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CONCRETENESS-ABSTRACTNESS AND THE
FEATURE-DIMENSION DISTINCTION

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ABSTRACT

This paper examines consumers' cognitive representations of products. Specifically, the paper attempts to provide insight into the representation of product attributes by focusing on two approaches for classifying these attributes--that of concreteness-abstractness and features-dimensions. The literature on both approaches is reviewed. The paper contends that the two approaches are related in that more concrete attributes may be associated with more dichotomous features, while more abstract attributes may be associated with more continuous dimensions. Two pilot investigations are reported which support both more abstract products having more abstract representations, and these more abstract representations being more dimensional than feature-based. The implications of the results for future research are discussed.

INTRODUCTION

Understanding consumer judgment and choice processes naturally requires an understanding of the cognitive representation of products on which these processes are based. Among the distinctions made among attributes in these representations, two have received particular attention. One such distinction is concreteness-abstractness. Distinguishing among attributes with respect to concreteness-abstractness has proved fundamental to the study of choice strategies (Johnson 1984). Concreteness-abstractness has, in addition, been indirectly researched in studies that have investigated the effects of pictorial information on persuasive communications (e.g., Edell and Staelin, 1983; Hirschman and Solomon 1984; Kisielius and Sternthal 1984a; Mitchell and Olson 1981). The pictorial vs. verbal format of information as well as the concreteness-abstractness of information can both be viewed as operationalizations of imagery. However, concreteness has been the focus of

investigation of only a few marketing studies dealing with persuasive communications (e.g., Dickson 1982; Rossiter and Percy 1978).

A second useful attribute distinction is that between features and dimensions (Johnson 1981). Either feature-based or dimensional representations are, for example, implicit in the use of different choice strategies (Garner 1978) and similarly scaling procedures (Pruzansky, Tversky, and Carroll 1982).

The purpose of this paper will be to integrate these two areas by suggesting that a relationship exists between the concreteness-abstractness and feature-dimension distinctions. First, a brief review will be undertaken on the concreteness-abstractness and the feature-dimension distinctions. Then, an attempt will be made to relate the concreteness-abstractness of products to the use of features or dimensions by consumers. Two pilot investigations of these relationships are reported. Finally, the implications of this view for future research will be discussed.

Concreteness-Abstractness

Concreteness-abstractness has long been central to research in psychology and has recently emerged as an area of interest in marketing. Within the psychological literature, a large body of research in verbal learning has examined the effects of concreteness-abstractness as an indicator of imagery on different measures of learning. Research in this area has been influenced primarily by the work of Paivio and his associates (Paivio 1971). According to Paivio (1969), the abstractness-concreteness of a stimulus is mediated by the stimulus' ability to arouse imagery, which in turn determines its ability to affect learning. Thus the higher the concreteness of a stimulus, the more likely it is to evoke imagery and to subsequently have an effect on learning.

Consistent with this view, concreteness has been found to be correlated with free recall, recognition, paired-associate learning (see Paivio, Yuille, and Madigan 1968), memory for changes in meaning and wording (e.g., Moeser 1974), and comprehension (e.g., Klee and Ekysenck 1973).

Within this framework, concreteness-abstractness has further been explained in terms of the subordination-superordination of categories (Paivio 1971). The abstractness of a word is assumed to be related to the degree that a word represents a superordinate category. The more abstract a word is, the more likely it is to belong to a superordinate category. Consistent with this view, Rosch (1975) in her work on human categorization uses levels of abstraction to indicate points at which basic category distinctions are made.

Concreteness and abstractness have also been used to explain human values and goals. Rokeach (1973) suggests that at least two different sets of values exist: instrumental values and terminal values. Instrumental values are considered to be relatively concrete and deal with values of "doing," whereas terminal values are more abstract and deal with values of "being."

The research in the psychological literature on the effect of concreteness-abstractness on persuasion is mixed. Concreteness has been found to both have an effect on judgments as well as to have no effect. A number of explanations have been offered for these results in reviews of this literature (e.g., Kisielius and Sternthal 1984b; Taylor and Thompson 1982). Since the focus of this paper is not to reconcile inconsistencies in the effects of concreteness on judgments, the interested reader should refer to the cited literature reviews for a more in depth discussion of this research.

In the field of marketing there is generally a renewed interest in attribute concreteness-abstractness. Holbrook and Hirschman (1982), for example, emphasize that tangible attributes of conventional goods, such as

calories in a soft-drink or miles per gallon of an automobile, have been studied in consumer research to the exclusion of important experiential aspects of consumption, such as cheerfulness and sociability. The distinction between tangible and experiential aspects of consumption can be viewed as a difference in the abstraction of product attributes. Art works and ideologies have similarly been viewed as more abstract than other, more tangible products (Hirschman 1983). Empirical research on concreteness-abstractness in marketing can be divided into the areas of market segmentation, persuasive communications, and consumer choice. Each of these areas will now be reviewed.

Market Segmentation

Implicit in benefit segmentation is the notion that descriptive product factors are more concrete, while basic product benefits are more abstract. In his seminal article, Haley (1968) urges managers to rely on the basic product "benefits" sought by consumers rather than descriptive product factors when segmenting consumer markets. This view of segmentation is consistent with Becker's (1976) economic approach to human behavior. Becker theorizes that consumers derive utility from the properties or "characteristics" which groups of products possess rather than from the goods themselves. One combines an automobile, gasoline, and one's own time, for example, to produce "transportation." It logically follows that segmentation should occur on these relatively abstract benefits or "characteristics" from which utility is more directly derived.

Persuasive Communications

The concreteness-abstractness of attributes also plays an important role in persuasive communications. Salesforce presentations often rely on concrete descriptions of a product's attributes. The concrete case history format for presenting product attribute information that describes one individual's experiences with a product is being used in current television ads as well as the more abstract base rate information that presents statistical information about a product's attributes.

A few studies have been undertaken in marketing that have experimentally manipulated concreteness (Dickson 1982; Kisielius 1982; Rossiter and Percy 1978; Wright 1979). Dickson (1982) manipulated concreteness through different reports on refrigerators that were presented to subjects with either concrete case-history information or abstract base-rate information. In the case history condition, actual quotes of five housewives were presented concerning the failure of their refrigerators. In the base rate condition, more abstract information was presented in the form of summary statistical reports of 500 housewives. Relative to the base rate information, the presentation of the case history information led to an increase in the recall of the information and to higher failure-frequency judgments.

Concreteness was also found to have an effect on the attitudes formed toward print advertisements. Rossiter and Percy (1978) found that an ad that was highly concrete in presenting superlative and explicit product claims was more persuasive than an ad which was superlative but presented vague product claims. In another study, Wright (1979) found that the reading of drug warnings was affected by concreteness. The combination of concrete information and a visual action demonstration resulted in a significant short term increase in the inspection of drug packages and in the likelihood of

reading in-store warning signs. Finally, concreteness has been found to affect the degree of consistency between an individual's attitude and behavior toward a consumer product (Kisielius 1982). A number of explanations for these results can be offered (e.g., Dickson 1982; Edell and Staelin 1983; Rossiter and Percy 1978). A recent literature review by one of the authors has attempted to explain the judgment effects of vividness, concreteness being one of its operationalizations, by using the availability-valence hypothesis (Kisielius and Sternthal 1984b). As is noted in the review, future research is needed in this area.

Consumer Choice

The third area of marketing in which concreteness-abstractness has prefigured is that of consumer choice, which is the focus of this paper. Specifically, we are interested in how consumers cognitively represent products when making decisions. No literature currently exists in this area that directly relates products to both the concreteness-abstractness of product attributes and to their feature-dimensionality. The literature that has been undertaken in the choice area that is relevant to our arguments concerns the relationship between concreteness-abstractness and choice. This literature will now be reviewed.

Consumer choice has often been viewed as a hierarchical process in which different levels of choice in a hierarchy are at different levels of abstraction (Bettman 1974; Howard 1977). Higher level product category choices, for example, involve more abstract alternatives than lower level, brand based choices. Howard hypothesizes that, first, an evaluative hierarchy of choice criteria exists that corresponds to the hierarchy of choices, and second, that criteria in the evaluative hierarchy are chosen which correspond

to a level in the choice hierarchy. In other words, there is a direct relationship between the abstractness of the alternatives in a choice and the abstractness of the choice criteria. A study by Boote (1975) indirectly supports this hypothesis. Subjects in the study rated the relative importance of Rokeach's instrumental and terminal values to each of two levels of choice, product category and brand. The results showed the more abstract terminal values as more important to product category choice, while the more concrete instrumental values were more important to brand choice. No evidence is given concerning actual product attributes or choice criteria.

However, as Johnson (1984) points out, choice is not always hierararchical. Consumers often face specific alternatives from different product categories. To account for such choices, Johnson hypothesizes a continuum of product attributes ranging from the concrete to the abstract. An important property of this continuum is that increasingly abstract attributes describe an increasing number of products. Thus products that are relatively noncomparable, or described on different concrete attributes, such as a bicycle and a television, can be compared directly on more abstract attributes such as "use" or "entertainment" value. Support for this view was found in three experiments conducted by Johnson (1984). As the comparability of the alternatives decreased, there was a corresponding increase in the level of abstraction of product comparisons.

An important implication of attribute abstraction for our attempt to relate concreteness-abstractness to features-dimensions is that abstraction, by definition, implies a summarizing or concentration of a larger whole resulting in a decrease in detail. That is, as representations become more abstract, fewer relevant attributes are involved. Both the Boote and Johnson studies support this decrease in relevant attributes with abstraction in

consumer choice contexts. In addition, this notion is consistent with the availability-valence hypothesis explanation for the processing of abstract information (Kisielius and Sternthal 1984a). According to the hypothesis, abstract information should be less available in memory than concrete information because it is less likely to be cognitively elaborated; that is, less associative pathways are likely to be formed. Thus, the fewer the associative pathways that are formed, the less likely a consumer will be to access the abstract information.

Features and Dimensions

Our understanding of concreteness-abstractness may benefit from the study of related distinctions. One of the aims of this paper is to show that concreteness-abstractness can be better understood by recognizing the distinction between features and dimensions. Specifically, while dimensions are continuous attributes on which objects differ as a matter of degree, features are dichotomous attributes that an object either has or does not have (Restle 1959; Tversky 1977; Garner 1978). For example, while one consumer may think of a beer as "sweeter" than another, indicating the use of a dimension another may view beers as either "sweet" or "not sweet," indicating use of a feature.

Recognizing whether consumers use features or dimensions has important marketing implications. The appropriateness of different consumer choice strategies may depend on the use of features or dimensions in a representation. For example, while lexicographic choice models (Coombs 1964) are based on dimensions, elimination by aspects (Tversky 1972) is based on features. Recognizing the distinction between features and dimensions may also help determine the appropriateness of different similarity scaling

procedures. Dimensions are, for example, implicit in product space analysis and underlie the use of multidimensional scaling procedures (Shocker and Srinivasan 1979). Features, in contrast, are implicit in many recent similarity scaling procedures such as hierarchical clustering, additive trees, and additive clustering (c.f. Tversky 1977). The ability of a scaling procedure to fit similarity data should depend on whether the consumer's representation of products when producing the judgments, using features or dimensions, is consistent with the representation implicit in the scaling procedure. Pruzansky, Tversky, and Carroll (1982), for example, show that multidimensional scaling fits better data generated from a dimensional space representation, while an additive tree procedure fits better data generated from a feature tree representation.

The Relationship of Concreteness and Abstractness to Features and Dimensions

Important differences between features and dimensions suggest an integral relationship between this qualitative difference in associated product attributes and the concreteness-abstractness of attributes. First, as features either do or do not exist (i.e., there is but one non-zero level for such attributes), they are relatively simply compared to dimensions (Garner 1978). Given a limited information processing capacity and that features are very simple because they only have two levels, the use of a feature-based representation is one way to handle products associated with a large number of attributes. Recall that concrete representations generally involve more relevant attributes than abstract representations (Johnson 1984) and that concrete information is more likely to be available than abstract information because of its greater cognitive elaboration (Kisielius and Sternthal 1984a). Thus, consumers may be more likely to use features the more concrete the

representation in order to reduce a possible cognitive resource limitation in memory induced by concrete information. Second, as Green, Wind, and Claycamp (1975) suggest, groups of features are themselves captured by more basic or abstract dimensions. The degree of "safety" in an automobile, for example, may capture the existence of seat belts, air bags and a particular type of construction. Essentially, a single abstract attribute captures or subsumes more than one concrete attribute. Similarly, a dimension may be viewed as a set of nested features (Tversky and Gati 1982). These arguments, taken together, suggest the main hypothesis of our paper that the more abstract the attribute, the more likely consumers represent the attribute as a dimension. Conversely, the more concrete the attribute, the more likely consumers represent the attribute as a feature.

The discussion suggests two experimental hypotheses that may be tested. The first hypothesis is that the abstractness of a representation increases with the abstractness of the product. Recall that Boote's initial test provided only indirect support for this hypothesis. The second hypothesis is that the more abstract the representation, the more likely the attributes in the representation resemble dimensions while the more concrete the representation, the more likely the attributes resemble features. Two pilot experiments are used to provide an initial test of these hypotheses. Experiment one tests hypothesis one, while experiment two tests hypothesis two.

EXPERIMENT ONE

Method

In order to test the first hypothesis, product abstraction was operationalized by choosing products at three different category levels,

category (abstract), subcategory (intermediate), and brand (concrete). Stimuli were chosen from three separate category types, home entertainment, domestic appliance, and mode of transportation. The stimuli included, from the abstract to the concrete, Home Entertainment Device, Television, and Sony Television for the home entertainment category, Domestic Appliance, Refrigerator, and General Electric Refrigerator for the domestic appliance category, and Mode of Transportation, Bicycle, and Schwinn Bicycle for the mode of transportation category. The specific brands used in the study were chosen on the basis of frequency of mention after asking a random sample of fifty University of Michigan students for the brands in each category with which they were most familiar.

Test subjects were asked to indicate the five attributes that most easily came to mind, from first to fifth, in response to the different products. A list of twenty-five possible attributes ranging from the concrete to the abstract accompanied each product. These attributes were taken from a larger list of 248 attributes obtained from Johnson (1984) involving stimuli from the same product categories used here. The original 248 attributes had been rated on a scale of zero (very concrete) to ten (very abstract) by eight judges and attribute ratings were obtained by averaging across judges (average intercorrelation of .70). The attribute lists represented the entire range of concrete to abstract attributes. The five attributes mentioned most frequently by Johnson's subjects were selected in each category in each of five ranges of concreteness-abstractness (0.00 to 2.00, 2.01 to 4.00, etc.). This resulted in three lists of twenty-five attributes, one for each of the three product category types. Attributes in each list were presented in random order.

Subjects were instructed to indicate the five attributes for a product that most easily came to mind when they thought about the product. For each product, subjects circled the five attributes and then ranked these five

attributes, from one to five, where one corresponded to the attribute that most easily came to mind and five corresponded to the attribute that least easily came to mind.

Design and Procedure

Each subject received three different products, representing each of the three levels of abstraction, each level taken from a different category type. This design avoids any interference in recall that might occur by having the same subjects receive products either at the same level of abstraction or products from the same category type. The three (levels of abstraction) by three (category types) Latin square design resulted in three different sets of stimuli. Within each stimulus set, the products were also balanced for order (one third of the subjects received the category first, one third received the subcategory first, one third received the brand first) resulting in nine different experimental conditions. Subjects included 128 University of Michigan students. The subjects were run in groups and randomly assigned to one of the nine stimulus conditions. A pencil and paper format was used. Three subjects failed to perform the task and were dropped from the analysis.

Analysis

An analysis of variance (ANOVA) model tested for significant differences in the dependent variable, the level of abstraction of attributes chosen, with changes in the independent variables. Given the Latin square experimental design, the model is composed of mostly main effects. The independent variables included in the model were the level of product abstraction (three levels), category type (three levels), degree of association (five levels), a subjects factor (125 levels), stimulus order (three levels), and a level of abstraction by degree of association interaction term.

Naturally, the attributes subjects most easily associated to the products may be the most important and, therefore, deserve more attention. If the results are affected by the degree of association of the attributes, it will result in either a significant main effect for attribute association or a significant interaction between product abstraction and attribute association.

Results

The analysis of variance results are presented in Table 1. Significant main effects occurred for level of abstraction, category type, and for subjects. The results support hypothesis one. Representations do become more abstract the more abstract the product. A Student-Newman-Keuls test for comparison of means, however, shows categories having significantly more abstract representations than either subcategories or brands ($p < .05$) while there were no significant difference between subcategories and brands.

The mean level of abstraction of the representations for each of the three levels of product abstraction, category, subcategory, and brand, are shown in Figure A. The figure shows the effect of adding attributes, from first to fifth most associated, into the cell means. Qualitatively, the results provide the best support for hypothesis one when only the most associated attributes are included. Adding attributes of decreasing association affects the results in two respects. First, the abstractness of representations for categories gradually decreases. This is expected given the nature of the attribute lists, in which there were only a limited number of abstract attributes. Second, there is a juxtaposition in the abstractness of the subcategories and brands. The overall interaction between level of abstraction and association is, however, insignificant.

A test of means also revealed that, overall, mode of transportation stimuli were significantly more abstract than domestic appliance and home entertainment device stimuli (mean abstractness of 5.02, 4.40 and 4.13 respectively). The difference between domestic appliances and entertainment devices was, however, insignificant ($p < .05$).

To summarize, experiment one supports hypothesis one; the more abstract the product, the more abstract the product's representation. Category representations were significantly more abstract than subcategory and brand representations. While subcategory representations were marginally more abstract than brands when only the most associated attributes are considered, overall there was no significant difference.

EXPERIMENT TWO

Method

Experiment two tests hypothesis two, whether more abstract attributes are more likely represented as dimensions while more concrete attributes are more likely represented as features. The stimuli in experiment two included all 248 attributes from the Johnson (1984) study, rated from very concrete (0) to very abstract (10). Subjects were asked to classify the attributes on the basis of how they were typically used. Subjects classified an attribute as a feature if it was typically something a product either had or did not have. If the attribute was something on which products typically differed as a matter of degree, it was classified as a dimension. If subjects could not classify an attribute in one of the two categories, they were instructed to classify it as being used equally often as both.

Design and Procedure

Thirty-six University of Michigan students classified all 248 attributes into one of the three categories resulting in a total of 8,927 observations. The attributes were presented in list form with boxes indicating Feature, Dimension, and Both to the right of the attributes. The subjects were instructed to simply check the appropriate response. The attributes were presented in one random order for half the subjects and the reverse order for the remaining half.

Analysis

In contrast to experiment one, labeling either the classifications or the concreteness-abstractness ratings as either independent or dependent variables is problematic here. A simple regression analysis, therefore, was used to test hypothesis two. The categorical responses were quantified by assuming that a "feature" classification equals one, a "both" classification equals two, and a "dimension" classification equals three. These classification values were then regressed against the concreteness-abstractness ratings. The second hypothesis predicts a positive correlation between the variables.

Results

The results support hypothesis two. The regression results show an increase in abstraction with classification from Features to Dimensions ($r=.41$; $F=1866.00$, significant at $p < .0001$). Qualitative support for the hypothesis is provided by viewing the frequency of response classifications across levels of abstraction (see Figure B). While the majority of Feature classifications involved the most concrete attributes, Dimensions, on average, were more abstract.

Interestingly, viewing the response proportions within each classification as opposed to absolute frequencies, from the concrete to the abstract (see Figure C), reveals a similarity between the Both and Dimension classifications. In hindsight, the following explanation is offered. There appears to be an asymmetry in the choice of a representation. A product that is naturally described on a dimension may be represented by a corresponding feature. Products may have some level of "practicality" or simply be considered "practical". In contrast, a product that is naturally described by a feature may not be represented on a corresponding dimension. What corresponding dimension is there for an automobile that has power steering, or an automatic transmission (without, of course, moving to a higher level of abstraction)?

The mean level of abstraction of the classifications was 3.0, 4.8, and 5.3 respectively for Features, Both, and Dimensions. Separate regressions do reveal, however, that the average level of abstraction increased significantly from Features to Both ($r=.33$; $F=580.52$, $p < .0001$), from Features to Dimensions ($r=.45$, $F=1920.50$, $p < .0001$), from Both to Dimensions ($r=.12$; $F=88.53$, $p < .0001$).

To summarize, more abstract attributes were judged as more likely to be used as dimensions while more concrete attributes were judged as more likely to be used as features, supporting hypothesis two.

DISCUSSION

Both the theoretical discussion and the pilot investigations reported here support a general relationship between the concreteness-abstractness of products, their representations, and the use of features or dimensions in those representations. The more abstract the product, the more abstract and

dimensional the representation of the product. The more concrete the product, the more concrete and feature-based the representation.

We suggest, however, that this hypothesis holds only in a general sense. Aspects of a stimulus, such as a product's concreteness-abstractness, do not completely determine the nature of the representation used in cognitive processing. Representations, for example, may be modified by the requirements of the task (Garner 1978). The dependence of stimulus representation on task variables was illustrated in a recent study by Johnson and Tversky (1984). Subjects were asked to make similarity judgments, conditional predictions, and dimensional evaluations among a set of risky alternatives. They found that both the similarity judgments and the conditional predictions were better explained by additive tree models, which are based on features, while the dimensional evaluations were better explained by multidimensional scaling and factor analysis, both of which are based on dimensions. The authors suggest that subjects may use more feature-based representations when making more holistic judgments such as similarity.

Future research should, therefore, study both the existence and nature of the general relationship between these two attribute distinctions and the effect of task or context specific factors on product representations. Other task or context factors that may affect the representations used in processing include the number of alternatives involved and the risk or error at stake in the task. Consider the attribute "safety" represented as both a feature and a dimension, such as a "safe" automobile versus an automobile with some degree of "safety." Using the attribute as a dimension allows for finer distinctions among the alternatives, in this case automobiles. Therefore, as the number of alternatives increases, so may the need for finer discrimination resulting in an increased use of dimensions. As dimensional representation of an attribute

may provide superior discrimination, dimensions may also be used when the risk or error involved in the task is large. Consider choosing among expensive durable products, such as automobiles, as opposed to inexpensive nondurables, such as candy bars. As there is more at stake when choosing an automobile, one's ability to make even the smallest discriminations may become important, resulting in an increased use of dimensions.

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TABLE 1
 EXPERIMENT ONE: ANALYSIS OF VARIANCE RESULTS

Source	df	SS	F (sign.)
Abstraction	2	50,245.59	40.47 (.0001)
Category Type	2	25,754.52	20.74 (.0001)
Subjects	124	151,342.69	1.97 (.0001)
Stimulus Order	2	764.27	0.62 (.5404)
Association	4	1,243.99	0.50 (.7350)
Abstraction X Association	8	8,475.71	1.71 (.0921)

Figure A

Experiment One: Attribute Abstraction

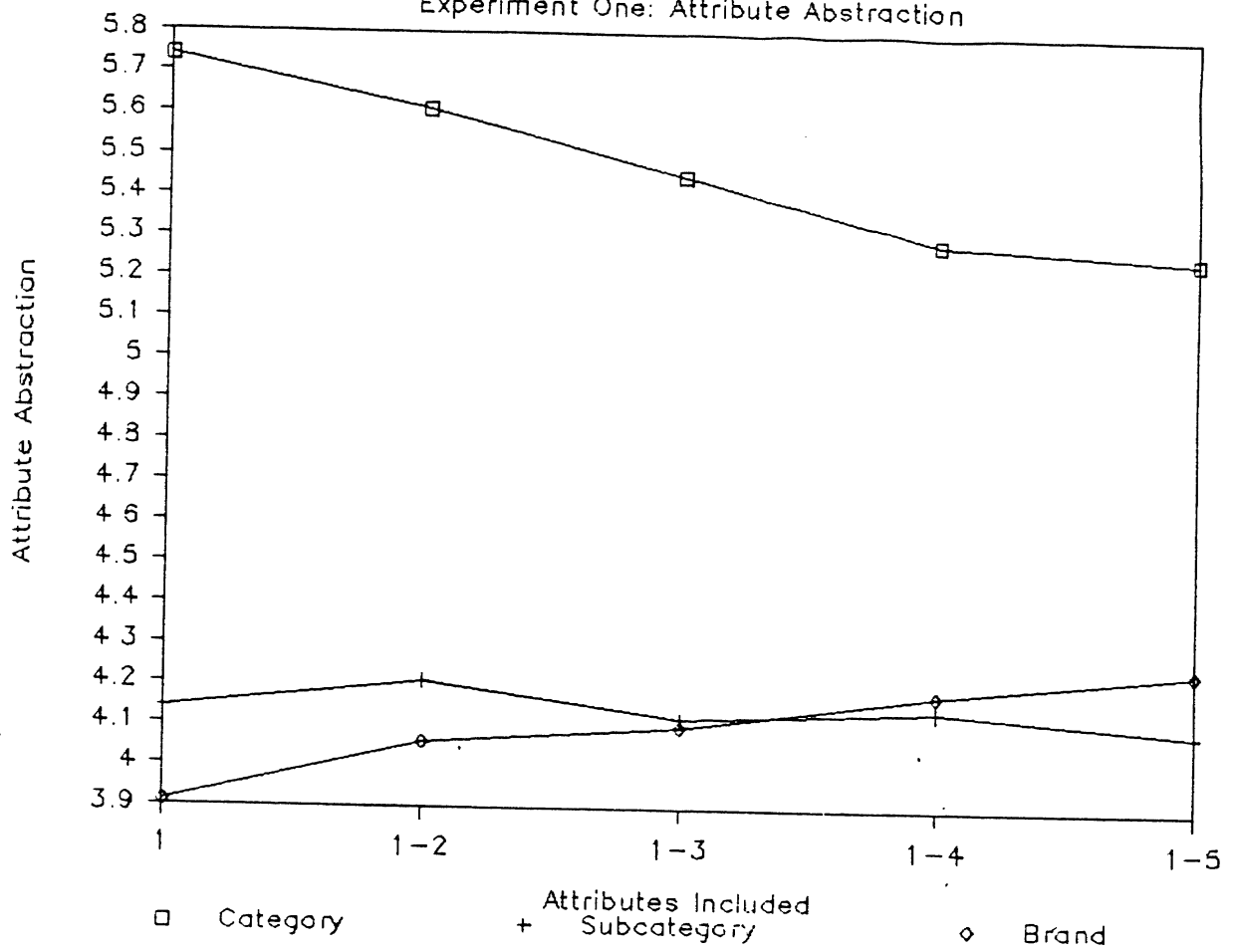


Figure B

Experiment Two: Response Frequencies

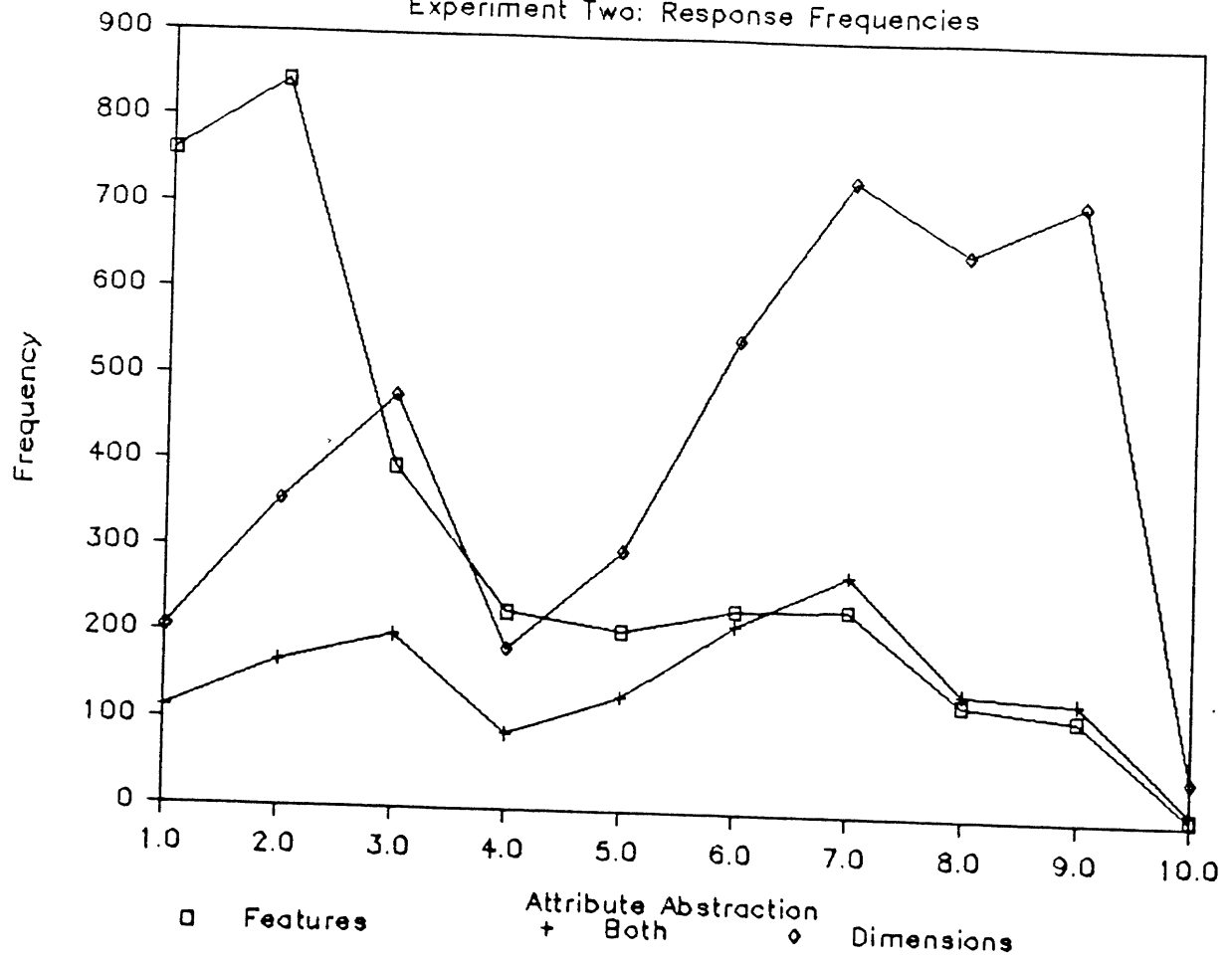


Figure C

Experiment Two: Response Proportions

