THE CONVERGENT VALIDITY OF SELECTED METHODS OF DETERMINANT ATTRIBUTE IDENTIFICATION: SOME PRELIMINARY FINDINGS

John H. Lindgren, Jr.*, University of Virginia

Abstract

Researchers have been questioning the methodology of determinant attribute identification for the past few years. The objective of this research project is to test the convergent validity of four different methods of determinant attribute identification. Results of the project suggest that the four methods produce varying results.

Research Problem

The purpose of the determinant model is to identify those attributes of a product that are most closely associated to actual behavior or purchase. The most significant feature of the concept of determinant attributes is that an important or salient attribute is not necessarily determinant. Automobile safety has been used to demonstrate this point (Myers and Alpert, 1968). Many consumers regard safety as an important product attribute, yet they fail to perceive major differences in the safety afforded by alternative automobile models; consequently, safety is important to these consumers, but it does not determine brand preference or brand choice.

Although researchers recognize the value of identifying determinant attributes, only the above article has been published concerning a test of the convergent validity of the model. Thus, there is an interesting situation of researchers using varying methods to identify determinant attributes but no recent study showing whether these differing methods yield the same or different determinant attributes.

Background

Approaches to Determinant Attribute Identification

There have been two major approaches used in the identification of determinant attributes. One approach involves some type of statistical analysis where the researcher correlates attribute ratings with behavior to identify those attribute ratings that are most closely associated with behavior. Regression and/or discriminant analysis has generally been used in this first approach.

The other approach can be classified as a heuristic technique since it identifies determinant attributes through attribute ratings. In this approach, the researcher does not use behavioral data but attempts to identify determinant attributes through the use of attribute ratings only. There are three heuristic techniques that have been used. These include the Myers/Alpert technique (Myers and Alpert, 1968), the Hansen technique (Hansen, 1977), and the direct questioning technique (Alpert 1971). These three techniques are briefly defined below.

Myers/Alpert technique. Since the publication of the article by Myers and Alpert in 1968 most researchers have used the Myers/Alpert dual questioning method when attempting to identify determinant attributes. The method consists of calculating the following two measures:

(1) A rating of the importance of various product attributes (flavor, color, etc.) for a chosen product category,

(2) A rating of the degree of similarity/dissimilarity of each attribute for a set of brands in the product category (Aim vs. Crest on flavor, for example).

Both of these ratings are measured on a Likert-type scale, and the scores combined in some manner to yield the determinant attributes. The technique of combining the scores is what differentiates the Myers/Alpert technique from the Hansen technique.

The Myers/Alpert technique combines the two above measures by first multiplying the importance rating times the similarity/dissimilarity rating for each attribute and then averaging these scores. The determinant attributes are those with the highest or lowest average DAS score across the entire sample depending on the scaling technique.

Hansen's Cross Classification Technique. In this working paper, Hansen suggests a cross classification technique of identifying determinant attributes. Respondents are asked to rate importance and similarity/dissimilarity of all attributes just as in the Myers/Alpert technique, but the individual responses are then cross classified so that each attribute has a cross classification table. The concept of determinance, as presented by Myers and Alpert, indicates that those attributes that have high importance and high variation among alternatives are the determinant attributes. Hansen argues that the multiplication procedure might mask certain potential determinant attributes. Hansen's suggestion is to compare only the cell of high importance and high variation across all attribute tables. The attribute with the highest proportion of respondents in this cell is the most determinant.

Direct Questioning Technique. The direct questioning technique is the most straight forward of the heuristic techniques. The researcher asks consumers what factors (attributes) they consider important in a purchasing decision or why they purchased one brand rather than another. The identification of determinant attributes is simply a tabulation of the number of times each attribute is mentioned. The attributes most often mentioned are then the determinant attributes.

Objective of Proposed Research

Although each of the above approaches to determinant attribute identification has been used by researchers, there is no recent study showing whether these techniques yield similar or dissimilar results. The objective of this research project is to test the convergent validity of the various approaches described above.

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Data Collection Considerations

A consumer panel was utilized in the present study to measure actual behavior of panel members through time. In this longitudinal study students at Kent State University were the panel's members. Three separate questionnaires were administered during the seven week period. The first questionnaire was used to measure respondents' past behavior at fast-food chains in Kent, Ohio. The second questionnaire was a repeated (for seven weeks) behavior measure which was completed each Friday of the study period. This questionnaire has two sections--first, respondents indicated which fast-food chains in Kent they had patronized during the week, and secondly, respondents were asked where they intended to eat during the next week. The third questionnaire was administered the last week of the study period, to determine the students' attitudes toward the fast-food chains in Kent.

Subjects

Students in three sections of Principles of Marketing classes at Kent State University served as subjects in the present research project. The three sections of classes contained 15, 96, and 158 students, respectively. This produced a total possible sample of 269 students. Of these 269 students, 237 or 88 percent of the sample completed all the forms over the seven week period. Thirty-two respondents were eliminated because of missing data or because they chose not to participate in all phases of the study.

Product Category

The product category of fast-food chains was chosen because of student familiarity with them and because of the high usage patterns by students in Kent, Ohio. In addition to the above reasons of familiarity with fast-food chains and their usage by students, the product category of fast-food chains is compatible determinant attribute analysis. Table 1 shows the percentage of total purchase at each of these fast-food chains during the study period of seven weeks.

TABLE 1
PATRONAGE OVER THE SEVEN WEEK STUDY PERIOD

Fast-Food Chain	Number of Purchases	Percentage of Total Purchases
Red Barn	76	06%
Arby's	185	14%
McDonald's	470	36%
Burger King	156	12%
Burger Chef	202	15%
Arthur Treacher's	222	17%
TOTAL	1,311	100%

Attributes

In a pilot study, students were asked: "What features of fast-food chains are important to you when deciding where to eat?" Based on the replies of 260 respondents, the most frequently mentioned attributes which emerged are listed Table 2.

Analysis And Interpretation Of Data

The Importance Measure

The importance measure is designed to allow respondents to indicate the degree of importance they place on each of the attributes when choosing a fast-food establishment. Table 2 shows the average importance scores for each of the attributes and the rank order of these scores.

TABLE 2
IMPORTANCE OF ATTRIBUTES WHEN CHOOSING A FAST-FOOD CHAIN*

Attribute	Mean	Rank
Fast Service	4.937	3
Pleasant atmosphere	4.785	4
Low regular prices	4.464	7
Low special prices (coupons, discounts)	3.283	9
Clean facilities/personnel	5.350	2
Convenient location	4.599	5
Friendly employees	4.519	6
Good quality food	5.629	1[a]
Variety of menu items	4.198	8

*n = 237

[a]Highest importance

The Similarity/Dissimilarity Measure

To determine similarity/dissimilarity, respondents indicated how similar or different the fast food chains were on each of the nine attributes (see Table 3). This measure was scaled on a one to six Likert-type scale with one labeled "very similar" and six labeled "very different." This scale yielded higher averages for the attributes that had high variation across the six fast-food chains and lower averages for similar attributes. Those attributes perceived as both important and dissimilar are identified as the possible determinant attributes.

TABLE 3
DISSIMILARITY OF ATTRIBUTES ACROSS FAST-FOOD CHAINS*

Attribute	Mean	Rank
Fast service	1.962	9
Pleasant atmosphere	2.409	7
Low regular prices	2.392	8
Low special prices (coupons, discounts)	3.038	1[a]
Clean facilities/personnel	2.451	6
Convenient location	2.966	3
Friendly employees	2.498	5
Good quality food	3.021	2
Variety of menu items	2.709	4

*n = 237

[a]Greatest dissimilarity.

The Patronage (Purchase) Behavior Measure

The patronage behavior measure is calculated as the proportion of times a particular chain was frequented out of the total number of times an individual purchased from all fast-food chains over the seven week study period. Table 4 shows the mean patronage behavior measure for each fast-food chain as well as the ranking for the fast-food chains. McDonald's has the highest patronage behavior with an average of 1.983 purchases per week while Arthur Treacher's ranks second and Burger Chef ranks third.

Comparison Of Techniques

The objective of this paper is to compare the four methods of determinant attribute identification: Myers/Alpert technique; Hansen technique; discriminant analysis technique; and the direct questioning technique.

TABLE 4
DEPENDENT MEASURE: PATRONAGE BEHAVIOR

Restaurant	Patronage Behavior Mean	Rank
Red Barn	.321	6
Arby's	.781	4
McDonald's	1.983	1
Burger King	.658	5
Burger Chef	.852	3
Arthur Treacher's	.937	2

*n = 237

Determinant Attributes-Discriminant Technique

The Myers and Alpert definition of determinant attributes adopted in this study defines them as those attributes or features which are most closely related to actual purchase decisions. To identify those attributes, the present researcher has divided the sample into two groups, users and nonusers of the fast-food chains. Discriminant analysis is then employed to derive the linear combination of predictor variables and their F-values so those that account for the greatest differences between the group of users and nonusers of fast-food chains may be identified. The predictor variables used in the discriminant analysis were calculated using the Myers and Alpert multiplication technique:

$$DAS_{ji} = I_{ji} * SD_{ji} \quad (1)$$

It should be noted that the Myers Alpert technique of determinant attribute identification averages the DAS_{ji} scores while the discriminant technique uses the raw unaveraged DAS_{ji} scores.

Thirty-one of the 237 respondents who did not eat at fast-food chains during the seven week study period are the nonusers group. A total of 206 respondents are in the users groups. Using the SPSS program, the following linear combination of predictor variables resulted:

$$D = .81309x_3 - .78863x_4 - .58603x_6 \quad (2)$$

where:

x_3 = low regular prices,

x_4 = low special prices (coupons, discounts),

x_6 = convenient location.

The equation is significant at $p < .05$.

The F-value associated with each of the above predictor variables indicate that low special prices is the only determinant attribute at a significance level of .05. Relaxing the significance level to .10, convenient location becomes the second most determinant attribute in identifying users from nonusers.

While the above discriminant function was significant at $p < .05$, the results must be interpreted with caution for two reasons. First, the researcher did not control for sample sizes in the groups of patrons and non-patrons. The result of this was that the patron group contained 206 individuals and the non-patron group contained only 31 individuals. Because of this small group of non-patrons, the researcher conducted further analysis by redefining the respondents as casual users versus regular users. The casual user category contained 54 individuals who made one or less purchase during the seven week study period. The regular user category contained 183 individuals who purchased two or more times. When the discriminant analysis was rerun for casual versus regular users, four variables were significant at the $p < .10$ level. Once again, the four variables were low special and convenient location, plus fast service and low regular prices. While the results included two additional variables, low special prices and convenient location appeared again as discriminators in this second analysis.

The second reason the results must be interpreted with caution is that discriminant analysis assumes equality of covariance matrices within the groups. Nie, et al. state the following regarding this assumption (Nie, et al., 1975):

> The statistical theory of discriminant analysis assumes that the discriminating variables have a multivariate normal distribution and that they have equal variance-covariance matrices within each group. In practice, the technique is very robust and these assumptions need not be strongly adhered to.

While they suggest that the technique is very robust, the present researcher checked for the equality assumption in both the above analyses and found that neither the users versus nonusers nor the casual users versus regular users had equality of covariance matrices.

Determinant Attributes-Myers/Alpert Technique

Table 5 contains the average DAS scores in the present study using the Myers/Alpert technique. The most determinant attribute is good quality food, the second convenient location. Ranked third and fourth were clean facilities/employees and pleasant atmosphere, respectively. Myers and Alpert did not suggest any objective criteria for selection of the number of attributes which are determinant; therefore this researcher has used, for comparison with the discriminant technique, the two highest mean DAS scores. Inspection of Table 5 shows good quality food and convenient location are the determinant attributes using the Myers/Alpert technique.

TABLE 5
DETERMINANT ATTRIBUTES-MYERS/ALPERT TECHNIQUE*

Attribute	Mean DAS Score	Rank
Fast service	9.6371	9
Pleasant atmosphere	11.4051	4
Low regular prices	10.7637	7
Low special prices (coupons, discounts)	10.2194	8
Clean facilities/personnel	12.9620	3
Convenient location	13.6793	2
Friendly employees	11.0717	6
Good quality food	17.0169	1
Variety of menu items	11.1814	5

*n = 237

Determinant Attributes-Hansen Technique

Table 6 presents the percentage of respondents indicating high importance and variation for the nine attributes using the Hansen technique. Inspection of this table identifies good quality food as the most determinant attribute while convenient location is the second most determinant attribute.

TABLE 6
DETERMINANT ATTRIBUTES-HANSEN TECHNIQUE*

Attribute	Proportion of Respondents in Cell Nine	Rank
Fast service	2.1%	9
Pleasant atmosphere	2.5%	8
Low regular prices	3.4%	6
Low special prices (coupons, discounts)	3.8%	4.5
Clean facilities/personnel	4.6%	3
Convenient location	7.6%	2
Friendly employees	3.8%	4.5
Good quality food	13.9%	1
Variety of menu items	3.0%	7

*n = 237

Determinant Attributes-Direct Questioning

The direct questioning technique requires the researcher to ask customers why they choose one brand rather than another. This open ended question was coded using three categories of responses: attribute reasons; social reasons; and miscellaneous reasons.

Table 7 indicates the percentage of each of the reasons given by respondents for their purchases during the seven weeks. The most determinant attribute based upon the greatest number of mentions is convenient location, the second is variety of menu items.

TABLE 7
DETERMINANT ATTRIBUTES-DIRECT QUESTIONING*

	Number	Percent
Attribute Reasons		
Good quality food	76	11
Quantity of food	3	0
Variety of menu items/type of food	133	20
Convenient location	217	32
Fast service	119	18
Low regular prices/inexpensive	59	9
Low special prices (coupons, discounts)	68	10
	675	100%
Social Reasons		
Decision made by another	27	40
Joint decision	41	60
	68	100%
Miscellaneous Reasons		
Novelty (change of pace)	32	24
Past behavior extension	12	9
Desire for privacy	6	5
Global evaluation	19	14
Unspecified reasons	63	48
	132	100%

*436 of the 1,311 purchases did not have reasons given.

Determinant Attributes-All Techniques

The two shortcut methods by Myers/Alpert and Hansen produced the same determinant attributes. This researcher is presently conducting another study which also produced the same results between these two shortcut techniques.

The discriminant analysis identifies low special price as the most determinant with the second most determinant attribute as convenient location. The direct question technique identifies convenient location as the most determinant and the second most determinant as variety of menu items. The results indicate that convenient location was identified as determinant using any of the techniques while that consistency does exist between the techniques, the other determinant attribute varies for each technique.

Implications

The methodology and findings from the present research project have implications and significance to both marketing researchers and managers. While all four techniques purport to accomplish the same results, it appears that the convergent validity of determinant attribute analysis can be questioned.

Determinant attribute analysis is a potentially powerful for marketing managers in the process of both constructing and evaluating their marketing strategies. Use of determinant attribute analysis by marketing managers will enable them to identify the attributes that are more significant to consumers when choosing one brand over another. With this information, marketing managers can reposition their products/services either by changing their offering to include this attribute and/or by stressing this attribute in their promotion mix if they are not doing so.

The findings of this study have important implications and significance to marketing researchers, that is, those engaged in scholarly research in marketing. Even though a number of articles have been published which question the Myers/Alpert procedure, this study represent the first test of the Myers/Alpert determinant attribute identification technique since the concept was introduced in 1968. The lack of convergent validity found in the present study for the four techniques of determinant attribute identification should stimulate other researchers to investigate this issue.

Suggestions for Subsequent Research

The present study suggests a number of subsequent research projects that should be performed. First, the study should be replicated using other product categories and samples. This could provide a framework for stronger and more externally valid conclusions. Specifically, a panel study using a population other than students and a durable goods product category, if tested, would provide the ability to compare and integrate the findings of that study and the present one.

Further research on the convergent validity of the determinant attribute techniques is also suggested by this study. Subsequent studies should be undertaken to identify determinant attributes using an experimental design where the researcher could control for the number of users and nonusers of the product. If this study were undertaken, the discriminant analysis method of determinant attribute identification might provide stronger conclusions.

References

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