A Multi-Dimensional Investigation of the Aesthetic Similarities of Consumer Durable Goods

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Marketers agree that product styling and design are important influences on consumer preference and choice. Using a photo sort procedure and multidimensional scaling, potential inherent individual aesthetic qualities or stylistic considerations are examined. Initial findings suggest that the respondents, in their early 20's, are inexperienced in aesthetic assessments. It also appeared that these respondents used simple heuristics to deal with the large number of product stimuli. Common dimensions discovered in this sample included shape (round elements vs rectangular elements) and color (usually bright or multicolored elements vs monochromatic elements).

INTRODUCTION

Marketing practitioners and academics agree that product styling and design have important influences on consumer preference and choice. One might therefore expect that the marketing and consumer research literature on product aesthetics would be substantial and would guide assessments of the aesthetic components of products and their influences on evaluations and choice. However, a limited number of marketing studies have considered the issue of aesthetics. Examples of this literature include Bloch et al.'s (2003) examination of visual product aesthetics; Hsiao et al.'s (2008) look at the application of aesthetics measurement to product design; Leder et al.'s (2007) exploration of the relationship between product design and brand strength and Veryzer's (1993) inquiry into the influence of design principles on product preferences.

Most consumer durables, including those whose primary function is utilitarian, are imbued with some level of styling or design so that consumers perceive the products as aesthetically appealing over and above their functional qualities. This is true of telephones, personal computers, wall clocks, calculators, coffee makers, furniture, automobiles, stereo equipment, and refrigerators. Styling is incorporated into products as a source of differentiation to increase competitive advantage.

Aesthetic criteria have also become more significant because product storage has often become synonymous with product display (Kotler & Armstrong, 1991) A need for convenience requires that products be readily available for use. Increasingly, products are being stored in plain sight instead of being hidden in storage. The aesthetic qualities of these products can influence a person's enjoyment of his or her living environment.

Ellis (1993) developed a psychometric scale to measure consumer perceptions of the aesthetic dimensions of consumer durable goods. This was an effort to calibrate consumption stimuli in terms of qualities apart from those that contribute to their functional value. Ellis, in conjunction with a panel of

design experts, developed a series of aesthetic dimensions: simplicity/complexity, harmony, balance, dynamics, unity, timeliness and style, and novelty.

THE EXPLORATORY STUDY

We suggest that most persons don't think about the aesthetic qualities of the objects in their worlds with the terms or dimensions mentioned above. However, perhaps people do have some inherent bases for making aesthetic judgments about products. In this research we explore what these individual dimensions might be and whether there is much individual variance. We combined a photo sorting procedure with multidimensional scaling (MDS). Prentice (1987) used such a process to investigate the consistency of several psychological functions using favorite possessions. Sorting photos into piles is a far easier task than making pairwise comparisons (a common data collection technique for MDS) amongst a fairly large set of stimuli. Prentice (1987) had a list of 70 possessions which would have required several thousand pairwise comparisons. A tradeoff is that pairwise comparisons (often used managerially to assess brand similarity) can create higher order data (interval level) while sorting piles creates categorical level data. Useful primers for using the SPSS ALSCAL procedure for MDS can be found in Giguère (2006) and Jaworska & Chupetlovska-Anastasova (2009). An interesting feature of MDS is that we can analyze individuals, there is not a need to aggregate respondents.

In our first study, the stimuli were a set of almost ninety photographs of consumer durable goods. We asked respondents to sort these photos into piles based on their individual stylistic or aesthetic criteria. Respondents were instructed to use whatever criteria they thought appropriate, and they could construct as many piles as they desired. Even one photo could constitute a pile.

The fifteen respondents for this exploratory study were undergraduate business majors, typically 21 or 22 years old. Generally, our analyses suggested the respondents were unsophisticated or inexperienced with aesthetic criteria. The dimensions uncovered by MDS were simple, at least in contrast with the aesthetic dimensions suggested by Ellis. Several respondents' resulting clusters in the MDS solution were merely product categories such as outdoor gear or kitchen appliances. Just slightly more complex was an emergent dimension of color: colorful and multicolored clusters anchoring one the end of a dimension, monochromatic clusters anchoring the other end.

Example 1

The respondent in our first example developed seven photo (product) piles which were reduced to three major clusters in two dimensions by the MDS routine. One cluster was monochromatic, mostly silver or metallic, with some round features, e.g. cameras, a table radio with a round speaker, and a silver hamburger grinder with a round crank. A second cluster was composed of brightly colored objects, e.g., a bright orange back pack, a bright red jigsaw, a bright red boombox. A third cluster was composed of rectangular monochromatic objects, e.g., a white toaster, a black laptop computer, a white iron, a rectangular silver coffee maker. The clusters were arrayed on two axes: with a monochromatic-colorful axis (color) and a round-rectangular (shape) axis.

These two axes were common among several respondents however there were some interesting variations among the clusters suggesting that we should investigate higher order solutions as well. We generally used a two-dimensional solution to aid our initial interpretations. Usually the scree plot tests indicated two dimensional solutions although sometimes a third dimension was indicated.

Example 2

The respondent in our second example developed thirteen piles and MDS generated what we interpreted as nine major clusters. Once again, the two axes were shape and color. However, individual clusters were differently nuanced from the first example, with some interesting variations. One cluster was mostly colorful objects but they had jagged looking elements: an open folding knife, a pointy headlamp, a jigsaw with an exposed blade. Another cluster was also colorful but mostly outdoor related products with almost garishly bright colors such as bright orange and lime green. One of the clusters was

a mix of monochromatic and colorful elements with round features and numbers: watches, a GPS device, a bike computer, and a digital thermostat.

Example 3

Our third example followed the same dimensions of color and shape but the multiple clusters again evidenced individual nuances. One cluster was monochromatic but the objects folded or looked like they could fold: a flip phone and lap top computers. Another cluster contained objects that were round and monochromatically silver. A third cluster contained colorful products used outdoors. A forth cluster was composed of monochromatically gold colored objects. A fifth cluster contained black and round elements, while a sixth cluster was composed of round elements and numbers, and the seventh cluster was composed of colorful and round elements.

Other respondents in this study reacted in similar fashion. We conjecture that the task of sorting almost 90 photos was daunting and that respondents may have resorted to heuristics to build their piles, for example, grouping products by product category, such as outdoor products, kitchen appliances, watches and clocks.

DISCUSSION, ISSUES AND FUTURE RESERCH

We have learned that respondents probably need to be more than 22 years old in order for us to develop richer sets of data. Perhaps more experience is necessary for a more sophisticated view of aesthetics, especially as they relate to consumer goods. For example, a forty-something year old architect was a rich source of information in our second study. There is also evidence that more than two dimensions are indicated.

There is also some evidence in the literature that there are some potential methodological issues with the various MDS procedures. There is some concern that the ALSCAL procedure has limitations. We found that ALSCAL provided different solutions depending on the order in which variables (our product stimuli) were entered into the procedure. PROXSCAL has been offered as a superior procedure however in our preliminary runs we found that it merely duplicated the piles of photos developed by the respondents. Hout et al. (2012) present a comparison between the two procedures.

To tease out a more sophisticated set of aesthetic elements (perhaps a larger number of indicated dimensions), we developed two new studies with smaller sets of stimuli (30 photos each). We also constructed each set from similar products: one set is a group of watches and the other set is a group of kitchen coffee making appliances. The idea is to reduce the need for a heuristic on the part of the respondent during the product sorting task.

Analysis on the first respondents for these studies continues. Initial results suggest that this tactic may help tease out additional dimensions, although a color dimension is still prominent for the watches. However, a new dimension suggesting a retro vs contemporary dimension emerged with one respondent. This might be related to the timeliness dimension suggested by Ellis.

REFERENCES

Bloch, P.H., Brunel, F.F., & Arnold, T.J. (2003). Individual differences in the centrality of visual product aesthetics: concept and measurement. *Journal of Consumer Research*, 29(4), 551-565.

Ellis, S.R. (1993). *A psychometric investigation of a scale for the evaluation of the aesthetic element in consumer durable goods* (Unpublished doctoral dissertation). University of Arizona, Tucson, Arizona.

Giguère, G. (2006). Collecting and analyzing data in multidimensional scaling experiments: a guide for psychologists using SPSS. *Tutorials in Quantitative Methods for Psychology*, 2(1), 27-38.

Hout, M.C., Papesh, M.H., & Goldinger, S.D. (2012). Multidimensional scaling. *Wiley Interdisciplinary Reviews: Cognitive Science*, 4(1), 93-103.

Hsiao, S.W., Chiu, F.W., & Chien, C.S. (2008). Applying aesthetics measurement to product design. *International Journal of Industrial Ergonomics*, 38, 910-920.

Leder, H.C., Carbon, C.C., & Kreuzbauer, R. (2007). Product-design perception and brand strength. *Thexis*, 2, 4-7.

Jaworska, N., & Chupetlovska-Anastasova, A. (2009). A review of multidimensional scaling (MDS) and its utility in various psychological domains. *Tutorials in Quantitative Methods for Psychology*, 5(1), 1-10.

Kotler, P., & Armstrong, G. (1991). *Marketing 5/E*. Upper Saddle River, N.J: Prentice Hall.

Prentice, D.A. (1987). Psychological correspondence of possessions, attitudes, and values. *Journal of Personality and Social Psychology*, 53(6), 993-1003.

Veryzer Jr, R.W. (1993). Aesthetic response and the influence of design principles on product preferences. *Advances in Consumer Research*, 20(1), 224-228.