MARKET SEGMENTATION ANALYSIS:
EXAMINING SHOPPING AND BUYING DECISIONS

Working Paper No. 70

by

Claude R. Martin, Jr.
Assistant Professor of Marketing
University of Michigan

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BACKGROUND

This paper is based on research sponsored by Research Group B of the Division of Research, Graduate School of Business Administration, University of Michigan.

A group of department stores from seven midwestern states provided the financial and logistical support for a series of studies into consumer behavior. This paper is one in a series of reports on this behavioral research.

ABSTRACT

This paper examines the factors considered by women consumers in the purchase of personal wearing apparel. Seventy-five in-depth interviews with consumers at the point of purchase were followed by 356 mail survey interviews that asked women to retrace a most recent purchase of an item of clothing they had purchased for themselves. The women were interrogated concerning the behavior, predispositions, information and product cues, demographics, and buyer goals associated with that purchase. The data were then subjected to the MCA computer analysis to determine those variables that had the greatest impact on choice of store type for both shopping and buying. These variables were then processed through the AID analysis to formulate tree diagrams that graphically depict both the shoppers and buyers for each particular type of store. Both analyses show a greater predictive power for predispositional and behavioral characteristics in market segmentation and a relative nonimportance of standard demographic characteristics.
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Introduction

Several recent studies have shown that two methodological techniques--AID (Automatic Interaction Detector) and MCA (Multiple Classification Analysis)--can be powerful tools for examining consumer behavior and for market segmentation.¹ This paper demonstrates the use of these two computer tools with a well-connected hypothetical construct of buyer behavior in an attempt to identify those dimensions that are the best predictors of women's fashion-buying behavior.

Research Design

The first step was to conduct 75 in-depth interviews with women consumers in three southwestern Missouri stores. The women were approached as they completed an apparel purchase and were interviewed concerning that purchase decision. This interview provided the basis for the design of a mail questionnaire which examined specific variables that emulated the behavioral modeling work of Howard² and Howard and Sheth.³ The variables


were categorized as: behavior, predispositions, information and product cues, demographics, and buyer goals. Each woman was asked to retrace her most recent purchase of an item of apparel for herself. Then she was questioned about the variables shown in Figure 1 as they related to that purchase (p. 4).

Two retail trade areas in Missouri--Joplin and Springfield--were chosen for this study. The main reason for this selection was merchant cooperation, but another reason was that the two areas showed differences in socioeconomic status and growth. Additionally, the two areas are geographically close, thereby controlling for regional differences. The major factors differentiating the two markets are population growth, educational levels attained, median and mean income levels, and median value of housing (Table 1, p. 5).

The mail survey obtained 356 usable responses. The distribution of the respondents was compared to the age, marital status and employment distributions of the 1970 census to check for nonrepresentative samples, and it was found that the distribution of the respondents was similar in configuration to that of the general population.

The original in-depth interviews led to the conclusion that there are differences in consumer behavior associated with different types of retail stores. The respondents were asked to identify, by name, the stores in which they had shopped and the store in which the purchase of a particular item of apparel had been made. With the assistance of a five-member retailer panel in both cities, the 96 stores mentioned were classified into general categories. Among these categories were three distinctive types, which were studied further:

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High-fashion women's specialty stores  -- Principally selling apparel for women in the middle and upper price ranges

Mass merchandiser stores  -- Restricted to Sears, Penney's, and Montgomery-Ward only

Independent department stores  -- Full-line department stores other than those cited in the mass merchandiser category

First-Level Analysis

The objective of the first level of analysis was to determine whether the variables shown in Figure 1 contribute to understanding where women shop and buy clothes for themselves. The MCA program was used to test six dependent variables:

- Department store buyers
- Department store shoppers
- Buyers in high-fashion women's specialty store
- Shoppers in high-fashion women's specialty store
- Buyers in mass merchandiser store
- Shoppers in mass merchandiser store

There were 33 explanatory variables used in this analysis (Figure 2). When the model for all variables was used, significantly high correlation coefficients were obtained for each dependent variable (Table 2), which led to the conclusion that many of the predictors of women's fashion-buying behavior had been measured in the study. (See pp. 6 and 7.)

Second-Level Analysis

Design

Bass, Tigert, and Lonsdale recognized the need for a multivariate analysis to examine the variations in such grouped data. Certainly the


Demographics:

Marital status
Age
Employment status of respondent
Employment status of husband of respondent, if married
Number and ages of children
City of residence

Predispositions:

Negative colors--garment colors respondent would not buy
Negative fabric characteristics--fabrics respondent would not buy
Garment care characteristics wanted
Wardrobe accessory matching
Upper and lower price limits to purchase
Had charge account where shopping and buying reported
Previously bought apparel in store of purchase
Prepurchase planning:
  General
  Specific--positive color wanted
     positive fabric wanted

Product and Information Cues:

Comparison shopping at alternate stores
Utilization of price limitations
Method of payment
Sought out particular sales clerk
Use of "shopping pals"
Used sales clerk evaluations of style and fit of garment
Evaluation of mass media helpfulness in purchase decision

Buyer's Goals:

Self-evaluation of fashion awareness
Factors used in developing level of fashion awareness
Shopping enjoyment in buying clothes for self

Behavior:

Coordinating items purchased
Type of garment purchased
Number of stores shopped
Number of stores shopped on day of purchase
Color of garment purchased
Fabric of garment purchased
Garment care requirement for item purchased

Fig. 1. Buyer construct.
<table>
<thead>
<tr>
<th>Census Characteristic</th>
<th>Springfield Standard Metropolitan Statistical Area (SMSA)</th>
<th>Joplin Retail Trade Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Population growth (in percentage)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.5</td>
<td>6.9</td>
</tr>
<tr>
<td></td>
<td>Median years of education for males</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12.3 years</td>
<td>11.8 years</td>
</tr>
<tr>
<td></td>
<td>Percentage of population having completed high school</td>
<td></td>
</tr>
<tr>
<td></td>
<td>58.9</td>
<td>48.7</td>
</tr>
<tr>
<td></td>
<td>Median income</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$8,215</td>
<td>$7,312</td>
</tr>
<tr>
<td></td>
<td>Mean income</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$9,310</td>
<td>$8,410</td>
</tr>
<tr>
<td></td>
<td>Owner-occupied household's median value</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$13,900</td>
<td>$9,000</td>
</tr>
<tr>
<td></td>
<td>Renter-occupied household's median rent</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$73</td>
<td>$55</td>
</tr>
</tbody>
</table>

City of residence of respondent
Life cycle--combination of marital status and age variables
Employment status of respondent
Employment status of respondent's husband
Number of children

Item purchased
Number of total stores shopped
Number of stores shopped on day of purchase
Prepurchase planning
Positive color preference
Positive fabric preference
Lower and upper price limitations
Method of payment
Charge account in store of purchase and/or shopping
Previous purchase of personal apparel in store

Evaluation of sales clerk assistance with style and/or fit
Predisposition to use a male sales clerk
Self-evaluation of fashion consciousness or awareness
Amount of shopping enjoyment in buying for self
Frequency with which respondent uses newspaper advertising
in fashion purchasing and evaluation of helpfulness of such ads
Method most helpful to respondent in developing her fashion awareness
Prepurchase discussion of buying decision with others
Frequency of shopping with other persons
Tendency of respondent to shop alone
Type of store shopped
Type of store where purchase was made

Fig. 2. Explanatory variables--first MCA run.
<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shopper in high-fashion women's specialty store</td>
<td>.50635</td>
</tr>
<tr>
<td>Department store shopper</td>
<td>.38177</td>
</tr>
<tr>
<td>Shopper in mass merchandiser store</td>
<td>.41322</td>
</tr>
<tr>
<td>Buyer in high-fashion women's specialty store</td>
<td>.50264</td>
</tr>
<tr>
<td>Department store buyer</td>
<td>.48303</td>
</tr>
<tr>
<td>Buyer in mass merchandiser store</td>
<td>.40457</td>
</tr>
</tbody>
</table>
limits imposed by 356 respondents and 33 predictive variables argue against
the more simplistic multiple cross-classification suggested by those authors.

**Limitations of AID.** Assael has demonstrated the effective use of the
AID algorithm in market segmentation.\(^7\) There are, however, several sub-
stantive limitations to such use. AID computes the ratio of the between
sum of squares for each variable by the total sum of squares for the group
to be split. It then selects the highest ratio for the binary split of the
respondents. All of the subsequent splits are contingent on the subgroups
formed by the first split; yet it is possible that there is a small difference
in discrimination between the variable split and the second variable. The
resultant tree diagram produced by a split on the second variable could be
quite different. Assael\(^8\) and Newman and Staelin\(^9\) have suggested that a
sensitivity analysis consisting of subsequent AID runs be used. Under this
technique the analyst eliminates the first split, reruns the analysis with-
out the initial variable, and compares the structures produced. The major
drawbacks to this technique are the expense of programming and computer time
charges and the arbitrary judgments used in comparing the different tree
diagrams.

Another limitation to the use of AID is that the independent variables
may be closely interdependent and there may be high intercorrelation among
the predictors.

Finally, there is the problem of judging where to terminate the AID
tree, i.e., what criteria are to be used for aborting the iterative process?


\(^8\)Ibid., pp. 155-56.

Overcoming the limitations. It is suggested that the MCA program be used to partially overcome these limitations. In its elementary form the MCA program produces measures of simple associations--pairwise correlations--between the dependent variables and the independent variable. This is reflected in the $\eta^2$ score output of the program. $\eta^2$ indicates the "ability of the predictor, given the categories given, to explain the variation in the dependent variable." 10/ The scores provide a foundation for the need to undertake the type of sensitivity analysis that has been suggested and the content of such analysis. Certainly they form the basis for halting the tree diagram construction to some defined limit, e.g., in this study only those variables with an $\eta^2$ score of beyond .02 were used. Finally, MCA can aid in indicating the presence of possible high inter-correlations among predictors. The MCA iteration process fails to converge or converges very slowly with oscillations when such a possibility exists. The analyst would then stop the process and examine the variables for interdependence rather than proceed with the costly, subsequent AID analysis.

Results

MCA analysis. When the MCA analysis was used with each of the six dependent variables and the limitation of an $\eta^2 > .02$ was imposed, the result was the identification of the applicable independent variables (Table 3). These then formed the basis for the subsequent AID analysis.

AID analysis. The results from the use of the AID algorithm are shown in the tree diagrams in Figures 3-8. The numerical figure is the percentage of that type buyer or shopper occupying that particular branch

10/ Andrews, Morgan, and Sonquist, Multiple Classification Analysis, p. 22.

11/ Ibid., p. 32.
## Table 3
Independent Variables with $\eta^2$ Greater Than .02

<table>
<thead>
<tr>
<th>Shopper in High-Fashion Women's Specialty Store</th>
<th>Department Store Shopper</th>
<th>Shopper in Mass Merchandiser Store</th>
<th>Buyer in High-Fashion Women's Specialty Store</th>
<th>Department Store Buyer</th>
<th>Buyer in Mass Merchandiser Store</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: Joplin or Springfield</td>
<td>Age of buyer</td>
<td>Women's employment status</td>
<td>Location: Joplin or Springfield</td>
<td>Age of buyer</td>
<td>Women's employment status</td>
</tr>
<tr>
<td>Husband's employment status</td>
<td>Husband's employment status</td>
<td></td>
<td>Husband's employment status</td>
<td>Husband's employment status</td>
<td></td>
</tr>
<tr>
<td>Number of stores</td>
<td>Number of children</td>
<td></td>
<td>Number of stores</td>
<td>Number of children</td>
<td></td>
</tr>
<tr>
<td>Number of stores</td>
<td></td>
<td></td>
<td>Number of children</td>
<td>Number of stores</td>
<td></td>
</tr>
<tr>
<td>Number of stores</td>
<td></td>
<td></td>
<td>Number of stores</td>
<td>Number of children</td>
<td></td>
</tr>
<tr>
<td>Prepurchase planning</td>
<td>Prepurchase positive color preference</td>
<td>Price limit</td>
<td>Prepurchase positive color preference</td>
<td>Price limit</td>
<td>Prepurchase positive color preference</td>
</tr>
<tr>
<td>Method of payment</td>
<td>Method of payment</td>
<td>Store charge account</td>
<td>Previously purchased in store</td>
<td>Prepurchase positive color preference</td>
<td>Prepurchase positive color preference</td>
</tr>
<tr>
<td>Previously purchased in store</td>
<td></td>
<td>Use of sales clerk in decision</td>
<td>Method of payment</td>
<td>Method of payment</td>
<td></td>
</tr>
<tr>
<td>Use of sales clerk in purchase decision</td>
<td></td>
<td>Enjoyment in shopping for self</td>
<td>Store charge account</td>
<td>Store charge account</td>
<td></td>
</tr>
<tr>
<td>Enjoyment in shopping for self</td>
<td></td>
<td>Helpfulness of newspaper ads</td>
<td>Predisposition to use a male sales clerk</td>
<td>Predisposition to use a male sales clerk</td>
<td></td>
</tr>
<tr>
<td>Helpfulness of newspaper ads in purchase decision</td>
<td>Fashion awareness</td>
<td></td>
<td>Enjoyment of shopping for self</td>
<td>Enjoyment of shopping for self</td>
<td></td>
</tr>
<tr>
<td>Fashion awareness</td>
<td></td>
<td>Helpfulness of newspaper ads</td>
<td>Helpfulness of newspaper ads in purchase decision</td>
<td>Helpfulness of newspaper ads in purchase decision</td>
<td></td>
</tr>
</tbody>
</table>
of the analytical tree to that point. For example, the farthest right-hand branch of the tree for department store shoppers shows that 55.9 percent of those shoppers enjoy shopping for themselves, find newspaper advertising helpful in their purchase decision for personal clothing, and shop in more than one store. In fact, when department store shoppers were examined, the maximum reduction in the unexplained sum of squares is obtained by splitting this cadre of shoppers by the number of stores in which they shopped.

The tree diagrams show graphically the characteristics of the customers, either shoppers or buyers, of particular types of retail stores.

Conclusions

The tree diagram should be useful to the retail marketing manager in identifying major market segments for women's apparel. Certainly the fact that there are differences in the tree diagrams of buyers and shoppers of similar types of stores can lead to some understanding of the differences between those who actually buy and those who are lured into, but do not buy, in a store.

Interestingly the three different types of store shoppers are all initially split on the basis of the number of stores shopped. Certainly the department store manager should find the fact that 58.4 percent of his shoppers comparison shop (two or more stores) and find newspapers helpful in making purchase decisions useful in his evaluation of the media. The additional recognition that most of those shoppers (55.9 percent) find shopping for their own clothing enjoyable should be a valuable contribution in determining the content of the advertising message. Similarly, the Sear's, Ward's, or Penney's retailer should be interested in the fact that the best predictor of his buyers is customer use of sales clerks, and that 75.9 percent of his market makes limited or
no use of the sales person in his purchase decision making. On the basis of these findings the retailer could decide to hire and train sales clerks, more for the order-taking function than for the order-getting function, and serious questions can be raised about the viability of paying commissions to sales clerks based on orders taken. Other analyses concerning sales force usage, advertising strategy, and product "extras" can be gleaned from the results of this study.

The relatively high $R^2$, when all the variables were used in the initial MCA analysis, lends support to the behavioral construct of Howard and Sheth. The greater predictive power of the predispositional and behavioral characteristics and the relative nonimportance of standard demographic characteristics is indicative of cross-classification analyses that use these demographic dimensions as the primary basis for market segmentation.
Fig. 3. Aid tree for high-fashion women's specialty store shopper.
Fig. 4. Aid tree for mass merchandise store shopper.
Fig. 5. Aid tree for department store shopper.
Fig. 6. Aid tree for high-fashion women's specialty store buyers.
Fig. 7. A tree for merchandise store buyer.
Fig. 8. A tree for department store buyers.