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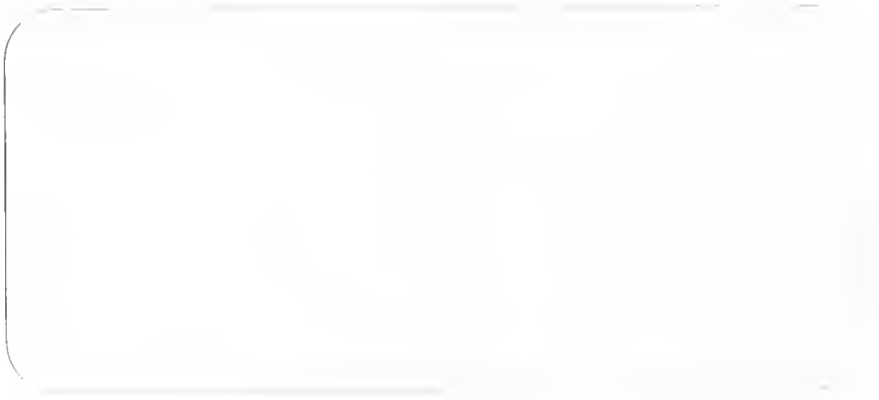
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An Expectancy X Value Analysis
of the Relationship Between
Consumer Attitudes and Behavior

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AN EXPECTANCY X VALUE ANALYSIS
OF THE RELATIONSHIP BETWEEN
CONSUMER ATTITUDES AND BEHAVIOR

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The field of consumer behavior has lived with a sort of "split personality" for some time; Dr. Jekyll, of course, being interested in basic research on consumer decision making and Mr. Hyde insisting on "successful applications" of behavioral theory to marketing practice. One of the results of this "marketplace schizophrenia" has been a conflict of purposes. For some, possibly those least committed to consumer behavior as an applied behavioral science, there has been a tendency to reject whole areas of research or sets of variables (e.g. personality, small group influence and basic psychological processes in general) and to search for variables exhibiting covariance with purchases, readership and the like. The most pragmatic would work with such predictors for their own sake, while others would try to relate these systematically to hypotheses specifying more general sets of conditions and relationships.

A strong behavioral science tradition in consumer behavior, however, has been emerging. As distinct from the thoroughly pragmatic point of view, the remarkably fertile laboratory of the marketplace is also being used to study the consumer for his own sake -- consumer behavior as a subset of human behavior -- rather than as an actual or potential purchaser or subscriber vis a vis a particular firm. Purchase of a product, in this framework, has value to the extent it is an adequate test of a hypothesis, and the extent of covariation between predictor and criterion variables is important as a guide to theoretical significance rather than market significance.

Though a certain tension results from the often conflicting goals of the two orientations, not only is some conflict inevitable, it may indeed be useful (as in a dialectic process) to the long run development of the field. Both orientations are legitimate and might best be seen as complementary to each other; permitting an analysis at different levels of aggregation and under various conditions. Evidence of a common ground may be seen in the generally favorable response to recent attempts to pull together and integrate much of the subject matter of consumer behavior. These models or "theories" of consumer behavior have helped to organize the field, to point out problems in need of further study, to provide common languages and frames of reference, and most importantly to spark the interest of many practitioners and students alike in more complete description and understanding of consumer behavior. It is, after all, in the realization of the great complexity of the phenomena under study and the knowledge that these preliminary models and theories are inadequate in dealing with this complexity that interest and enthusiasm for further work is engendered.

Truly comprehensive theories of motivated behavior must interrelate basic psychological processes (e.g. motivation, learning, perception) within goal-directed action sequences, these occurring in a dynamic and interactive environmental setting. An inclusive yet cohesive theory of consumer behavior, therefore, should detail the nature of the total process and particularly the functional relationships among interactive elements. To be adequate, such a theory must be more than a checklist of factors found to be

important in previous research and must be more, still, than a flowchart specifying for the list the usual temporal order of variables. It is necessary that the theoretical system from which deductions are to be made so specify the rules of symbolic manipulation that unequivocal tests of the theory are possible. Much has been written concerning the lack of specificity among theories in the behavioral sciences (e.g. in assumptions, definitions, scope), the conclusion of many being simply that the field is still too young to expect comprehensive theories to emerge from the data at hand.

This state of affairs has, in part, forged another link between the researcher interested in psychological functioning and the practitioner interested in predicting and modifying purchase behavior. For both, there was great reluctance to wait until all the theoretical "pieces" fit neatly together or to treat the consumer as a black box (or in the aggregate as a convenient probability distribution). For both, a key mediating variable, attitude, became a focal point. If we are unable to adequately trace the process of motive arousal, through the forming of expectancies as to goal satisfactions from among potential alternatives, assess revisions of these as a function of direct and indirect learning experiences, specify subsequent decision-making (1) across alternative motives and goals and (2) within a subset of object choices for a given motive; we can only hope to "short-circuit" the process in some way. One approach is to "tap in" to the decision process by measuring attitudes presumed to have a subsequent relationship to behavior. If this is the goal, then the orientation taken to the concept of "attitude" and the means of measurement and analysis used must be consistent with the goal.

An Expectancy X Value Orientation

Recent consumer research has featured the application of two somewhat similar models of cognitive structure (Fishbein, 1963, 1967a; Rosenberg, 1956, 1960). The first has its origins more in the behavioristic tradition (learned, mediating responses) following upon the work of Doob (1947), Osgood and his associates (1957, 1965), Staats & Staats (1958), and Rhine (1958), while the second is more in accord with the Michigan "functional" approach (Smith, 1949; Katz, 1960). Though a number of potentially important differences exist in the specification of variables making up the two models (Cohen & Houston, 1970), the application of either two-factor model to the study of consumer attitudes meets many of the requirements and purposes to be discussed.

The Fishbein model has benefited from increased development and extension in recent years enabling a sophisticated specification of the attitude-behavior relationship. Fishbein (1971) summarizes his adaptation of Dulany's (1967) theory of propositional control as follows:

The theory essentially leads to the prediction that an individual's intention to perform any behavior in a given situation...is a function of (1) his attitude toward performing the behavior in the situation and (2) his perception of the norms governing that behavior in that situation and his motivation to comply with those norms.

There are several aspects of this theory which differ considerably from those of previous formulations. First, the theory focuses on an attitude toward performing a specific behavior (e.g. purchase, product use) in a

particular situation rather than with an attitude toward a given person or object.² Behavior must, of course, occur under specific conditions at a specific time and place. Hence, if behavioral prediction is the goal, the researcher should specify the action(s) and the context in which the action is to take place. Public versus private use of a product may be more fundamental than conditions of purchase, the act of purchase itself often being incidental to the act of use.

A number of objections might be raised regarding this approach including the difficulty of specifying the exact context in which, say, consumers are likely to find themselves when using a product. To the extent this is true we should not expect to make predictions with especially high degrees of accuracy. It may, however, be the case that a small number of situational contexts, each thought to be probable, might be specified in advance for a given behavior. These could then be incorporated into the attitude measurement procedure and used in prediction (after assigning appropriate probabilities of occurrence).

Substantial variation among behavioral acts and across people is to be expected relative to the importance of normative considerations. Some work on the development of an interactive consumer-product typology incorporating perceived social conspicuousness is now under way and may prove useful in this regard (Cohen & Barban, 1970). To the extent that normative considerations are not likely to influence behavior they may simply be ignored (or weighted appropriately) in making predictions from the theory.

Attitudes, as considered above, should be expected to (and do in fact) predict behavioral intentions more accurately than they do purchase behavior itself. Part of this discrepancy results from operational factors. For example, behavioral intentions are generally measured at a closer point in time to the attitudinal measure than is behavior.³ Hence there is a greater opportunity for attitudes to change over the longer interval. This may be a particular problem in consumer research, since attitudes toward many products and brands, (1) may not be strongly held and (2) are subject to constant influence attempts through advertising and other information sources. In fact, it is certainly reasonable to expect many consumers to deliberately seek out information which, if accepted, would likely produce some restructuring of beliefs and attitudes and to do so at an increasing rate as they approach the time of decision. To the extent that either genuine attitudinal changes or disturbance factors (e.g. changes in economic conditions, special promotions, out of stocks) intervene between intentions and behavior, one should expect attitudes to predict the latter to a lesser degree.

At the heart of both the Fishbein and Rosenberg approaches is a structural model of similar algebraic form. Since our research utilizes a model of exactly similar form, we shall not present a formal statement of the other two models, but rather call attention to the essential characteristics of this class of models.

The model we have used is as follows:

$$A_b = \sum_{j=1}^n P_j I_j$$

where: A_b = a consumer's attitude toward a brand
 P_j = the brand's possession score on attribute j ,
i.e. the extent to which a consumer believes
that the brand possesses the j th product
attribute or want satisfying property
 I_j = the importance of the j th product attribute
and n = the number of salient product attributes

Rosenberg (1956), in a similar fashion, describes an attitude score, "as a function of the algebraic sum of the products obtained by multiplying the rated importance of each value associated with that object by the rated potency of the object for achieving or blocking the realization of that value [p. 367]."

Our model thus generates predictions according to an expectancy x value formulation. A brand is viewed favorably to the extent that it satisfies more important goals better than alternative brands. Were we to begin with a more basic model of motivated behavior (Atkinson, 1964) we might express this same notion as: $B_t = M \times E \times I$ where behavioral tendency (B_t) is a multiplicative function of: (M) the strength of motivation toward a goal, (E) the expectancy of attaining the goal through some action toward an object, and (I) the incentive potential of the goal object. For any M a number of alternative object choices are possible. Alternatives may be thought of as constituting a hierarchy based on their relative expected values ($E \times I$), thus generating a set of behavioral tendencies for a given motive. Since a number of competing motives exist at any given time, a single motive model of behavior is not adequate to predict that a specified action toward an object will occur, regardless of the object's standing in a given hierarchy. A more adequate conceptualization is needed, possibly specifying a system of behavioral tendencies within and across motives and a mechanism whereby the value of resulting tendencies could be compared to one's tendency to continue in his present activity (Cohen, 1971). The dynamic character of such a model is a further source of complication since both internal states and changing conditions tend to produce considerable variance around the estimates of B_t .

The attitudinal model thus is a surrogate for a more complete model of motivated behavior. Typically the attitude researcher ignores variability in the level of motive strength and degrees of conflict among motives. He, then, is interested in specifying the relationship between behavioral tendencies or intentions and ($E \times I$). Our version of this type of attitude model does this (1) by specifying the incentive potential of a brand in terms of the importance of each of a set of attributes or want satisfying properties generally thought to be salient, and (2) by equating perceived possession of each attribute with the expectancy of attaining that particular want or goal.

Summed over product attributes, then, the importance term represents the relative attractiveness of the product as a goal object. Summed beliefs regarding the extent of attribute possession represent the expectancy that behavior toward a particular brand will lead to attainment of desired states. The interaction of the two components serves, then, to weight a brand's possession of desired attributes by the relative importance of each attribute. We will shortly consider alternative (and, we feel, less satisfactory) ways of working with this type of data, such as by directly measuring only attribute possession and developing "importance" weights statistically on a post hoc basis.

This model approaches the difficult question of the content of motives, values and goals in an indirect manner. There is no effort made to trace the complex and often circuitous path through which a given motive (e.g. achievement, self-actualization) becomes manifest in behavior. Rather, respondents generate a set of want-satisfying properties (i.e. product attributes) perceived to be most important for the object in question. In a sense, the work load is shifted to respondents who, following an expectancy theory formulation, are thought to relate valued states to object choices during the process of product evaluation. It is, in fact, this evaluation process that we wish to "tap into" with our attitude measure.

We are of course dealing, then, with the "echo" of a motive rather than the motive itself, our knowledge of buying motives being entirely inferential (at best) through working backwards from product attributes. We clearly see this as a weakness of this approach as regards a more systematic view of motivation.⁴

To date, two research topics seem to have benefited the most from this type of approach: the study of attitude structure or components and the study of attitude-behavior relationships.⁵ In the context of the latter purpose, it is possible to regard investigations of attitude structure (i.e. the extent to which the models actually portray the interrelationships among attitude components) as tests of their validity. If, in this way, it may be established that a valid measure of consumer attitudes has been generated, one may then study the relationship between attitude and behavior with some confidence. In the absence of established validity, a researcher runs the risk that negative findings, especially, are ambiguous (i.e. is the relationship or the method "at fault?").

A growing number of studies by Fishbein and his associates provides impressive evidence regarding the relationship between scores on the Dulaney-Fishbein Model and behavioral intentions (an average multiple correlation of about .85; Fishbein, 1971). This may be interpreted as strong evidence regarding validity, at least over the range of attitudes and behavioral intentions studied. In addition, encouraging research has begun to appear using overt behavioral criteria, although many of the experimental settings used to date (e.g. Prisoner's Dilemma Game) may not be comparable to those generally studied in consumer behavior (Ajzen, 1969; Ajzen & Fishbein, 1970).

Applications of the Models in Consumer Behavior

Sheth & Talarzyk (1970) and Sheth (1970) have applied the basic Rosenberg-Fishbein approach to the area of consumer behavior. Their research has raised some interesting issues relative to the roles of (using our terminology) P and I components in determining "attitude" and to some extent behavioral intention and behavior.

Sheth & Talarzyk (1970) sought "to determine the relative contribution of perceived instrumentality and value importance factors" by running three types of regressions on a measure of affect ("attitude") for each of 30 brands of various products including toothpaste, mouthwash, frozen orange juice, toilet tissue, lipstick, and brassieres. Data came from 1,272 members of the Consumer Mail Panel of Market Facts, Inc. The first regression predicted variance in "attitude" as a function of the sum of the products of the two attitude components. The second and third regressions utilized one of the two summed components ("perceived instrumentality" and "value importance" respectively) by itself for the same purpose.

The authors found that the "perceived instrumentality" component model was superior to not only the "value importance" component model but also the combined model. The former result is not surprising, since "value importance" relates to product class attributes (e.g. for toothpaste: taste/flavor, decay prevention, etc.) and should not be an effective predictor of brand preference apart from some estimate of possession scores ("perceived instrumentality") for each brand. That is, it is not enough to know how important certain product benefits are unless we also know to what extent the consumer believes a given brand will provide those benefits.

The second result, however, is quite interesting. The authors express this well by stating that, "There is a clear implication that value importance not only does not have any strong correlation with attitude, but also that it suppresses the prediction of perceived instrumentality [p. 9]."

Is there any other explanation for this unexpected finding? A clue may come from the magnitudes of the r^2 's presented for each brand. Even with the "best" model, a substantial number of these (12 out of 30) indicate that less than 10% of the variance in "attitude" is being explained. While practically all of the r 's are statistically significant (when compared to the null hypothesis), in retrospect they seem unusually low for what should be a correlation between two measures of the same attitude. The criterion variable, "affect measured by the preference scale" (ranked), and the attitude measure derived from the Rosenberg model for some reason do not seem to vary together to the degree they should. Correlations between attitude scores generated by the Fishbein model and those of a measure of behavioral intention developed by Triandis, for example, have averaged .70 thus producing an $r^2 = .49$ (Fishbein 1967b). It is not unreasonable, then, to expect two measures of the same attitude to do about as well. In fact, not one of the thirty r^2 's in the "perceived instrumentality" regression was nearly this high. When we look at the r^2 's resulting from the regression using the Rosenberg equation, the lack of relationship is even more remarkable. Only three out of 30 r^2 's exceed .10, and a substantial number are practically 0!

To the extent that the criterion measure does not correlate highly with an established measure of attitude, it may be inappropriate to use it to evaluate modifications of the established measure. Not only may the criterion measure not be sensitive enough for this purpose, it may in fact lead to errors in evaluation if the lack of commonality reflects a systematic bias rather than random error.

One possible contributing factor to the lack of success Sheth and Talarzyk had with the two-component model is their decision to measure value importance by asking respondents to rate importance as "if you were designing an ideal brand for the category [p. 6]." Though they do not report means and variances for their data, one cannot help but wonder if an "ideal brand" could be anything other than more satisfying on the attributes deemed important. Hence under ideal conditions, relatively high mean importance scores and smaller variance on these would be expected. This is important since the magnitude of the correlation coefficient varies with the degree of heterogeneity of the traits being correlated (McNemar, 1969).

We must conclude, therefore, that though the Sheth-Talarzyk notion regarding the relative contribution of "value importance" warrants serious consideration, the data provided in support of this contention are not yet convincing. In addition, generally supportive evidence that both components add significantly to predictability is available from a set of four experiments conducted by Hansen (1969). We shall shortly introduce more data relevant to this issue.

In another paper, Sheth (1970) argues for a disaggregative analysis of evaluative beliefs as separate elements (rather than a summed attitude score). Essentially, this is the approach used by Banks (1950) in his multiple attribute analysis of brand preference and purchase of scouring cleanser and coffee. Banks suggests that the empirical determination of crucial product attributes may be quite valuable as a diagnostic tool in marketing management. Aggregating beliefs is likely to result in a loss of information, possibly even a canceling out of effects.⁶

We would also suggest that not only for the sake of more accurate behavioral prediction but especially for the analysis of attitude change, insight to be gained by studying the underlying belief structure is likely to be quite substantial (DiVesta & Merwin, 1960). For one thing, individual P and I elements should be more sensitive to changes in product perception (Krugman, 1965) which define the nature of the product. For example, the nutritional value of breakfast cereal may come to assume a greater importance (I) for many people as a result of recent nutritional evidence.

Individual brands' possession scores (P) on this product attribute should also change with greater knowledge.

In Sheth's disaggregative approach, evaluative beliefs underlying consumers' attitudes toward three brands of "instant breakfast" were measured directly. Regression weights were then calculated for each of these. Sheth reports that this procedure increased predictive power relative to prior summation of beliefs. The average R² varied from approximately .60 for affect, to .27 for buying intention, and to less than .05 for behavior.⁷ The substantial reduction between buying intentions and behavior is, of course, somewhat discouraging, though several possible explanations for this are discussed.

One way of looking at Sheth's approach is that rather than specifying importance weightings (I_j's) through direct measurement, he prefers to determine these from the data in the form of beta weights as did Banks (1950). While this procedure may provide a good fit for the sample upon which the weights were calculated, the real test of this approach may be its ability to predict an appropriate criterion variable for a new sample. We shall return to this later. A second point to consider in evaluating the contribution of the I_j terms (or any predictor variable) is that a lack of sample variation (e.g. too high agreement on the relative importance of each product benefit) will greatly dampen the potential effect of that variable. Thus Sheth's work raises the very interesting question as to whether attribute importance is likely to explain as much of the variance in purchase behavior (at least for established products on which substantial consensus regarding product benefits exists) as it should for more idiosyncratic behavioral choices.

Research Plan and Procedures

The purpose of our research was to evaluate several alternative ways of treating data from a Fishbein-Rosenberg type of model, namely:

$$A_b = \sum_{j=1}^n P_j I_j$$

The following alternatives were to be evaluated:

- (1) Both components multiplied together and summed
- (2) Both components multiplied together but not summed
- (3) Possession scores by themselves and not summed
- (4) Importance scores by themselves and not summed
- (5) Possession scores and importance scores by themselves and not summed

The first three appear to be the more meaningful approaches. The first represents the traditional method of handling the data, while the third has been suggested by research reviewed in this paper. The second approach seemed to us to be the most appealing of all. This model has the advantages of a disaggregative approach to determining the underlying belief structure without giving up the unit of analysis (P_jI_j) which seems the heart of the Fishbein-Rosenberg approach. That is, P_jI_j represents (in a single score) the extent to which a consumer believes that a brand possesses a product attribute weighted by the perceived importance of that attribute. Approaches four and five are used to provide a more complete analysis of alternatives, although the meaning of a weighted importance score (bI_j) is not altogether clear.

Accordingly, a product comparable to those used in related studies (toothpaste) was selected. Interviews with a convenience sample of approximately 40 consumers indicated that essentially the same five attributes or product benefits (appearance, decay-cavity prevention, breath freshness,

low price, and taste) as those used by Sheth & Talarzyk (1970) were probably most salient. A questionnaire was developed to establish scores for each of these attributes on the six leading brands of toothpaste sold in the area as well as importance scores on these attributes. Several criterion variables were measured, however our analysis has been confined to "frequency of purchase." Although this variable has the drawback of referring to past behavior (hence it does not seem appropriate to speak of behavioral prediction), it was felt to be the most meaningful criterion available on which to evaluate the five alternative models. Although based upon recall of past behavior, the criterion represents a pattern rather than an isolated incident (and, therefore, may be more reliable). Some bias may be present, however, to the extent recall of behavior is influenced by current attitudes. By the same token, of course, same-time measures of anticipated behavior or behavioral intention are likely to be biased so as to be consistent with attitudes. Frequency of purchase was measured along a five-point scale from "never" to "most of the time."

Attribute possession and importance scores were measured along nine-point scales specially developed for this purpose (Cohen & Houston, 1970). Both scales were tied to visual frames of reference and emphasized comparative bases for evaluation (i.e. P scores by attribute across brands and I scores across attributes).

Data were obtained from a probability sample of 192 people (more specifically, the person in the household who usually purchased toothpaste) in the Champaign-Urbana area.

Results and Discussion

Table 1 presents a summary of the coefficients of determination for frequency of purchase by model.⁸ Each of the R^2 's has been adjusted downward to provide unbiased estimates (McNemar, 1969). If one is willing to accept

Table 1

Coefficients of Determination for Frequency of Purchase

Brand	Model 1	Model 2	Model 3	Model 4	Model 5
Pepsodent	.24	.24	.23	.01	.22
Macleans	.22	.25	.25	.00	.25
Gleem	.24	.23	.24	.00	.22
Ultra Brite	.37	.37	.39	.07	.41
Colgate	.14	.25	.24	.10	.31
Crest	.10	.31	.31	.08	.31

Note.--Adjusted R^2 values are presented for models 2 through 5.

the contention that the criterion variable is somewhat closer to being an index of behavior than it is to being a cognitive variable, the magnitude of the relationships is reasonably encouraging. The R^2 's are substantially higher than those found by Sheth (1970) for the attitude-behavior relationship. In fact they come quite close to the R^2 's he reports between evaluative beliefs and behavioral intention, both measured during the same telephone interviews.

As expected, Model Four shows very little association with behavior toward brands. Information concerning the importance of an attribute by itself (i.e. in the absence of perceptions regarding attribute possession) seems of little value for predictive purposes.

There is little to choose among the other four models in terms of the R^2 criterion. The only substantial difference among them is Model One's relatively poor performance for Crest and Colgate. In aggregating evaluations of the two leading brands, a somewhat curtailed and skewed distribution of scores on both predictor and criterion variables resulted, thus almost certainly reducing the effectiveness of Model One.

For reasons discussed earlier, however, we feel that the disaggregative models are to be preferred for the insight they provide into the underlying belief structure of consumer attitudes. The reader may wish to examine the beta weights provided in Table 2 in this regard though far more penetrating analyses of this same data are possible such as by first breaking the sample down according to brand usage patterns. Relatively little variance in beta weights was found for Models Two and Three, although for example, Colgate seems to be treated somewhat differently. Such weightings may prove to be particularly sensitive indicants of changes in brand perception as a result of modifications in the product itself or in advertising themes.

There is little chance of being carried away by the "success" of the attitudinal model. Over 70% of the variance in behavior (and these data may not be as "hard" as would be desirable) is unexplained by the models. A good deal has been written as to why we should not expect to be able to predict behavior "perfectly" using attitudinal or any other kind of information. Still, we are very far from being perfect.

There are a number of explanations for the consistent "failure" (in terms of magnitude) of attitude-behavior relationships to live up to expectations. For one thing, of course, we simply may have overrated the extent of the relationship between any single intervening variable and subsequent behavior. As Doob (1947) pointed out, not only must attitudes be learned, but responses to the attitude as well. Perfect correspondence, then, may not be present at a single point in time; the further removed are the measures of both, the greater the opportunity for subsequent learning and genuine yet unmeasured changes. Put another way, both overt behavior (e.g. purchase) and responses to attitude scales are acts of behavior, each having a set of non-overlapping or unique elements. To the extent that the two are responses to somewhat different stimuli and conditions, something less than perfect correspondence must be expected (Eokeach, 1968).

Secondly, problems of unreliability plague measurement in this area attenuating the extent of whatever underlying or "true" relationship exists between attitude and behavior. Though statistical means of correcting for attenuation are available (McNemar, 1969) they are of limited practical value. As Fishbein (1972) has pointed out, it is ironic that careful attention is commonly paid to attitude scale construction, while researchers are often content with a single act, single observation behavioral criterion measure. The latter, of course, is analogous to a single item attitude scale administered once under uncertain testing conditions, a procedure few would defend as leading to reliable estimates. The use of multiple criterion

Table 2

Beta Weights for Attributes

	Pepsodent		MacLeans		Gleem		Ultra Brite		Colgate		Crest	
	Model 1	Model 3	Model 2	Model 3	Model 2	Model 3	Model 2	Model 3	Model 2	Model 3	Model 2	Model 3
Appearance	.040	.056	.293**	.180	.108	.068	.224*	.144	-.028	.103	-.168*	-.113
Decay prevention	.208*	.226*	-.052	-.020	.191*	.113	.141	.184*	.064	.113	.534***	.459***
Breath freshness	.105	.028	.037	.076	-.023	.148	.033	.055	.260*	.261*	-.134	-.109
Low price	.192*	.145	.040	.093	.087	.027	.038	.026	.071	.066	.154	.082
Taste	.080	.111	.265**	.255*	.235*	.215	.281**	.295**	.245**	.035	.223**	.277**

Note.--Model 2 incorporates both components (P_{1j}) while Model 3 uses the (P_j) component by itself.
 T ratios are used in tests of significance.

*p<.05

**p<.01

***p<.001

measures (Campbell & Fiske, 1959; Rokeach, 1968; Fishbein, 1972) would be a substantial improvement. Those holding favorable attitudes toward a product, for example, should manifest this preference in a variety of ways including: favorable comments, positive evaluation of advertising appeals, and greater recall of advertising appeals, in addition to patterns of purchase.

A third reason why relationships between attitudes and behavior typically fall short of expectations, we shall argue, is due to the customary method of analyzing such data for predictive purposes. Probably the most frequently used technique is regression analysis. One of the assumptions of models of this form (e.g. regression, correlation, canonical correlation) is not only that specifying the predictor(s) variable(s) reduces the variance of possible criterion values, but in addition that the rate of change -- unit change in the predictor set per unit change in the criterion set -- is systematic and continuous (e.g. linear, curvilinear). Regression coefficients specify these rates of change. How reasonable is this assumption?

A single act of behavior has certain unique characteristics as well as those common to the set from which it was sampled. Situational characteristics, moods, and unpredictable variations in necessary and sufficient conditions for the behavior combine to make any single act of behavior a potentially unreliable indicant of "true behavior." To the extent that unreliability (beyond that of isolated and random fluctuations) is a prevailing characteristic of the phenomena under study the pattern of behavior taken as a set or whole may constitute a far more meaningful test of prediction. To what extent is single-trial purchase behavior subject to factors likely to bring about systematic unreliability?

Though not all marketing activities may be successful, a common purpose may be seen in them: to keep one's customers and to attract new ones, usually from competitors. Looking at this from the standpoint of a particular customer; great sums of money, years of experience and marketing expertise culminate in attempts to woo, cajole, interest, and induce him to behave in alternative directions (i.e. toward various brands) at the same time. It is as if our proverbial consumer were being seduced from all sides, each firm making itself particularly attractive and the act itself as easy and pleasurable as possible! And what about our consumer's willpower, his determination to keep to the straight and narrow, to be loyal to one brand? What are the costs, the implications of (in this case) brand switching? What is the magnitude of the mistake he might make by buying that other brand of soap, margarine or cola? We submit that variability in behavior is not only a logical outcome of market forces but of the consumer's own desire to satisfy his own needs by obtaining continually more desirable assortments of products (not to mention the value of novelty itself). The norm, then, should be trial and error learning, and the picture that emerges is one of starts and stops, now "on," now "off." The frequency of purchase for any given brand should be characterized by marked deviations in a consumer's behavior, not necessarily preceded by changes in attitude but possibly followed by changes in attitude (Krugman, 1965).

And what about sheer quantity of brand purchased as a criterion measure? Are we not to expect that the more favorable the attitude the more the consumer will purchase of a specific brand? As Banks (1950) points out, quantity is affected by many things in addition to preference (e.g. size of family, consumption habits, shopping habits, income).

Finally, what is it we want to predict; purchase on the next trial, number of units to be purchased over the next several trials or months, or which brand a consumer will customarily purchase? If the first, the influence of unique and situational factors is likely to be great, and our measures must be quite specific to these and as close in time to the behavior as possible. If the second, a broader model (attitude being only one of the dimensions)

incorporating additional factors thought to vary with quantity must be used. Only in the case of the latter prediction does a generalized measure of attitude (of the type outlined in this paper) seem to hold promise for strong relationships. In the latter case, regression is not the appropriate method of analysis. More meaningful and significant results should be obtained using discriminant analysis, which has as its purpose the classification of a set of objects -- in this case consumers having different brand purchase patterns -- by a set of predictor variables -- in this case attribute possession and importance scores.

Results of Discriminant Analysis

Of the six brands for which we had gathered attitudinal and behavioral data, three had sufficient numbers of consistent purchasers to be included in the analysis. Seventy eight Crest buyers, 29 Colgate buyers and 17 Ultra Brite buyers indicated that they purchased their respective brand more often than any other combination of brands. Discriminant functions, tests of significance and degree of association, and respondent classification tables were calculated for the aggregative (ΣI) and two competing disaggregative models ($P \times I$ versus P). These findings will be summarized below. A more technical discussion of this application of discriminant analysis procedures is available elsewhere (Cohen & Ahtola, 1971).

Table 3 reveals that the more traditional aggregative model incorporating attribute possession and importance scores was quite successful in predicting group membership (i.e. Ultra Brite, Colgate, and Crest buyers). A customary test of significance for the null hypothesis of equality among

Table 3

Discriminant Analysis For Model One $\left(\sum_{j=1}^n P_j I_j \right)$

Discriminant functions	df	Eigenvalue	% Trace	Test of significance	P	ω^2
$V_1 + V_2$	6/238	.7216	100.00%	$F_2 = 13.882$	.001	.4403
V_1	4	.5322	73.75	$X^2 = 51.631$	.001	
V_2	2	.1894	26.25	$X^2 = 20.981$	.001	

Classified	Actual			
	Ultra Brite	Colgate	Crest	Total
Ultra Brite	8	3	6	17
Colgate	2	13	1	16
Crest	7	13	71	91
Total	17	29	78	124

Note. -- Percentage Correctly Classified = $\frac{92}{124} = 74.19$

the population centroids is Wilks' lambda using the F approximation developed by Rao (1952). This tests the discriminating power of, here, two discriminant functions (one less than the number of groups) in terms of the extent of "separation" (roughly, $\lambda = \frac{SS_b}{SS_w}$). Through the use of discriminant analysis the two sums-of-squares are expressed in terms of a weighted linear combination of, here, the summed attitude scores for each of the three brands. These weights maximize the value of λ , the eigenvalue associated with each discriminant function, subject to the constraint that each successive discriminant function constituting the discriminant space possesses maximum variance among linear combinations uncorrelated with the first, and so on. The relative magnitudes of the two eigenvalues indicate the percentage of the trace (total discriminating power contained in the two discriminant functions). Each discriminant function, V_j , is distributed approximately as a chi-square with $p + k - 2j$ degrees of freedom where p = variables and k = groups (Tatsuoka, 1970).

Thus, both discriminant functions represented dimensions along which significant differences among the Ultra Brite, Colgate and Crest buyers were found.⁹ High statistical significance does not, however, imply a strong degree of association between predictor and criterion variables, especially when the sample size is fairly large. A measure of discriminatory power, $\hat{\omega}^2$ (omega squared) has been generalized to the multivariate case (Hays, 1963, p. 382; Tatsuoka, 1970) and provides a measure similar to R^2 in multiple regression analysis. It may be interpreted as the extent to which the relative reduction in the variance (or uncertainty) associated with a criterion is conditional upon the values of the predictor variables. Table 3, then, indicates that approximately 44% of the variance in the discriminant space was relevant to group differentiation. This seems most encouraging in terms of the ability of the attitudinal predictors to account for consistent differences in patterns of brand purchasing behavior. We have also presented classification matrices showing the percentage of respondents correctly classified by the discriminant functions. Since this classification is performed on the same set of respondents from which the discriminant function is calculated (The sample was too small to save part of the data strictly for this purpose.), an upward bias is present in the results. A comparison over the three models, however, may be useful as may this complementary way of looking at discriminatory power despite its upward bias. In comparison with the $\hat{\omega}^2$ criterion, classification matrices leave a good deal to be desired since the decision rule used is, in essence, "which group" rather than one of "degree of similarity." Hence a model lower in variance explained may seem to be superior on the latter criterion by correctly classifying a set of marginal individuals.

Model One correctly classified 74.19% of the respondents. The procedure used was essentially Bayesian (Cooley & Lohnes, 1962) incorporating both differences in frequency of occurrence of membership in the three groups and differences in group dispersion. How good any such classification is depends upon the purpose of the classification. If the purpose were only to maximize the percentage correctly classified we should use a maximum chance criterion (Morrison, 1969) by way of comparison. Since the percentage distribution of respondents in the sample is as follows: Ultra Brite, 13.7; Colgate, 23.4; Crest, 62.9; we could classify 62.9% correctly by assigning everyone to the Crest group. The limitations of this criterion are obvious since we commonly seek to identify members of each group, not simply maximize the percentage correctly classified. The proportional chance criterion seems a more appropriate standard for comparison. Simply stated, if we would classify respondents according to the actual percentages represented in the sample, we would classify 46.9% of the sample correctly (Morrison, 1969). Model One did considerably better than that.

Turning now to Model Two (See Table 4) we can see the far greater power of our disaggregative treatment of attribute possession and importance scores. Discriminant functions were calculated from the five P x I scores

Table 4
Discriminant Analysis For Model Two (P_jI_j)

Discriminant functions	df	Eigenvalue	% Trace	Test of significance	P	ω^2
V ₁ + V ₂	30/214	1.5699	100.00%	F = 5.395	.001	.6687
V ₁	16	1.1037	70.30	$\chi^2 = 85.874$	.001	
V ₂	14	0.4662	29.70	$\chi^2 = 44.011$	.001	

Classified	Actual			
	Ultra Brite	Colgate	Crest	Total
Ultra Brite	11	0	1	12
Colgate	2	23	4	29
Crest	4	6	73	83
Total	17	29	78	124

Note. -- Percentage Correctly Classified = $\frac{107}{124} = 86.29$

for each of the three brands (thus 15 predictor variables in total). Both discriminant functions were highly significant; over 66% of the variance was explained by the two together.¹⁰ In addition over 86% of the respondents were correctly classified.

Table 5 indicates that a very similar degree of relationship was obtained when possession scores were used by themselves as predictors. Over 65% of the variance was explained, a little more than 1% less than Model Two. The relative contribution of the two discriminant functions in each case was about the same, the first (and most discriminating) had a very slight relative advantage over the second when both components were used (Model Two). Model Three correctly classified one additional respondent more than Model Two. Clearly, then, our results indicate that there was little increase in predictive power associated with the addition of attribute importance scores. We do not find any evidence, however, for the "suppressor" effect noted for this component by Sheth & Talarzyk (1970).

Theoretically, at least, attribute importance should make more of a contribution than has been found in several of the studies in the consumer behavior area (including our own). Several hypotheses have been suggested for the weak relationship. Sheth & Talarzyk (1970) suggest that "value importance is probably already incorporated by the respondent [p. 12]" when he assigns ratings on the perceived instrumentality (attribute possession) component.¹¹ To see if this could help explain our findings, we calculated intercorrelations of the two components by brand for each attribute, and as

an overall index of intercorrelation between the two sets of predictors, canonical correlations by brand. These results are presented in Table 6.

Table 5

Discriminant Analysis For Model Three (P_j)

Discriminant functions	df	Eigenvalue	% Trace	Test of significance	P	$\hat{\omega}^2$
$V_1 + V_2$	30/214	1.4836	100.00%	$F = 5.136$	.001	.6546
V_1	16	1.0168	68.54	$\chi^2 = 80.673$	.001	
V_2	14	.4608	31.46	$X = 44.057$	.001	

Classified	Actual			
	Ultra Brite	Colgate	Crest	Total
Ultra Brite	15	1	3	19
Colgate	0	21	3	24
Crest	2	7	72	81
Total	17	29	78	124

Note. -- Percentage Correctly Classified = $\frac{108}{124} = 87.10$

Table 6

Intercorrelations Of P And I By Brand

Attribute	Ultra Brite	Colgate	Crest
Appearance	.25	.10	.35
Decay prevention	-.02	-.09	.35
Breath freshness	.20	.16	.15
Low price	.03	.15	.24
Taste	.20	.08	.12
Canonical Correlation			
All attributes	.45*	.45*	.52**

*p .05, N = 124
 **p .001, N = 124

Even though significant correlations were found between the two sets of measurements (using chi square approximations for lambda; Bartlett, 1947; Cooley & Lohnes, 1962) the high degree of association needed to argue that, in effect, only one component is needed -- since it is measuring the same factor -- is not present.

In order to take a slightly different view of the problem, a discriminant analysis similar to those discussed earlier was run using only attribute importance scores (i.e. five predictor variables). We had earlier designated this approach as Model Four in the regression analysis segment. Would there be any meaningful discriminatory power in a set of predictors whose point of reference was not differences among brands at all but rather the importance of the product attributes themselves? Results indicated that approximately 20% of the variance ($\hat{\omega}^2 = .1993$) can be explained using only attribute importance scores. While, taken by itself, this is not a high degree of association, still it is not inconsequential. When the moderate degree of correlation between attribute possession and importance scores is taken into consideration, the tentative conclusion emerges that attribute importance has potential significance and is not being adequately measured through attribute possession scores.

The question of lack of contribution still remains when attribute importance was combined with the far more discriminating attribute possession component as applied to our data. One conclusion is inescapable when the two sets of scores are compared: there is much less variation in perceived attribute importance regardless of brand preferred than there is in perceived attribute possession across brands. Table 7 presents the mean evaluations of each component by brand within groups. Importance scores, which are based on respondents' evaluations of want-satisfying characteristics of the product class, exhibit little variation per attribute across purchaser groups. Possession scores, on the other hand, are a direct function of brand characteristics and show considerable variability depending on (1) which group of purchasers is doing the evaluation and (2) which brand each group is evaluating. Some idea of the extent of the differences in variability for the two components may be seen by looking at the range of mean differences over groups and, for possession scores, by brand. Though these are average evaluations by groups, and therefore do not exhibit as much variability as would be found among individuals, the range of attribute possession scores was not only consistently high but dramatically greater than that of importance scores. As McNemar (1969) has pointed out, correlations based upon variables restricted in range must be relatively low. Their contribution to a model such as this, then, must be limited.

A number of factors combine to increase the variability of P scores relative to I scores. First, of course, brands do in fact differ in their possession of desired attributes. Secondly, advertising and promotional appeals are typically used to further differentiate brands from one another. In addition, post-purchase psychological processes often operate so as to "spread apart" evaluations of alternatives considered for purchase on the very attributes used for brand evaluation (Cohen & Houston, 1972). In total, there are 30 "own brand versus other brand" comparisons (e.g. for Ultra Brite users; Ultra Brite versus each of the other two brands on five product attributes) across the three consumer groups (See Table 7). On all 30, the evaluation is in favor of the brand used! Thus, ratings of attribute possession are not only variable but consistent with brand customarily used. It is little wonder, then, that they would be a valuable correlate of brand choice.

Table 7

Mean Evaluations of P And I By Brand Within Groups

Attribute	Ultra Brite(N=17)			Colgate(N=29)			Crest(N=78)					
	Ultra Brite	Col-gate	Crest	Import-ance	Ultra Brite	Col-gate	Crest	Import-ance	Ultra Brite	Col-gate	Crest	Import-ance
Appearance	8.06	4.35	5.71	7.71	3.62	6.38	4.59	6.10	3.96	3.81	5.56	6.50
Decay prevention	6.76	5.29	6.53	8.29	2.83	7.38	5.76	7.79	2.46	4.74	8.15	8.77
Breath freshness	7.65	4.53	4.76	7.24	4.28	6.97	4.59	7.34	3.67	4.22	5.99	6.64
Low price	6.76	5.18	6.24	4.41	3.14	5.72	5.14	5.55	2.95	3.90	5.68	4.53
Taste	7.71	4.29	4.94	6.59	3.90	7.14	4.28	6.83	3.26	4.51	6.92	6.05

Range of Mean Differences

Attribute	P	I
Appearance	4.44	1.61
Decay prevention	5.69	.98
Breath freshness	3.98	.70
Low price	3.81	1.14
Taste	4.45	.78

Conclusion

An attitude model incorporating respondents' evaluations of attribute possession (by brand) and attribute importance was developed along lines suggested by expectancy x value theory. Several alternative ways of treating data based on the model (relating attitudes toward brands of toothpaste to reported brand use over prior periods) were then considered. Two disaggregative approaches -- one incorporating only attribute possession scores and the other both components -- were found to be superior to initially summing component scores and thereby weighting each equivalently.

Little difference was found for predictions based upon the two-component model compared to a model using attribute possession scores by themselves using both multiple regression and multiple discriminant analyses. A number of factors were advanced to account for the lack of difference.

One of these concerns the inadequacy of testing a predictive model on the same sample used to generate weights for predictor variables. The multiple correlation coefficient, for example, represents an optimal state of affairs: the maximum correlation to be expected between the criterion variable and (a linear combination of) predictor variables. The empirical determination of regression coefficients insures an optimal weighting of variables. This, or course, means that advocates of a one-component approach are put in a most ambiguous position in arguing the adequacy of their model: they cannot know the extent to which regression weights incorporate the contribution of the second component on a post hoc basis. To the extent they do, the model would appear to be less desirable from the standpoint of prediction. A direct measure of both components for the second sample should be more accurate than the use of one direct measure with functional relationships among terms (for both models) specified by weights derived from earlier data.

Theoretical justification exists for a two-component approach. Specific applications (certain products, objects, issues) may not benefit as greatly from the inclusion of the attribute importance component, though no evidence for diminished predictive power as a result of its inclusion was found. The relative contribution of attribute importance in predicting behavior may be a direct function of the amount of disagreement among consumers as to the value of the product benefits possessed by members of the product category. For products on which substantial consensus exists in the ordering and nature of wants and goals served, attribute importance, while theoretically sound, should be of reduced practical significance. Arguments were presented in support of multiple discriminant analysis (relative to regression analysis) for the kinds of predictions generally thought to be tractable in relation to attitudinal variables. Considerable success ($\hat{w}^2 = .67$) was observed in the application of discriminant analysis to the data.

Footnotes

¹Appreciation is expressed to Michael J. Houston for his help in supervising the field study and in data processing.

²Rokeach (1968) makes a similar point regarding the importance of both object and situation. He chooses to assess both A_o and A_s (attitudes toward the object and situation respectively) and determine weightings for each.

³If behavioral intentions are measured at the same point in time as attitudes using roughly similar measurement techniques, it is not clear that they should be regarded as anything other than a related (e.g. more focused) measure of attitudes.

⁴Rosenberg (1956) offers a far richer treatment of motives and values. Building upon the work of Murray (1938) and White (1951), Rosenberg obtains measures of more basic and central needs and values in his two-component model.

⁵There seems good reason to believe that this type of approach can be applied successfully to the study of attitude change. Though this has not been a prime focus to date, the specification of underlying cognitive structure rather than merely degree of affect suggests the possibility of estimating information relevance and effect. Such a research program is now underway under the direction of the senior author.

⁶Looking at this another way, it is possible to imagine a profile of competing products in terms of P_j 's, which together with importance weightings (I_j 's) tend to describe patterns of similarities in product judgments. Such data might then be used to evaluate market opportunities and segmentation strategies, to design products and product appeals, and to maintain a continuous audit of changing consumer desires and product information. Many of these objectives can be approached using multidimensional scaling techniques without prior specification of attribute dimensions. Although the approach suggested here may be more direct and less subjective (e.g. in interpreting dimensions), a meaningful comparison must await appropriate research. It does seem clear, however, that a great deal of information regarding the bases of consumers' attitudes toward a product can be learned from a disaggregative analysis of belief structure.

⁷No indication is given as to whether the R^2 's have been adjusted downward to provide unbiased estimates (McNemar, 1969). However, since sample size is large relative to the number of variables in the equations little change should result.

⁸See Cohen & Houston (1970) for a discussion of procedures used in regard to skewness present in the data.

⁹Further discussion of the interpretation of the discriminant space in terms of product attributes is contained in Cohen & Ahtola (1971).

¹⁰Unfortunately, there is presently no reliable method of correcting \hat{w}^2 for the number of predictor variables used, and some upward bias is likely.

¹¹Actually, their argument seems more a critique of weaknesses in measurement than of theory. Since value importance has theoretical merit it would seem reasonable to evaluate its potential contribution. This, of course, cannot be achieved unless an adequate and separate means of measurement is used by the researchers.

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