Individual Differences in the Centrality of Visual Product Aesthetics: Concept and Measurement

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ABSTRACT

This research conceptualizes and develops a scale to measure individual differences in the centrality of visual product aesthetics (CVPA), defined as the level of significance that visual aesthetics hold for a particular consumer in his/her relationship with products. Three related dimensions of product aesthetics centrality emerged from the research: value, acumen, and response intensity. A series of eight studies provided evidence that the CVPA measure possesses satisfactory reliability and validity. Additionally, this research illuminates important differences between high- and low-CVPA consumers in product design-related evaluations and behaviors and provides suggestions for future research employing the scale.
The capacity of advanced aesthetic experience is not common to all …Both the capacity for it and the interest in developing it are very unevenly distributed (Osborne 1986, p. 119).

Most products today rarely break and tend to do what they promise. Therefore it is not surprising then, that consumers increasingly make brand choices based on aesthetic value and distinctiveness of visual design (Dumaine 1991; Schmitt and Simonson 1997). Visual aesthetics also are growing in prominence for an ever-wider selection of products. Vegetable peelers, wireless phones, car washing buckets, and lawn tractors are all being designed with attention to the aesthetic value of their appearance. Although attempts to produce goods with attractive forms are nothing new, we are today seeing a widespread emphasis on product design unmatched since the Art Deco era of the 1930’s (Loewy 1951; Nussbaum 1999).

Product design is a broad term that includes a considerable range of engineering-related attributes such as ergonomics, production efficiency, strength, recyclability, and distribution ease, as well as aesthetics (Bloch 1995; Davis, 1987). While not minimizing the importance of these other design elements, the scope of this article is limited to visual product aesthetics or those characteristics that create a product's appearance, such as materials, proportion, color, ornamentation, shape, size and reflectivity (Lawson 1983). Although product aesthetics may include a range of important non-visual elements, as in the case of music, foods, or fabrics, the focus here will be limited to visual aesthetics because of marketplace prominence and relevance to the widest assortment of goods. In addition, inferences about other sensory experiences are often based on product appearance. For example, the look of a leather car seat may suggest softness and the dark color of a chocolate may indicate a semi-sweet taste.

Visual aesthetics influence consumers' perceptions in several ways. First, superior designs distinguish products from competitors and help gain recognition in a crowded marketplace (Bloch 1995; Dumaine 1991; Schmitt and Simonson 1997). Visual aesthetics also have a symbolic function that influences how a product is comprehended and evaluated. Images
of elegance, ease of use, youthfulness, durability, and innovativeness all may stem from choices marketers make in developing the appearances of new products (Forty 1986). Finally, product appearance represents the central channel for the formation of consumer/product relationships (Hollins 1990). It is the first thing about a product that connects with a potential buyer, and regardless of product class, judgments follow from this sensory experience.

The 20th Century’s most well known industrial designer, Raymond Loewy (1951) recognized that some consumer segments are more design-oriented than others when he differentiated between users and aesthetes. It is important to understand and measure these individual differences relating to design for several reasons. First, individual differences in responsiveness to visual aesthetics may underlie a number of other well-established consumer behavior variables such as product involvement, brand loyalty, materialism, innovativeness, self-image congruence, choice and usage behavior. For example, one could test whether innovators possess high aesthetics centrality due to desires for the most visually advanced and distinctive products available to purchase. Building on the work by Fournier (1998), one could also speculate that high aesthetics centrality underlies consumer relationships with and loyalty to marketers known for superior design executions (e.g., Apple, Braun, Target, Bang & Olafsun).

Explication of the aesthetics centrality concept is potentially important in understanding consumer decision processes. In particular, aesthetics centrality may determine the manner in which product aesthetics are evaluated and used in arriving at a purchase decision. Using an Elaboration Likelihood framework, high centrality levels should lead to the processing of product aesthetics in a systematic and elaborate fashion. Low centrality would be associated with peripheral processing. This is an important consideration because central/systematic processing is cognitively based and produces more enduring outcomes than does peripheral processing (Eagly and Chaiken 1993). Studies of visual aesthetics centrality also may enhance our understanding of the price consumers are willing to pay for a product. Lichtenstein, Bloch and Black (1988) found that product involvement served as a countervailing force to price
consciousness in explaining acceptable price levels. It is expected that aesthetics centrality may act in a similar fashion, but across a range of product categories.

Finally, measuring the centrality of visual aesthetics will allow marketers to identify receptive segments and make more efficient resource commitments to design. Investment in design can be better matched to the anticipated target market to avoid either over or under spending on design. Sales forecasts also might become more accurate if the centrality of product aesthetics to a market can be assessed and considered in light of the design characteristics of a new product. Understanding of and the ability to assess product aesthetics centrality will also allow researchers to achieve greater insight into differences in product reactions that may exist across cultures, nations, and time (e.g. Galbraith, Siguaw and Lim 1995). This can guide marketers in more effectively modifying goods for export and in response to changes in the product lifecycle.

The present research has two objectives: first, to provide a conceptual foundation for understanding the centrality of visual product aesthetics; second, to develop a scale to measure differences in this centrality across consumers. The literature concerning individual differences in the centrality of aesthetic characteristics is first reviewed and linked to a conceptualization of the centrality variable. This is followed by a report of eight studies that develop a scale measuring this construct. Finally, the article discusses the implications of the results for future research and for design decision making by marketers.

INDIVIDUAL DIFFERENCES IN THE CENTRALITY OF VISUAL PRODUCT AESTHETICS

For our purposes, the centrality of visual product aesthetics (CVPA) is defined as the overall level of significance that visual aesthetics hold for a particular consumer in his/her relationships with products. CVPA represents a continuous individual difference variable that may range from near zero to very high levels where visual aesthetics dominate a consumer's
acquisition and usage of goods. CVPA is also considered to be a general consumer trait. That is, consumers exhibiting higher CVPA are expected to have greater than average concern for visual aesthetics independent of product category or setting. CVPA has the potential to affect the weight that visual aesthetics hold in a purchase decision as well as preferences for brands and products that satisfy aesthetic needs. In nonpurchase contexts, CVPA also may influence usage levels, duration of ownership, display, word of mouth, and product maintenance activity of consumers. Note that CVPA captures the general significance or importance of visual product aesthetics rather than preferences for or attitudes toward a particular aesthetic style. High CVPA may be associated with positive reactions to products that vary in their amount of ornamentation and overt styling cues.

Based on past research and our theorizing, CVPA encompasses four related facets or dimensions: (1) the value a consumer assigns to product appearances in enhancing personal and even societal well being, (2) acumen or the ability to recognize, categorize, or evaluate product designs, (3) the level of response to visual design aspects of products, and (4) the determinance of visual aesthetics in affecting product preferences and purchase satisfaction. These four facets of CVPA are described in more detail below.

Personal and Social Value of Design

One element comprising CVPA is the perceived value of visual product aesthetics as a means of enhancing quality of life, both personally and for society in general. On an individual level, consumers with high CVPA believe that encounters with beautiful objects positively influence the quality of their daily lives or allow them to satisfy higher level needs (Yalch and Brunel 1996). The rewards they receive from the aesthetic properties of products are recognized and held dear. Such consumers may define themselves in part by the value that design plays in their life, and they may see themselves as connoisseurs who get substantial benefit from owning beautiful objects (Csikszentmihalyi and Robinson 1990).
The value dimension in part captures the tendency for beautiful objects to be deemed "sacred" by consumers. Belk, Wallendorf, and Sherry (1989) introduced the concept of sacred possessions where particular objects are highly valued by a consumer and are treated in a reverential manner as extensions of the self. These authors noted that one way an object may become sacred is through quintessence (see Cornfield and Edwards 1983). Quintessential objects have variously been described as unique, magically desirable, wonderful, authentic, and unequivocally right. Sexton (1981) profiled and photographed a set of 130 products that are frequently described as quintessential such as Chris-Craft wooden speedboats and Eames chairs. He attributed their quintessence to superior design attributes. It may be argued that high CVPA consumers sacralize products based on their superior designs or quintessence.

Consumers with high visual aesthetics centrality are also likely to believe that fine design is valuable to society generally and to believe that the quality of life for everyone is affected by the quality of the designed environment. Prince Charles of Wales may be considered to exemplify high CVPA when he passionately comments on the negative impact poor architectural design has on British society (Charles 1989). Individual differences in support for public works of art also may be explained by variations in this social value dimension.

Acumen

Another proposed facet of CVPA is that of acumen (Bloch 1995). Acumen reflects an ability to recognize, categorize, and evaluate product designs and is expected to vary within a population (Osborne 1986). Berlyne (1971) argued that some people are endowed with more aesthetic taste than others. In an early writing on the subject, Ortega Y Gasset (1925) noted that art could only be comprehended by people possessed of the peculiar gift of artistic sensibility. Csikszentmihalyi and Robinson (1990) extensively discussed what they call the "good eye" or a gift for analyzing the visual arts. They argued "most people in our culture are not aware of the range and intensity of the enjoyable experiences available to them through the sense of vision"
The authors explain this shortcoming by noting that "some people are visual and some people’s abilities lie in other forms of intellectual pursuit" (p. 125). In a similar vein, several consumer researchers (Childers, Houston, and Heckler 1985; Holbrook 1986) have indicated that some consumers favor visual over verbal processing and that highly visual individuals may give greater weight to aesthetic elements in making product choices than do less visual processors.

Level of Response

Checkbook in pocket, we went back to the canoe store ready to buy. But then I accidentally fastened my eye on an irresistible object hanging from one of the display racks. It was a brand new, but timelessly traditional, all-wood canoe with a canvas hull covering…I almost got dizzy looking at it. (Egan 2000)

Throughout human history, beautiful objects have had the capacity to generate significant responses among consumers. Ingarden (1983) theorized that reactions to the design of an object vary from practical to the aesthetic, with the latter having the potential to be quite strong. In Rook's (1987) work on impulse buying, he indicated that impulse buying frequently involves products that have strong aesthetic or styling elements and that stimulus characteristics may produce this type of buying. Thus, individual differences in level of responses to design aesthetics may be one underpinning of impulse buying. Responses to design aesthetics can take several forms.

A number of scholars have described the affective reactions people have to the design aesthetics of objects (Bloch 1995; Veryzer 1993). Csikszentmihalyi and Robinson (1990) characterized aesthetic responses as "a state of intense enjoyment characterized by feelings of personal wholeness, a sense of discovery, and a sense of human connectedness" (p. 178). The literature has also suggested an attributional process where initial reactions to design are primarily emotional with cognitions following in an attempt to analyze one’s feelings (Csikszentmihalyi and Robinson 1990; Durgee 1988). There are also behavioral responses to
product designs such as moving closer to the object, extended viewing of its appearance, touching of its surface, and ultimately its acquisition (Bloch 1995; Csikszentmihalyi and Robinson 1990).

Responses to the design aesthetics of objects have valence as well as intensity. Certain forms or designs will generate positive responses in a particular consumer while others evoke negative reactions. An unappealing design may engender feelings of dislike, critical arguments as to the problems with the design and even disgust.

Design Determinance

The fourth component of CVPA concerns the extent to which product aesthetics are used as evaluation criteria. Consumers with high visual aesthetics centrality should prefer products with superior designs and admit to the influence of design on forming product and brand preferences. Visual appearance is actively considered in comparing products and is a key determinant of purchase satisfaction.

For some consumers, design quality may not be considered at all; is not recognized or is simply deemed unimportant. For others, there may be some interest in product appearance, but these individuals may not be willing to trade other product benefits such as low prices to obtain aesthetic improvements. With high levels of CVPA, however, consumers not only use visual appearance in comparing products, but also are willing to expend resources in order to obtain fine design. These resources may be financial or temporal in the form of effort to locate and obtain goods with superior design aesthetics. These product-related aesthetes perceive a relatively high payback in purchase satisfaction in return for any additional cost they may incur.
Given the existence of individual differences in CVPA and their relevance to a variety of consumer behavior constructs, researchers need a means to assess these differences. Although the literature contains no instrument specifically developed to assess the centrality of any type of commercial aesthetics, there have been attempts to assess related variables. For example, there are a number of tests used to measure art appreciation. Most of the research activity along these lines occurred between 1920 and 1940. Examples include Thorndike's Test for Aesthetic Appreciation (1916), and the Child Test of Esthetic Sensitivity (1964). More recently, tests have been proposed by Goetz et al. (1979) and Bamossy, Scammon and Johnston (1985).

The basic format of these tests is to show subjects various works of art and then examine the overlap between a subject’s preferences and those of established art experts. The level of correspondence with external standards of aesthetic value becomes a surrogate for art appreciation. Psychometric testing has been spotty for these instruments with validation typically focusing on the ability to discriminate between artists and nonartists. Although art appreciation measures bear some relevance to the design acumen aspect of CVPA, the unwieldy format of these tests and their focus on famous works of art have meant limited usefulness in consumer research.

Other instruments that bear some relationship to CVPA take an information processing approach by differentiating persons based on their propensity to employ verbal vs. visual styles of processing (Childers et al. 1985; Holbrook 1986). For purposes here, one might expect that visual styles of processing may be related to the centrality of visual aesthetics and this idea is tested below in the empirical validation component of the CVPA measure development.

Extant measures just noted offer important, but tangential insights into the concept of visual aesthetics centrality. To assess CVPA as conceptualized here, and to meet the need for a measure that can be used to advance our understanding of product reactions, a scale development
The empirical studies undertaken in the creation and psychometric testing of an instrument to assess CVPA are described next.

**MULTI-STUDY SCALE DEVELOPMENT PROGRAM**

The focus of the studies reported below was to develop a reliable and valid scale to measure CVPA. It was also the intention to provide a measure that assessed such centrality in general, rather than for a single product class.

**Study 1: Item Generation and Refinement**

In order to generate the initial pool of items for the CVPA scale, two sources of information were employed: a review of relevant literature and depth interviews of individuals believed to have above-average interest in design aesthetics. Interview subjects included three graduate students in design and one principal in a major product design firm. The informants commented on their reactions to product appearances, how they evaluate product designs, and the role that well designed objects play in their lives. Each interview lasted approximately one and one half-hours. Recurrent themes discovered among the responses along with concepts emerging in the literature were used in the conceptual material presented above and an initial pool of 86 scale items.

The initial 86 items followed the preliminary four-dimensional conceptualization of CVPA: *value* (23 items), *acumen* (28 items), *response* (17 items), and *determinance:* (18 items). Although dimensions are specified, it is our contention that they occur together and can be combined to form an overall measure of CVPA. Subsequent to the conceptualization of these scale dimensions, a group of five marketing faculty and Ph.D. students at a large Midwestern university judged the content validity of the items. Each judge was presented with a written definition of CVPA and each of its dimensions coupled with an example scale item. Judges were
then asked to assign each of the 86 items to a dimension or to a "none of these" category, following methods used by Bearden, Netemeyer and Teel (1989) and Bearden, Hardesty, and Rose (2001). Items that did not receive consistent classification by at least four of the five judges were eliminated. This analysis resulted in 52 remaining items.

Next, similar to a procedure used by Bearden et al. (1989) and Zaichkowsky (1985), four more judges (faculty different from the above respondents) were given a definition for each dimension and asked to rate each statement as being clearly representative, somewhat representative, or not representative of the dimension. Items evaluated as clearly representative by three judges and no worse than somewhat representative by a fourth judge were retained. This process resulted in a set of 34 items for further analysis.

Study 2: Item Reduction and Reliability Testing

This stage of the research involved scale purification and reliability testing for the 34 items. Data were collected via a mail survey of a random sample drawn from current drivers license registrations in an industrialized Midwestern state. An initial mailing of 1050 surveys was followed by a reminder letter and second copy of the questionnaire mailed two weeks later. Usable responses were received from 318 individuals, resulting in an overall response rate of 30%. Further, per Armstrong and Overton (1977), study respondents were divided into early (first tercile) versus late (last tercile) respondents to examine non-response bias. Mean CVPA scores for early (3.51) and late (3.48) respondents were not statistically different, indicating non-response bias is not an issue with this data collection. Descriptively, slightly over half of the respondents were female (55%), with an average annual household income of between $35,000 and $50,000. The typical respondent had taken some college courses, with only 24% having a college or post-graduate degree. These demographic data follow very closely the 2000 Census norms for the state.
All items were scored using a five point Likert format with higher scores representing greater levels of CVPA. Prior to data analysis, the Kaiser-Meyer-Olkin (KMO) test of sampling adequacy and the Bartlett test of sphericity were used to determine the appropriateness of factor analysis (Kaiser 1974). The KMO level of .924 and the significance of the Bartlett test indicated that factor analysis was appropriate for the data (Kaiser 1974). As an initial reduction method, the correlation of each item with the score for the total set of 34 items was computed. Items that did not have corrected item-total correlations above .40 were deleted. This resulted in the deletion of seven items. Exploratory principal components factor analysis (varimax rotation) was performed next on the remaining set of 27 items. Ten items failed to exhibit simple structure on any factor and were deleted. Corrected item-total correlations were again calculated leading to the deletion of one additional item. Follow-up factor analyses on the remaining items suggested a 15-item scale with three dimensions.

The first factor captured the value facet of visual aesthetics centrality, the second captured acumen, while the third captured response intensity. The determinance dimension failed to materialize. Its constituent items were either deleted based on criteria noted previously or loaded on another of the three dimensions. It is likely that the other three dimensions effectively subsumed determinance. That is, if one strongly values product aesthetics and has a strong response to beautiful objects, it is likely that design will be an important purchase determinant. The exploratory results seemed reasonable and parsimonious, resulting in the introduction of the 15 remaining items to further structural testing through confirmatory factor analysis.

Study 3: Confirmatory Factor Analysis

A second mail survey was conducted to generate data for confirmatory factor analysis. Once again, a survey was mailed to a random sample of adult consumers living in a Midwestern state. An initial mailing of 520 surveys was followed by a reminder letter and second copy of the questionnaire mailed two weeks later. There were 136 usable responses, resulting in an overall
response rate of 26%. The demographics of the second sample were similar to those achieved in
the first mailing. As with the first mailing, non-response bias did not appear to be a concern with
the second mailing.

A series of confirmatory models was examined and estimated using EQS (Bentler 1992). Examination of item reliabilities, Lagrangian multiplier tests, and tests of discriminant validity from confirmatory factor analysis models for both a one-factor second order model (with three sub-dimensions) and a three-factor correlated model suggested the deletion of four additional items. In addition, concerns regarding high correlations among the three dimensions (i.e., value, acumen, and response intensity) prompted the examination of several alternative factor structures. The models estimated included: a null model; a one-factor model for which all of the eleven remaining items were forced to load on a single factor; a three-factor uncorrelated model; a three-factor correlated model; and a one-factor second order model with three sub-dimensions.

As indicated in Table 1, the one-factor second order model and the unidimensional model provided the best fit of the data. The chi-square statistic of both models represented significant improvement over any of the competing models. The chi-squares of the two models themselves, however, were not significantly different. This, in combination with the high correlation among the second order sub-dimensions (value and acumen = .93; value and response intensity = .87; acumen and response intensity = .88), suggested that the appropriate representation of the CVPA scale is a unidimensional model. Such a conclusion was substantiated through replication of the confirmatory analysis with the data collected in Study 2.

In addition, the unidimensional model demonstrated satisfactory fit of the data. The fit statistics were: chi-square = 97.11, 41 degrees of freedom, \( p < .01 \); \( CFI = .96 \); \( NNFI = .95 \); and \( NFI = .93 \). Although the chi-square statistic was significant, it was under the limit of 3 times the number of degrees of freedom suggested by Bollen (1989). The internal consistency of the items,
as determined through the sum of the loadings squared divided by the sum of the loadings squared added to the sum of the item variance, was .89, indicating acceptable reliability of the scale (Fornell and Larcker 1981). Similarly, the corresponding coefficient alpha estimate of internal consistency reliability was .89. The eleven remaining items and their corresponding factor loadings are presented in Table 2. The sub-dimension to which each item originally belonged is retained to demonstrate the equality of representation among the theoretical components of design aesthetics centrality.

The results of the confirmatory analysis indicate that CVPA is comprised conceptually of three dimensions that are useful in terms of understanding the construct, but that are unidimensional in scope and, hence, measurement. As discussed by Carver (1989), in such instances it is appropriate to combine the items tapping the dimensions of CVPA to arrive at a composite score that represents the general high/low nature of the construct. As such, the composite score of CVPA represents an individual difference in the salience of visual product aesthetic among consumers.

Further, these results are in concert with previous work on experiential consumption (Holbrook and Hirschman 1982; Holt 1995). Holt posited that under conditions of consumption for the experience, the product is consumed as an end in itself, rather than as a means to another end. In the present research, high CVPA consumers will likely see a product with a beautiful design as worthwhile to consume as an end in its own right. Holt also identified three components that are necessarily associated with consumption for the experience: accounting, evaluating, and appreciating. He defined accounting as having the ability to apply an interpretive framework to make sense of the focal product. This component is similar to the acumen element of our scale. Evaluating is allied with our value element being defined by Holt as applying one's interpretive framework to pass judgment on the focal object. His last component, Appreciating, is described as an emotional reaction to the focal object, being analogous to our response facet. Thus the results of our analyses suggest that that these three scale facets logically occur together,
Study 4: Discriminant Validity and Relationships with Other Measures

For the purpose of assessing discriminant validity, a survey containing the CVPA scale, and measures of four conceptually related constructs, was administered to 108 undergraduate business students (Campbell and Fiske 1959). Evidence of discriminant validity was provided through the test recommended by Fornell and Larcker (1981), and through examination of chi-square difference tests between pairwise comparisons of the various scales (Anderson and Gerbing 1988).

The first related measure employed here was the visual component of Childers et al.’s (1985) Style of Processing (SOP) scale, which captures an individual’s propensity to use the visual modality of processing. Because individuals who score highly on CVPA may be more likely to process visually, it was deemed appropriate to compare the two measures for purposes of establishing discriminant validity. Second, the CVPA measure was assessed relative to the Desire for Unique Consumer Products (DUCP) scale (Lynn and Harris 1997). The DUCP scale measures the extent to which consumers hold as a personal goal the acquisition of products that few others possess. One might expect consumers who score high on the CVPA scale would be more likely to seek products that are unique, if only for the appearance of the product. Finally, the relationship between CVPA and consumer materialism was investigated. Richins and Dawson (1992) argued that materialism is comprised of three dimensions: acquisition centrality, acquisition as the pursuit of happiness, and possession-defined success. It seems plausible that for consumers who score high on CVPA, the acquisition of aesthetically pleasing products may
become central to their lives. In a similar manner, the high value of design aesthetics for high CVPA consumers could produce a mindset where feelings of satisfaction and well-being are not possible without being surrounded by beautiful products. As indicated in Table 3, each of the measures investigated in combination with CVPA demonstrated an acceptable level of reliability, with internal consistency scores ranging from .74 (DUCP) to .80 (Success component of Materialism).

Table 3 also shows that CVPA is, as anticipated, positively correlated with each of the measures discussed. Each correlation (phi estimate) between CVPA and the other respective constructs was significant at the .01 level. This is not surprising, given the strong "product-oriented" commonalities of the measures. Given that several of the correlations exceeded .40, further analysis was conducted to ensure that discrimination existed among the tested scales. Specifically, following the recommendations of Fornell and Larcker (1981), the variance extracted estimates for each pair of constructs were examined to ensure that they exceeded the squared phi estimate between the constructs. The variance extracted estimates ranged from a low of .34 (DUCP) to a high of .47 (Happiness component of Materialism), indicating discrimination between CVPA and each respective scale. The variance extracted estimate for CVPA was .43. Finally, the discriminant validity of the factors was assessed by testing whether, for every pair of factors, a two-factor model fit significantly better than a one-factor model (Anderson and Gerbing 1988). In all cases, the two-factor model fits significantly better than the one-factor model with the smallest Chi-Square difference of 74.15 ($p < .01$) witnessed in relation to the DUCP scale. Thus, it was concluded that the CVPA measure is clearly discriminated from the other scales examined in this study.

Data from Study 3 were also used to gain further insight into the construct validity of the CVPA scale as well as to allow further examination of the scale interrelationships noted above.
Respondents to the Study 3 survey were presented with a list of 30 products and asked to indicate those products for which design or appearance was very important to them in making purchases. Respondents could select as many or as few product categories as they wished. Accordingly, scores could range from zero to thirty, depending on the number of products selected. It was presumed that higher scores on the CVPA scale would be associated with a larger number of selected products. For validation purposes, the number of products indicated was regressed on the CVPA scale, Childers' visual processing measure, and the DUCP scale in order to examine the unique contribution of each construct to explaining design’s usage as a purchase criterion.

As Table 4 indicates, CVPA, as well as the other two measures were all significantly correlated with the number of product classes indicated, although CVPA was the only construct statistically significant at the .01 level (\( r = .29, p < .01 \)), with SOP and DUCP being statistically significant at the .05 level. Results indicated that the instruments explained unique portions of the variance in the number of products selected. That is, the tolerance scores for CVPA (0.96), visual orientation (0.93), and DUCP (0.96), and the low VIF scores (1.039, 1.078, and 1.05 respectively) indicated that multicollinearity is not an issue suggesting that the independent variables are contributing independently to the prediction of the dependent variable (see Neter,

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1 The product list was generated through an open-ended survey given previously in a separate pretest to 104 undergraduate and graduate students at a large university in the Northeastern U.S. Respondents were asked to list up to six products for which product appearance was very important to them in making choices and six products for which appearance was not at all important. This list was supplemented with products shown on navigation buttons at the Wal-Mart and QVC home shopping web sites. The products used in the validation of the CVPA scale were: clothing/shoes, personal computers, lawnmowers, clothing accessories/belts, furniture, power tools, bedding/linens, small kitchen appliances, gardening tools, eyeglasses, large appliances, hand tools/hardware, watches/jewelry, automobiles, vacuum cleaners, perfume/cosmetics, cameras, barbecue grills, dinnerware/china, televisions, space heaters/fans, toothbrushes, VCR's, pens/stationary, camping/outdoor gear, telephones/cell phones, bicycles, sporting goods, audio equipment, and cookware.
Wassermann, and Kutner 1989). Overall, the findings provide preliminary evidence for the nomological validity of the CVPA scale.

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Study 5: Social Desirability Testing

Due to the recent media coverage given to product design aesthetics (e.g., Nussbaum 1999), it was considered prudent to test the CVPA measure for susceptibility to social desirability bias. Social desirability was measured with the 20-item impression management (IM) scale developed by Paulhus (1993). The IM scale and CVPA items were administered to 53 undergraduate and graduate students at a Midwestern university. The correlation between the 11-item CVPA and Paulhus measures was – .07 (ns), suggesting that social desirability bias was not a significant problem for the CVPA measure.

Study 6: Known-Groups Validation

When naturally existing groups should meaningfully differ on a scale in question, a known-groups validation test is appropriate (Lastovicka et al. 1999). To conduct such a test, a sample of design professionals taken from a subscriber list for a design-related magazine (@Issue) was compared to the random samples drawn from the first and second general mail survey administrations (i.e., Studies 2 and 3, respectively). Based on the training, experience, and career demands typical of these individuals, it was expected that design professionals would have high interest in design and consider visual aesthetics to be highly central. 250 design professionals received a mail survey similar to that sent to the general random sample and a reminder survey two weeks later. Responses were received from 62 individuals, resulting in a
response rate of 25%. The mean for the 11-item CVPA scale was markedly higher for the design professionals than for the general population in both instances (4.26 vs. 3.51 with Study 2 data; 4.26 vs. 3.44 with Study 3 data; both differences significant $p<.01$). This successful known groups test provides additional evidence for the CVPA scale's validity.

Study 7: Experimental Validation of the CVPA Scale

As further validation, a study was designed to test CVPA levels influence reactions to product designs that differ in aesthetic quality. While we expected a main effect where the superior design execution generates more positive reactions overall, our chief hypothesis is that high CVPA consumers should be more discriminating than low CVPA consumers in their reactions to designs with high versus low aesthetic content, as stated in the following hypothesis:

**H1:** For high CVPA consumers, the difference between reactions to the low and high aesthetic products would be greater than the difference between the corresponding reactions of low CVPA consumers. This difference will be observed for four types of responses: (a) aesthetic appraisal of the product, (b) attitude toward the product, (c) purchase intention, and (d) price willing to be paid for the product.

To test the proposed hypotheses, a 2 X 2 factorial design was used. The product design manipulations were within-subject (subjects saw color pictures of two design executions for the same product class: one with low aesthetic content and one with high content; no product features information was given). CVPA was a between-subjects factor. The position in which the products appeared was counterbalanced. A within-subject design was necessary to obtain comparative evaluative judgments and to simulate "cross-over testing" procedures often used in real-world tests (Tapp 1998).

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2 Across all general population research applications of CVPA, the scale mean has ranged from a low of 3.31 to a high of 3.6. The standard deviation of the scale has ranged from a low of 0.59 to a high of 0.62.
One hundred and ninety undergraduate business students at a large Northeastern university participated in this study for course credit. Toasters were selected as product stimuli for this study because of relevance to student subjects and variations in design aesthetics without commensurate variations in other product features. These last two reasons are critical for our investigation as we wished to isolate the effect of aesthetics from function. Based on qualitative pre-testing, two toaster designs were selected as representing a high and a low level of product design aesthetics (see Appendix A). Both of the photos were digitally altered for consistency and to hide brand identification. Toaster A was rated in the pretest as representing a high aesthetics design and Toaster B as a low aesthetics design.

Both products were featured on the same page (position counterbalanced). After viewing the pictures, subjects completed a set of seven-point product aesthetics appraisal items taken from Hirschman (1986). Subjects also indicated their overall attitude toward each design and their purchase intention. For each of these three reaction variables, means were computed across constituent items to produce an overall score that could range from 1 to 7 with higher scores representing more favorable reactions. Finally, prices willing to be paid for each product design were captured through open-ended questions.

An overall CVPA score was computed for each subject. The mean CVPA score for this sample was 3.45 ($SD = .469$). To test our hypotheses, the sample was divided into terciles by CVPA score and a series of two-way analyses of variance was conducted using a 2 X 2 design. In these analyses, the product design manipulation (low versus high aesthetics design) was a within-subject factor and CVPA (high = top tercile of scores on the total 11 item scale, $M = 3.90$; low = bottom tercile of scores, $M = 2.96$) as a between-subjects factor. Confirming the product aesthetics manipulation, we found that subjects perceived the two products to be aesthetically different ($M_{LA} = 3.20; M_{HA} = 5.10; F(1,134) = 110.23, p < .001$). Further, and as expected, the higher aesthetics product led to more favorable product attitudes ($M_{LA} = 4.60; M_{HA} = 5.44; F(1,134) = 32.38, p < .001$), higher purchase intentions ($M_{LA} = 4.53; M_{HA} = 5.03; F(1,133) = 5.99, p = .016$) and willingness to pay a higher price ($M_{LA} = $24.08; $M_{HA} = $37.32; $F(1,129) =$
We also found a significant multivariate effect of product aesthetics across the four dependent measures that were just mentioned ($F(4, 124) = 66.26, p < .001$). Results are shown graphically in Figure 1.

As hypothesized, a multivariate test showed a significant interaction effect of CVPA and product version with the four dependent measures ($F(4, 124) = 3.47, p = .01$). Univariate tests were also analyzed. First, we found that there was a significant interaction of product aesthetics with CVPA on aesthetic appraisals (Panel A: $F(1, 134) = 12.53, p = .001$). Even though both low and high CVPA respondents evaluated the high aesthetics product as more aesthetically pleasing than the low aesthetics product (t(65) = 4.58, $p< .001$; t(69) = 10.72, $p< .001$ respectively), high CVPA subjects were more discriminating in their evaluations of product design than were the low CVPA subjects. This interaction confirmed that high CVPA subjects showed a greater spread (2.51) between their aesthetic appraisals of the high versus low aesthetics products than did low CVPA subjects (1.24). This increase is mainly driven by the fact that the high CVPA respondents evaluated the high aesthetics product in a more favorable manner than did the low CVPA group ($M_{high CVPA} = 5.63; M_{low CVPA} = 4.53, t(134) = 4.61, p < .001$) -- whereas there was no difference in the evaluation of the low aesthetics version ($M_{high CVPA} = 3.12; M_{low CVPA} = 3.29, t(134) = .83, NS$). A similar significant interaction pattern was found with respect to attitudes (Panel B: $F(1, 134) = 8.74, p < .005$) and in purchase intentions (Panel C: $F(1, 133) = 9.48, p < .005$) in which high CVPA subjects discriminated more strongly across the two product designs. With these two dependent measures it is important to note that the low CVPA respondents did not show significantly different attitudes or purchase intentions (t(65)=1.90, NS; t(65)=.43, ns respectively) between the high and low aesthetics products. However, in both

3 For price, the degrees of freedom are different because four subjects had either incomplete answers or aberrant answers (price = 0 or outlier of more than 3 standard deviations).
cases the high CVPA respondents gave higher attitudes and purchase intentions scores to the high aesthetics product versus the low aesthetics product (product attitudes: $M_{\text{high aesth.}} = 5.69$; $M_{\text{low aesth.}} = 4.43$, $t(69)=6.22$, $p<.001$; purchase intentions: $M_{\text{high aesth.}} = 5.53$; $M_{\text{low aesth.}} = 4.43$, $t(68)=4.06$, $p<.001$). Also in both situations, the high aesthetics product produced greater attitudes and purchase intentions with the high CVPA group than with the low CVPA group (product attitudes: $M_{\text{high CVPA}} = 5.69$; $M_{\text{low CVPA}} = 5.17$, $t(134)=2.59$, $p<.02$; purchase intentions: $M_{\text{high CVPA}} = 5.53$, $M_{\text{low CVPA}} = 4.51$, $t(134)=3.68$, $p<.001$). With respect to the low aesthetics product, it appears that there were no statistically significant differences in attitudes and purchase intentions across the two CVPA groups ($t(134)=1.93$, $p>.05$; $t(133)=.82$, NS respectively).

Finally with respect to price, only a marginal interaction effect was found (Panel D: $F(1, 129) = 2.83$, $p <.10$). Even though this interaction did not reach the .05 significance level, it was consistent with the other patterns that were found and with the hypothesis. Because price was an open-ended measure, subjects reported a broad range of prices. The high variance on this measure may partially explain the weaker results. Since the overall interaction is not statistically significant, no discussion of the contrast effects is reported.

The above findings should be interpreted in light of the conservative nature of this experiment. The product category used in the study is not one that tends to generate strong consumer involvement, nor is it ego expressive and conspicuous. One could expect greater effect sizes with product categories where design plays a greater role in identity expression or public display. In addition, it should be noted that toasters are a product category where designs typically differ only in superficial styling, but not in scale, proportion, or basic form. Finally, because we chose two product versions that were available commercially, one can expect that even the low aesthetics product was pleasing enough in order to have made it to store shelves, de facto providing a floor effect for our test. While, the product stimuli used in this study allowed more experimental control and rigor in hypothesis testing, they may have limited the magnitude of observed effects.
Study 8: Validation of the CVPA Scale using Conjoint Analysis

To further investigate the scale’s validity and predictive ability, a conjoint study was employed to determine if high CVPA consumers assign greater weights to aesthetics in making purchases than would low CVPA consumers. Conjoint analysis is particularly appropriate here as it encourages consumers to attach values to specific attributes and mirrors the types of trade-offs consumers have to make in the actual marketplace (Huber 1997). The target product category selected for this study was bathroom scales based on the same criteria used to choose toasters in the previous study.

As a pretest, 57 MBA students at a large Northeastern university were asked to evaluate the physical attractiveness of 16 bathroom scales. All stimuli were photos of actual marketplace products that were digitally altered so that they did not show a brand name. Based on the results of the pretest, three bathroom-scale designs were chosen for the conjoint study, representing low, medium, and high levels of aesthetic quality (means = 3.54, 4.14 and 4.98 respectively, all different from each other at p=.01 levels or lower). A further survey of offerings in the product class was used to gather information on relevant product features and price points for our study.

For this study, the following attributes were manipulated: aesthetic quality (3 levels), power source (2 levels), memory functions (2 levels), warranty (2 levels), and price (3 levels). The methodology outlined by Green and Wind (1975) was employed and conjoint design software was used to reduce the number of conditions from 72 to 16 (an orthogonal factorial design). Appendix A contains three sample cards providing examples of all the levels used for each product attributes. To best suit the study objective, a full profile rating conjoint design was used where subjects were presented with cards that contained full product descriptions and evaluated them one by one (see Huber 1997). On the bottom of each card, subjects encountered a 10-point purchase intention scale (see Huber et al.1991).
A total of 108 undergraduate business students participated in this study for course credit. In order to control for order effects, subjects were randomly assigned to a particular card presentation sequence. For analysis purposes, we dummy coded each factor in the experiment with 2 dummy variables for design and for price and one each for power source, memory functions, and warranty. Overall mean CVPA was 3.59 (Std. Dev. = .611). A tercile split on scores for the 11-item CVPA scale was used to identify low (bottom third) versus high (top third) CVPA groups.

The first step involved estimating the entire model, irrespective of CVPA. A least square regression was run with purchase intention as the dependent variable and all the manipulated factors as predictors. The overall model was significant ($F(7, 1724) = 118.08, p < .001$) and explained 32.5% of the variance. Each dummy variable was significant as well. As expected, increased power ($\beta=.41, t = 20.55, p < .001$), memory ($\beta = .17, t = 8.67, p < .001$) and warranty ($\beta=.24, t=12.26, p<.001$) contributed to higher purchase intentions, and increased prices ($\beta \$28 = -15, t=-613, p < .001; \beta \$35 = -.26, t = -10.59, p< .001$) contributed to lower purchase intentions. With respect to aesthetic quality, the middle level product elicited slightly lower purchase intentions ($\beta = -.05, t = -2.06, p < .05$) than did the low aesthetic quality option, somewhat contradicting our pretest results. However, the high aesthetic quality product did generate an increase in purchase intentions ($\beta = .13, t = 5.28, p < .001$)\(^4\).

The next step involved studying the weight of product aesthetics in the formation of purchase intentions for low versus high CVPA respondents. To do so, we ran a second model where dummy terms were used to capture the differences in aesthetic weights for high versus low CVPA respondents across the three product designs. To decompose these effects and to capture the 6 weights, we used a total of 5 dummy variables. This new model was significant

\(^4\) Upon closer examination, it appears that one of the reasons that the a priori lower and middle aesthetic scales lead to results that are contrary to expectations, is that for the low CPVA respondents, there is not a significant difference for the impact of aesthetics of these two products on their purchase intention ($t = -.862, \ p=.389$). However, and as expected, high CPVA respondents are able to attribute different weights to each design.
(F(10, 1090) = 54.16, \ p< .001) and explained 33.2% of the variance. The result replicated the findings of our first model but also showed that for all three of the product design executions, the importance placed on aesthetics in the formation of purchase intentions was greater for high CVPA respondents than for low CVPA respondents (see Figure 2 for the aesthetic weights for each groups). Specifically, there was an increase of .103 (t= 3.17, p< .005) for the beta weight of the low aesthetic quality product option, .084 (t = 2.58, \ p< .01) for the medium product, and .082 (t = 2.73, \ p < .001) for the high aesthetic quality product.

These results provide additional evidence of the validity and predictive ability of the CVPA scale. Again, it should be noted that these findings might be considered rather conservative given the product stimuli used in the study.

DISCUSSION

Findings from Research

Marketplace responses clearly indicate strong differences in consumers’ concern with product appearance or design. All consumers care about what they receive from a product during its acquisition and use. CVPA reflects an enduring concern with the aesthetic benefits provided by a product. However, these consumer differences have not been well illuminated in past research, nor has there been a means to measure them. The intention of this research was to conceptualize and develop a multi-item scale that captures individual differences in the centrality of visual product aesthetics. The present research would not only fill gaps in our understanding of consumer preferences and reactions to design, but also has the potential to further our
understanding of a number of seminal consumer behavior concepts such as brand loyalty, involvement, materialism, and innovativeness.

A series of eight studies, integrating a range of methodologies, suggest that CVPA is both a theoretically and managerially relevant construct and that the resulting scale possesses acceptable reliability and validity. In particular, validity was successfully demonstrated through the testing of convergence and discrimination (both within the scale and among published scales), known-groups comparisons, experimental and conjoint procedures, and replicable nomological analysis. All of the studies undertaken here employed recognized psychometric procedures and standards similar to those reported in other recent scale development work (e.g., Bearden et al. 2001; Bearden et al. 1989; Lastovicka et al. 1999; Richins and Dawson 1992). This research has broadened our understanding of aesthetics in consumer behavior generally as well as bringing needed attention to individual differences in reactions to design.

Based on the conceptual and empirical material presented earlier, CVPA emerged as a unidimensional construct that is comprised of elements drawn from three domains that occur in concert: the perceived value attached to superior product design executions, abilities in understanding and evaluating product design, and the level of response to product aesthetics. Given the results for the scale reported above, consistent scores across the three dimensions are expected. However, it should be noted that relatively high levels of overall CVPA could derive from different patterns of response among the three dimensions. For example, a consumer may strongly value product aesthetics while not reporting high levels of acumen.

High CVPA consumers consider aesthetics to be important for a wider range of product categories than do consumers scoring low on visual aesthetics centrality. Further, the importance placed on product aesthetics in the formation of purchase intentions is greater for high CVPA respondents than for those with low CVPA. It should be recognized however that the objective of this research was to explore and measure only one aspect of consumer related aesthetics: the visual appearance of products. We recognize that design and aesthetics are also important for other commercial elements and for other sensory channels. We selected visual product aesthetics
for this research due to their significance in the marketplace and in contemporary discussions of design. In addition, visual aesthetics are relevant to the widest set of product classes. Whereas sound, scent, and taste may be critical for a few products, visual appearance is a key feature for nearly all goods.

Research Directions

There are also several areas of research expansion regarding CVPA that appear profitable. In subsequent study, researchers could extend the concept of aesthetic centrality to other sensory experiences. One could explore whether consumers who are concerned with the visual aesthetics of products also care more than average about aesthetics relating to sound, smell, or feel. It might also be the case that visual aesthetics are unique as a source of consumer centrality. Determining whether concern with visual product aesthetics is allied with the centrality of visual aesthetics generally represents another research direction of promise. For example, do consumers with high CVPA also tend to care about the appearance of store interiors or web page layouts? Answering this question may require attention to the impact of selective product involvements and role performance demands. For example, the male canoe buyer quoted earlier may find it culturally acceptable to express a concern about the styling of the canoe, but not about the ambience of a sporting gear dealership, or the attire of the sales staff. It still seems likely, however, that a person with greater abilities and interests regarding visual aesthetics will give them relatively high weight wherever they may be encountered.

Future research can also address another limitation of the present research by using more disparate product categories as arenas of inquiry. It would be worthwhile to see if results reported above for consumer durables such as toasters also apply to non-durables, packaging, and to more experiential goods such as restaurant food presentations. The CVPA scale may also have application in cross-regional or cross-national research. Certain nations, cities, and, regions have reputations for the fine design of their products and the high tastes of their citizens. The
CVPA scale could be used to empirically verify whether geographic areas in fact differ in terms of the importance design plays in a person’s life. Differences observed could be related to regional characteristics to allow greater insight into the development of CVPA. Furthermore, longitudinal research would allow us to determine whether a region’s CVPA is evolving over time. With the growing attention to design execution in more and more product classes, one might expect to see an elevation of CVPA over the course of time.

It might also prove profitable to explore whether high CVPA consumers have a greater facility for making product and brand inferences based on aesthetic features. Because they care about product appearances, those with high CVPA may retain aesthetically-based product meanings that can be recalled during subsequent decision episodes. Those with low CVPA are not expected to have the previously-formed inferences at their disposal and will have to form them at each purchase decision. The process of acquiring meaning and making judgments when exposed to the visual aspects of an object will therefore be faster for those with high CVPA.

Other key consumer behaviors and attitudes also may be further understood through the examination of CVPA. For example, our understanding of the antecedents of product involvement may be enhanced through investigation of CVPA as an independent variable. Although consumer researchers have actively studied involvement for many years, we know very little about its genesis. It could be that many instances of product involvement are based upon the response or value that a consumer absorbs from the aesthetics of a product class. In other words, the aesthetic appeal of jewelry, sports cars, or roses may be the force that creates highly involved consumers for each of these categories. Thus, research could explore whether high CVPA consumers are more likely to be involvement-prone generally due to the relatively high aesthetic payoffs many products provide them.

Similarly, the co-investigation of visual aesthetics centrality and consumer impulse purchasing may be fruitful. Beatty and Ferrell (1998) examined multiple antecedents to the felt urge to buy impulsively. Although not examined, CVPA may, among certain consumers, be an important antecedent to impulse purchasing as suggested by Rook’s (1987) work. That is,
following a strong response to the aesthetics of a product, it may be very likely that a consumer will take an impulsive action. Assuming a design-oriented consumer, such a relationship would lend credence to the strategies of retailers that are increasingly adding merchandise with high aesthetic content. There appear to be many avenues of future research related to the CVPA scale, both theoretical and managerial. It is hoped that the ultimate value of this scale will be demonstrated through its future application.
### Digital Bathroom Scale

- Permanent lithium power source that never needs replacing - no batteries to buy or dispose of
- No memory function
- Lifetime warranty
- Price: $35.00

### Digital Bathroom Scale

- Powered by replaceable, disposable batteries
- No memory function
- Lifetime warranty
- Price: $28.00

### Digital Bathroom Scale

- Permanent lithium power source that never needs replacing - no batteries to buy or dispose of
- Multiple memories function
- Limited warranty for 90 days
- Price: $21.00
REFERENCES


Campbell, Donald T. and Donald W. Fiske (1959), "Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix," *Psychological Bulletin*, 56 (March), 81-105.


Loewy, Raymond (1951), Never Leave Well Enough Alone, New York: Simon & Schuster


### TABLE 1

**CONFIRMATORY FACTOR ANALYSIS**

**MODEL FIT COMPARISONS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Chi-Square</th>
<th>df</th>
<th>Chi-Square Difference&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Null</td>
<td>1677.00</td>
<td>55</td>
<td>---------</td>
</tr>
<tr>
<td>1-Factor</td>
<td>98.13&lt;sup&gt;b&lt;/sup&gt;</td>
<td>44</td>
<td>1578.87&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>3-Factor Uncorrelated</td>
<td>318.25</td>
<td>44</td>
<td>220.12&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>3-Factor Correlated</td>
<td>273.10</td>
<td>43</td>
<td>45.15&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>1-Factor Higher Order</td>
<td>97.11&lt;sup&gt;b&lt;/sup&gt;</td>
<td>43</td>
<td>175.99&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>CFI</th>
<th>NNFI</th>
<th>NFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Factor</td>
<td>.96</td>
<td>.95</td>
<td>.93</td>
</tr>
<tr>
<td>1-Factor Higher Order</td>
<td>.96</td>
<td>.94</td>
<td>.93</td>
</tr>
</tbody>
</table>

---

**Note:**<br>
- df is degrees of freedom, CFI is Comparative Fit Index, NNFI is Non-Normed Fit Index, and NFI is Normed Fit Index.<br>
- Chi-square differences represent comparisons of subsequent models (e.g., null versus 1-Factor; 1-Factor versus 3-Factor Uncorrelated; etc.).<br>
- The chi-square difference between the 1-Factor and 1-Factor Higher Order Models is not significant<br>
- p < .01
### TABLE 2
CONFIRMATORY FACTOR ANALYSIS RESULTS FOR CVPA ITEMS

<table>
<thead>
<tr>
<th>Item</th>
<th>Single Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Value:</strong></td>
<td></td>
</tr>
<tr>
<td>Owning products that have superior designs makes me feel good about myself.</td>
<td>.77</td>
</tr>
<tr>
<td>I enjoy seeing displays of products that have superior designs.</td>
<td>.73</td>
</tr>
<tr>
<td>A product’s design is a source of pleasure for me.</td>
<td>.66</td>
</tr>
<tr>
<td>Beautiful product designs make our world a better place to live.</td>
<td>.64</td>
</tr>
<tr>
<td><strong>Acumen:</strong></td>
<td></td>
</tr>
<tr>
<td>Being able to see subtle differences in product designs is one skill that I have developed over time.</td>
<td>.71</td>
</tr>
<tr>
<td>I see things in a product’s design that other people tend to pass over</td>
<td>.64</td>
</tr>
<tr>
<td>I have the ability to imagine how a product will fit in with designs of other things I already own.</td>
<td>.62</td>
</tr>
<tr>
<td>I have a pretty good idea of what makes one product look better than its competitors.</td>
<td>.55</td>
</tr>
<tr>
<td><strong>Response:</strong></td>
<td></td>
</tr>
<tr>
<td>Sometimes the way a product looks seems to reach out and grab me.</td>
<td>.75</td>
</tr>
<tr>
<td>If a product’s design really &quot;speaks&quot; to me, I feel that I must buy it.</td>
<td>.56</td>
</tr>
<tr>
<td>When I see a product that has a really great design, I feel a strong urge to buy it.</td>
<td>.55</td>
</tr>
</tbody>
</table>

Note: Single-factor model chi-square is 98.125 with 44 degrees of freedom; $CFI = .96$, $NNFI = .95$, $NFI = .93$; Internal Consistency = .89
### TABLE 3

CORRELATIONS AND RELIABILITY ESTIMATES FOR KEY VARIABLES

<table>
<thead>
<tr>
<th></th>
<th>CVPA</th>
<th>Visual Processing</th>
<th>DUCP</th>
<th>Materialism</th>
<th>Success</th>
<th>Happiness</th>
<th>Centrality</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVPA</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visual Processing</td>
<td>.34&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DUCP</td>
<td>.53&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Materialism</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Success</td>
<td></td>
<td>.58&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.14</td>
<td>.34&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Happiness</td>
<td></td>
<td>.34&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.11</td>
<td>.32&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.52&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Centrality</td>
<td></td>
<td>.50&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.02</td>
<td>.47&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.55&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.24&lt;sup&gt;c&lt;/sup&gt;</td>
<td>-</td>
</tr>
<tr>
<td>Internal Consistency&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.89</td>
<td>.78</td>
<td>.74</td>
<td>.80</td>
<td>.79</td>
<td>.76</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> Internal consistency determined through two-factor model comparisons involving CVPA and each respective construct.

<sup>b</sup> p < .01

<sup>c</sup> p < .05
### TABLE 4

**TEST RESULTS WITH BREADTH OF USAGE OF DESIGN AS A PURCHASE CRITERION**

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Beta</th>
<th>Products Indicated</th>
<th>Correlation with #</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVPA Scale</td>
<td>.31</td>
<td>.29</td>
<td>Adjusted $R^2 = .19$, $F(3, 142)= 6.19, p &lt; .001$.</td>
</tr>
<tr>
<td>SOP/Visual Scale</td>
<td>.27</td>
<td>.19</td>
<td>$p &lt; .01$.</td>
</tr>
<tr>
<td>DUCP Scale</td>
<td>.26</td>
<td>.14</td>
<td>$p &lt; .05$.</td>
</tr>
</tbody>
</table>

Results with number of product categories selected as dependent variable:

- CVPA Scale: $r = 0.31$, $p < .01$
- SOP/Visual Scale: $r = 0.27$, $p < .01$
- DUCP Scale: $r = 0.26$, $p < .05$
FIGURE 1
THE MODERATING EFFECT OF DESIGN AESTHETICS CENTRALITY ON
PRODUCT DESIGN EVALUATIONS

FIGURE 2
COMPARISON OF CONJOINT DESIGN STANDARDIZED WEIGHT ESTIMATES
FOR LOW AND HIGH CVPA RESPONDENTS
FIGURE 1
THE MODERATING EFFECT OF DESIGN AESTHETICS CENTRALITY ON
PRODUCT DESIGN EVALUATIONS

A. Aesthetics Evaluations (1-7)

B. Product Attitudes (1-7)

C. Purchase Intentions (1-7)

D. Price ($)

High Aesthetics

Low Aesthetics

Product

Product
FIGURE 2

COMPARISON OF CONJOINT DESIGN STANDARDIZED WEIGHT ESTIMATES
FOR LOW AND HIGH CVPA RESPONDENTS
INDIVIDUAL DIFFERENCES IN THE CENTRALITY OF VISUAL PRODUCT AESTHETICS

Personal and Social Value of Design
Acumen
Level of Response
Design Determinance
Measurement of Individual Differences in Design Related Traits

MULTI-STUDY SCALE DEVELOPMENT PROGRAM

Study 1: Item Generation and Refinement
Study 2: Item Reduction and Reliability Testing
Study 3: Confirmatory Factor Analysis
Study 4: Discriminant Validity and Relationships with Other Measures
Study 5: Social Desirability Testing
Study 6: Known-Groups Validation
Study 7: Experimental Validation of the CVPA Scale
Study 8: Validation of the CVPA Scale using Conjoint Analysis

DISCUSSION

Findings from Research
Research Directions