The Accuracy of Brand and Attribute Judgments: The Role of Information Relevancy, Product Experience, and Attribute-Relationship Schemata

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A multidimensional approach for accuracy of ratings is introduced that examines consumers' abilities to assess various brands across a set of attributes and attribute performances across a set of brands. A model is presented that addresses the roles of the relevancy of information, attribute-relationship schemata, and consumers' product category experience on the accuracy of their brand attribute ratings. Study participants were provided either with relevant or irrelevant attribute information for various automobile brands and later asked to rate the attribute performances of brands. The results indicate that the provision of relevant information in the judgment environment increases brand and attribute rating accuracy but does not favorably affect consumers' brand attribute-relationship schemata. Rather, consumers' product experience was directly related to their attribute-relationship schemata, which in turn were related to improved accuracy of brand and attribute ratings.

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The accuracy of consumers' perceptions about brand performance is a critical factor related to brand evaluations and purchase behavior. These perceptions are a primary basis for product positioning, brand quality expectations, and brand comparisons that affect ultimate purchase decisions. Consumers' perceptions about brand attribute performance are based on exposure to brand information and their experiences with the brand and/or experiences with other brands within the product category. This information and experiences are stored in memory and accessed when making subsequent appraisals of brands (Pechmann and Ratneshwar 1992).

This study investigates the correspondence between consumers' ratings of brand attribute performance levels and objective measures of brand attribute performance levels within a product category and across multiple brands and relevant attributes. Our purpose is to examine factors that affect the "accuracy" of this correspondence between consumers' ratings and objective brand attribute ratings. Specifically, we examine the effects on accuracy of exposure to relevant (versus irrelevant) brand attribute information, consumers' attribute-relationship schemata, and consumers' prior product category experience. In this study, we introduce to the marketing literature Cronbach's (1955) multidimensional approach to performance rating accuracy and extend it to the brand and attribute-related product context.

BACKGROUND AND HYPOTHESES

Previous research in marketing generally has focused on the accuracy of relationships between attributes rather than the accuracy of the specific brand and attribute ratings themselves. For example, consumers' price-quality perceptions and objective price-quality relationships have been extensively studied (e.g., Curry and Faulds 1986; Lichtenstein and Burton 1989). In these studies, measures of objective quality typically use *Consumer Reports'* rankings of brands and correlate them with prices. Consumers' price-quality perceptions are then ascertained using Likert-type scales and compared with the objective measures. Results have revealed that consumers' price-quality relationships are, at best, modest predictors of objective price-quality relationships and vary by product category (Curry and Riesz 1988; Lichtenstein and Burton 1989).

While price-quality studies have aggregated attributes in inferring quality, other studies have examined the relationship between pairs of attributes (e.g., price and taste) using objective correlations and consumers' covariation judgments. These studies often manipulate the objective attribute correlations and assess consumers' covariation judgments when looking at brand preferences (e.g., Pechmann and Ratneshwar 1992). In both price-quality and covariation judgments, consumers' perceptions of the relationship between two attributes (e.g., quality and price, taste and price) are measured rather than having consumers judge or rate each attribute (e.g., price, taste, quality) and brand.

In contrast to these prior studies, very little research exists in marketing that directly assesses the accuracy of consumers' ratings of multiple attributes and brands within a product category. To assess the accuracy of ratings, objective measures of brand and attribute performance must be available and compared with consumers' subjective ratings. Furthermore, for the subjective ratings, individual brand and attribute ratings must be measured and compared with the objective measures.

Cronbach's (1955) ratings dimensions allow the accuracy of consumers' judgments (ratings) of brands and attributes for both multiple brands and multiple attributes to be ascertained. Specifically, when objective brand attribute performance scores are available, Cronbach's (1955) ratings accuracy dimensions offer a meaningful way to assess the accuracy of consumers' brand and attribute performance assessments. This approach, widely used in performance appraisal research (Becker and Cardy 1986; Harvey and Lozada-Larsen 1988; K. Murphy, Kellam, Balzer, and Armstrong 1984; Sulsky and Balzer 1988), decomposes global accuracy into dimensions. Accuracy dimensions of significant interest to marketers interested in overall brand and specific attribute performance ratings include differential elevation and differential accuracy (Cronbach 1955). While these rating accuracy measures are common in the human performance appraisal literature, to our knowledge, they have not been used to assess consumers' brand and attribute product ratings. Given this extension to a product and brand attribute context, a brief discussion of what these measures represent and how they are assessed in a brand ratings' domain is offered.

Differential elevation (DE) assesses the extent to which consumers accurately estimate *aggregate* performance of specific brands within a product category. For each brand, DE provides an accuracy measure for overall brand performance across all salient attributes. Thus, DE is a critical evaluation of rating accuracy for consumers who evaluate brands, within a given product category, based on attribute performance across multiple salient attributes (e.g., a compensatory evaluation rule). The accuracy of the overall performance of the brand is measured as the sum of the squared differences between the consumers' perceived mean attribute ratings for each of the brands and the objective "true" measure of mean attribute levels for each of the brands. This aggregated accuracy measure (DE) is shown in equation 1.

$$DE^2 = \frac{1}{n}\Sigma[(\bar{x}_{i.} - \bar{x}_{..}) - (\bar{t}_{i.} - \bar{t}_{..})]^2, \qquad (1)$$

where

n = the number of brands rated,
$\bar{x}_{i.}$ = subject provided mean attribute rating for the individual brands,
$\bar{x}_{..}$ = grand mean of the subject provided attribute ratings across all brands,
$\bar{t}_{i.}$ = true mean attribute rating for the individual brands, and
$\bar{t}_{..}$ = true grand mean attribute ratings across all brands.

Differential accuracy (DA) refers to the extent to which consumers accurately estimate the performance of individual brands across specific attribute dimensions. For *each* attribute, DA provides an assessment of how accurately consumers rate the performance of specific brands on each specific attribute. As such, DA provides a detailed measure that assesses accuracy based on specific attribute levels for each of the brands assessed within the product category. Because of the cognitive difficulty in assessing individual attributes across multiple brands, the evaluation task associated with DA is more challenging for consumers than the DE task. The measure of DA is shown in equation 2 below (Becker and Cardy 1986; Cronbach 1955).

$$DA^2 = \frac{1}{kn}\Sigma\Sigma[(x_{ij} - \bar{x}_{i.} - \bar{x}_{.j} + \bar{x}_{..}) - (t_{ij} - \bar{t}_{i.} - \bar{t}_{.j} + \bar{t}_{..})]^2, \quad (2)$$

where

- n = the number of brands rated,
- k = the number of attributes rated,
- $\bar{x}_{i.}$ = participant provided mean attribute ratings for specific brands,
- $\bar{x}_{..}$ = grand mean of the participant provided attribute ratings across all brands,
- x_{ij} = participant ratings for the respective brands (i) across the various attributes (j),
- $\bar{x}_{.j}$ = mean individual attribute ratings across brands,
- $\bar{t}_{i.}$ = true mean attribute rating for individual brands,
- t_{ij} = true ratings for the respective brands (i) across the various attributes (j),
- $\bar{t}_{.j}$ = true individual mean attribute ratings across brands, and
- $\bar{t}_{..}$ = true grand mean attribute ratings across all brands.

As indicated by equations 1 and 2, *higher* DE and DA scores indicate *less* accurate consumer ratings, while a score of zero represents a perfect score (i.e., no error). To summarize, while DE is an indicator of the accuracy of consumers' ratings of overall brand performance evaluations aggregated across attributes, DA is an indicator of the accuracy of their attribute-level performance evaluations for those brands.

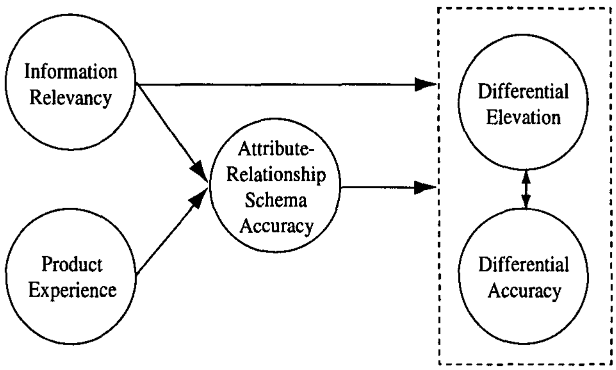
Factors Hypothesized to Affect the Accuracy of Overall Brand and Attribute Evaluations

Various researchers have suggested differences between stimulus-based and memory-based processing of information (e.g., Alba, Hutchinson, and Lynch 1991). In stimulus-based processing, consumers have information available such that they can directly observe and compare brands on relevant information. Memory-based processing, on the other hand, requires consumers to retrieve brand and attribute information from memory prior to making any comparative judgments. In memory-based judgments, consumers may retrieve the actual attribute information from memory and, hence, engage in actual data-driven judgments. Alternatively, consumers may retrieve some information from memory while relying on cognitive shortcuts to infer other information (Chaiken 1980; Wyer and Carlston 1979; Wyer and Srull 1989). In this regard, consumers may use attribute-relationship schemata, inferring performance for one attribute from accessible information on another attribute. For example, consumers may infer quality from price or, in the case of automobiles, infer acceleration from engine horsepower. These memory-based schemata may vary in accuracy (i.e., amount of horsepower may be *perceived* to covary positively with speed of acceleration, but this perception may or may not be consistent with the actual relationship between attributes), affect the processing of new information, and ultimately influence brand and attribute judgments (Mantel and Kardes 1999; Pechmann and Ratneshwar 1992).

Several judgment models suggest that consumers may apply prior knowledge and experience in processing information or judgment tasks before engaging in pure data-driven information processing (Fiske and Neuberg 1990; Kardes 1994; Wyer and Carlston 1979). Pure data-driven information processing suggests that the actual information, attribute by attribute, is processed and encoded into memory. Alternatively, consumers may use memory-based schemata to help process the information, processing some attributes directly as in pure data-driven information processing, while inferring other attribute levels using prior knowledge and experience (e.g., memory-based schemata). In the present study, we propose that consumers' memory-based schemata and, specifically, the accuracy of those attribute-relationship schemata, affect the accuracy of their ratings of brands and attributes (i.e., DE and DA). In turn, consumers' attribute-relationship schemata are affected by their existing product experiences and from their exposure to, and incorporation of, product information available in the judgment environment. Providing product attribute information may affect subsequent judgment tasks via incorporation into memory through schema-based processing (e.g., attribute-relationship heuristics or schemata) and/or through the actual information being directly processed into memory (e.g., data-driven processing). A model of the proposed relationships is presented in Figure 1.

Relevant product information. Although consumers' product evaluations are often influenced by information contained in their memories (Costley and Brucks 1992), they may conduct an information search prior to product evaluations and purchases (Alba et al. 1991). When exposed to information about brands, consumers can use that information in making judgments either directly (data-driven processing) or through memory-based processes. Exposure to relevant attribute information appears capable of improving the accuracy of both overall brand and specific attribute evaluations, when compared to conditions in which relevant information is not provided and consumers must rely solely on information accessible in memory for evaluations. Also, given that many consumers may not develop particularly accurate attribute covariation assessments from information they have gleaned from the marketplace (John, Scott, and Bettman 1986), exposure to relevant information about attributes may improve the accuracy of attribute-relationship schemata. This proposed

FIGURE 1
The Role of Product Experience, Relevant Information, and Attribute-Relationship Schemata on Differential Elevation and Differential Accuracy in Judgments



pattern of results suggests more accurate attribute performance judgments both directly and indirectly (Kozlowski and Mongillo 1992).

Hypothesis 1: Given relevant (as opposed to irrelevant) brand information, consumers will provide (a) more accurate attribute ratings across brands (DE decreases) and (b) more accurate brand ratings across attributes (DA decreases).

Hypothesis 2: Given relevant (as opposed to irrelevant) brand information, consumers will form more accurate attribute-relationship schemata.

Hypothesis 3: The accuracy of consumer attribute-relationship schemata directly influences (a) the accuracy of their attribute ratings across brands (DE decreases) and (b) accuracy in rating brands across attributes (DA decreases).

Product experience. Consumers' product experience refers to their knowledge about, and familiarity with, a product category (Alba and Hutchinson 1987). As consumers' product experience increases, they develop more refined category structures that include information on attributes relevant to the product category (G. Murphy and Smith 1982; Sujan and Dekleva 1987). This more refined category structure allows consumers with higher product experience to exercise greater discernment when recalling and/or evaluating product category attributes and category-based relationships between these attributes. Inexperienced consumers, on the other hand, probably have less well-developed schemata for category attribute relationships and must rely on much less developed schemata available in long-term memory (Brucks 1985; Park and Lessig 1981). To the extent that more experienced consumers' long-term memories about the general product category are more developed and their abilities to recall information about product category attribute-relationship schemata are enhanced, their brand performance evaluations should be more accurate. However, this increased accuracy for brand performance evaluations should develop through more accurate attribute-relationship schemata rather than directly via their general product category experiences. Therefore, we propose the following:

Hypothesis 4: Consumers' level of product experience is positively related to the accuracy of the consumers' attribute-relationship schemata.

METHOD[1]

Product Category and Objective Attribute Measures

The product class of automobiles was selected as the category from which brands and brand attributes were to be rated by participants. This category was selected for several reasons. First, for most consumers, judgments related to automobiles are high-involvement decisions (Zaichkowsky 1985) in which at least some attribute-level processing (e.g., price, miles per gallon, acceleration) is probable. Second, information about the performances of automobile brands and attributes is readily available, and many participants are likely to have at least some familiarity with available automobile performance-related measures. Third, this product category has been used in prior consumer research on judgments and decisions (cf. Elliott and Roach 1991; Furse, Punj, and Stewart 1984).

Examining the accuracy of brand attribute performance ratings for the DE and DA measures required an assessment of objective attribute measures. *Consumer Reports'* measures for automobile attributes were used as the objective attribute measures. Attribute measures provided by *Consumer Reports* were chosen because (1) their evaluators generally are viewed as having a high level of expertise (Lutz 1975); (2) a precedent exists for the use of *Consumer Reports'* ratings as objective ratings (Gerstner 1985; John et al. 1986; Lichtenstein and Burton 1989); (3) these measures are often used by consumers to make more informed, knowledgeable purchase decisions (John et al. 1986); and (4) research has supported the use of *Consumer Reports'* ratings as objective ratings even for attributes that are rated on subjective scales (e.g., product quality) (Curry and Faulds 1986; John et al. 1986).

Pretests

The first pretest was conducted to determine which automobile brands would serve as the rated objects. Thirty-five undergraduate students rated their knowledge for sixty-six automobile brands that were evaluated by *Consumer Reports* during the previous year. Knowledge was used as the selection criterion because when asked about their beliefs, knowledgeable consumers are less likely to construct product beliefs on the spot and more likely to provide reliable responses (Simmons, Bickart, and Lynch 1993). The 10 highest scoring automobile brands were selected for the main study. There were no significant differences ($p > .10$) between the ratings for these 10 brands.

Two criteria were used to determine which *Consumer Reports'* tested automobile attributes would be rated by the participants. These criteria were the following: (1) the participants should understand what the attribute is, and (2) the attributes should be important to the consumer during product evaluations. These criteria were used because in product judgment and choice situations, consumers tend to evaluate products across attributes they believe to be important and of which they have an adequate understanding (Punj 1987).

A second pretest was performed in which 60 students rated 35 automobile attributes assessed by *Consumer Reports* in terms of their understanding of the attributes and the importance of the attributes for product choice using 5-point scales. Indices were constructed from these responses, and the five highest overall scoring attributes were selected as the relevant attributes for the main study. These attributes included price (in dollars), fuel economy (average of city and highway driving miles per gallon), net horsepower (the ability of an engine to maintain a constant workload), acceleration (seconds required to go from 0 to 60 miles per hour), and braking performance (distance required to stop from a speed of 60 miles per hour). Information on all of these attributes could be stated in quantitative terms. The five lowest scoring attributes included the automobiles' length, width, wheelbase, road clearance, and weight. These attributes served as irrelevant attributes for a manipulation of information relevancy (see below).

Proposed Antecedents of Rating Accuracy

Information relevancy. The relevancy of the attribute information provided was varied across study participants. Approximately one half of the participants received relevant brand attribute information, and the others received irrelevant attribute information. A table containing the price, fuel economy, acceleration, braking, and horsepower performance ratings (the five highly rated attributes from the pretest), as provided by *Consumer Reports* for the 10 examined automobiles, served as the relevant information stimulus. The irrelevant information consisted of a table containing *Consumer Reports'* attribute ratings for the five lowest scoring attributes (determined from the second pretest) for the 10 examined automobiles. (For testing the proposed model, relevant information was coded as 1, and irrelevant information was coded as 0.) Although they were exposed to information on these irrelevant attributes, participants in this condition provided performance ratings for only the relevant attribute variables.

Attribute-relationship schema. The schema pertaining to the relationship between attributes was assessed using two sets of measures, an *objective* measure derived from the *Consumer Reports'* information on the five relevant attributes across the 10 brands and a measure assessing consumers' *perception* of the relationships between the five attributes. Based on the attribute information in *Consumer Reports*, Pearson correlations were calculated for each of the pairs of attributes (price-fuel economy, price-net horsepower, etc.). These objective correlations between attributes for the automobile stimuli ranged between –.80 (horsepower and fuel economy) and .73 (horsepower and acceleration). For the subjective measure, consumers responded to belief questions that asked about attribute relationships (e.g., "If an automobile is rated high in net horsepower, how likely is it to be rated high in acceleration?") using 7-point scales with end points of *very unlikely* and *very likely*. Two separate items were used to measure each combination of attributes taken two at a time. Correlations between these two items used for each possible two-attribute combination were all greater than .80. The two items for each combination of attributes were averaged to arrive at the subjective measure.

These subjective measures assessing perceived attribute relationships were then put into a column vector format and compared with the column vector consisting of the objective measures of the attribute relationships. Specifically, for each respondent, a correlation coefficient was calculated that indicated the direction and strength of the correspondence between the respondent's *perception* of the relationship between attributes and the *objective* measure of the attribute relationship. (Thus, a score of 0 would indicate no relationship between the consumer's perception of the attribute relationship and the objective measure of the attribute relationship, whereas a score of 1 would indicate a perfect, positive relationship.) These individual-level correlation measures were then retained and used in subsequent analyses as the accuracy of the attribute-relationship schema.

Product experience. Product experience has been measured in terms of product familiarity and subjective product knowledge. Product familiarity refers to consumers' prior product usage, product ownership, and exposure to information concerning the product category (Alba and Hutchinson 1987; Park and Lessig 1981). Subjective knowledge refers to consumers' perception of their knowledge about the general product category (Park and Lessig 1981; Rao and Sieben 1992; Srull 1983).

Ten items, shown in the appendix, were used to measure product experience. Four items (adapted from Brucks 1985) were developed to tap the study participants' subjective product knowledge. Six items (adapted from Park and Lessig 1981) were constructed to assess their product familiarity. All 10 items were measured on 7-point scales, where higher scores indicated higher levels of automobile knowledge/familiarity (i.e., product experience). The level of automobile experience was computed by summing responses to the experience items ($\alpha = .87$). These scores ranged from 10 to 69, with an overall mean and standard deviation equal to 34.13 and 12.25, respectively. Product experience item-to-total score correlations ranged from .58 to .87, and all were significant ($p < .001$).

Dependent Measures

Participants provided five attribute ratings for each of the 10 automobile brand stimuli. Each brand was rated on its price, fuel economy, and horsepower (anchored by 1 = *very low* and 7 = *very high*). The brands also were rated in terms of their acceleration (anchored by 1 = *very slow* and 7 = *very fast*), and braking (anchored by 1 = *very poor* and 7 = *very good*). Respondents only provided ratings for attributes that were perceived as important in Pretest 2. These measures served as the attribute ratings for the overall brand and attribute-level accuracy calculations. DE and DA scores for each participant were then computed, based on equations 1 and 2 previously presented, and these measures served as the dependent measures of accuracy in tests of hypotheses.

Study Participants and Procedures

Data were collected during classes at a southern university with 651 students serving as the study participants. Respondents participated in groups ranging from 20 to 35 students. Because of missing data, responses from 28 study participants were removed from the analysis, leaving 623 usable surveys.

To begin the study, the participants' product experience was assessed. Then, the study participants were provided with brand attribute information. On the basis of block randomization procedures, approximately half of the study participants were assigned to the relevant information condition and half to the irrelevant information condition. The participants were verbally told that the information provided came from *Consumer Reports*. After allowing the participants approximately 5 minutes to examine the brand attribute information, this information was withdrawn and participants rated the brands on the attributes, using the scales previously discussed.

As a check on the provision of relevant (irrelevant) attribute information, participants' perceptions about the relevancy of the brand attribute information were assessed with four 5-point Likert-type scale statements (e.g., "The information provided was relevant to the ratings task"). The coefficient alpha for the summated scale was .74. Higher scores indicated that the respondents perceived the information provided as more relevant information. As expected, participants in the relevant-information condition indicated that the information stimulus was more relevant for the rating tasks ($M = 15.71$) compared with the participants in the irrelevant-information condition ($M = 7.32, t = 38.5, p < .001$).

RESULTS

Levels of Differential Elevation and Accuracy

Given the DA measure assessed the correspondence between individual attribute measures across 10 brands, it was not surprising that the mean for this measure ($M = 2.546, SD = 1.021$) was greater than the mean for the DE measure ($M = 0.818, SD = 0.594, t = 51.04, p < .001$). (Recall that higher scores indicate lower accuracy and a perfect score is zero.) Some respondents were quite accurate in their estimates, with minimum scores of 0.035 and 0.370 for DE and DA, respectively. (In contrast, maximum scores exceeded five for both measures.) DE and DA accuracy scores for the 25th, 50th, and 75th percentiles were 1.068, 0.767, 0.474 (DE) and 3.23, 2.81, and 1.92 (DA). Initial analyses also indicated that these DE and DA measures were positively and significantly correlated ($r = .56, p < .001$), indicating that in general, participants who were better able to rate brands overall via their attributes were also better able to rate the specific attribute performances of the individual brands.

Tests of the Proposed Relationships

In testing the proposed model and estimating the hypothesized relationships between constructs, path analysis was conducted via LISREL 8. Path analysis enables the simultaneous modeling between constructs and allows for both direct and indirect relationships to be ascertained (Hair, Anderson, Tatham, and Black 1998:588). The correlation matrix used as input for the path analysis is shown in Table 1.

Overall model fit. The chi-square associated with the overall model is 4.86 ($p = .09$), and the model fit statistics

TABLE 1
Correlation Matrix Used as Input for the Path Analysis ($N = 623$)

Variable	*Information Relevancy*	*Experience*	*Attribute Schema Accuracy*	*Differential Elevation*	*Differential Accuracy*
Information relevancy	1.00				
Experience	.01	1.00			
Attribute schema accuracy	–.22	.27	1.00		
Differential elevation	–.46	–.01	–.11	1.00	
Differential accuracy	–.56	–.11	–.16	.56	1.00

NOTE: The information relevancy measure was dichotomous. Hence, relationships with this variable and other measures in the model are biserial correlations. With the exceptions of experience and information relevancy and experience and differential elevation, all correlations are significant at $p < .01$.

TABLE 2
Tests of Proposed Relationships for Attribute Ratings Accuracy

Model Relationships	*Proposed Relationship*	*Completely Standardized Coefficients*	*t-Values*
Hypothesis 1a: Information → DE	Negative	–.51	–14.33**
Hypothesis 1b: Information → DA	Negative	–.63	–19.64**
Hypothesis 2: Information → Attribute schema accuracy	Positive	–.23	–6.06**
Hypothesis 3a: Attribute schema accuracy → DE	Negative	–.22	–6.19**
Hypothesis 3b: Attribute schema accuracy → DA	Negative	–.30	–9.46**
Hypothesis 4: Experience → Attribute schema accuracy	Positive	+.27	7.29**

NOTE: Model fit statistics: $\chi^2 = 4.86$; $df = 2$; Goodness-of-Fit Index (GFI) = 1.0; Adjusted Goodness-of-Fit Index (AGFI) = .98; Comparative Fit Index (CFI) = 1.0; Tucker Lewis Index (TLI) = .98. Information = information relevancy; DE = differential elevation; DA = differential accuracy. Because lower DE and DA scores indicate more accurate ratings (with zero representing a perfect score), negative relationships concerning DE and DA denote improved accuracy as the independent variable increases.
**$p < .01$.

indicate an acceptable level of fit between the proposed model and these data (Comparative Fit Index [CFI] = 1.0, Tucker Lewis Index [TLI] = .96, Adjusted Goodness-of-Fit Index [AGFI] = .98, root mean square error of approximation [RMSEA] = .048). However, because of the small number of degrees of freedom and hypotheses about effects of antecedents on DE and DA, path estimates related to predictions are of greater interest. Standardized path estimates and *t*-values used to test predictions in Hypothesis 1 through Hypothesis 4 are shown in Table 2.

Tests of hypotheses concerning proposed paths. Hypothesis 1a, Hypothesis 1b, and Hypothesis 2 concern relationships between the relevancy of the attribute information provided and the measure of consumers' attribute-relationship schemata, DE and DA, respectively. The results support predictions related to the provision of the information and measures of DE and DA (coefficients of –.51 and –.63, $p < .001$ for each), indicating that providing relevant information leads to improved accuracy for both measures (Hypotheses 1a and 1b). However, the prediction in Hypothesis 2 that the relevant information results in more accurate attribute-relationship schemata is not supported by these data. Rather, relevant information resulted in less accurate attribute-relationship schemata (coefficient of –.23, $p < .01$). This pattern of findings is consistent with data-driven processing of brand attribute information and, subsequently, data-driven judgments. The brand attribute information does not appear to have aided the formation of more accurate memory-based schemata.

Hypothesis 3 predicts that consumers' attribute-relationship schemata directly influence the measures of DE (Hypothesis 3a) and DA (Hypothesis 3b). Results in Table 1 offer support for both predictions (path estimates of –.22 and –.30, respectively; $p < .001$ for each). Hypothesis 4 concerns the relationship between consumers' product category experience and attribute-schema relationships. The path coefficient (+.27, $t = 7.29$, $p < .001$) supports the prediction of higher levels of experience being related to more accurate attribute-relationship schemata. In sum, the data support five of the six proposed relationships,[2] and the model explains 40 percent of the variance in DA and 26 percent of the variance in DE.[3]

DISCUSSION

The purpose of this research was to investigate the correspondence between consumers' ratings of brand attribute performance levels and objective measures of brand attributes and factors that affect the "accuracy" of the correspondence. In this context, we examined the effects of exposure to relevant (versus irrelevant) brand attribute information, consumers' attribute-relationship schemata, and consumers' prior product category experience on the "accuracy" of this correspondence between consumers' ratings and objective brand attribute ratings. Using Cronbach's (1955) accuracy dimensions, the results revealed that consumers were more accurate in their judgments of aggregate performance of brands (DE) than their judgments of the brands' performance on specific attributes (DA). The accuracy of consumers' judgments was directly influenced by having received relevant information and indirectly, through more accurate attribute-relationship schemata in memory, by their product experience. Consumers who were exposed to relevant information and/or who had more accurate attribute-relationship schemata were more accurate in their rating of aggregate brand performance (DE) and attribute-level brand performance (DA) than consumers who were exposed to irrelevant information or who had less-accurate attribute-relationship schemata.

To the best of our knowledge, Cronbach's (1955) accuracy dimensions have not been used to assess consumers' brand and attribute ratings. Previous literature on consumers' rating accuracy has tended to focus on one or two attributes (e.g., price and quality) and with a limited set of brands. The use of DE and DA accuracy of consumers' judgments of brands and attributes allows accuracy to be assessed for a number of attributes and brands. The differences in the complexity of the task (overall relative brand judgments versus brand-by-attribute judgments) and previous research indicating that consumers categorize brand attribute information by brands rather than by attributes lend credence to the finding that consumers were more accurate in assessing aggregate brand performance (DE) rather than brand attribute performance (DA).

Consistent with previous research (Alba et al. 1991; Chaiken 1980; Fiske and Neuberg 1990; Kozlowski and Mongillo 1992; Pechmann and Ratneshwar 1992; Wyer and Srull 1989), the findings suggest that both stimulus-based and memory-based processing and judgments may be occurring. Information in the present study directly affected ratings (stimulus based), while general product category experience indirectly, through attribute-relationship schemata, affected ratings (memory based). This is consistent with prior work that has suggested that high levels of product experience allow consumers to form more accurate attribute-relationship schemata (Kozlowski and Kirsch 1987) that may be accessed and used when making brand and attribute judgments (Alba and Hutchinson 1987; Alba et al. 1991; Rao and Monroe 1988).

The overall strength of the direct relationship between information and judgment tasks (stimulus based) and the lack of support for a direct effect of information on attribute-relationship schemata (memory based) may be due, in part, to the brand attribute information and procedures used in the study (see Pechmann and Ratneshwar 1992), as well as the use of a homogeneous sample (i.e., college students) as respondents. First, the brand and attribute information used in the study represents a small part of the universe of brands and attributes for automobiles. It is possible that the small amount of information presented to participants was not sufficient to change schemata that were already embedded in memory, based on prior exposure to attribute information during a long period of time. Second, the brands used were those about which pretest respondents indicated they were knowledgeable, and the relevant attributes were those that respondents considered important. In this respect, information may have been previously incorporated into the respondents' attribute-relationship schemata. However, the attribute-relationship schemata were important in and of themselves in enhancing rating accuracy beyond the effects of information in the judgment environment. Third, the attribute information that was presented to respondents was important and objective, making differentiating between brands both overall and on the individual attributes a somewhat easier task. Previous studies have shown that easily understandable and well-organized information is more likely to result in data-driven processing (Pechmann and Ratneshwar 1992) and judgments (Mantel and Kardes 1999). Finally, respondents completed their brand attribute ratings in close proximity to exposure to the brand attribute information. The timing between receipt of the information and the ratings may have allowed respondents to use the information in the rating tasks directly due to its relative ease of accessibility. A longer delay between the receipt of the information and rating task may have resulted in respondents needing to use different retrieval and rating strategies, possibly via the use of schemata. Because the information may not be easily accessible following a longer delay, cognitive shortcuts such as attribute-relationship schemata may become more important in retrieving and/or constructing information for rating purposes. It is important to reemphasize that, even given the short time period between receipt of information and brand attribute ratings that may enhance data-driven processing, the accuracy of the attribute-relationship schemata had a positive effect on the accuracy of judgments (i.e., DE and DA).

Conclusions and Future Research

Using a novel approach (at least to the marketing literature), this study addressed the effects of product experience and information relevancy on brand attribute evaluations. Findings indicate that consumers can effectively use that information to evaluate brands across attributes more accurately and to identify the brands that perform well or poorly on specific attribute dimensions. Consumers' product experiences, on the other hand, indirectly improve the accuracy of their evaluations of brands through memory-based processes such as more accurate attribute-relationship schemata.

It is evident that more research is needed to improve our understanding of how consumers process and use brand attribute information in evaluating brands. Future research should be conducted to assess Cronbach's (1955) accuracy measures across product categories, brands (e.g., "name" brands versus private-label brands), and attributes (e.g., experience versus search attributes). Research is also needed to examine additional factors (e.g., motivation, stimulus factors) that may influence consumers' use of stimulus-based versus memory-based evaluations of brand and brand attribute performance. As marketers gain a better understanding of the processes and factors that affect consumers' brand evaluations, marketing communications can become more effective and result in better choices for consumers.

While findings related to the effects of provision of objective information, prior product experience, and attribute-relationship schemata on accuracy may be of greater interest to academics than to practitioners, the accuracy equations used here seem to offer some opportunities for applied applications that may be of interest to marketing managers. For example, managers may be interested in comparisons of perceptual ratings with *Consumer Reports* attribute information at the individual brand level. By examining differences for individual brands without squaring the DE and DA accuracy measures, instances in which brands and brand attribute perceptions were underrated or overrated, compared to *Consumer Reports* data, could be identified. Such analyses may identify brands whose attribute ratings are consistently over- or underestimated, relative to brand competitors, and may suggest attribute information that should be addressed in marketing communications. Given our interest in measures of accuracy using Cronbach's methodology, we did not address more subjective attributes such as image or perceived attractiveness that are important attributes in judgments about automobiles. Future research may address accuracy at the individual attribute level for other objective, quantifiable attributes available in *Consumer Reports* as well as more subjective attributes (e.g., styling, image). Finally, how global affect and/or brand image leads to biases for specific attributes and the role of halo effects as they relate to brand attribute accuracy may warrant future studies. Thus, the general methodology appears potentially useful for a number of extensions that may be of interest to both applied-brand and marketing managers and academic researchers who are interested in consumer attitudes and judgment processes, brand management and positioning, and measurement issues.

APPENDIX
Items used to Measure Product Experience

Item	*Scale Anchors*
1. Please rate your knowledge about automobiles.	*Very unknowledgeable, very knowledgeable*
2. Relative to people you know, how would you rate your knowledge of automobiles?	*Very unknowledgeable, very knowledgeable*
3. Relative to a professional race car driver, how would you rate your knowledge about automobiles?	*Very unknowledgeable, very knowledgeable*
4. Based on your current knowledge about automobiles, how comfortable would you be in making an automobile purchase decision today?	*Very uncomfortable, very comfortable*
5. How much information about automobiles have you been exposed to during your lifetime?	*Very little, very much*
6. Compared to other students, how much time do you spend reading automobile-related magazines?	*Very little, very much*
7. How familiar are you with the features available on new automobiles?	*Very unfamiliar, very familiar*
8. Compared to other students, how much time do you spend in an automobile per week?	*Very little, very much*
9. Compared to other students, how many automobiles have you purchased in your life?	*Very few, very many*
10. Compared to other students, how many times have you been the primary decision maker in the purchasing of an automobile?	*Very few, very many*

NOTE: All items were measured on 7-point scales. Items 1-4 were adapted from Brucks (1985), and items 5-10 were adapted from Park and Lessig (1981).

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NOTES

1. We acknowledge that the task and study context used is not equivalent to how consumers actually select automobiles (the product stimulus used here) in the actual marketplace. As noted in the text, our objective was to examine the effect on accuracy of consumers' ratings at the brand and attribute level of factors such as provision of objective information similar to that found in *Consumer Reports*, prior product experience, and attribute relationship schemata.

2. While not of direct interest in our predictions, we also estimated the path between differential elevation (DE) and differential accuracy (DA) in the proposed model. As would be anticipated based on the Pearson correlation reported in the article, this nondirectional path (i.e., correlated constructs) was positive and significant (coefficient = .24, t = 8.50, p < .001).

3. The path analysis procedure did not directly test the mediating role of attribute-relationship schema accuracy. Using procedures and tests identified by Baron and Kenny (1986:1177), results revealed that attribute-relationship schema accuracy was a "pure" mediator of the product experience and DA relationship, but it did not mediate the information relevancy to DA relationship. Similarly, attribute-relationship schema accuracy did not mediate the information relevancy to DE relationship. Finally, results indicated that attribute-relationship schema accuracy was not a mediator for the experience and DE relationship. Rather, experience was a predictor of attribute-relationship schema accuracy, which in turn was a significant predictor of DE.

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