Judging the Attractiveness of Product Design: the Effect of Visual Attributes and Consumer Characteristics

Molly Eckman, Colorado State University
Janet Wagner, University of Maryland

ABSTRACT - The objective of this study was to explore aesthetic aspects of product design. Judgments of the attractiveness of men's tailored clothing were analyzed, focusing on the effects of visual attributes and consumer characteristics. An individual-subject analysis of variance, based on a conjoint model with interactions, showed that consumers' judgments were affected by visual attributes and configurations of visual attributes. Consistent with aesthetic theory, the most important main effect was one dimension of silhouette and jacket length. The most important interaction effect was between jacket width and jacket pattern. Judgments of attractiveness differed by age, with older consumers evaluating visual attributes differently from younger consumers.


http://acrwebsite.org/volumes/5981/volumes/v21/NA-21

JUDGING THE ATTRACTIVENESS OF PRODUCT DESIGN: THE EFFECT OF VISUAL ATTRIBUTES AND CONSUMER CHARACTERISTICS

Molly Eckman, Colorado State University
Janet Wagner, University of Maryland

ABSTRACT -

The objective of this study was to explore aesthetic aspects of product design. Judgments of the attractiveness of men's tailored clothing were analyzed, focusing on the effects of visual attributes and consumer characteristics. An individual-subject analysis of variance, based on a conjoint model with interactions, showed that consumers' judgments were affected by visual attributes and configurations of visual attributes. Consistent with aesthetic theory, the most important main effect was one dimension of silhouette and jacket length. The most important interaction effect was between jacket width and jacket pattern. Judgments of attractiveness differed by age, with older consumers evaluating visual attributes differently from younger consumers.

More than a decade has passed since Holbrook (1981) issued his seminal "Aesthetic Imperative." In that document, Holbrook challenged consumer researchers to change their focus from utilitarian to aesthetic attributes of products. Despite the widespread use of measurement techniques, based on information processing theory, which are well-suited to the study of aesthetic attributes (Berlyne 1971), there continues to be little research on the aesthetic aspects of consumption. Following Holbrook and his colleagues, the purpose of our research was to explore the aesthetic aspects of product design. We chose apparel as the vehicle for our study, for two reasons. First, the aesthetic attributes of apparel are often major factors in consumer choice. Second, apparel is an important means of visual communication, conveying information on individual creativity as well as reference group membership (Holman 1981). The rules of visual communication are not as well-defined as those of verbal communication. Nevertheless, aesthetic theory suggests that some visual attributes have more influence than others on how consumers evaluate product design.

In this research, we applied conjoint analysis, a research technique commonly used to study the processing of information on utilitarian attributes of products, to study how consumers evaluate aesthetic attributes. Our results demonstrate how conjoint analysis might be applied in evaluating the design of new products and suggest how consumer decision-making models might be modified to better accommodate aesthetic judgments.

Aesthetics and Design

Aesthetics is the study of artistic phenomena. While the term "aesthetics" is associated with all the fine arts (music, literature, dance, painting and sculpture), it is usually used in reference to the visual arts. As such, aesthetics is often extended to the design of everyday objects, such as apparel, that are consumed visibly.

A design is a unique combination of visual elements - line, space, shape, light, color and pattern. For centuries, philosophers and aestheticians have debated how the elements of design relate to one another in determining the attractiveness of an object. Historically, line has been considered the definitive design element, interacting with space to create visual attributes of objects, such as silhouette, shape and...
and color. The 16 designs were fully replicated, to capture the configurative aspects of a design, it is necessary to extend the conventional conjoint model to include interaction terms. Holbrook and Schindler (1989) recruited subjects ranging in age from 18-86 from local church groups, to study the relationship between age and preferences for an aesthetic product. The results of an OLS regression analysis showed that adult consumers preferred music popular when they were in their teens or early twenties. Holbrook and Schindler suggested extending their research to consumer preferences for other aesthetic products, including apparel.

Holbrook (1986) explored how sex and personality affect preferences for men's apparel. Forty-two female and 22 male M.B.A. students evaluated a set of 32 black-and-white drawings of men's suits. The results of a canonical correlation analysis showed that visually-oriented women tended to prefer solid jackets, verbally-oriented women preferred plaid jackets, and men, in general, disliked any combination of visual attributes that clashed.

Models of consumer decision-making suggest that consumers are more involved with some products than others. In research on involvement in women's apparel, Fairhurst, Good and Gentry (1989) compared the performance of standard fashion involvement scales to Zaichowsky's (1985) Personal Involvement Inventory (PPI). The PPI was superior in validity and equivalent in reliability. In the consumption of any product, involvement may affect the extent and rigor with which consumers process information. However, previous research on involvement has focused on the processing of verbal, as opposed to visual information.

Given the conceptual and empirical evidence we have cited, the second objective of our research was to explore the effect of personal characteristics (age, sex and involvement) on the processing of visual information by consumers.

We advanced the following hypotheses:

H2: Older consumers will judge the attractiveness of products differently from younger consumers.

H3: Females will judge the attractiveness of products differently from males.

H4: Consumer judgments of the attractiveness of products will differ by level of involvement.

The Processing of Visual Information and Research Methodology

According to Holbrook and Moore (1981a), progress toward understanding the aesthetic aspects of consumption has been hindered by reliance on the additive model of information processing. In that model, it is assumed that consumers process information in a linear manner. The additive model is well-suited to the analysis of information on utilitarian attributes, which is easily presented in verbal protocols. However, the additive/verbal paradigm may not be as well-suited to the analysis of aesthetic attributes, for two reasons. First, visual attributes of design are presented more effectively in pictorial stimuli. Second, the Gestalt principle suggests that visual attributes of a design may be processed configurationally, rather than linearly. To capture the configurative aspects of a design, it is necessary to extend the conventional conjoint model to include interaction terms.

Holbrook and Moore (1981b) compared the processing of information on sweaters presented in pictorial and verbal stimuli, using a conjoint model with interaction terms. While more main effects were observed for the pictorial than the verbal stimuli, no differences were observed in the number of interaction effects. The strength of the most powerful main effect was compared to that of the most powerful interaction effect, based on Hays' (1988) omega-squared values. The results offered support for configurality in the processing of both visual and verbal information.

In this research, we analyzed the effect of visual attributes on consumers' judgments of the attractiveness of men's tailored clothing. Subjects in four age groups judged the attractiveness of 32 designs presented in pictorial form. Their judgment strategies were analyzed using a conjoint model with interactions. By using a conjoint model, we were able to explore the relative importance of individual visual attributes and selected configurations of visual attributes.

METHODOLOGY

Stimuli

Stimuli were colored line drawings of men's tailored jacket and trouser combinations, presented on a male figure. The same figure was used throughout, to control for the effect of body type on the subjects' responses. All designs were based on a classic rectangular silhouette. Drawings were rendered by a professional artist, then photographed and converted into slides. The jacket and trouser combinations were developed using a 2^8 fractional factorial design (Hahn and Shapiro 1966: Appendix I, plan 7b), making it possible to analyze main effects for eight visual attributes and six interactions. Each visual attribute was presented at two levels. Levels were chosen by reviewing trade publications and the fashion press to determine what silhouettes, colors, and patterns were likely to be on the market when the study was conducted. Spring 1991, when the data were collected, was marked by a continuation of the conservative look of the 1980s concurrent with a return to the flamboyance of the 1960s. The most important trend in silhouettes was long, wide jackets worn with wide trousers. Short jackets with high drops and no lapels were new. ["Drop" is the distance between the base of the neck and the first button.] Fashionable colors included blues and greens and plaid was becoming popular. The eight visual attributes and corresponding levels of the jacket and trouser combinations included two dimensions of jacket silhouette: width (wide or narrow) and length (long or short); jacket drop (high or low); jacket neckline (lapels or no lapels); jacket color (blue or olive); jacket pattern (plaid or solid); trouser width (wide or narrow); and trouser color (blue or olive). [The levels were reviewed by three professors of design to ensure that they represented meaningful differences.] The six interactions involved one dimension of silhouette (jacket width) in conjunction with jacket drop, neckline, color and pattern, and trouser width and color. The 16 designs were fully replicated, to test for consistency in aesthetic judgments. Eight filler designs were included to disguise
A data collection booklet was compiled for each subject. The first page included instructions. The core of the booklet was a series of 100 millimeter continuous rating scales with end points labeled "very unattractive" and "very attractive". A fashion involvement questionnaire (based on Zaichowsky's (1985) PII) and a set of demographic questions appeared at the end of the booklet.

Sample

The sample was convenient, purposive and stratified. Subjects were recruited from local religious organizations, restricted to Episcopalian, Presbyterian, Unitarian, and Jewish, to control for the effect of socioeconomic status. [Previous research by Gockel (1969) and Goldstein (1969) suggests that members of these four religious groups are similar in socioeconomic status. The trickle-down theory of fashion adoption, consumer decision-making models, and conventional market segmentation strategies in the fashion industry suggest that consumers in a given socioeconomic group may use similar judgment strategies.] Participating organizations were located in the suburbs of a large metropolitan area on the East Coast. Members were offered a $10 donation to their religious group as inducement to participate. Our goal was to collect data from 20 males and 20 females in each of four age groups: 20-24, 31-35, 44-48, and 56-60. Each of the three older groups was composed of individuals who were 20-24 years of age during one of the post World War II peaks in fashion trends, including the "Edwardian Dandy" (1955), the "Peacock Revolution" (1967) and the "Return of Conservatism" (1980) (Paolelli 1991). The fourth group, composed of individuals 20-24 years old at the time of the study, was intended as a point of comparison. Unfortunately, we found it difficult to recruit males, particularly in the older groups. Consequently, there were only 19 males in the 31-35 age group and 14 males in the 56-60 age group. Data were collected from 172 subjects. Four sets of results were unusable, leaving a total sample of 168 subjects.

Procedure

Data were collected either before or after meetings or services to minimize inconvenience to participants. Subjects were divided into small groups of all males or all females, and were seated at tables in front of a screen, with the data collection booklets face down in front of them. Subjects were thanked for volunteering and asked to turn their booklets over. Instructions printed on the first page of the data collection booklet were then read aloud to them. Slides were projected on the screen for 15 seconds each. [Pretesting showed that 15 seconds was sufficient time for subjects to make their judgments.] To evaluate each design, subjects placed a mark on the corresponding rating scale. After half the data collection sessions, the order of the slides was changed. When the slide portion of data collection was finished, subjects completed the fashion involvement questionnaire and the set of demographic questions.

### TABLE 1

| NUMER OF MAIN EFFECTS AND AVERAGE OMEGA-SQUARED VALUES FOR EACH VISUAL ATTRIBUTE |

Responses were analyzed using an individual-subject analysis of variance, which allowed us to identify attributes and interactions affecting subjects' aesthetic judgments, and assess their relative importance, using Hays' (1988) omega-squared values. A 4 (Age) x 2 (Sex) x 3 (Involvement) x 2 (Occupation) post hoc ANOVA performed on the average omega-squared values was used to assess the effect of age, sex and involvement on subjects' aesthetic judgments. [Zaichowsky (1991) suggested dividing the sample into three groups, based on involvement scores; twenty-five percent were treated as high involvement, 50% as medium involvement and 25% as low involvement.] Post hoc Tukey tests were used to identify differences among the groups in the relative importance of visual attributes.

**RESULTS**

**Description of Sample**

Most subjects were married, had attended college, were employed in professional, technical or managerial jobs, and reported salaries greater than $50,000. Chi-squares used to test for differences in socioeconomic status showed no significant differences among subjects in the four religious groups. [Socioeconomic status was evaluated using occupation as a proxy.]

**Visual Attributes Affecting Aesthetic Judgments**

**Main Effects.** The results of the individual-subject ANOVA are summarized in Table 1. Jacket length was the visual attribute appearing to most often affect the subjects' aesthetic judgments, followed by jacket pattern, drop and neckline. Visual attributes with fewer effects included jacket width, trouser width, jacket color, and trouser color.

The average omega-squared values in Table 1 show a pattern similar to the main effects, in that jacket length, with an omega-squared value of .109, was the dominant element, followed by jacket pattern, with an omega-squared value of .067. Drop and neckline were next in importance, followed by jacket width, trouser width, jacket color, and trouser color.

**Interaction Effects.** The results presented in Table 2 show that the dominant interaction effect was that of jacket width and jacket pattern, which affected the judgments of 78 subjects and yielded an average omega-squared value of .138. The remaining interaction effects had little influence, as demonstrated by the few significant effects and low average omega-squared values.

**Differences among the Visual Attributes.** The results of the post hoc ANOVA showed that the visual attributes differed in importance ($F=12.86; p<.0001$). Ensuing Tukey tests confirmed that jacket length was the most important visual element, followed by jacket pattern ($p<.01$). No differences were observed in relative importance among the other attributes.

**Differences by Age, Sex and Involvement.** The results of the post hoc ANOVA showed a significant interaction ($F=2.71; p<.001$) between the visual attributes and age, indicating that the visual attributes were used differently by subjects in the four age groups. Ensuing Tukey tests showed that jacket length was more important to subjects in the two older groups (ages 56-60 and 44-48) than to subjects in the youngest group (age 20-24) ($p<.05$). A similar difference was observed between subjects in the 44-48 age group and those in the 31-35 age group ($p<.01$). No interaction effects were observed between the visual attributes and either sex or involvement. However, a significant interaction was observed among the four groups of variables/cusual attributes, age, sex, and involvement. The post hoc Tukey tests showed that jacket length was more important to high involvement males, age 56-60 and medium involvement females, age 44-48 than to subjects in other categories.

**DISCUSSION**

In this research, we explored aesthetic aspects of the consumption of product design, focusing on consumer judgments of the attractiveness of men's tailored clothing. Our results were consistent with Hypothesis 1, in showing that the visual attributes differed in their effect on judgments of attractiveness. The most important single attribute was jacket length, lending credibility to the fundamental, but hitherto untested, tenet of aesthetics that line is the definitive visual element. The marginal means showed that the majority of subjects (94 percent) for whom jacket length was significant preferred the longer silhouette. Principles of proportion (see Davis 1987) suggest that a rectangular silhouette, such as that created by the long jacket, is more interesting and attractive than a square silhouette, such as that created by a short
Next to jacket length, pattern was the most important visual attribute. However, the importance of pattern stemmed from dislike of the plaid. The marginal means showed a majority of subjects (96%) preferred the solid jacket. Preference for the solid jacket was part of an overall tendency for subjects to prefer conventional attributes (e.g., longer jacket, solid color) to those that were more newer (e.g., short jacket, plaid).

### TABLE 2

<table>
<thead>
<tr>
<th>NUMBER OF SIGNIFICANT EFFECTS AND AVERAGE OMEGA-SQUARED VALUES FOR INTERACTION OF JACKET WIDTH AND OTHER VISUAL ATTRIBUTES</th>
</tr>
</thead>
</table>

The majority of interaction effects were of relatively little importance. However, the interaction between jacket width and pattern was an exception, yielding more significant effects and a larger omega-squared value than any of the individual attributes. This result lends support to the Gestalt principle that visual attributes may be processed as configurations. The marginal means showed that the majority (74 percent) of subjects preferred the conventional narrow jacket and solid color. However, 24 percent preferred the more newer square jacket in the plaid. The meager effect of the jacket width/color interaction casts doubt on Bell's (1914) assertion that the relationship between line and color is a critical determinant of “significant form.”

Our results support Hypothesis 2, in showing that judgment strategies differ by age of the consumer. This result is consistent with models of consumer decision-making and previous research (Holbrook and Schindler 1989) showing that age is related to preferences for music, another aesthetic product. Our results are also consistent with conceptual work in design (DeLong 1987; Sproles 1979) suggesting that consumer judgments of attractiveness differ by age. Although models of consumer decision-making and the results of previous research led us to hypothesize that judgments of attractiveness would differ by sex (Holbrook 1986) and involvement, neither hypothesis was supported.

It is important to interpret our results in light of limitations inherent in our study. Our research was limited to one product category—men's tailored clothing. Clearly, this type of research should be extended to other product categories to test the generalizability of the results. Our research was also limited to upper middle class consumers. However, diffusion theory suggests that members of the upper middle class are often early adopters of new products. Thus, their judgments of aesthetic attributes may be useful in gauging the potential for widespread adoption of new products.

### CONCLUSION

In this research, we studied consumers' judgments of the aesthetic attributes of product design. Our results have both conceptual and methodological implications. In the conceptual domain, our results contribute to the development of aesthetic theory, in showing that the visual attributes of design differ in their effect on those judgments, with silhouette dominating. Our results also lend support to the Gestalt principle that visual attributes may be processed as configurations, as suggested by the relatively large jacket width/pattern interaction. In the methodological domain, our results demonstrate the potential usefulness of conjoint analysis in evaluating the potential acceptance of new product design.

The aesthetic aspects of consumption represent a fascinating, yet undeveloped research area. Given the pervasive effect of design on products in our culture, the processing of information on aesthetic attributes holds enormous promise for consumer researchers.

### REFERENCES


Padgett, Jo B. (1991), Associate Professor, Department of American Studies, University of Maryland, Personal Communication, June 15.
Consumer-brand relationships based on identification are selective and volitional acts on the part of consumers and cannot be imposed by companies (Bhattacharya & Sen. 1979) posit that individuals prefer relationships with similar others to maintain a consistent sense of self (Marin & Ruiz, 1993). A key assumption of identification is the consumer's perception of belonging to a particular social group (Ashforth & Mael, 1990). Consumers' perceptions of a brand as attractive. Previous research investigating the effect of CBI on brand loyalty reports mixed results. CBI is positively related to brand loyalty. In a similar vein, both product categories are familiar to all respondents and widely consumed. (2003). 2001.