaluations (H10 and H11).

7. Hence, the use of property interpretations while interpreting ambiguous products induces a transfer of properties between the category consistent and inconsistent aspects of the product. This results in beliefs about both categories being induced,
under property but not relational interpretations (H12). Processing ambiguous products using property interpretations can therefore yield multiple category inferences.

8. While we predicted that product evaluations are predicted by both category consistent and inconsistent attributes under property interpretations (H13), we found support for this effect only at an overall level. That is, when both the camera and the organizer conditions were collectively considered, both camera and organizer attributes predicted brand evaluations. However, when each label condition was separately considered, only the label inconsistent attributes significantly predicted brand evaluations. This was an unexpected finding, and we suggest that sub-typing of the ambiguous product may be an explanation for this effect. That is, if people categorized the product as a special type or sub-type of a camera (organizer), then the features of the camera (organizer) that are inconsistent or incongruous with the camera (organizer) category would receive greater weight during product evaluations (Sujan and Bettman 1989). This theorizing may explain why the inconsistent product attributes receive greater weight during product evaluations, but it still does not explain why the consistent aspects were not significant predictors of evaluations.

9. While we had predicted that product evaluations would be predicted by only category consistent attributes under relational interpretations, we did not find support for this prediction (H14). While the relatively small sample size in Study 3 may be responsible for this lack of effect, further research is needed to explain this issue.
10. While we had predicted that product evaluations would be more favorable under property as compared to relational interpretations, we did not find support for this prediction (H15).

THEORETICAL CONTRIBUTIONS OF OUR RESEARCH

Our research contributes to the literatures in categorization and psycholinguistics. We explore how ambiguous products are categorized and find that category cues such as category labels are powerful influencers of categorization for these products. This is an interesting finding because it signifies that category labels may be stronger than similarity to mental reference points during categorization. That is, despite ambiguous products being similar to more than one category and hence, theoretically, being placed in either both categories or a new category being created for them which possesses features of both categories, the presence of a category label overwhelmingly directs categorization into a single category. Thus, similarity alone may not be sufficient to fully account for the categorization of products.

Our finding regarding product inferences being restricted to a single category in the absence of any interpretation strategy priming is consistent with past research. However, our finding is unique in one way. We demonstrate that inferences are restricted to a single category even when information other than just the category labels is provided. That is, despite a larger amount of information being provided (attribute information as well as label information) as compared to past research that has typically
provided only the category labels, inferences were nonetheless restricted to a single
category. Hence, amount of information did not appear to have any impact on the type of
inferences made.

An important contribution of our research is the incorporation of product
evaluations as a dependent measure. Past research on categorization under ambiguity has
not considered this variable. We find that evaluations are driven primarily by the set of
category consistent attributes, thus rendering the categorization of ambiguous products
critical to evaluations. This finding suggests that controlling categorization of ambiguous
products can influence product evaluations. Therefore, categorization may be an alternate
route to persuasion as opposed to standard attitude change models.

A critical contribution of our research is the demonstration that priming property
interpretations prior to exposure to information about ambiguous products can result in
the induction of inferences about category consistent as well category inconsistent
attributes. As stated earlier, the lack of multiple category inferences is a robust
phenomenon that has been found across a number of studies in psychology and marketing
(e.g. Malt et al 1995; Murphy and Ross 1994; Moreau et al 2001). By incorporating
findings from a different literature stream, namely psycholinguistics, we are able to
overcome this persistently demonstrated effect. This finding is a significant contribution
to the categorization, the psycholinguistics and the marketing literatures.

We further add to the psycholinguistics literature by examining the processes
underlying the transfer of properties under property interpretations. We demonstrate that
property and relational interpretations both result in the processing of the head and
modifier categories. However, the way in which these categories are processed is
different. Property interpretations focus attention at the attribute or property level of the modifier category while relational interpretations focus attention on the whole category. Hence, accessibility to the categories per se is no different between the two types of interpretations, but accessibility to the properties of the modifier category is significantly higher under property interpretations.

We also explore the processes underlying property and relational interpretations in the context of greater information (labels and attributes) which is consistent with how marketing communications are structured. Past research in psycholinguistics has typically provided very little information (only labels) to respondents. Further, we are able to demonstrate property and relational priming effects even when only a single label (e.g. camera or organizer) is provided to respondents. Past research in psycholinguistics has typically utilized a dual label approach (e.g. whiskey beer). Hence, we are able to demonstrate and extend past findings in the psycholinguistics literature in the context of a different research paradigm.

Overall, our research significantly extends the boundaries of past research in categorization under ambiguity and incorporates theory from psycholinguistics to resolve a persistently found problem in categorization.

**MANAGERIAL CONTRIBUTIONS**

Our findings present some very useful insights for marketers on how they can tailor communication strategies in order to influence consumer categorization and evaluations of their ambiguous products.
We suggest that presenting category cues such as category labels can resolve product ambiguity. However, we caution that such ambiguity resolution may result in higher inferences about the label consistent category as well as the attributes of the inconsistent category being ignored during product evaluations. Thus, providing strong cues to control categorization may solve the categorization problem, but set up an inference problem. Marketers would ideally want consumers to attend to and utilize all product attributes during product judgments. We suggest that this may be possible through the priming of property interpretation strategies. While our research did not prime such an interpretation strategy through a marketing communication (e.g. advertisement), it should be easy to tailor property primes to be presented through such communications. Therefore, we contend that the positioning and communication of the product will be critical in determining how the product is categorized and evaluated.

Our research provides marketers with an understanding of how consumers process ambiguous products and identifies a key issue associated with these products – namely the tendency to make single category inferences instead of multiple category inferences. We propose one way by which this issue can be overcome – namely through the priming of property interpretations prior to exposure to information about the ambiguous product. Thus, we present a complete analysis and understanding of how ambiguous products may be marketed for optimal results.
LIMITATIONS

As with any research, our research too has some limitations. The lack of support for five of our hypotheses is a key limitation. Specifically, we are unable to explain the lack of cue order effects on categorization and inferences when no category labels are provided, the pattern of effects of product beliefs on product evaluations under relational and property priming and the lack of difference in product evaluations between the property and relational priming conditions. While we have some speculative explanations for the lack of these findings, future research is called for to test these explanations.

A second limitation of our research is the fact that all our empirical studies were conducted with a single ambiguous product. It would be useful to extend our findings to other ambiguous products in order to demonstrate the robustness of our results.

FUTURE RESEARCH

Our research is restricted to instances where the consumer is exposed to a single advertisement for the product and makes judgments based on this single communication. In reality, consumers are often exposed to repetitive and multiple sources of information for products (e.g. multiple advertisements, word of mouth etc). It would be useful to study how such multiple information sources impact categorization and evaluations.

We use only two types of category cues in our research – labels and non-label attributes. However, consumers are often exposed to other types of cues. For example product placement in a retail setting can often suggest categories for products. Thus, if a
camera organizer is shelved in the camera section, then it may be possible that such product placement cues the category camera and may even be strong enough to overcome an organizer category label. Hence, a study of other types of category cues would be useful.

We selected respondents who were not experts in the categories that we studied. Given past research on the effects of expertise (e.g. Alba and Hutchinson 1987; Sujan 1985), it would be very interesting to consider whether expertise can overcome some of our results. For example, since experts usually possess large amounts of category knowledge, will they attend to and use the attributes of both categories during product evaluations? And if they are cognizant of the fact that the product possess multiple category attribute, will they be more likely to categorize the product as a hybrid as compared to novices? And, what are the implications of such differences in categorization and inference making between experts and novices for product evaluations? These are questions that are important to consider in future research.

Another important avenue for future research would be to consider the interaction between product usage and categorization. We do not cater for product use in our studies. If consumers were exposed to the product and use it over a period of time, what would be the impact of such use on product categorization and evaluation? One possibility is that categorization can drive usage. For example, if a consumer uses a cell phone – PDA after it has been labeled as a PDA and finds that s/he uses the cell phone features of the product more than the PDA features, then s/he may re-categorize the product as a PDA. A second possibility is that usage can drive categorization or re-categorization. For example, given that the product has been categorized prior to usage as a PDA, the
consumer may use the PDA function more than the cell phone function. This suggests that categorization could potentially exert a very strong influence on product usage decisions. This is an interesting question for future research to consider.

Finally, while we consider the inferences made about both categories, we have not explored the inheritance of attributes by the ambiguous product. Past research in psycholinguistics (e.g. Hampton 1988) has found that when two categories combine, some of their properties are transferred to the combination, whereas other properties are not transferred. Further, the combination often gains attributes that are novel or ‘emergent’, i.e. these attributes are not possessed by the combining categories, but are possessed by the combination. For example, in our studies using the camera organizer, consumers may expect a camera organizer to have a swivel screen while they may not expect either a camera or an organizer alone to have one. What factors account for attribute transfer and failure to transfer? What influences the generation of such emergent attributes? What is the impact that these attributes have on product evaluations? These are important issues for future research.
APPENDIX A

LIST OF NEW PRODUCTS USED IN PRETEST 1

1. Cell phone - PDA
2. Cell phone - MP3 player
3. PDA - MP3 player
4. Camera - Watch
5. Watch - GPS
6. Hair dryer - Iron
7. SUV - Pick up truck
8. SUV - Sedan
9. SUV - Minivan
10. Camera - PDA
11. Laptop - Camera
APPENDIX B

QUESTIONNAIRE USED IN PRETEST 1

1. Please indicate how familiar you are with the products given below on the following scale where 1 = Not at all familiar and 7 = Very familiar

<table>
<thead>
<tr>
<th>Product</th>
<th>Not at all familiar</th>
<th>Very familiar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell phone</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Sports Utility vehicle</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Digital camera</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Pick up truck</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>MP3 Player</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Electronic Organizer</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>CD (Compact discs)</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Minivan</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Laptop computer</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>PDA (Personal digital assistant)</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Hair dryer</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Electric iron</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>DVD (Digital video disc)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Please indicate how often you use the following products on the following scale where 1 = Not at all often and 7 = Very often

<table>
<thead>
<tr>
<th>Product</th>
<th>Not at all often</th>
<th>Very often</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell phone</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Sports Utility vehicle</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Digital camera</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Pick up truck</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>MP3 Player</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic Organizer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minivan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laptop computer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDA (Personal digital assistant)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hair dryer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electric iron</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. Please indicate how knowledgeable you are about the products given below on the following scale where 1 = *Not at all knowledgeable* and 7 = *Very knowledgeable*

<table>
<thead>
<tr>
<th>Product</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell phone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sports Utility vehicle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital camera</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pick up truck</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MP3 Player</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic Organizer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minivan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laptop computer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDA (Personal digital assistant)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hair dryer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electric iron</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This study aims at understanding how people perceive pictures of different products. On the following pages, you will be given a number of different pictures and asked to name the products shown in the pictures.

If you are not sure what product is shown in the picture, please list your best guess about that product.

Please be as specific as possible while naming the product. For example, instead of writing “bag”, write “duffel bag” or “handbag” or “backpack” or “messenger bag”.

If you have any questions, please ask the experimenter now; otherwise you may turn the page and begin the study.
Target pictures used
APPENDIX D

QUESTIONNAIRE USED IN PRETEST 3

This study aims at understanding how people perceive different products. On the following pages, you will be given a number of different products and asked to list out some key attributes or features that these products possess. Please read the following instructions carefully.

For each of the products listed on the following pages, we would like you to list at least 6 different attributes of the product. These attributes could be anything that you associate with the product. For example, if the product is bread, we would like you to list the attributes that come to your mind when you think about bread (e.g. nutrition content, taste, softness, type – white/wheat etc.). Please list the attributes in the order in which they come to your mind.

There are no right or wrong answers, so don’t worry or puzzle over individual items. If you do not know the meaning of any word, please circle that word and move on to the next word.

If you have any questions, please ask the experimenter now; otherwise you may turn the page and begin the study.
DIGITAL CAMERA
1. _________________________________________________________
2. _________________________________________________________
3. _________________________________________________________
4. _________________________________________________________
5. _________________________________________________________
6. _________________________________________________________
7. _________________________________________________________

PDA (PERSONAL DIGITAL ASSISTANT)
1. _________________________________________________________
2. _________________________________________________________
3. _________________________________________________________
4. _________________________________________________________
5. _________________________________________________________
6. _________________________________________________________
7. _________________________________________________________
APPENDIX E

TARGET ADVERTISEMENT USED IN STUDY 1

Introducing The Revolutionary Xircom Electronic Organizer…
• The rechargeable Xircom has a Date Book, an improved Address Book and To Do List.
• The new Xircom has a 3X optical/6X digital zoom lens with a built-in intelligent flash and Optical Viewfinder.

**The new Xircom Electronic Organizer**
Connect with your world.
APPENDIX F

FILLER ADS USED IN STUDIES 1, 2, 2B AND 3

Introducing New Neem toothpaste
A safer way to clean teeth

Extracted from the Neem tree in southwestern Asia, Neem's beneficial properties have been known for centuries. Neem is naturally effective in preventing bacterial build-up in the mouth. It protects against bleeding gums, removes dental plaque, and fights germs, which cause tooth decay.

In addition, Neem toothpaste is low in abrasives making it an excellent, healthier alternative to commercial brands.

Neem Toothpaste
A naturally effective alternative
Introducing the new high performance Sanitaire Vacuum cleaner...
Sanitaire scientists developed the Root8Cyclone™ to give higher suction power and pick up more dust. The Root8Cyclone™ is the first vacuum cleaner

Sanitaire's Bactisafe™ screen traps and kills bacteria, mold and allergens on contact, preventing them from re-entering the air.

Sanitaire Root8Cyclone™ vacuum cleaners have the only quick-draw hose and are hygienic and easy to empty. The brush control system protects rugs and delicate floors, and the lifetime HEPA filters mean there are no bags or filters to buy.

**Sanitaire**
The most powerful upright vacuum cleaner
Nourishes your skin

New Origins Precipitation lotion made with all natural ingredients and contains no harsh chemicals. Your skin hasn't a care in the world when stimulating Ginkgo Extract and nourishing Soybean fortify it with everything it needs to face the day.

No wonder the editors of Consumer Reports gave it an overall superior rating.

Origins Precipitation Lotion
Nourishes your skin
APPENDIX G

QUESTIONNAIRE USED IN STUDY 1

General Instructions

On the following pages, you will be asked to answer some questions about one of the ads that you have just read. Please do not refer to the ad when answering these questions.

If you have any questions, please ask the experimenter now, otherwise please turn the page and begin the study.
1. One of the ads that you read was for a new product called Xircom. Please list the attributes or features that you think Xircom will possess. These attributes could be anything that you expect the product to possess.

1. ______________________________________________________
2. ______________________________________________________
3. ______________________________________________________
4. ______________________________________________________
5. ______________________________________________________
6. ______________________________________________________

2. Xircom is a __________________________________
   (please write down the product category to which you think this product belongs.)
3. Please indicate how much you agree with the following statements.

Xircom will be a useful tool to schedule your appointments.

Strongly disagree 1 2 3 4 5 6 7 8 9 Strongly agree

Xircom will allow you to take and store photographs.

Strongly disagree 1 2 3 4 5 6 7 8 9 Strongly agree

Xircom will come with a pen that allows you to enter data into the product.

Strongly disagree 1 2 3 4 5 6 7 8 9 Strongly agree

Xircom will have an auto focus feature for good photograph clarity.

Strongly disagree 1 2 3 4 5 6 7 8 9 Strongly agree

Xircom will have an address book to store contact information.

Strongly disagree 1 2 3 4 5 6 7 8 9 Strongly agree

Xircom will have a built in flash feature.

Strongly disagree 1 2 3 4 5 6 7 8 9 Strongly agree

Xircom will have a To Do list feature.

Strongly disagree 1 2 3 4 5 6 7 8 9 Strongly agree

Xircom will have good zooming capabilities.

Strongly disagree 1 2 3 4 5 6 7 8 9 Strongly agree

Xircom will be small in size.

Strongly disagree 1 2 3 4 5 6 7 8 9 Strongly agree
4. A typical layout for an electronics retail store is shown below. If you were shopping for Xircom in this store, where is the FIRST place in the store you would go to find the product? Please circle the name of the department.

<table>
<thead>
<tr>
<th>Televisions</th>
<th>Electronic organizers and PDAs</th>
<th>Computers and computer accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP3 Players and audio accessories</td>
<td>Digital cameras and camera accessories</td>
<td>Telephones and cellphones</td>
</tr>
</tbody>
</table>

Please indicate how much you agree with the following statements about PDAs (Personal digital assistants):

PDAs are a useful tool to schedule your appointments.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

PDAs typically come with a pen that allows you to enter data into the product.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

PDAs typically have an address book to store contact information.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

PDAs typically have a To Do list feature.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

PDAs typically are small in size.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>
Please indicate how much you agree with the following statements about Digital Cameras.

Digital cameras are a useful tool to take pictures.

Strongly disagree: 1 2 3 4 5 6 7 8 9

Digital cameras come with different sized lenses.

Strongly disagree: 1 2 3 4 5 6 7 8 9

Digital cameras typically possess a strap that allows you to easily carry them.

Strongly disagree: 1 2 3 4 5 6 7 8 9

Digital cameras typically have a zoom feature.

Strongly disagree: 1 2 3 4 5 6 7 8 9

Digital cameras typically are small in size.

Strongly disagree: 1 2 3 4 5 6 7 8 9

While reading the advertisements earlier, I was

<table>
<thead>
<tr>
<th></th>
<th>Very uninvolved</th>
<th>Very involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentrating very hard</td>
<td>9 8 7 6 5 4 3 2 1</td>
<td>9 8 7 6 5 4 3 2 1</td>
</tr>
<tr>
<td>Paying very little attention</td>
<td>1 2 3 4 5 6 7 8 9</td>
<td>1 2 3 4 5 6 7 8 9</td>
</tr>
</tbody>
</table>

How much do you agree with the following statement?

I carefully considered the claims made about the brands in the advertisements

Strongly disagree: 1 2 3 4 5 6 7 8 9

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APPENDIX H

TARGET ADVERTISEMENT USED IN STUDY 2

Introducing The Revolutionary Xircom Electronic Organizer...
• The new Xircom has the latest Windows XP software for great performance and has an improved, practically unlimited capacity Address Book feature.
• The new Xircom has a small 1X optical/2X digital zoom lens with a limited flash range of 2 feet and includes an Optical Viewfinder feature.

The new Xircom Electronic Organizer
Connect with your world.
APPENDIX I

QUESTIONNAIRE USED IN STUDY 2

General Instructions

On the following pages, you will be asked to answer some questions about one of the ads that you have just read. Please do not refer to the ad when answering these questions.

If you have any questions, please ask the experimenter now, otherwise please turn the page and begin the study.
1. One of the ads that you read was for a new product called Xircom. Please list the attributes or features that you think Xircom will possess. These attributes could be anything that you expect the product to possess.

1. ______________________________________________________
2. ______________________________________________________
3. ______________________________________________________
4. ______________________________________________________
5. ______________________________________________________
6. ______________________________________________________

2. Xircom is a ____________________________________________
   (please write down the product category to which you think this product belongs.)

3. Based on the information that you read on the previous pages, how would you rate Xircom?

   I think Xircom is:

   Bad ____:
   ______: 1  2  3  4  5  6  7  8  9
   Desirable ____:
   ______: 1  2  3  4  5  6  7  8  9
   Awful ____:
   ______: 1  2  3  4  5  6  7  8  9
   Attractive ____:
   ______: 1  2  3  4  5  6  7  8  9
   Low quality ____:
   ______: 1  2  3  4  5  6  7  8  9
   Good ____:
   ______: 1  2  3  4  5  6  7  8  9
   Undesirable ____:
   ______: 1  2  3  4  5  6  7  8  9
   Nice ____:
   ______: 1  2  3  4  5  6  7  8  9
   Unattractive ____:
   ______: 1  2  3  4  5  6  7  8  9
   High quality
4. A typical layout for an electronics retail store is shown below. If you were shopping for Xircom in this store, where is the FIRST place in the store you would go to find the product? Please circle the name of the department.

<table>
<thead>
<tr>
<th>Televisions</th>
<th>Electronic organizers and PDAs</th>
<th>Computers and computer accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP3 Players and audio accessories</td>
<td>Digital cameras and camera accessories</td>
<td>Telephones and cellphones</td>
</tr>
</tbody>
</table>

5. If you were considering purchasing a product in Xircom’s category:

How likely are you to consider purchasing Xircom?

Not at all likely

Very Likely
6. Please indicate how much you agree with the following statements.

a. Xircom will come with a pen that will allow easy and convenient entry of data into the product.

   Strongly disagree: 1 2 3 4 5 6 7 8 9
   Strongly agree: 9 8 7 6 5 4 3 2 1

b. Xircom will have an Image Stabilization feature for superior photograph clarity.

   Strongly disagree: 1 2 3 4 5 6 7 8 9
   Strongly agree: 9 8 7 6 5 4 3 2 1

c. Xircom will possess a good Memo Pad feature to enable quick recording of notes and messages.

   Strongly disagree: 1 2 3 4 5 6 7 8 9
   Strongly agree: 9 8 7 6 5 4 3 2 1

d. Xircom will have a good Wide Angle lens feature for taking photos from different angles.

   Strongly disagree: 1 2 3 4 5 6 7 8 9
   Strongly agree: 9 8 7 6 5 4 3 2 1

e. Xircom will possess good email capabilities.

   Strongly disagree: 1 2 3 4 5 6 7 8 9
   Strongly agree: 9 8 7 6 5 4 3 2 1

f. Xircom will possess good photo editing software.

   Strongly disagree: 1 2 3 4 5 6 7 8 9
   Strongly agree: 9 8 7 6 5 4 3 2 1

g. Xircom will have a good To Do list capability.

   Strongly disagree: 1 2 3 4 5 6 7 8 9
   Strongly agree: 9 8 7 6 5 4 3 2 1

h. Xircom will have a good Auto Focus feature for superior photograph clarity.

   Strongly disagree: 1 2 3 4 5 6 7 8 9
   Strongly agree: 9 8 7 6 5 4 3 2 1
i. Xircom will be easy to use.

   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
---|---|---|---|---|---|---|---|---|---|
Strongly disagree | | | | | | | | | |
Strongly agree | | | | | | | | | |

j. Xircom will be conveniently sized for easy portability.

   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
---|---|---|---|---|---|---|---|---|---|
Strongly disagree | | | | | | | | | |
Strongly agree | | | | | | | | | |

k. Xircom will have long lasting batteries.

   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
---|---|---|---|---|---|---|---|---|---|
Strongly disagree | | | | | | | | | |
Strongly agree | | | | | | | | | |

l. Xircom will have a large memory capacity.

   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
---|---|---|---|---|---|---|---|---|---|
Strongly disagree | | | | | | | | | |
Strongly agree | | | | | | | | | |

m. Xircom will possess the latest operating system software.

   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
---|---|---|---|---|---|---|---|---|---|
Strongly disagree | | | | | | | | | |
Strongly agree | | | | | | | | | |

n. Xircom will have good photo zooming capabilities.

   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
---|---|---|---|---|---|---|---|---|---|
Strongly disagree | | | | | | | | | |
Strongly agree | | | | | | | | | |

o. Xircom will have fast processing speed.

   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
---|---|---|---|---|---|---|---|---|---|
Strongly disagree | | | | | | | | | |
Strongly agree | | | | | | | | | |

p. Xircom will possess a good Flash feature for taking photos under different lighting conditions.

   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
---|---|---|---|---|---|---|---|---|---|
Strongly disagree | | | | | | | | | |
Strongly agree | | | | | | | | | |
APPENDIX J

TARGET ADVERTISEMENT USED IN STUDY 2B

The new Xircom Digital Camera
The new Xircom has a large 6X optical/8X digital zoom lens and a built-In Flash feature with a wide flash range of over 12 feet.
The new Xircom has a 100 MHZ processor with limited Windows 98 software and includes a restricted capacity Address Book feature.
You will now be asked to answer some questions about one of the products that you just read about. There are no right or wrong answers to these questions, so please provide your true opinions.

1. One of the ads that you read was for a new product called Xircom. Please list the attributes or features that you think Xircom will possess. These attributes could be anything that you expect the product to possess. Please list each feature on a separate line.

2. For the next question, you will be given a series of features and asked to indicate whether Xircom will possess these features. Please note that there are no right or wrong answers to this question - we are interested in what you think about the product.
   a. Xircom will possess an Address Book
      Agree    Disagree
   b. Xircom will possess a Flash feature
      Agree    Disagree
   c. Xircom will possess Windows software
      Agree    Disagree
   d. Xircom will possess a Zoom feature
      Agree    Disagree
e. Xircom will possess a To Do list feature
   Agree    Disagree

f. Xircom will possess photo editing software.
   Agree    Disagree

g. Xircom will possess a Memo pad feature
   Agree    Disagree

h. Xircom will possess an Auto Focus feature.
   Agree    Disagree

3. You will now be asked to evaluate some of the features of Xircom. Some of these features may be familiar to you from the previous question. Please note that we are interested in how you evaluate the feature.

You will be given a series of statements about Xircom and asked to indicate how much you agree or disagree with each statement on a 9 point scale where 1 = Strongly disagree and 9 = Strongly agree.

Xircom will come with a pen that will allow easy and convenient entry of data into the product.

Xircom will have an Image Stabilization feature for superior photograph clarity

Xircom will possess a good Memo Pad feature to enable quick recording of notes and messages

Xircom will possess good photo editing software.

Xircom will have a good To Do List capability.

Xircom will have a good Auto Focus feature for superior photograph clarity.

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### 4. We are interested in your overall evaluation of Xircom. Please provide your opinion on the scales provided below.

I think Xircom is:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bad</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Good</td>
</tr>
<tr>
<td>Desirable</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>Undesirable</td>
</tr>
<tr>
<td>Awful</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Nice</td>
</tr>
<tr>
<td>Attractive</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unattractive</td>
</tr>
<tr>
<td>Low quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High quality</td>
</tr>
</tbody>
</table>

### 5. If you were considering purchasing a product in Xircom's category, how likely are you to consider purchasing Xircom?

<table>
<thead>
<tr>
<th>Not at all likely</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Very likely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6. Some typical departments found in an electronics store are given below. If you were shopping for Xircom in this store, where is the FIRST place in the store you would go to find the product? Please select only one department.

<table>
<thead>
<tr>
<th>Televisions</th>
<th>Electronic organizers and PDAs</th>
<th>Computers and computer accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP3 Players and audio accessories</td>
<td>Digital cameras and camera accessories</td>
<td>Telephones and cellphones</td>
</tr>
</tbody>
</table>
APPENDIX L

STIMULI USED IN PRETEST 4

List of property primes
1. bus truck
2. cactus carpet
3. motorcycle bicycle
4. pencil pen
5. rock bagel
6. octopus chair
7. dolphin vase
8. porcupine snake
9. MP3 player cellphone

List of relational primes
1. clothing truck
2. floor carpet
3. grocery bicycle
4. ink pen
5. breakfast bagel
6. executive chair
7. coin vase
8. mountain snake
9. family cellphone

List of Target combinations
1. PDA camera
2. book magazine
3. whale boat
4. dinosaur scientist
5. painter photographer
Category accessibility task stimuli

Instructions
In this experiment, you will be presented with a series of letter strings and must determine as quickly as possible whether they are words or non-words. Your accuracy in judging if these strings are words or non-words and your response time to making your judgment will both be recorded by the computer. The non-words will be pronounceable just like real words, so please pay attention to each string before making your judgment.

If you think that the letter string is a word, click on the "word" button; if you think that the string is a non-word, click on the "non-word" button.

List of practice words
YARD
ATHUACT
GLAB
DEN
ONACTMENT

List of filler words
KANGS
BAKEM
LANJO
UDGE
BACIN
FADGER
HASER
MATHERINE
FOMELY
COLIRS
CEARDLESS
FEVOLVES
TESPLENDEENCE
VUN
POMMIT
PALCIFIED
LOMBAT

List of target categories
BICYCLE
MOTORCYCLE
FLOOR
SNAKE
PORCUPINE
TRUCK
BUS
INK
BOAT
WHALE
FAMILY
BREAKFAST
PDA
CAMERA
PHOTOGRAPHER
PAINTER
MOUNTAIN

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Attribute accessibility stimuli

Instructions
This study aims at assessing how much you agree with some statements about some of the objects that you read about in Study 1. You will be given a series of statements and asked to either agree or disagree with these statements. There are no right or wrong answers, so please provide us with your true opinions. Do not worry or puzzle over individual statements - just provide your true impressions.
Practice statements
a. I am an undergraduate student at the Fisher College of Business
b. I think Columbus is a good place to live
c. English is my native language.

Target statements
a. Scientists are very smart people.
b. Dinosaurs are very old.
c. Magazines have a glossy appearance.
d. Books contain many pages.
e. Cameras have a Flash feature.
f. PDAs are small in size
g. Photographers are artistic people.
h. Painters are creative people.
i. Boats have sails.
j. Whales are large in size.
APPENDIX M

TARGET ADVERTISEMENT USED IN STUDY 3

The new Xircom Digital Camera
The new Xircom possesses a large memory capacity of 32 MB, allowing you meet all your data storage requirements. It has an updated Address book and Calendar to meet all your scheduling needs. And it comes equipped with the latest Windows XP software.
The new Xircom delivers a resolution of 3.5 megapixels for excellent picture quality. It comes with the latest CompactFlash card which allows a picture storage capacity of up to 40 pictures. And the color LCD screen allows you to preview your photographs immediately.
APPENDIX N

QUESTIONNAIRE USED IN STUDY 3

Before answering the questions, we would like you to answer a few practice questions so that you are comfortable using this software. For the practice questions, you will be given some statements and asked how much you agree with each of these statements.

a. I am an undergraduate student at the Fisher College of Business
   Agree   Disagree

b. English is my native language
   Agree   Disagree

c. I think Columbus is a good place to live
   Strongly disagree : 1 2 3 4 5 6 7 8 9 Strongly agree

d. I am happy with the undergraduate program at Ohio State
   Strongly disagree : 1 2 3 4 5 6 7 8 9 Strongly agree

You will now be asked to answer some questions about one of the products that you just read about. There are no right or wrong answers to these questions, so please provide your true opinions.

1. One of the ads that you read was for a new product called Xircom. Please list the attributes or features that you think Xircom will possess. These attributes could be anything that you expect the product to possess. Please list each feature on a separate line.

2. In the line provided below, please write down the product category to which you think Xircom belongs.
3. For the next question, you will be given a series of features and asked to indicate whether Xircom will possess these features. Please note that there are no right or wrong answers to this question - we are interested in what you think about the product.
   a. Xircom will possess an Address Book.
      Agree   Disagree
   b. Xircom will allow you to preview your photographs
      Agree   Disagree
   c. Xircom will possess Windows software
      Agree   Disagree
   d. Xircom will possess good picture storage capacity
      Agree   Disagree
   e. Xircom will possess a To Do list feature
      Agree   Disagree
   f. Xircom will possess photo editing software
      Agree   Disagree
   g. Xircom will possess a Memo pad feature
      Agree   Disagree
   h. Xircom will possess an Auto Focus feature
      Agree   Disagree
   i. Xircom will possess Email capability
      Agree   Disagree
   j. Xircom will possess a Flash feature
      Agree   Disagree
4. You will now be asked to evaluate some of the features of Xircom. Some of these features may be familiar to you from the previous question. Please note that we are interested in how you evaluate each feature, that is, how good or bad you think each of the features possessed by Xircom is.

You will be given a series of statements about Xircom and asked to indicate how much you agree or disagree with each statement on a 9 point scale where 1 = Strongly disagree and 9 = Strongly agree.

Xircom will come with a pen that will allow easy and convenient entry of data into the product.

Strongly disagree 1 2 3 4 5 6 7 8 9 Strongly agree

Xircom will possess a good digital zoom feature to enable taking photographs from various distances.

Strongly disagree 1 2 3 4 5 6 7 8 9 Strongly agree

Xircom will possess a good Memo Pad feature to enable you to write down notes quickly.

Strongly disagree 1 2 3 4 5 6 7 8 9 Strongly agree

Xircom will possess good photo editing software to enable you to make and save changes to your photographs.

Strongly disagree 1 2 3 4 5 6 7 8 9 Strongly agree

Xircom will possess a good To Do list feature that will allow you to organize your tasks more efficiently.

Strongly disagree 1 2 3 4 5 6 7 8 9 Strongly agree

Xircom will possess a good Auto Focus feature to enable you to take better quality photographs.

Strongly disagree 1 2 3 4 5 6 7 8 9 Strongly agree

Xircom will possess good Internet connectivity to enable you to access your email anywhere you go.

Strongly disagree 1 2 3 4 5 6 7 8 9 Strongly agree

Xircom will possess a good built-in Flash feature to enable you to take photographs even in dim light conditions.

Strongly disagree 1 2 3 4 5 6 7 8 9 Strongly agree
Xircom will possess large data storage capacity.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

Xircom will possess a high megapixel resolution for good picture quality.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<th>9</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

5. We are interested in your overall evaluation of Xircom. Please provide your opinion on the scales provided below.

I think Xircom is:

<table>
<thead>
<tr>
<th>Bad</th>
<th>1</th>
<th>2</th>
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<td>2</td>
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<td>5</td>
<td>6</td>
<td>7</td>
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</tr>
<tr>
<td>Awful</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>9</td>
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</tr>
<tr>
<td>Attractive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>8</td>
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<td>1</td>
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<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>High quality</td>
</tr>
</tbody>
</table>

6. If you were considering purchasing a product in Xircom's category, how likely are you to consider purchasing Xircom?

<table>
<thead>
<tr>
<th>Not at all likely</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Very likely</th>
</tr>
</thead>
</table>

7. Some typical departments found in an electronics store are given below. If you were shopping for Xircom in this store, where is the FIRST place in the store you would go to find the product? Please select only one department.

<table>
<thead>
<tr>
<th>Televisions</th>
<th>Electronic organizers and PDAs</th>
<th>Computers and computer accessories</th>
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<tbody>
<tr>
<td>MP3 Players and audio accessories</td>
<td>Digital cameras and camera accessories</td>
<td>Telephones and cellphones</td>
</tr>
</tbody>
</table>

8. Please indicate to what extent you agree with the following statements.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

I am very knowledgeable about electronic organizers

I am very knowledgeable about digital cameras

How often do you use an electronic organizer?

How often do you use a digital camera?
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