

Behavioral Segmentation for e-Tail Personalization

by

Douglas L. MacLachlan
Professor of Marketing
University of Washington Business School
Box 353200, Seattle, WA 98195-3200
(206) 543-4562
macl@u.washington.edu

June, 2003.

Behavioral Segmentation for e-Tail Personalization

Abstract

A multichannel retailer desires to develop a personalization strategy for customers who agree to receive e-mail communications containing imbedded Internet purchase appeals. Using customers' transactions history with the firm, four behavioral segments emerged from factor and cluster analyses. The segments were also distinguishable on the basis of attitudes toward shopping, determined from an attitude survey. A CART analysis provided an algorithm for classifying customers into the behavioral segments, based simply on their purchase history information. The segments were validated in a replication, which involved a survey with a new sample. Finally, different appeals were used in personalized messages tailored to two of the segments in an I-media experiment. The appeals resulted in higher sales response for one of the segments.

Key words: e-commerce, multichannel retailing, behavioral segmentation, personalization, relationship marketing

Although hyped as the eCommerce “Holy Grail,” true personalization at the individual customer level remains far in the future for most retailers. Certainly a degree of 1-to-1 communications between retailers and customers exists today, but customers rather than retailers typically initiate the exchange, and the actual personalization involved is fairly minimal (Peppers, Rogers, and Dorf, 1999). So-called “personalized” retailer communications are by and large reactive, rather than proactive or promotional. Reaching each customer with individualized promotional messages is largely infeasible for most retailers, despite the new information economics driven by the digital revolution (Peppard, 2000). Indeed, some have questioned whether personalization is even appropriate (Nunes and Kambil, 2001). Those customers who agree to receive persuasive communications through I-media, however, represent a potential source of new revenues for retailers having the desire and technology to address them.

What can a retailer do to achieve a degree of personalization of promotional messages, without communicating individually with all customers? The answer would seem to lie in behavioral segmentation; that is, grouping customers with similar purchase behavior into segments for the purpose of targeting them with persuasive messages that are personalized at the segment level.

Retailers potentially have in their databases vast amounts of cumulative information on the transactions of many of their customers. Not only can those databases contain transaction dates and amounts (leading to information on RFM variables, i.e., recency, frequency, and monetary value of customer transactions), but they may also record *what* was purchased on each occasion, including such data as styles, colors, and other item-specific information,

whether the item was purchased on promotion, method by which the purchase was made (credit card, check, cash), channel used (store, catalog, internet), and so forth. These are the “behaviors” on which behavioral segmentation can be based.

A major question to be answered before undertaking behavioral segmentation in this arena is whether it is possible to define behavioral segments to which targeted (i.e., personalized) persuasive appeals can be made that will actually result in increased sales. The answer involves demonstrating the validity of several linked propositions: (1) behavior-based segments, that are comprised of customers or potential customers who would respond differentially to targeted appeals, exist and can be discovered; (2) persuasive appeals can be designed that will be differentially attractive across the behavioral segments; (3) membership in a priori defined behavioral segments can be identified; and (4) personalized appeals will be successful in increasing purchase volume and/or frequency of purchase within targeted segments.

A multichannel (store, catalog, internet) retailer set about to provide a “proof of concept” of one type of behavioral segmentation in a realistic context.¹ It involved a multistage research program and a variety of multivariate statistical methods, as well as conceptual and creative input from advertising specialists. This paper describes that effort.

It must be recognized that the behavioral segmentation described in this paper only involves existing or past customers, and indeed, for purposes of developing marketing campaigns, only those existing customers who agree to be contacted by e-mail. To that extent, what is involved is a form of “permission marketing,” (see Godin (1999)). Prospective customers

¹ The company has declined to be identified by name. An original co-author of this paper was formerly Director of Customer Relationship Management for the company, but may not be identified because of company confidentiality.

will require other variables than past transactional behaviors in order to segment them; e.g., demographics, geocoded psychographics, and so forth.

1. The Company

Evolved from a single-store retailer specializing in outdoor gear, the company now has over 600 stores, selling mostly casual sportswear (although it has stores selling other items as well), a large catalog operation, and a burgeoning Internet presence. Although its stores are mostly in the US, it does an increasing amount of business outside the US through its catalogs and website. Its sales are in excess of \$2 billion, of which roughly one-fourth comes from catalog and Internet business. Thus, it has long had a multichannel business strategy and desires to capitalize on that strength by increasing synergies across its channels.

The company maintains a database of customer transactions across the three channels and has a number of customers who have agreed to be sent e-mail messages with imbedded I-media content. It is this last group of customers with whom the company would like to communicate using personalized promotional messages.

The company is prototypical of the retail organization most likely to survive and prosper in the future (Spector 2002). Rather than being a “pure-play” e-commerce company like Amazon.com, it evolved over time from a successful retail store chain and catalog retailer, into a completely integrated “bricks and clicks” firm, with significant synergies among the parts. Customers who have gotten to know and grown loyal to the company over the years, either from visiting its stores or using its catalogs, are naturally drawn to its website as they become more comfortable shopping for goods online. Most people who have purchased goods online were already aware of the physical stores and typically began their relationship

with the company by purchasing at those outlets. Many customers have developed sufficient good will and loyalty to the company to be willing to receive e-mail messages (on an acceptance basis) that are linked to its online store.

Being a physical retailer has allowed the company to help its online customers obtain rapid order fulfillment because of its existing network of warehouse and retail facilities. Returns can also be taken directly to the stores, creating a level of product assurance unmatched by pure-play e-tailers. Product assortments, while overlapping, can be different across the three channels, making it easier to satisfy the variety of needs of its many customers with greater breadth and depth of product lines.

Fundamentally, the multichannel marketing approach fosters a high level of trust among the company's loyal customers and confidence that it will deliver on its promises. The ability rapidly to obtain extensive data on purchase behavior through all channels allows the company to tailor its offerings more closely to its customers' needs, thereby creating greater customer satisfaction, loyalty, and repurchase behavior.

The data allow the company the ability to employ behavior-based customer segmentation. The idea is to personalize, at the segment level, the offerings made through e-mail and over the Internet. The general communication approach they have called "personalized content." While not strictly personalized at the individual customer or household level, personalized messages are to be directed to segments of current and potential customers deemed to have different needs based on their patterns of buying behavior. The company's Customer Relationship Management group experimented with and validated such a customer segmentation and communication approach during the spring and summer of 2000.

As an aside, other cluster-oriented empirical segmentation approaches might have been employed (Wind, 1978). For example, attitude-based segmentation schemes might appear to be an acceptable alternative to behavior-based segmentation. However, past behavior has been demonstrated often to be a better predictor of behavior than attitudes (or behavioral intentions). Furthermore, measuring attitudes requires survey research, which would be an expensive undertaking relative to the inexpensive information available on customers' prior purchases. This is especially the case if identifying segment membership required surveying the attitudes of all of a company's e-mail customers. Closely examining behavioral patterns allow inferring the benefits that customers seek from their purchases and shopping activities. So in fact, behavioral segmentation is a kind of benefit segmentation, perhaps the most intuitively desirable form of customer segmentation available to marketers (Haley, 1968).

Unlike some companies' approaches to behavioral segmentation (e.g., based on RFM or similar variables), this company decided to incorporate attitudinal information at the early stages of its investigation of this approach, to help understand behavioral patterns. Only after behavioral segments were characterized in terms of their attitudes, were pure behavioral segments selected for personalized communications. This might make the company's approach unique.

The purpose of this paper is to describe the company's approach to researching whether this type of segmentation and communication approach would be a viable means of targeting its customers. Additionally, we provide some insights into a successful multichannel retailer's marketing strategy.

2. Research Methods

The research was divided into three major phases: (1) preliminary development of behavioral segments and means of classifying customers into those segments, (2) validation of the behavioral segmentation with a new sample, and (3) testing to see whether targeted segments would respond differentially to personalized messages.

To validate the propositions mentioned above, it was first necessary to match respondents from an attitude survey with their transaction behavior data. That is, in order to target persuasive messages, it was determined necessary to describe behavioral segments on the basis of attitude variables as well. Thus the first step was to take respondents from a survey of customer attitudes toward shopping in general and add to that database those customers' shopping data from purchases made across all modes for previous years.

This combined database (of attitudinal and behavioral data) was then subjected to several analyses. First, exploratory factor analyses were used to identify underlying dimensions of behavior based on the item-specific variables obtained from purchase transaction records. Factor scores from these results were used to cluster subjects into groups. Multiple clustering routines were employed and the resulting clusters were cross validated to assure their stability. (A combination of hierarchical and nonhierarchical clustering methods was employed.) Next, the resulting clusters were described both on the basis of the behavioral dimensions and the attitude dimensions coming from factor analyses of the attitude variables. The last preliminary step before the experimental stage was developing a procedure for classifying additional customers into the behavioral segments; i.e., for identifying segment membership of any customers based on their prior purchase patterns across the channel modes. Tree-structured classification models were used for this stage.

The behavioral segmentation validation of phase 2 involved using a new sample of current customers with a similar behavior profile, to see if the attitude profiles would be replicated in the behavior segments. This new sample of customers was surveyed to ascertain their attitudes about shopping, fashion, clothing and lifestyle. The transaction behavior information available on these surveyed customers allowed their classification into the predefined segments. Attitude profiles were then developed for the segments and compared with similar profiles developed in phase 1.

The testing stage, phase 3, involved designing persuasive communications in the form of internet-embedded messages in emails that were sent to customers who agreed to be thus contacted. The persuasive communications were designed to appeal differently to the segments. Customers who were to be contacted by e-mail were classified into their respective segments and the different appeals were sent. Sales across all channel modes were monitored for all customers sent the messages and compared to customers who did not receive the personalized messages.

It was not necessary to use samples of customers in the third phase, because the experiment could involve all customers.

3. Results of Phase 1

Customers in an attitudinal sample survey done in 1998 were matched to the in-house transaction database for all transactions across all channels for the five years between 1995 and 1999. This resulted in data for 615 customers.

Transactions were transformed into variables that reflected the type of product (e.g., garments purchased were categorized by color, size, dressiness, and so forth), the channel, the payment method, spending levels, and responsiveness to offers. Additionally, transactions were transformed into variables for each channel or category of product that reflected the frequency of purchase, share of total purchases, dollars spent, and average number of items. Factor analyses of these behavior variables resulted in four dimensions of customer relationships with the company: spending level, channel preferences, spending pattern, and product preference.

Cluster analyses using factor scores resulted in stable clusters for four behavioral segments. Comparing the results of different cluster and linking algorithms assessed stability of the four-cluster solution. (As an interesting side note, in a paper presented at the 2001 Marketing Science Conference, Dolnicar and Leisch (July 2001), a content analysis of a large number of published segmentation studies showed that four was the modal number of segments identified in those studies.)

Profiling of the four segments resulted in naming them as follows: Too Busy, Stylish Professionals, Conformists, and Shopping's Fun (not the actual labels). Table 1 shows the percent of the sample for each segment along with some of their descriptive characteristics. The two smaller segments accounted for disproportionately larger spending.

Table 1 about here

The designated segments were then characterized according to their attitudinal profiles. Attitudinal dimensions uncovered with factor analysis were: Brand Orientation, Shopping Experience, Style Consciousness, and Self-Confidence. The results are shown in Figure 1.

Figure 1 about here

As can be seen, the three dimensions Brand Orientation, Shopping Experience, and Style Consciousness distinguish the segments Too Busy and Conformists on the one hand, from Stylish Professionals and Shopping's Fun on the other. The remaining dimension, Self-Confidence, distinguished Too Busy and Stylish Professionals from the Conformists and Shopping's Fun segments. Multivariate ANOVA demonstrated that the four dimensions distinguished among the four groups at the .001 level of significance.

This is an important finding, in that it demonstrates, at least in this instance, that transaction-behavior actions are associated with attitudinal differences. Thus, the attitude descriptors of the segments can be used to help develop creative appeals that are designed to be attractive specifically to the different behavioral segments.

Next, in order to be able to identify membership in the different segments for other customers, classification trees were developed using the CART procedure (Breiman, *et al.*, 1984).

CART provides automatic development of a model that can incorporate interactions in a binary tree structure. It has a cross-validation procedure that selects stable trees. Among the set of original variables used to develop the segments, twenty-three variables were found useful for predictive classification. Although the variables employed are disguised, the tree that was developed and validated is shown in Figure 2. Each final node represents

classification into one of the four segments as indicated. What is not shown is that the classification is essentially probabilistic, in that each node represents proportions of customers in each of the four segments, with the assignment made on the basis of highest proportion (plurality) at that node.

Figure 2 about here

The tree in Figure 2 allows unambiguous classification of most of the company's customers into one of the four segments (except those customers for whom little transaction data is available). Although misclassifications will certainly occur, the model provides correct classification for a large majority of customers.

4. Results of Phase 2

Six hundred customers participated in a telephone survey in spring of 2000, which was not identified as being sponsored by the company. The sample was extracted from a customer database that had been scored for membership in the four segments by the classification tree developed in phase 1. The four segments were approximately equally represented in the sample, which was a slightly different proportion than occurred in phase 1. The questionnaire included a subset of the attitudinal battery from the original survey, some demographics, and questions about channel usage (to update internet-related behavior which was assumed to be quite different after two years), spending, and competitive purchases. The respondents also evaluated the extent to which descriptions of the four segments' profiles fit their attitudes toward shopping.

The attitude profiles of three of the four segments were validated. The Stylish Professionals had nearly identical patterns in all aspects of the profiles. The Too Busy segment's customers were still convenience-oriented and bulk-purchase-oriented in both attitudes and behaviors. The Conformists were somewhat more fashion conscious than in the earlier study. Although the Shopping's Fun segment's customers were consistent with its original profile for the most part, some of their attitudes were different from before, making that segment no longer fully warrant the name. Although this last segment still expressed some enjoyment in shopping, much of the challenge and fun was missing for them.

The results indicate that the classification-tree scoring algorithm was successful; i.e., the segments were behaviorally differentiated as before. Any differences in spending patterns from those found before were consistent across all segments and represent general trends.

The data support the development and use of positioning themes created after the initial project. Links between behavioral indicators and attitudes provide a rich resource for development of communications to attract key customers.

5. Results of Phase 3

As indicated above, attitude and behavioral profiles of the four segments were presented to creative personnel, along with instructions to design two different persuasive communications that could be transmitted to customers willing to be contacted by e-mail. Thus, different messages were to be targeted to the most valuable segments (in terms of their higher per capita revenues), Too Busy and Stylish Professionals. Given the attitudinal profiles, it was felt that the Conformists and Shopping's Fun segments would probably be influenced at least somewhat by appeals directed to the other two segments, respectively. That is, the idea was

to direct two different appeals to the left and right side segments shown in Figure 1. For this test, three versions of e-mail were sent to different cells of the two target segments – one designed for each target segment and a third neutral control version. Subgroups within each target segment were sent the neutral control e-mail.

The creative staff came up with two positioning themes to address the segments. “Easy Choices” aimed primarily at the Too Busy segment and “Add Spice to Your Wardrobe” to be targeted mainly at the Stylish Professionals.

As an example of one appeal developed to be sent to the Stylish Professionals (and Shopping’s Fun), an ad used the lead line: “Find accessories to put your own mark on classic business clothes ...”. The ad stressed spontaneity and versatility in the clothing and used edgy, dramatic flair in the photography. The appeal to be sent to the Too Busy (and Conformist) customers emphasized simple purchases of classic ensembles. The same products were to be displayed in each ad, but with different executions. Obviously every communication must be different over time as merchandise and fashions change, but clear understanding of a positioning theme allows creative personnel to work within guidelines in the hope that personalized appeals will differentially influence the intended target segments.

After classifying all e-mail customers into the four segments, the two appeals were directed to the segments in the left and right halves of Figure 1. Neutral appeals sent to subsets of each segment contained only general information, not product-specific appeals. Results were monitored in terms of actual sales to these customers across all channels over the ensuing period (one week). Although the results are proprietary, it can be disclosed that significantly higher per capita sales occurred for customers in the Stylish Professionals segment who

received the personalized e-mail message over those receiving the neutral e-mail. None of the other segments outperformed customers receiving the neutral control e-mail, in terms of per capita sales.

Therefore, it was determined that the experiment was only a partial success. One of the segments performed better than would be expected by chance. The personalized appeal apparently was sufficiently persuasive with members of the segment who received it, to increase their purchase propensity. The Too Busy target segment (and other segments) might not have been provided with sufficiently creative personalized appeals to generate more than normal purchases.

6. Conclusions

By and large, this series of studies has successfully demonstrated the proof of concept that was their objective. It was found possible to uncover behavioral segments with variables derived completely from transactional information on customers. These segments were not only different behaviorally, but also different in their shopping attitudes. A scoring algorithm was found to be successful for predictively classifying customers into the behavioral segments. For the most part, the segments were determined to be stable and consistent over a two-year period. Personalized I-media communications were found to be differentially influential in stimulating purchases in the case of one of the targeted segments.

Although this project provides only a partial validation of the proposed strategy for addressing behavioral segments with targeted communications, the results are encouraging. Companies with similar databases as this company can perhaps identify segments for personalization of their I-media communications. In the case of this company, more work

will need to be done to refine its segmentation, to develop positioning themes, and to make the communications increasingly attractive differentially to its customers. As a practical matter, the company management has decided not to pursue this avenue for e-personalization at this time. However, the series of studies is valuable in that it demonstrates that the chain of reasoning from behavioral data to segments that can respond differentially to communications can be validated in certain circumstances.

We have been able to provide only sketchy descriptions of the methods employed in this research project, but we hope that they stimulate future work in this arena. Human behavior is complicated, necessitating complex methods for understanding and predicting behavior that results from attempts to persuade. It is a big leap from classification of customers into behavioral types to designing and communicating persuasive messages with hope of encouraging additional sales. Yet the advent of e-mail and Internet, along with technologies for database marketing, has opened the door to the possibility of successful e-personalization through behavioral segmentation.

References

Breiman, L. J. H. Friedman, R. A. Olshen, and C. J. Stone. (1984). Classification and Regression Trees. Belmont, Calif.: Wadsworth.

Claycamp, Henry J. and William F. Massy. (1968). "A Theory of Market Segmentation," Journal of Marketing Research 5 (November), 388-394.

Dolnicar, Sara and Friedrich Leisch. (2001). "Knowing What You Get – A Conceptual Clustering Framework for Increased Transparency of Market Segmentation Studies," Marketing Science Conference, Wiesbaden, Germany, (July 6).

Godin, Seth. (1999). Permission Marketing. New York: Simon & Schuster.

Haley, Russell. (1968). "Benefit Segmentation: A Decision-Oriented Research Tool," Journal of Marketing 32 (July), 303-315.

Nunes, Paul F. and Ajit Kambil. (2001). "Personalization? No Thanks," Harvard Business Review (April), 2-3.

Peppard, Joe. (2000). "Customer Relationship Management (CRM) in Financial Services," European Management Journal 18:3, 312-327.

Peppers, Don, Martha Rogers, and Bob Dorf. (1999). "Is Your Company Ready for One-to-One Marketing?" Harvard Business Review (January-February), 151-160.

Spector, Robert. (2002). Anytime, Anywhere: How the Best Bricks-and-Clicks Businesses Are Delivering Seamless Service to Their Customers. Cambridge, MA: Perseus Publishing.

Wind, Yoram. (1978). "Issues and Advances in Segmentation Research," Journal of Marketing Research 15 (August), 317-337.

Table 1: Behavioral Segments^a

Segment	Percent of Sample	Partial Description
Too Busy	22	<ul style="list-style-type: none"> • High spending levels, especially from catalogs and I-media • Frequent bulk and big-ticket purchases
Stylish Professionals	16	<ul style="list-style-type: none"> • Buy dresses, but infrequently buy other clothing • Frequent trips to store with small purchases
Conformists	30	<ul style="list-style-type: none"> • Bulk purchases often, mainly stores • Highest men's purchases
Shopping's Fun	32	<ul style="list-style-type: none"> • Higher than average retail trips, but not spending • Purchase at discount often

^aNames and partial descriptions disguised.

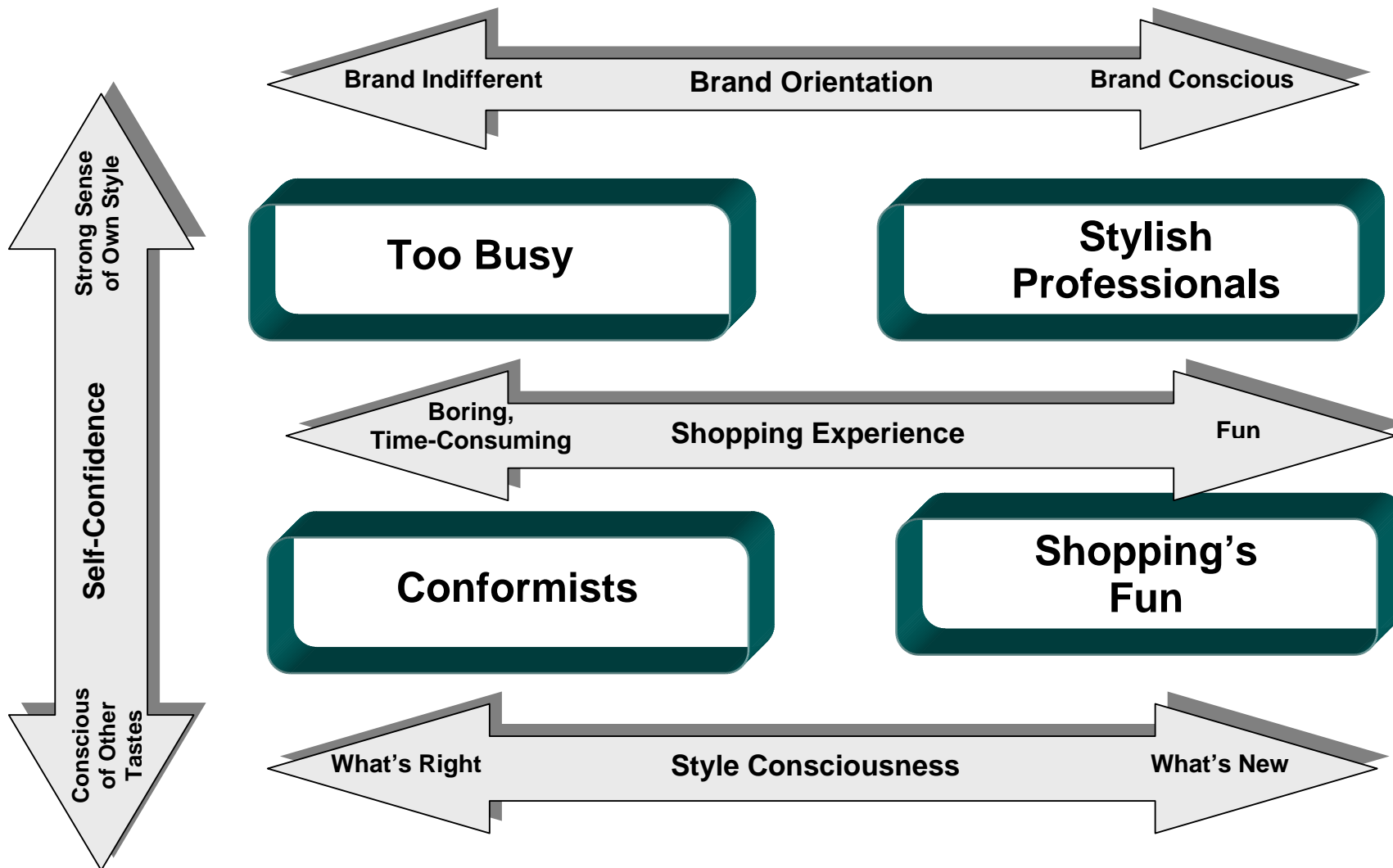


Figure 1: Segment Attitude Profiles

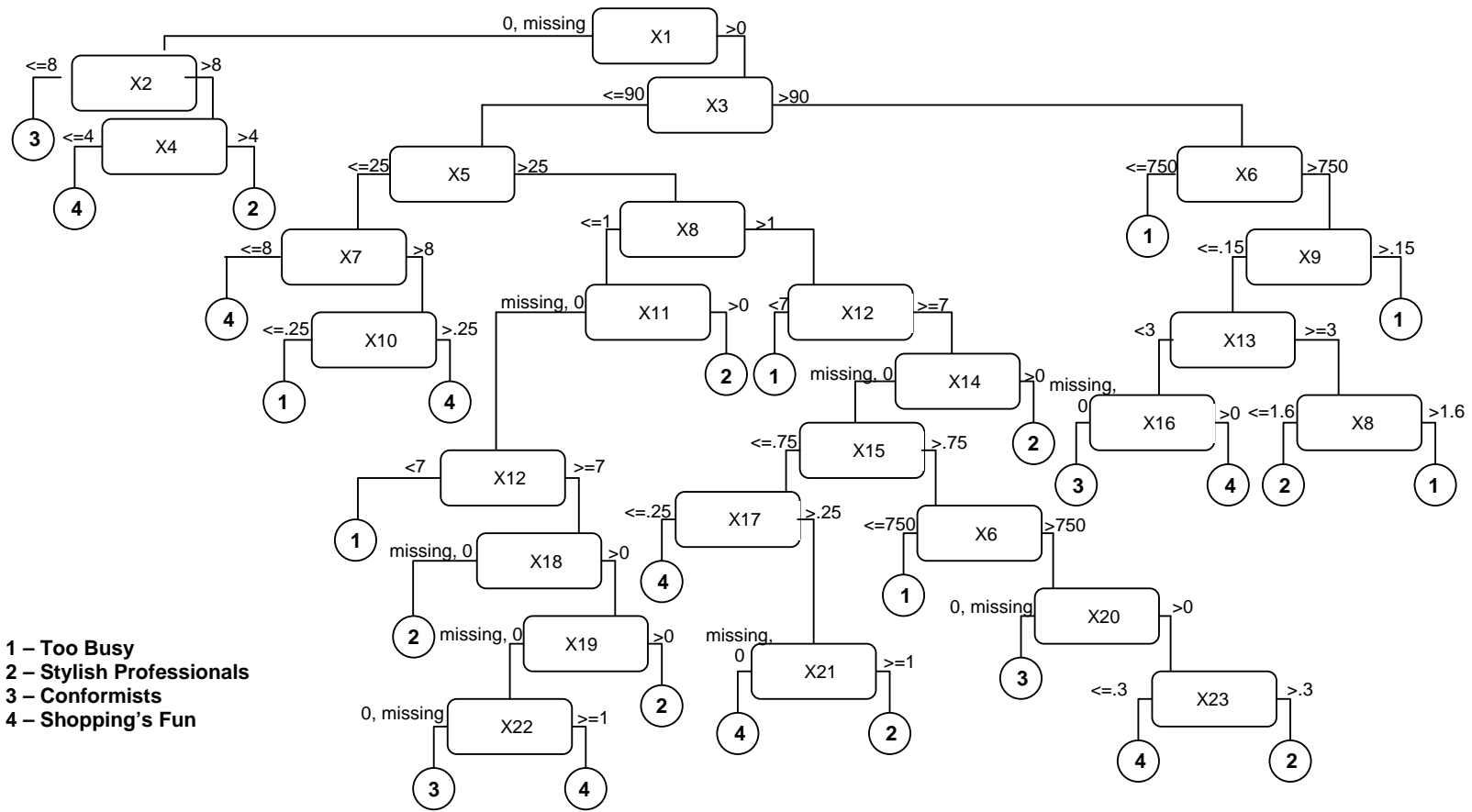


Figure 2: Classification Tree