Identification of Determinant Attributes: A Comparison of Methods

Article *in* Journal of Marketing Research · May 1971

DOI: 10.2307/3149759

CITATIONS
252

READS
3,242

1 author:

Mark I Alpert
University of Texas at Austin
38 PUBLICATIONS **2,140** CITATIONS

SEE PROFILE

MARK I. ALPERT*

Not all product attributes are equally important in determining consumer preferences. This article distinguishes determinant attributes from nondeterminant ones and presents a cross-validation method for testing alternative approaches to identifying these key attributes.

Identification of Determinant Attributes: A Comparison of Methods

INTRODUCTION

Considerable time and money have been devoted to measuring overall consumer attitudes toward companies and products and their particular attributes. However, even when attitudes have been identified, there may be no clear indication of *which* ones determine purchases and preferences.

Image studies [e.g., 5] measure consumer ratings of companies on several attributes and compare these ratings to those of the "ideal" company from which to buy. In these analyses all of these attributes are assumed equally important for a company's success. However, it has been pointed out that some attributes are clearly more important than others in determining purchasing behavior [1, 2, 9, 28.]

Those attributes projected by the product's image which lead to the choice of that product may be called *determinant,* since they determine preference and purchase behavior.[1] For example, consider safety features in cars. Both owners and nonowners of, say, Buicks probably hold comparable opinions about the car's safety, but differ in opinions about handling ability, appearance, and other traits. Thus, it would make more sense to promote the latter attributes rather than safety, which probably strikes most people as being equally present in most cars and, therefore, is not used as a basis of selection.

Objectives

The best way to identify determinant attributes which should be stressed to win customers has been widely debated [6, 8, 11, 17]. There have been few studies of various methods' effectiveness under controlled conditions. This study is an attempt to compare the usefulness of several common methods of identifying determinant attributes. Specifically, the objectives of this study are to:

1. Demonstrate how determinant attributes may be identified for a particular product,
2. Illustrate a means of comparing various methods of identifying these attributes—to indicate how pilot studies for particular products might be carried out,
3. Compare the values of the methods of identification, along with relevant implications for similar marketing research problems (and products).

METHODS OF IDENTIFYING DETERMINANT ATTRIBUTES

Approaches proposed for identifying determinant attributes might be classified broadly as: (1) direct questioning; (2) indirect questioning, including motivation research and covariate analysis; and (3) observation and experimentation. Since no one study could encompass a comparison of the myriad variations of these methods, this discussion will be confined to some approaches typifying divergent methods for determinant attribute identification; see also [1, 20].

In direct approaches the respondent is asked to give his reasons for purchase and it is assumed that he knows and will tell which attributes determined his choice. Attributes are then classed as determinant if they are either among the most frequently stated reasons for

* Mark I. Alpert is Assistant Professor of Marketing Administration, The University of Texas at Austin. He is grateful for constructive comments by James H. Myers of The University of Southern California, Subrata K. Sen of The University of Chicago, and Robert E. Witt of The University of Texas.

[1] The notion of determinant attributes implies a correlation between a customer's attitudes toward certain attributes of a product and his overall attitude toward that product. While this correlation cannot establish a causal link between attributes and brand choices, one may expect high preference for the determinant attributes to lead to choice of the brand perceived as having them.

Journal of Marketing Research,
Vol. VIII (May 1971), 184–91

purchase or have the highest average importance rating in a set of rated attributes, as in [25].

To counter the objection that consumers may not differentiate competing brands in terms of attributes seen as important (e.g., safety in a car), measurements of components other than importance have been developed in order to obtain more than one dimension of attribute ratings [9, 12, 26, 28]. Frequently, *dual questioning* is used; this calls for ratings of various product attributes in terms of: (1) how important each is thought to be in determining choice, and (2) how much difference is perceived among competing products in terms of each attribute. Attributes judged high in combined importance and differences are selected as determinant.

Social psychologists have stressed looking at two dimensions of attitudes towards objects [9, 26], and their work has influenced studies in marketing research [4, 12]. Common to all of these is the idea that overall attitude is a function of beliefs about an object's attributes (i.e., the degree to which it does or does not possess a particular attribute), and the evaluative aspect of these beliefs (i.e., the importance of the attribute to overall satisfaction with the object). With measures of the degree to which products fulfill certain attribute requirements (and of each attribute's influence in determining choice), based on direct questioning of respondents, one could predict overall attitudes toward products relatively easily. Objections that direct measures of the relative influence of attributes wrongly assume that respondents know what gives them most satisfaction and will tell their true feelings [6, 17] can be countered by using indirect methods.

Indirect questioning is any method in which a respondent is not asked *directly* why he bought a product or which attributes influenced his choice. Rather, indirect approaches range from controversial and qualitative (but not necessarily nonquantitative) techniques of motivation research to statistical techniques such as discriminant analysis and multiple regression models. One motivation research technique which can be readily quantified for comparison with a direct questioning counterpart is "third-person" projective questioning. This technique [16, 29] asks respondents to state the importance of various attributes in determining the choices of *most people* for a particular product. The psychological principles underlying this approach are well known and need no further discussion here [11, 16, 17, 29]. In this study, two direct questioning methods will be compared with two similar indirect questioning versions (with "most people" substituted for "you" in appropriate single and dual question forms).

Covariate methods also may be classed as indirect, since they infer determinant attributes from subjects' ratings of products, as related to some measure of behavior toward the products. These approaches typically obtain ratings of various attributes of each brand, along with the information concerning the subjects' overall preferences for each brand, or else which brand each subject normally purchases [3]. Linear discriminant analysis can then be employed to separate respondents into various categories of product usage, based upon the ratings they gave various products in terms of a set of attributes [2, 24]. When the dependent variable (such as overall preference) is continuous, an analogous application of multiple regression analysis enables attributes to be ranked in order of descending contribution to percentage of variation in preference ratings which they helped to explain. Of the methods discussed here, regression and discriminant analysis are the most complex and require the most data, since determinant attributes are inferred from a matrix of attribute ratings for several brands. This study includes a model of "regression coefficient determinance" against simpler methods in identifying determinant attributes.

Another pair of models was included for added comparison of direct and indirect questioning methods. In direct questioning techniques, determinant attributes are often assumed to be objective, rational motives for purchase expressed by subjects. For example, in choosing a pen (the product used in this study) objective attributes might include "comfortable to hold," "freedom from skipping," or "durability." In fact, preliminary direct questioning did produce these attributes, numbered 2–11 in Table 1. These were arbitrarily grouped as an objective attributes model for determinant pen traits, for an additional example representation for direct questioning.

Many motivation researchers emphasize attributes which are more subjective in nature [6, 17, 18]. These often vary from product to product, but would include such things as the degree to which a brand is perceived to be "masculine or feminine," "prestigious or nonprestigious," and the types of personality and occupation which might be associated with persons using each product (all components of the brand image). Accordingly, variables 12–38 in Table 1 are designated as subjective attributes, and they are combined in a model to see how much influence they might have on determining brand preferences.

THE COMPARATIVE TECHNIQUE

As well as its use in identifying a set of determinant attributes, multiple regression is convenient for judging the predictive validity of a number of potential methods for identifying determinant attributes. If one has a set of attributes regarded as candidates for determinants, along with ratings by subjects about their overall preferences and for individual attributes of each product, it is possible to build multiple regression models of any combination of attributes as predictors of overall preference.[2]

[2] Preference, a good predictor of purchase [2], is preferred when nonproduct factors such as shelf-facings, stock-outs, and short-run competitive campaigns are held constant. The identi-

Table 1

ATTRIBUTES CONSIDERED AS POSSIBLE DETERMINANTS OF PEN PREFERENCES

Variable number[a]	*Attribute description*
2	Comfortable to hold
3	Smoothness while writing
4	Writing lifespan
5	Freedom from skipping
6	Attractiveness of pen
7	Convenience in refilling
8	Quality of writing appearance
9	Economy of refills
10	Freedom from smudging
11	Durability
12	Old fashioned—modern
13	Masculine—feminine
14	Nonprestigious—prestigious
15	Formal—informal
16	Would not give as gift—would give as gift
17	Light—heavy
18	Small seller—large seller
19	Careless—perfectionist
20	Sensitive—thick-skinned
21	High social status—low social status
22	Writes a lot—writes very little
23	Tense—relaxed
24	Liberal—conservative
25	Writes signature often—seldom writes signature
26	Creative—noncreative
27	Banker
28	Young socialite
29	Athlete
30	Accountant
31	Taxi driver
32	Top executive
33	Factory worker
34	Physician
35	Sales clerk
36	Housewife
37	Retired person
38	College student

[a] Variables 2–11 are objective attributes, 12–28 are subjective, 12–18 describe the product, 19–26 describe the personality of each brand's typical user, 27–38 describe the likelihood of occupational groups' use of each brand.

The methodology of this study involves obtaining such a set of ratings and splitting it into two parts, one for parameter estimation and the other for a sample held out for cross-validation. Then, for any method of identifying attributes one can obtain a model which predicts overall preference as a function of ratings given to various brands in terms of attributes selected as determinant by that method. Each model is cross-validated with the sample held out. Next, each model's predicted values of overall preference can be correlated with actual values and the various models intercorrelated (see Table 3).

Cross-validation is necessary for two reasons. First, there is an upward bias in any multiple regression technique (or discriminant analysis) which uses the same data to estimate coefficients and then to measure its predictive validity. Correlated measurement errors can yield a high degree of "boot-strapping" with a probable bias in favor of those methods which choose a large number of attributes. Cross-validating usually causes the measure of predictive validity to "shrink," because of these errors [13]. Second, unless one multiple regression model contains variables which are entirely a subset of another, there is no straightforward technique for comparing their relative abilities to explain variation in the dependent variable. Since different methods often choose sets of attributes which do not meet this restriction, comparing them in terms of multiple r's is impractical. However, cross-validation essentially involves substituting one large independent variable, usually a weighted sum of the held-out sample's independent variables, and the analysis sample's coefficients to obtain a simple r instead of a multiple r. Thus the resulting intercorrelation matrix, as shown in Table 3, can be readily analyzed using a simple t-test for correlated correlation coefficients [19, p. 148].

Research Questions

Given a way to compare various methods but a conflicting body of literature on advantages of these methods, the following comparisons were felt to be most meaningful:

1. *How do direct and indirect questioning methods compare in effectively predicting overall preference?* Relevant comparisons include models generated for simple direct questioning vs. simple indirect questioning, direct dual questioning vs. indirect dual questioning, and, subordinately, the objective attributes model vs. the subjective attributes model. Null hypotheses are that each pair of models produces the same degree of correlation with overall preference (cross-validated).
2. *Is dual questioning superior to simple (single) questioning?* Here direct dual questioning is compared to simple direct questioning and indirect dual questioning to simple indirect questioning. Null hypotheses are that each pair produces equivalent degrees of correlation with overall preference.
3. *How do methods compare with each other?* Each possible pair is tested to see if any clear superiorities or inferiorities emerge.
4. *Which attributes determine overall preference for the test product?* Determinant attributes chosen by each method are indicated, along with relative comparisons of various attributes.

PROCEDURE

A convenience sample of 97 undergraduate business students at California State College at Long Beach was

fication of brand attributes which determine preference is one important area; other studies can then be initiated to identify other factors that influence purchase besides brand preference [3].

Table 2

SELECTION OF DETERMINANT ATTRIBUTES BY VARIOUS METHODS

Attribute	*Significance level of selection*				*Regression coefficient*
	Direct dual questioning	*Indirect dual questioning*	*Direct questioning*	*Indirect questioning*	
Quality of writing appearance	.0000001	.001	.00005	.0001	.0004
Freedom from smudging	.00003	.00004	.00001	.00003	.9999[a]
Smoothness while writing	.001	.0003	.00001	.00003	.00000001
Comfortable to hold	.02	.02	.0001	.3282	.02
Durability	.02	.62[a]	.0018	.2177[a]	.24[a]
Would not give as gift—would give as gift	.04	.34[a]	.8620[a]	.8133[a]	.03[a]
Freedom from skipping	.24[a]	.003	.00001	.00003	.39[a]
Accountant[b]	—	—	—	—	.001
Writes a lot—writes very little[b]	—	—	—	—	.005
Small seller—large seller	.99998[a]	.95[a]	.99999999[a]	.9710[a]	.03
Economy of refills	.999[a]	.97[a]	.9987[a]	.5871[a]	.04

[a] Not identified as determinant at the .05 level.

[b] Specific attributes of the typical user's personality identified as determinant by regression coefficients model. Neither occupation nor personality of typical user was identified by other methods.

surveyed on attitudes about moderately priced ballpoint and fountain pens. Since comparing methods requires rating competing brands in terms of several attributes, subjects were given four brands of pens to use for a writing exercise in the test room[3] and then asked to rate each in terms of the 37 attributes shown in Table 1. This approach ensures that respondents are reasonably familiar with each brand before rating attributes and giving overall preference.

Three different questionnaires were administered. The first, completed by all subjects, was an attribute rating form in which all four brands were rated, one attribute at a time, after the writing exercise.[4] The second questionnaire had two sections: half of the subjects completed Form A and half Form B. Form A, direct dual questioning, asked "How important is each of these attributes in your own choice of a pen in the one-dollar category?" and "How much difference do you feel there is among these brands, in each of these attributes?" Form B, indirect dual questioning, contained the same two questions, with "most people" substituted for "you." To allow use of multiple regression and other parametric statistical techniques, evaluative adjectives were chosen to approximate five-point interval scales. This involved some slight modifications of prescaled adjectives, such as those suggested by Myers and Warner [22].[5] The third questionnaire, completed by both groups, asked for data on age, sex, and course load. Post-test comparisons between responses of those who completed Form A and Form B of the second questionnaire revealed no significant demographic differences, implying that differences in responses are due to the direct vs. indirect frame of reference used in questioning.

Fifty usable sets of indirect dual questioning, 42 direct dual questioning, and 82 attribute-rating forms (containing 328 sets of rated brands) were obtained. From this data, models of various methods were constructed and their efficacies compared (see Tables 2–5). Model 1 contains all the subjective and objective attributes used to describe reasons for pen-brand choices. Models 2 and 3 contain attributes selected as determinant by direct and indirect dual questioning respectively. As outlined above, attributes were identified by comparing the combined scores for importance and differences given each attribute with the average combined score for all attributes rated by a particular method. If x represents the importance rating and y the differences rating of a particular attribute by an individual subject, in dual questioning xy indicates the degree of determinacy for the given attribute and subject (since this method uses both importance and differences).

If one knew the universe mean xy and its standard deviation, comparing the mean xy for each attribute with this μ_{xy} would allow selection as determinant of those attributes which have means significantly higher than the universe mean. Lacking these parameters, this study followed a heuristic approach assuming the rated attributes to be representative of a population of poten-

[3] Four brands which preliminary study had indicated to be the largest selling one-dollar pens were used. They were also of the modal pen color (black), ink color (blue), and pen point (medium). Their order of use in the writing exercise was randomized.

[4] Overall preference ratings were obtained after all other attributes, to lessen the tendency to rationalize specific attribute ratings in terms of overall preference for the brand.

[5] Intervals in these two scales were: no importance, slightly important, moderately important, very important, extremely important, and no differences, slight differences, moderate differences, large differences, extreme differences. The attribute rating form called for each brand to be rated on a seven-point scale for 37 attributes plus overall preference. Intervals were: fairly poor, mediocre, all right, fairly good, good, very good, excellent [22].

Table 3
CORRELATION MATRIX FOR CROSS-VALIDATED MODELS

Variable	*Overall preference*	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*	*Model 7*	*Model 8*
Overall preference	1.000	.816	.853	.816	.744	.822	.854	.833	.800
Model 1 All attributes		1.000	.918	.849	.886	.910	.965	.873	.838
Model 2 Direct dual questioning[a]			1.000	.917	.784	.930	.948	.952	.892
Model 3 Indirect dual questioning[a]				1.000	.637	.925	.891	.983	.973
Model 4 Subjective attributes					1.000	.716	.869	.668	.625
Model 5 Objective attributes						1.000	.910	.944	.895
Model 6 Regression coefficient tests[a]							1.000	.902	.862
Model 7 Simple direct questioning[a]								1.000	.956
Model 8 Simple indirect questioning[a]									1.000

[a] Method used to select determinant attributes.

tially determinant attributes, μ_{xy} was estimated with the grand mean xy. The standard deviation of the obtained ratings was supposed equal to σ_{xy} since the number of ratings for each of the 19 attributes was about 5% of the universe, and it was felt that none were large enough to seriously bias these estimates of μ_{xy} and σ_{xy}. To the extent that any bias is present, it results in a test which is too conservative because extremely determinant attributes tend to pull the grand mean toward their sample means.[6] Given these parameters, Table 2 gives the probabilities that the obtained mean xy ratings for the selected attributes could have exceeded the grand mean by chance sampling variation (a one-tailed Z-test). As indicated in Table 2, direct dual questioning chose six attributes as determinant at the .05 level: quality of writing appearance, freedom from smudging, smoothness while writing, comfort in holding, durability, and would not and would give as a gift.

The indirect dual questioning groups' responses identified five attributes (Model 3) indicated in Table 2 as determinant, including four chosen in direct dual questioning. For *single* questioning methods, only mean scores for importance of an attribute were compared with the grand mean score for importance, giving six attributes from direct questioning (Model 7) and a subset of four of these from indirect questioning (Model 8).

Model 6, representing the regression coefficient determinance technique, was obtained slightly differently. Using about two-thirds of the cases, overall preference was regressed on all 37 ratings. Dividing the standardized partial regression coefficients (β) by their standard deviations (s_β), a two-tailed t-test [15, p. 339] indentified eight attributes as determinant.[7]

To all these attributes were added sets of subjective (Model 4) and objective attributes (Model 5). Cross-validated correlation coefficients (with overall preference) of the eight models (Table 3) were then compared, two by two.

RESULTS

Comparison of Direct and Indirect Questioning

Table 5 shows that simple direct questioning produced a more effective predictive model (Model 7) of overall preference than simple indirect questioning (Model 8). The difference between their cross-validated correlation coefficients is significant at the .05 level (using a two-tailed t-test for intercorrelated correlation coefficients). Direct dual questioning (Model 2) surpassed indirect dual questioning (Model 3) at the .06 level. Also, objective attributes (Model 5) were better predictors than subjective attributes (Model 4) at the .06 level. Direct questioning methods were thus superior in identifying determinant attributes, excepting the covariate technique of regression coefficient determinance, which does not involve questions of as comparable a format.

[6] Thus this method might be understating the determinance of some attributes (at a stated level of alpha), but attributes might at least be chosen systematically in this manner rather than through mere "eyeballing." At present, no standard technique for choosing "how high is very high" exists.

[7] This test was two-tailed because the coefficient which indicates a determinant may be either high or low, whereas in previous tests the ratings had to be significantly high in importance and/or differences. Multicollinearity tends to lessen the stability of the coefficients, but this method is frequently used to identify key attributes [2].

Table 4
RANK ORDER OF MODELS' PREDICTIVE ABILITY

	Cross-validated multiple R	R^2
Model 6: Regression coefficients determinance	.854	.729
Model 2: Direct dual questioning	.853	.728
Model 7: Direct questioning (single)	.833	.694
Model 5: Objective attributes	.822	.676
Model 1: All attributes	.816	.666
	tie	
Model 3: Indirect dual questioning	.816	.666
Model 8: Indirect questioning (single)	.800	.640
Model 4: Subjective attributes	.744	.554

Comparison of Single and Dual Questioning

The comparison of dual and single questioning techniques is not so clear. Direct dual questioning surpassed simple direct questioning, but only at the .23 level, and indirect dual questioning was better than simple indirect questioning at the .24 level. In a Bayesian sense, the decision of whether to use simple or dual questioning would thus depend on cost differences in data collection and the value of improved accuracy given by dual questioning (multiplied by the probability that it is better, about .75).

Comparisons Among All Methods

Tables 4 and 5 compare the various methods modeled and show that no one technique achieved overall superiority. However, simple indirect questioning and subjective attributes models were clearly inferior. Regression coefficient determination appears to be better than most other methods, although it is not more effective than direct dual questioning (alpha = .95). A rank order of methods is given in Table 4, but specific differences must be checked with the comparisons in Table 5.[8]

Determinant Attributes

Determinant attributes identified by the best methods, regression coefficient determination and direct dual questioning, may be those which determine overall preference. However, the partial regression coefficients model is a poor approximation of the mental process of judging products (since consumers do not logically evaluate attributes ceteris paribus). Ranking by simple raw correlations with overall preference (Table 6) indicates which attributes are most closely associated with overall preference, but differences between rankings should not be taken as significant without first comparing correlation coefficients. The direct dual questioning method gives a simple list of likely determinants of overall preference and has the advantage of not requiring a set of ratings (brand-by-brand) to identify attributes.

[8] Model 1 (all attributes) was clearly inferior to the regression coefficients determinance model (.007 level) and probably the direct dual questioning model (.09 level), which points out the necessity for cross-validation. Before validation, the r^2 for all attributes exceeds any subset model. Screening the set of attributes can actually increase predictive validity.

CONCLUSIONS

Comparing methods of identifying determinant attributes is difficult because there is usually no standard for measuring their relative efficacies. However, this study has demonstrated that cross-validation and regression analysis can be quite useful in demonstrating relative predictive validities of various sets of attributes which alternative methods identify as determinants of buyer preferences. All one needs do is estimate regression models' optimum parameters for each method's chosen attributes and cross-validate the models against a held-out sample of attribute ratings. One may then determine the relationships between predicted values of overall preference and actual values in the second set of data, as well as the interrelationships among predicted values estimated by each model. Comparing obtained measures of predictive ability shows which identification methods are most effective.

Table 5
SUMMARY DATA FOR COMPARISONS BETWEEN MODELS

Comparison[a]	T_{data}	*Significance level*
Model 4 vs. Model 6	−4.068	.0001
Model 2 vs. Model 4	3.217	.001
Model 1 vs. Model 6	−2.724	.007
Model 1 vs. Model 4	2.577	.01
Model 4 vs. Model 7	−2.184	.03
Model 2 vs. Model 8	2.182	.03
Model 6 vs. Model 8	2.005	.048
Model 7 vs. Model 8	1.981	.051
Model 4 vs. Model 5	−1.945	.06
Model 2 vs. Model 3	1.907	.06
Model 1 vs. Model 2	−1.746	.09
Model 3 vs. Model 4	1.666	.10
Model 3 vs. Model 7	−1.642	.11
Model 3 vs. Model 6	−1.584	.12
Model 2 vs. Model 5	1.581	.12
Model 5 vs. Model 6	−1.460	.15
Model 4 vs. Model 8	−1.243	.22
Model 2 vs. Model 7	1.229	.23
Model 3 vs. Model 8	1.174	.25
Model 6 vs. Model 7	.935	.36
Model 5 vs. Model 8	.858	.40
Model 1 vs. Model 7	−.636	.53
Model 5 vs. Model 7	−.597	.55
Model 1 vs. Model 8	.515	.62
Model 3 vs. Model 5	−.277	.78
Model 1 vs. Model 5	−.255	.82
Model 2 vs. Model 6	−.061	.95
Model 1 vs. Model 3	0.000	1.00

[a] These tests are not independent of each other because different models may contain some of the same predictor variables.

Table 6

RELATIVE VALUE OF SIMPLE RAW CORRELATION COEFFICIENTS: ALL ATTRIBUTES

Variable number	*Attribute*	*Simple r*
3	Smoothness while writing	.668
8	Quality of writing appearance	.642
6	Attractiveness of pen	.570
2	Comfortable to hold	.566
11	Durability	.536
7	Convenience in refilling	.519
29	Athlete	.516
38	College student	.506
22	Writes a lot—writes very little	−.502
16	Would not give as gift—would give as gift	.501
10	Freedom from smudging	.491
4	Writing lifespan	.490
12	Old fashioned—modern	.472
18	Small seller—large seller	.468
30	Accountant	.462
25	Writes signature often—seldom writes signature	−.460
39	Prior experience with brand	.444
34	Physician	.441
55	Freedom from skipping	.416
32	Top executive	.416
35	Sales clerk	.394
27	Banker	.353
14	Nonprestigious—prestigious	.353
28	Young socialite	.340
31	Taxi driver	.311
36	Housewife	.311
33	Factory worker	.284
19	Careless—perfectionist	.210
37	Retired person	.208
21	High social status—low social status	−.203
26	Creative—noncreative	−.163
15	Formal—informal	−.151
13	Masculine—feminine	−.123
9	Economy of refills	.120
24	Liberal—conservative	−.093[a]
17	Light—heavy	−.042[a]
23	Tense—relaxed	−.035[a]
20	Sensitive—thick-skinned	.001[a]

[a] Not significantly different from zero at the .05 level. All variables above these are significantly correlated with overall preference.

In this study direct questioning techniques generally identified determinant attributes more efficiently than indirect methods, with the exception of the regression coefficients determinance technique. However, direct dual questioning may be frequently preferred for straightforward products such as ball-point pens because considerable time and expense may be saved by eliminating the attribute rating. In direct dual questioning subjects need never examine or rate individual brands in terms of specific attributes. In addition, dual questioning appears to offer an advantage over simple questioning methods, although the findings are merely suggestive.

Several important limitations inhibit generalizing from the results reported here. Obviously the sample was limited and homogeneous. Further, for products such as one-dollar pens, direct questioning methods may be better than the indirect ones tested here, but for other products involving more subjective buying motives, indirect approaches may be more effective. Other indirect questioning methods might outperform the simple third-person approaches tested here. Probably the regression coefficients method has the best potential to identify subjective *and* objective attributes.

Conclusions must therefore be guarded concerning other products and consumer groups. However, the methodology for *comparing* possible methods for identifying determinant attributes is clearly one which can be used in other cases.

Approaches not compared in this study might eventually prove more valuable for identifying determinant attributes. Multidimensional scaling allows utilization of paired comparisons of products along several attributes, working backwards to those attributes which provide the best explanation of observed comparisons. One might develop a model [10] of selected attributes for a given product and compare its variables with those chosen by alternative methods. Multidimensional scaling's flexibility for nonmetric scaling and the fact that it does not rely on direct questioning may well prove it superior to more traditional approaches.

REFERENCES

1. Alpert, Mark I. "Identification of Determinant Attributes: A Comparison of Methods," unpublished doctoral dissertation, University of Southern California, 1968.
2. Banks, Seymour. "The Relationship Between Preference and Purchase of Brands," *Journal of Marketing,* 15 (October 1950), 145–57.
3. ———. "Some Correlates of Coffee and Cleanser Brand Shares," *Journal of Advertising Research,* 1 (June 1961), 22–8.
4. Bass, Frank M. and W. Wayne Talarzyk. "A Study of Attitude Theory and Brand Preference," *Proceedings.* Fall Conference, American Marketing Association, 1969, 272–9.
5. Bolger, John F., Jr. "How to Evaluate Your Company Image," *Journal of Marketing,* 24 (October 1959), 7–10.
6. Dichter, Ernest. *The Strategy of Desire.* Garden City: Doubleday, 1960.
7. Evans, Franklin B. "Motivation Research and Advertising Readership," *Journal of Business,* 30 (April 1957), 141–6.
8. ———. "Psychological and Objective Factors in the Prediction of Brand Choice: Ford vs. Chevrolet," *Journal of Business,* 32 (October 1959), 340–69.
9. Fishbein, Martin. "A Behavior Theory Approach to the Relations between Beliefs about an Object and the Attitude Toward the Object," and "Attitude and the Prediction of Behavior," in Martin Fishbein, ed., *Readings in Attitude Theory and Measurement.* New York: John Wiley & Sons, 1967, 389–99, 477–92.
10. Green, Paul E., Frank J. Carmone, and Patrick J. Robinson. *Analysis of Marketing Behavior, Using Nonmetric Scaling and Related Techniques,* Technical Monograph. Marketing Science Institute, 1968.
11. Haire, Mason. "Projective Techniques in Marketing Research," *Journal of Marketing,* 14 (April 1950), 649–52.

12. Hansen, Flemming. "Consumer Choice Behavior: An Experimental Approach," *Journal of Marketing Research*, 6 (November 1969), 436–43.
13. Horst, Paul. "An Overview of the Essentials of Multivariate Analysis Methods," in Raymond B. Cattell, ed., *Handbook of Multivariate Experimental Psychology*. Chicago: Rand McNally, 1966, 129–52.
14. Howard, John A. and Jagdish N. Sheth. *The Theory of Buyer Behavior*. New York: John Wiley & Sons, 1969, 191–228.
15. Johnson, Palmer O. *Statistical Methods in Research*. New York: Prentice-Hall, 1949.
16. Klaus, Bertrand. "Understanding Why They Buy," in Martin M. Grossack, ed., *Understanding Consumer Behavior*. Boston: Christopher, 1964, 71–2.
17. Martineau, Pierre. *Motivation in Advertising*. New York: McGraw-Hill, 1957.
18. Mindak, William A. "Fitting the Semantic Differential to the Marketing Problem," *Journal of Marketing*, 25 (April 1961), 28–33.
19. McNemar, Quinn. *Psychological Statistics*. New York: John Wiley & Sons, 1955.
20. Myers, James H. and Mark I. Alpert. "Determinant Buying Attitudes: Meaning and Measurement," *Journal of Marketing*, 32 (October 1968), 13–20.
21. Myers, James H. and William H. Reynolds. *Consumer Behavior and Marketing Management*. Boston: Houghton-Mifflin, 1967.
22. Myers, James H. and W. Gregory Warner. "Semantic Properties of Selected Evaluation Adjectives," *Journal of Marketing Research*, 5 (November 1968), 409–12.
23. Osgood, Charles E., George J. Suci, and Percy H. Tannenbaum. *The Measurement of Meaning*. Urbana: University of Illinois Press, 1957.
24. Perry, Michael. "Discriminant Analysis of Relations Between Consumers' Attitudes, Behavior, and Intentions," *Journal of Advertising Research*, 9 (June 1969), 34–40.
25. Riter, Charles B. "What Influences Purchases of Color Television?" *Journal of Retailing*, 42 (Winter 1966–67), 25–31, 63–64.
26. Rosenberg, Milton J. "Cognitive Structure and Attitudinal Affect," *Journal of Abnormal Psychology*, 53 (November 1956), 367–72.
27. Smith, Gail. "How GM Measures Ad Effectiveness," *Printer's Ink*, 290 (May 14, 1965), 19–29.
28. Twedt, Dik Warren. "How to Plan New Products, Improve Old Ones, and Create Better Advertising," *Journal of Marketing*, 33 (January 1969), 53–7.
29. Weaver, Herbert B. "Evaluating Tourists' Reactions to Hawaii—A Study of Techniques," in Martin M. Grossack, ed., *Understanding Human Behavior*. Boston: Christopher, 1964, 193–220.
30. Westfall, Ralph L., Harper W. Boyd, Jr., and Donald T. Campbell. "The Use of Structural Techniques in Motivation Research," *Journal of Business*, 32 (October 1959), 134–9.