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Many researchers have demonstrated the existence of an attraction effect that increases the choice probability of an existing "target" brand by the introduction of a relatively inferior "decoy" brand. This study develops a causal model that links antecedent variables with the attraction effect. We find that the attraction effect is explained to a considerable extent by changes in the following seven variables: (1) information relevance or stimulus meaningfulness, (2) product class knowledge, (3) task involvement, (4) perceived similarity between decoy and target, (5) relative brand preference, (6) share captured by decoy brand, and (7) perceived decoy popularity. The overall results were consistent across product classes studied, which included beer, cars, and TV sets. The popularity explanation for attraction effect, alluded to by Huber, Payne, and Puto (1982), was tested and found to hold true.

Antecedents of the Attraction Effect: An Information-Processing Approach

Huber, Payne, and Puto (1982) define the attraction effect as an increase in the probability of consumer choice of the target brand when an asymmetrically dominated alternative is introduced. Given that the attraction effect is a real-world phenomenon, not just an experimental artifact, what factors influence it? A better understanding of the attraction effect will enable consumer researchers to design consumer choice experiments more carefully by (1) controlling for influential factors in the choice task and (2) estimating the nature and magnitude of the effect of these factors on the choice task. Similarly, practitioners would want to consider these factors in designing a marketing strategy by taking advantage of the attraction effect. For example, when a new brand is being introduced, is cannibalization the major issue to consider? Can a new brand have a positive effect on the existing brand? Will the strategy of introducing a "decoy" be more relevant for a product class with high or low brand loyalty?

Figure 1 is a diagrammatic representation of the attraction effect. Brands X and Y constitute the *core choice set* (i.e., only these two brands are present initially). Brand W is an asymmetrically dominated alternative: W is inferior (or equal) to X on both dimensions but is better than Y on the vertical dimension 2. Given a choice set consisting of X, Y, and W, it is unlikely that W would be chosen; therefore, it is referred to as a *decoy*. On the basis of the similarity concept, which suggests that competition is greatest from the most similar brand, X is referred to as the *target* and Y is referred to as the *competitor*. To summarize, the choice set includes three kinds of brands: the target, X, the competitor, Y, and the decoy, W.

An attraction effect occurs if the introduction of an asymmetrically dominated alternative, W in Figure 1, increases the choice probability of the dominating target, X. This phenomenon, which has been observed in a number of studies, violates basic tenets of choice models (Huber, Payne, and Puto 1982). Some have proposed that the attraction effect is observed because of the ambiguity of the information presented about the products and their attributes (cf., Ratneshwar, Shocker, and Stewart 1987). This ambiguity could be the result of respondents' lack of familiarity with the product or insufficient information about the product. Simonson (1989) found that respondents who had to justify their choices were more likely to exhibit the attraction effect than those who did not have to defend their decisions.

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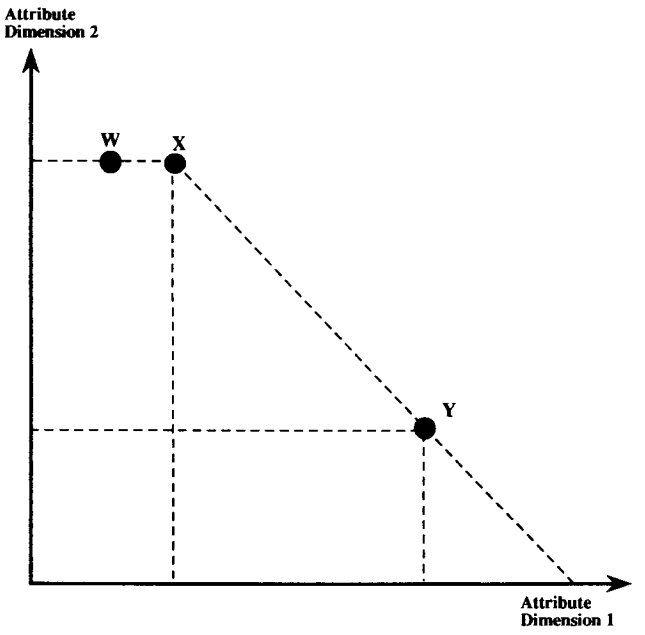
Figure 1
DIAGRAMMATIC ILLUSTRATION OF THE ATTRACTION EFFECT



Note : X and Y constitute the core set. W is a range increasing decoy for X .

In conclusion, the results of the tests of the attraction effect are mixed, suggesting the need for further study in the area. The attraction effect has been viewed as a situation of imperfect choice or a choice anomaly (cf., Huber and Puto 1983; Ratneshwar, Shocker, and Stewart 1987; Simonson 1989; Simonson and Tversky 1992). This view suggests that there should be minimal attraction effect in the situations of relatively high consistency and quality in the decision process.

PURPOSE OF THE STUDY

This study differs from previous research in a number of ways. Previous research has verified the existence of the attraction effect (cf., Huber, Payne, and Puto 1982; Huber and Puto 1983; Simonson 1989). Our aim is to build on this line of research by examining the effect of various antecedent variables on the attraction effect and testing the popularity explanation. Second, we use the number of points allocated on a constant sum scale, rather than the most preferred choice, so as to study the phenomenon at an individual level (Hauser and Shugan 1980).

Consequently, this paper will proceed as follows: First, we will discuss the overall processes that appear to be influencing the attraction effect phenomenon. Second, we will present specific antecedent constructs and discuss how they relate to the attraction effect in a causal model framework. Next, the results of the hypotheses and their implications will be examined.

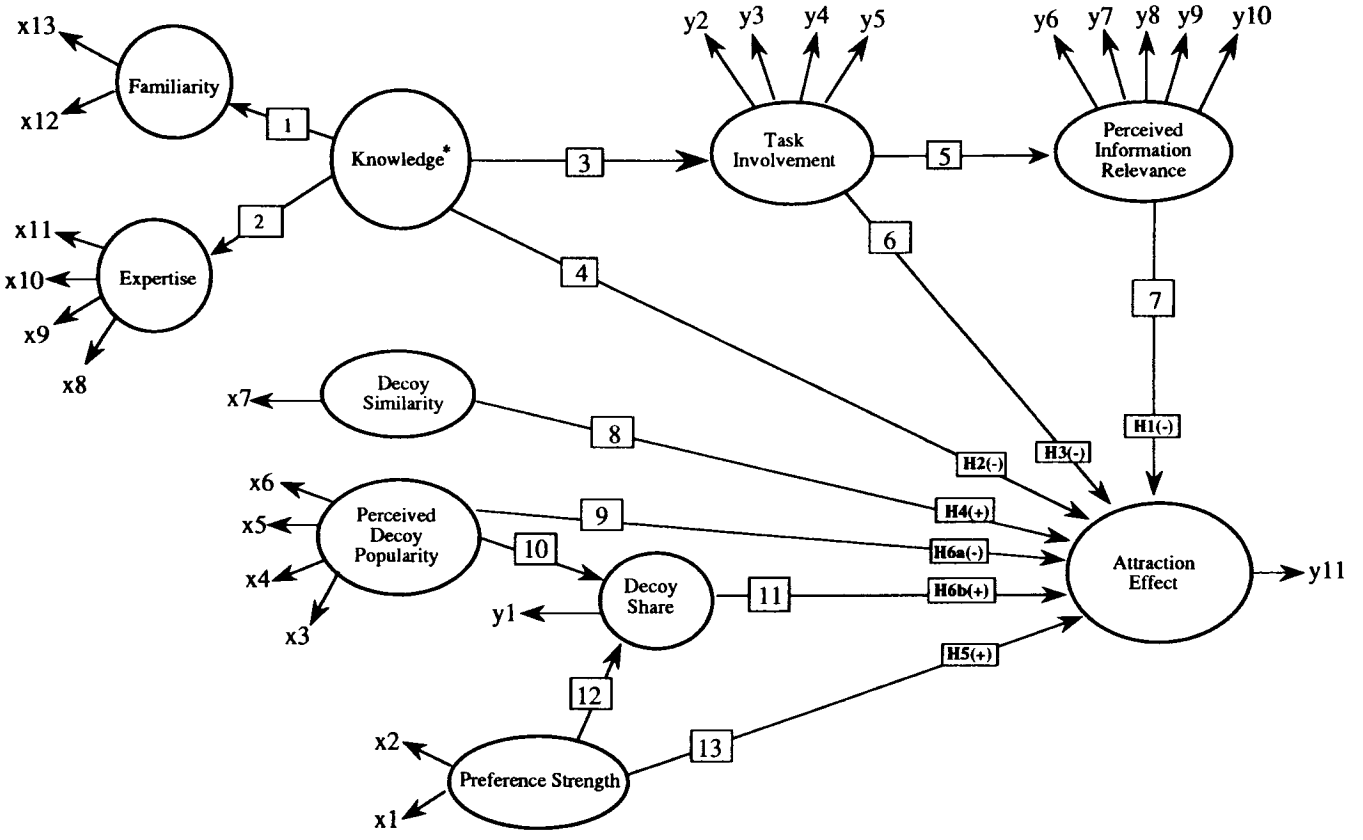
OVERALL FRAMEWORK FOR A CAUSAL MODEL

The attraction effect is viewed as a complex interplay of decision-making factors. Huber and Puto (1983) have presented a simplification argument that might underlie the attraction effect. The simplification might result in the decoy brand being used as an anchor to make comparisons resulting in a "local" superiority of a target brand rather than the competitors' brand. Simonson (1989) has viewed simplification from the standpoint of consumers' justifying their decisions. By the very nature of the attribute design, the target is the easiest to justify and tends to be chosen—leading to the attraction effect. Similarly, Huber, Payne, and Puto (1982) suggest that the evaluation of two brands—one dominant and the other inferior—is relatively simple for the respondent. Consequently, the respondent might choose the dominant brand, which is the target, and end the decision making at that stage, even if there was some other brand in the market that was more desirable. This process leads to the observed attraction effect. These arguments suggest that the attraction effect results from certain processes of decision making which are likely to be influenced by a simultaneous interaction of task, respondent, and object-related variables. This distortion in decision making is related to factors such as knowledge, popularity, decoy similarity, task involvement, and information relevance. A causal model can best capture the effect of these antecedent factors, because a simple linear model would ignore the interrelationships that result from the complex decision processes.

The Antecedent Variables

Researchers in the area of choice and preference have suggested several moderating variables that influence decision making (Alba and Hutchinson 1987; Bettman 1986; Cohen and Chakravarti 1990). Since the attraction effect is an outcome of the consumer decision-making process, similar antecedent variables are likely to influence this process. A model describing the relationships between the antecedent variables and the attraction effect is presented in Figure 2. Constructs are either exogenous or endogenous. As a rule, a construct with an arrow pointing toward it is an endogenous variable. (For the sake of simplicity, we refrain from using the conventional Greek letters for these constructs.) Indicators or measures of exogenous constructs are represented as Xs and those of endogenous constructs are Ys. In this figure, the directional relationships represented by the individual paths that lead to the attraction effect provide the hypotheses. Next, a point-by-point discussion of each independent variable and its effect on the attraction ef-

Figure 2
CAUSAL MODEL FOR THE ATTRACTION EFFECT



* Factor variance set to 1.00.
NOTE: Numbers in boxes refer to path numbers used in the text.

fect is presented. Interrelationships between the independent variables are also discussed.

1. Perceived Information Relevance

Relevance is defined as the degree to which the product stimulus information is useful in distinguishing between objects in the choice set (Ratneshwar, Shocker, and Stewart 1987). For example, the description, "Ride quality = 40: Bumpy ride and tosses like a baby buggy," elaborates on the description, "Ride quality = 40." Researchers in adaptive decision making suggest that the perceived diagnosticity and accessibility of the relevant information will alter the inference process used (cf., Dick, Chakravarti, and Biehal 1990). If the information presented makes less sense to a person, it is more likely that such a person will resort to a decision-simplifying paradigm. On the other hand, if the presented information is perceived as relevant, it should facilitate the decision-making process, and the resulting decision structure should be a clean and stable one. Therefore, we postulate that the attraction effect should be reduced when the presented information is deemed more relevant (path 7 in Figure 2).

H_1: The attraction effect will be diminished with increased levels of perceived information relevance.

The level of involvement with the task will determine how meaningful the respondents find the information. Respondents for whom the task is irrelevant and for whom very little is at stake in the choice task will find little use for the information and will be reluctant to expend the effort necessary to extract any meaning from it. On the other hand, respondents who feel the choice task is important to them will not only find the information to be more helpful in evaluating the available brands but will also make an extra effort to assimilate the information in a form that is useful and relevant to the task at hand. Therefore, task involvement will have a positive effect on perceived information relevance (path 5).

2. Product Class Knowledge

Kotovsky and Simon (1990) mention that people with less knowledge find it more difficult to assimilate the information presented into their decision-making framework because the problem is too difficult for them. Knowledge is a source of problem difficulty. People who have enough knowledge about the product class will be better equipped to solve the problem. These people should be less likely to exhibit the attraction effect. We use a two-dimensional structure for knowledge, as proposed by Alba and Hutchinson (1987, p. 411):

> We propose that consumer knowledge has two major components: *familiarity* and *expertise* . . . Familiarity is defined as *the number of product-related experiences that have been accumulated by the consumer*. Expertise is defined as *the ability to perform product-related tasks successfully*.

Park and Lessig (1981) have noted that, at low levels of familiarity, consumers are not discriminating enough in their choices. Consequently, such people are more likely to exhibit the context effect, i.e., their choice depends on how the alternatives are presented. Hence, one expects that the attraction effect will be higher for people who are less familiar with the product category.

Similar arguments can be made for observing a lower level of the attraction effect for people with higher expertise levels (if they exhibit the phenomenon at all). Experts are better able to assimilate the information presented. Consequently, the experts are likely to have a clear and stable decision structure, and their choice will not be affected by the introduction of a dominated (irrelevant) decoy. Therefore, respondents with more knowledge—high familiarity and a high level of product class expertise—would demonstrate a lower attraction effect. As shown in path 4, Figure 2, we hypothesize:

> H_2: The attraction effect will be lower for respondents who have more knowledge about the product category.

Knowledge is viewed as a two-dimensional (expertise and familiarity) latent construct (Alba and Hutchinson 1987). As a result, paths 1 and 2 show the knowledge construct as driving the respondents' expertise and familiarity. According to Rothschild (1979), response involvement or involvement with the task encompasses information processing, learning, and decision making and is influenced by a person's characteristics. For instance, past experiences with the product, e.g., familiarity or expertise, will affect the respondents' involvement with the choice task. Consequently, we feel that the level of involvement with the task should be positively affected by product class knowledge, path 3 in Figure 2.

3. Task Involvement

The respondents' involvement in the task or the activities relating to it determines the consistency in decision making (Johnson and Payne 1985; Payne 1982). Most of the choice mechanisms that have been purported to yield intransitivities are based on the notion of shifting attention or switching dimensions from one choice to another (Tversky 1969). In this process, some relevant information describing the alternative is ignored or discarded in particular choice sequences. Because of a lack of involvement, the respondent has difficulty in making a choice and resorts to heuristics. For instance, in the framework of Huber, Payne, and Puto (1982), the respondent might choose a locally superior brand, the target brand. This heuristic ignores the competitors' brand in the evaluation. A person who is less involved with the task will not consider the experiment stimulating enough to spend the effort to make a good decision and will be more likely to demonstrate the attraction effect (path 6).

> H_3: The attraction effect will be higher for respondents who are less involved with the choice task than for those who are more involved.

4. Perceived Decoy Similarity

The traditional similarity hypothesis requires that a newly introduced brand will take away market share, disproportionately, from brands that are most similar to it (Tversky 1972). However, Huber, Payne, and Puto (1982) observe attraction effects in violation of the similarity hypotheses. Some degree of similarity is a necessary condition for the attraction effect to occur. Huber, Payne, and Puto found that decoys that were most similar to the target produced the largest magnitudes of the attraction effect vis-á-vis the target. Similarly, the experimental results of Huber and Puto (1983) suggest that the greater the similarity, the stronger the observed attraction effect. Similarity has the potential to influence attraction effect in a number of ways. The presence of similar objects can increase the cost of thinking (Shugan 1980), cause a target brand to be viewed as locally superior, or force a respondent to make a compromise decision (Simonson 1989). All of these factors can lead to an observed attraction effect. In most regions (with the exception of a small region around the target where target and decoy are virtually indistinguishable), the Huber, Payne, and Puto (1982) principle is expected to hold; that is, the attraction effect increases when the perceived similarity between the decoy and the target increases (path 8).

> H_4: The magnitude of the attraction effect should increase as perceived decoy-target similarity increases.

5. Preference Strength

Preference strength is a measure of the confidence or conviction in a particular brand, given a choice situation. If the preference strength for a brand is high relative to others, then the brand would be chosen most often. A

high preference strength signifies a clear and stable decision structure. By contrast, when two brands exist in the core set and are equally preferred by the respondent, the preference strength would be low because there is no clear-cut choice. As a result, we represent preference strength as a composite of two items: centrality of preference and relative preference. These items are distinct and represent different aspects of preference as it relates to the attraction effect.

First, centrality of preference is high when the core set brands have nearly equal shares.[1] Mathematically, it is the product of the choice probabilities of the core set brands, $[P^*(1 - P)]$. Thus, centrality of preference varies from 0 to 0.25. A preference situation involving equal, competing alternatives will lead to greater conflict (Tyebjee 1979). In this situation, the choice framework is unlikely to be simple. Respondents without a strong preference for a particular brand are therefore more likely to exhibit the attraction effect.

Relative preference refers to the strength of preference for one brand relative to another (Bass 1974; Urban, Hauser, and Roberts 1990). Relative preference is represented here by choice probability, and varies from 0.00 to 1.00. If the consumer overwhelmingly prefers brand X over brand Y (i.e., the preference for X, $P(X;Y)$, is higher than that for Y, $P(Y;X)$), then on subsequent purchase decisions he or she is more likely to buy brand X. The consumer is said to be loyal to brand X (Krishnamurthi and Raj 1991). Brand-loyal consumers have a more stable decision structure (Kotler 1991, p. 275) and are less likely to exhibit the attraction effect. In the psychology literature, this unwillingness of consumers to change their minds, despite external pressure, has been referred to as "staunch" confidence in judgment (Asch 1955).

A low preference strength refers to a choice situation where the centrality factor is high and the relative preference for a brand is comparatively low. Both these conditions point to a situation where the respondents are unsure of their decision process and, consequently, their conviction about the decisions they have made is low. Therefore, the respondents are more likely to alter their decisions when new brands are introduced and the likelihood of the attraction effect occurring increases. As a result, we expect (path 13):

> H_5: Respondents who have a low preference strength are more likely to exhibit the attraction effect.

Preference strength is also expected to affect the share captured by the decoy. The decoy can capture share from the target or the competitor. If the preference strength of the target is high, the decoy cannot capture much share from it. By contrast, if it is low, the decoy can capture a relatively larger share because it can attract share from both the target and the competitors' brands. Thus, we expect that preference strength will have a negative impact on decoy share (path 12).

6. *Perceived Decoy Popularity*

Huber, Payne, and Puto (1982) suggest that the belief among subjects that a decoy is popular alters their own attitudes toward the target in a positive way. We refer to this belief as the popularity effect. Perceptions of the popularity of a brand have been used in comparative advertisements to influence the viewer's decision process. For example, a Diet Coke ad stated that ". . . of the two million people who stopped drinking Pepsi, most switched to Diet Coke." Another example would be the Bayer ad that claimed, "Of the 1,000 doctors surveyed, more than 40 percent preferred Bayer . . ." Also, in developing a sale, salespersons often mention that a brand or a model is "moving fast" in the market.

Versions of the popularity effect, also called the bandwagon effect, are prevalent in various disciplines: "herd behavior" in finance (Keynes 1936; Scharfstein and Stein 1990) and "social pressure" in psychology (Asch 1955). With reference to investors, Keynes (1936) suggested that some financial decisions are not made in an efficient manner because the investors are reluctant to act according to their beliefs and information. Out of fear for their reputation, investors refrain from contrarian behavior and "follow the herd." Scharfstein and Stein (1990) refer to this as "sharing-the-blame" effect (p. 466). In other words, an investor's unprofitable decision is not as bad if everybody commits the same mistake.

In his classical experiments to study "the effect of the opinion of others on our own," Asch (1955) demonstrated that, under group pressure, individuals who rarely committed any errors could be wrong as much as half the time. The magnitude of their inconsistency was significantly affected by the size of the majority. In our manipulation of popularity, we are varying the "size of the majority." If more people have positive views about a particular brand, then the pressure exerted on the others to conform is higher. This should lead to an alteration in the decision structure of the respondent.

An increase in the perceived decoy popularity tends to make many respondents include the decoy brand in the consideration set. Some respondents might first evaluate the decoy brand and then compare it to the nearest brand, i.e., the target brand, and in most cases decide that the target brand has superior attributes (true by definition). Thus, the introduction of a popular decoy brand can benefit the target at the expense of the competitor. The respondent is less likely to compare the decoy with the more distant competitive brand. Thus, we expect the attraction effect to increase as the perceived popularity of the decoy increases (path 9).

> H_{6a}: The attraction effect will increase as the perceived popularity of the decoy increases.

[1] We thank a reviewer for suggesting this definition for preference strength.

If the decoy is perceived as very popular, the individual will be more likely to shift his/her preference toward the decoy. Conversely, if perceived decoy popularity is low, the market share of the decoy is likely to be low. As a result, we expect that the perceived popularity of the decoy will have a positive impact on the share captured by the decoy (path 10).

If the decoy captures only a small share of the market, it will have little impact on the attraction effect. When the decoy gains very little share, the preference structure is only marginally affected by the introduction of the decoy. Thus, the attraction effect should be low. We can look at this relationship as an indirect effect of decoy popularity on the attraction effect: perceived decoy popularity influences decoy share, which in turn influences the attraction effect (path 11),

H_{6b}: The attraction effect will increase as the share captured by the decoy increases.

METHOD

Sample

The subjects for the study were undergraduate and graduate students at a large university. Earlier attraction effect studies have also used student populations (cf., Huber, Payne, and Puto 1982; Simonson 1989). The students were offered credit for participating in the study. The final sample, used to estimate the model in Figure 2, included 359 respondents for beer and TV sets and 330 respondents for cars.[2] The respondents were 19 to 45 years old, with a mean age of 22 years.

Study Design

The products used in the current study are beer, cars, and TV sets, products which students use frequently. These products yield a wide range of risk and consumer involvement levels and, as such, are consistent with good practice in experimental designs. Zaichkowsky (1985) reports Personal Involvement Inventory (PII) scores of 122 for automobile (car) and 97 for color TV sets. These are higher-involvement products, while beer (PII score = 82) is a lower-involvement product. These products have been used in previous studies that have observed varying degrees of the attraction effect for them (cf., Huber, Payne, and Puto 1982).

Two stimulus descriptions—elaborated and original—were used in this study. Popularity of the decoy was manipulated at three levels: The low-popularity group was told that the market share of the decoy was 5%; the high-popularity group was told that the market share was 40%; and the control group was not told anything about the popularity of the brand. Popularity was held below 50%, because a dominated decoy cannot be expected to be the most popular. The overall design is a randomized 2 (stimulus description: elaborated and original) × 3 (popularity: control, 5% and 40%) design for each product category. A respondent was randomly assigned to one of these six conditions. For each design cell, the study was conducted on a within-subject basis to compare the preference pattern in the core set (X and Y) to the decoy-augmented choice set (W, X, and Y). As a result, the study is a mixed design one. The between-subject aspect of the design assigns a respondent to one of six design conditions, thereby reducing the task length and the resultant respondent fatigue. By contrast, the within-subject aspect of the design requires two choice tasks to be completed by each respondent. Consequently, we can estimate the attraction effect for *each* respondent. Previous studies in the area have been able to provide attraction effect estimates mainly at the aggregate level, because no single respondent completed all of the tasks required to estimate an individual-level attraction effect. Individual-level estimates of attraction effect are essential to using a structural equation model analysis.

Pretests with the questionnaire showed that a respondent took 25 to 30 minutes to answer the questions on each product class. Consequently, to reduce respondent fatigue, each participant was presented with only two of the three product categories. A choice problem for a given product class consisted of a brief situational description followed by the available options. The elaborated stimuli information was presented after the situational description.

The attribute elaborations used in the study were similar to those used by Ratneshwar, Shocker, and Stewart (1987). The options were presented in an alternative-by-attribute (row-by-column) matrix format. The attributes were similar to those used in previous studies: reliability and percentage distortion for TV sets, MPG and ride quality for cars, and price and quality rating for beer (cf., Huber, Payne, and Puto 1982). Brand W is a range-increasing decoy for the target brand X (see Figure 1). Huber, Payne, and Puto (1982) observe that the attraction effect was the highest for range extension decoys. In keeping with earlier practice, the stimuli were presented in verbal form and *not* pictorially, as shown in Figure 1. Subjects were instructed to indicate their preferences on the basis of the information presented only.

The basic choice task consisted of two decisions: (1) the respondents chose the brand they would buy, and (2) they provided preference ratings on a constant sum scale. The following is a detailed description of these tasks. Respondents indicated their choice by picking one brand from the choice set: *Given that you had to buy one brand based on this information alone, which one would it be*?

The instructions for using constant sum scales were

[2]The initial sample sizes were 361, 334, and 367 for beer, cars, and TV sets, respectively. Respondents who either guessed the purpose of the study or failed to follow the instructions were excluded from the analysis. Given the small number of such deletions (a maximum of four for TV sets), the instructions for the study and the survey instrument were deemed adequate.

(Hauser and Shugan 1980): *Based on your preference, please distribute 100 points among the brands, giving most points to the brand you prefer most.* ***Allocate points in proportion to the ratio of your preferences for these brands.*** *(Make sure the points add up to 100).*

For each product class, they had two choice tasks: choosing from (a) core set brands X and Y (Figure 1) and from (b) brands X, Y, and decoy brand W. (The respondents were also asked to evaluate the introduction of another decoy, but those results are not relevant for this study and hence are not reported here.) Respondents used a 7-point scale to indicate the similarity between decoy and each of the core set brands.

Procedure

The study participants were told that the study dealt with consumer preferences. The first part of the survey measured their involvement or interest in the products. Participants then made a choice from the core set brands X and Y. Next, they were presented the decoy-augmented choice set. Filler tasks were included between these choice tasks. After the choices had been made, the participants responded, in the following order, to questions relating to the perceived popularity of the decoy, perceived similarity between the decoy and the core set brands, involvement with the choice task, and relevance of the presented information. Next, they repeated this set of tasks for the second product. Product class usage, spending, buying behavior, and expertise was addressed in the next set of questions. Responses to these were simultaneously obtained for both products. Finally, the participants responded to a set of demographic questions. Overall, we used responses to four choice tasks (=2 * 2—two choice tasks per product category × two product categories) in our analysis of the effects of the antecedent variables on the attraction effect. The order of the decoy presentation, product category, decoy popularity level, and type of stimulus presentation was randomized across the subjects. Most subjects spent 35 to 40 minutes on the survey.

Measures

We briefly define the operationalization of some of the constructs used in this study. All the measures are described in the Appendix, Table A1.

Similarity. The similar-dissimilar and 7-point semantic differential brand pair ratings are used in this study, along with a similarity-based ranking of the pairs. The difference measure of similarity used in this study is based on the subtractive model of comparative judgment (Lynch 1985). This measure is similar to the measure of relative similarity proposed by Huber, Payne, and Puto (1982, p. 94) except that they define it as the "ratio of the decoy-competitor distance to the decoy-target distance," and ours considers the difference between the two distances. The subtractive model is:

$$S = S_{WX} - S_{WY},$$

where S is the transformed similarity, S_{WX} is the perceived similarity between W and X, and S_{WY} is the perceived similarity between W and Y. The subtractive model provides a *relative* measure of similarity. The theories that are used to explain the attraction effect are based on the relative similarity between the decoy and the target brands and the lack of similarity between decoy and competitor brands. If the decoy is perceived as equally similar to the competitor and the target, the value of the similarity measure, S, is zero. In such a case, there should be no attraction effect. A direct measure of similarity would fail to reveal this comparison. As a result, we do not use S_{WX} directly as a measure of similarity.

Popularity. A four-item, 7-point scale was used to check the success of the manipulation of popularity. The four items are consistent with dictionary definitions for popularity and appear to have face validity. A pretest of the popularity measure ($n = 27$) suggested that it had adequate reliability (Cronbach's $\alpha = 0.90$) and discriminant validity in distinguishing between those who had been presented the very popular decoy compared with those who received the less popular ones ($p = 0.01$).

Other independent measures. The other measures used in this study are: preference strength, task involvement, decoy share, information relevance, expertise, and product class familiarity.

Attraction effect. The attraction effect has been defined as a violation of the regularity and similarity conditions (Huber, Payne, and Puto 1982). Researchers have operationalized this definition by suggesting that attraction effect implies that the choice probability of a product increases with the introduction of a decoy brand. In this study, we use the broader definition of attraction effect, as stated by Huber and Puto (1983, p. 32), ". . . a new item can increase the favorable perceptions of similar items." Using this broad definition, the existence of attraction effect can lead to an increase or decrease in choice probabilities with the introduction of a decoy (as shown in Appendix A).

A standard principle used in choice situations involving a new brand is that it will capture share from other brands in proportion to their market shares (Huber, Payne, and Puto 1982). This principle of proportionality is incorporated in the Luce (1959) axiom and is central to numerous choice models in consumer behavior (cf., Silk and Urban 1978). We prefer Luce's model because it is parsimonious and popular (Huber and Puto 1983). The attraction effect, AE_L, occurs if, on the introduction of the decoy, the *observed* share of brand X, $O(X)$, is different from the expected share under the Luce model, $E_L(X)$ (see Appendix A.) Mathematically,

$$AE_L = O(X) - E_L(X).$$

If AE_L is positive, it is a "positive" attraction effect. If AE_L is negative, it is a "negative" attraction effect or the substitution effect (Huber and Puto 1983).

For example, consider a core set share of 60 for brand X and 40 for Y. If the decoy W captures a share of 20, the expected shares of brands X and Y will decline proportionately to 48(=60–20 * .6) and 32(=40–20 * .4), respectively. AE_L will be positive if the observed share of X, $O(X)$, is greater than 48 and AE_L will be negative if $O(X)$ is less than 48. One should note that AE_L is defined at the individual level.

Earlier researchers have collected data at only the nominal level (cf., Huber, Payne, and Puto 1982). In the current research, data is collected at the ratio level for three reasons. First, the constant sum scale has been found to make excellent predictions for both frequently purchased products (Silk and Urban 1978) and durable products (Urban, Hauser, and Roberts 1990). Second, for use in covariance structure modeling, it is preferred that the data be collected at the ratio level. Third, researchers prefer to use data at the highest possible level of measurement (i.e., ratio data), provided reliable and valid measures are available. To collect data at the ratio level, it is imperative that the attraction effect construct be defined on a *within* subject basis.

RESULTS

Validity and Reliability of Measures

Constant sum scale. We use the respondents' ratings on the constant sum scale as input to the causal model. The convergent validity of two choice task measures—choice of most preferred brand and choice deduced from constant sum scale—was pretested using a quasi independence log linear model (Bishop, Fienberg, and Holland 1975, p. 287). The model had a good fit with the data for all the products (n = 98 for cars and TV sets and n = 100 for beer). That is, all χ^2 differences were insignificant (χ^2 = 1.115, 1.06, 3.767 for TV sets, cars, and beer, respectively; d.f. = 3). Using either the constant sum scale or the most preferred brand, 85%, 89%, and 92% of the respondents had identical choices for beer, cars, and TV sets, respectively. This is further testimony to the validity of the constant sum scale. Therefore, we conclude that the constant sum scale and most preferred choice lead to convergent predictions, consistent with the findings of Urban, Hauser, and Roberts (1990). Brand X was not the preferred brand for all the respondents. After 2 weeks, a subset of the subjects (n = 42) was presented with the choice tasks to determine the test-retest reliability of the constant sum preference measure. The test-retest correlation is significant and varies from 0.51 to 0.62 for the products studied ($p < .005$). The high correlation between the two responses (Cohen 1977, p. 78), suggests that the constant sum measure of preference is reliable, too.

Other measures. Reliabilities of the measures used in the current study are presented in Table A1. The Cronbach's αs for the measures are deemed adequate across all products.

Manipulation Checks

Product class involvement. The mean scores on the Zaichkowsky (1985) involvement scale were 125 for cars, 100 for TV sets, and 87 for beer. These scores are very similar to those obtained in the Zaichkowsky study. Thus, it is safe to conclude that the respondents perceived the products as intended.

Similarity. As noted in Figure 1, X was the intended target for W; hence, W should be perceived as more similar to X than to Y. The perceived similarities of pairs (XW) and (YW)—where W is the decoy—were compared. The manipulation was effective for over 90% of the responses for each of the products. The respondents who failed to perceive W as more similar to X were retained in the analysis, since the similarity construct is incorporated in the causal model. The construct considers the perceptions of the respondents and is not based on the study design.

Information relevance. To check for the success of the elaboration manipulation, a pretest was conducted (n = 49). The responses to the relevance measure were compared for the elaborated and original stimuli conditions. The elaborated information was perceived as significantly more relevant and meaningful for all three products ($p < .05$).

Popularity. We compared respondent-rated scores for the three conditions: (1) control group, (2) 5%, and (3) 40% for pairwise differences. The results indicate that the popularity manipulation was successful. The perceived popularity of both the 5% and control groups was significantly less than that of the 40% decoy. The respondents did not perceive the popularity of the 5% decoy as being any different from the control group. This pattern is identical across all the product classes.

Model Specification and Estimation

The structural equation models were analyzed using a maximum likelihood procedure in EQS (Bentler 1989) to simultaneously test the effect of all antecedent variables. (The correlation matrices are in Tables A2–A4 in the Appendix.) This study is primarily concerned with the structural relationships between the constructs, shown in Figure 2, as they represent the hypotheses. The loading for the constructs with single indicators was set to the square root of the assumed measure reliabilities, 0.85 in this case.[3]

[3]To generate sample sizes adequate for structural equation modeling, the data across the two experimental variables were pooled. Also, following Bentler (1989, p. 117), cases with an inordinately high contribution to the multivariate kurtosis were deleted from these analysis—1, 3, and 4 for beer, cars, and TV sets, respectively.

Multiple group tests. To test whether the pattern of effects was identical across the three products, we conducted a multiple group analysis (Bentler 1989, p. 151; Bollen 1989, p. 355). Basically, we test the hypothesis that the parameter estimates of the structural model, the β matrix, especially those relating to hypotheses H_1 to H_{6b}, are invariant across the product classes. We conducted a three group analysis, where these parameters were constrained to be equal. This analysis reveals that there is no support for the null hypothesis ($\chi^2_{diff} = 31.00$, d.f. = 14, $p < 0.01$). This suggests that the analysis of each product class must be reported separately. We conclude that the effects of the antecedent variables on the attraction effect are moderated by the product class under consideration. On the other hand, if the null hypotheses of invariance of parameter estimates had not been rejected, it would have considerably simplified the reporting of the results. Consequently, separate analyses were run for each product category.

Measurement model. The standardized factor loadings for the measurement model of the multiple-item constructs is presented in the Appendix, Table A5. All the parameter estimates are highly significant ($p < .001$). A point to note is the positive sign of loading of measure X1 on the preference strength construct. This suggests that as relative preference increases, the preference strength increases. As the target share increases, the centrality of preference X2 decreases. Therefore, the measure loadings of preference strength construct are of opposite signs, and of the two measures of preference strength, relative preference was found to be a stronger measure than centrality of preference. The two-dimensional structure of knowledge—familiarity and expertise—is confirmed in this analysis: Paths 1 and 2 are both significant for all the products. In all but a few cases, the factor loading is greater than 0.70, signifying the high reliability of the measures. The consistency of the results across the product categories is testimony to the stability of the constructs and the measures.

Model fits. The goodness of fit measures for the models

Table 1
STANDARDIZED EFFECT DECOMPOSITION AND EXPLAINED VARIANCE FOR THE ATTRACTION EFFECT

Product	*Variable*	*Total*	*Direct*	*Indirect*
Beer	Knowledge	−.129	−.124**	−.005
	Task involvement	−.019	.010	−.029**
	Information relevance	−.105	−.105**	—
	Preference strength	−.607	−.647***	.040*
	Decoy share	.133	.133**	—
	Perceived decoy popularity	−.017	−.040	.023*
	Similarity	.084	.084*	—
	Sample size (*n*)	359		
	Explained variance	41.94%		
		(.040, 467.35, 265, $p < .001$, .921)[a]		
Car	Knowledge	.034	.033	.001
	Task involvement	−.024	.022	−.046*
	Information relevance	−.106	−.106*	—
	Preference strength	−.218	−.259***	.042**
	Decoy share	.197	.197***	—
	Perceived decoy popularity	.072	−.011	.083***
	Similarity	.152	.152***	—
	Sample size (*n*)	330		
	Explained variance	11.64%		
		(.052, 434.26, 242, $p < .001$, .921)[a]		
TV Set	Knowledge	.026	.017	.009
	Task involvement	.023	.107	−.084***
	Information relevance	−.161	−.161***	—
	Preference strength	−.384	−.384***	.000
	Decoy share	.004	.004	—
	Perceived decoy popularity	.118	.116***	.002
	Similarity	−.023	−.023	—
	Sample size (*n*)	359		
	Explained variance	18.10%		
		(.038, 468.45, 242, $p < .001$, .931)[a]		

Direct and indirect effects may not sum to the total effect because of rounding. Information relevance, decoy share, and similarity have only a direct effect on the attraction effect.

[a]Read (average standardized residual, chi-square, degrees of freedom, *p*-value, Bentler-Bonett normed fit index).

*significant at $p < .10$.

**significant at $p < .05$.

***significant at $p < .01$.

Table 2
SUMMARY OF RESULTS OF THE EFFECT OF VARIOUS FACTORS ON THE ATTRACTION EFFECT

Factor	*References*	*Expected Sign*	*Hypothesis#*	*Result**
Information relevance	Ratneshwar, Shocker, and Stewart (1987)	Negative	H_1	Beer, cars, and TV sets
Product class knowledge	Kotovsky and Simon (1990)	Negative	H_2	Beer
Task involvement	Tyebjee (1979)	Negative	H_3	Beer, cars, and TV sets
Decoy-target similarity	Huber, Payne, and Puto (1982)	Positive	H_4	Beer and cars
Preference strength	Asch (1955); Bass (1974); Tyebjee (1979)	Negative	H_5	Beer, cars, and TV sets
Popularity of decoy	Asch (1955); Huber, Payne, and Puto (1982)	Positive	H_{6a}	Beer, cars, and TV sets
Decoy share		Positive	H_{6b}	Beer and cars

*These are the products for which the effects are significant (see Table 1).

are presented in Table 1. Many measures of fit have been formulated to indicate the "closeness" of the observed covariance matrix and the reproduced covariance matrix. The measures of fit commonly used are (1) residuals, (2) chi-square test, and (3) fit indices (Bollen 1989, p. 281). On the basis of these three measures of fit, one concludes that the reduced model is an adequate representation of the antecedent variables and their influence on the attraction effect. The large number of significant parameter estimates is also an indication of the appropriateness of the model.

Variance explained in the attraction effect. The variables considered in the model account for over 41%, 11%, and 18% of the variance in the attraction effect for beer, cars, and TV sets, respectively. There appears to be an inverse relationship between the involvement score for the product and the explained variance. For all the products, the amount of the explained variance is appreciable, ranging from about the medium to the large-effect size (Cohen 1977, p. 80). Furthermore, they are appreciably larger than the mean-effect size of .053 observed in consumer behavior studies (Peterson, Albaum, and Beltramini 1985).

Tests of the hypotheses

As shown in Figure 2, the antecedent variables can influence the attraction effect both directly and indirectly. To gain a better understanding of the modeled phenomenon, researchers have advocated that we investigate both the direct and indirect effects by looking at the decomposition of the effects (cf., Bollen 1989, p. 36). For example, consider the effect of preference strength on the attraction effect for cars. Apart from the significant direct effect, the preference strength has a bearing on the attraction effect by influencing the share captured by the decoy. The indirect effects operate through at least one intervening variable. Decoy share, on the other hand, has only a direct effect, and hence there is a blank in the indirect effect column (see Table 1). The total effect is the sum of the direct and indirect effects. Table 1 breaks down the total effects of the variables on the attraction effect. These effects are the standardized values that facilitate comparison of the factors within a model. The results from testing all of the hypotheses are summarized in Table 2. Next we discuss the results of each hypothesis.[4]

Hypothesis H_1: This hypothesis, that the attraction effect will be affected by the relevance of the presented information, is supported for beer, cars, and TV sets. The attraction effect decreases as the perceived relevance of the information increases. Comparing the unstandardized values of the effect, we find that the effect is comparable for beer and cars and much higher for TV sets. An examination of the summary statistics—Appendix Tables A2–A4—indicates that the mean levels of the perceived information relevance are comparable for beer and cars and relatively lower for TV sets. When people find the presented information to be of a high quality, a choice or preference anomaly is much less likely to occur.

Hypothesis H_2: Knowledge has a significant effect for beer. An increase in product class knowledge tends to decrease the attraction effect. The magnitude of this effect is nearly equal to that of the effect of decoy share. The effect of knowledge on the attraction effect is not significant for TV sets and cars. We find that the respondents know most about beer, which appears to help them to make consistent decisions, leading to a lower attraction effect.

Hypothesis H_3: Task involvement has a significant ef-

[4]To check the comparability of our results with previous studies, a categorical measure of attraction effect was developed. When AE_L was positive, $AE = 1$, and $AE = 0$ if negative. Respondents with AE_L zero were deleted. An analysis of the means of the antecedent constructs across the two groups of AE shows that the direction of the results is as expected for most of them.

fect on the attraction effect. This effect operates through perceived information relevance (path 5), and is significant for all the three products: beer, cars, and TV sets. We conclude that as the respondents become more involved with the choice task, they process the information better and are more consistent in their decision making. Thus, as task involvement increases, the attraction effect decreases.

This effect is different than the need for justification, because this constraint was not imposed on the participants of this study. If manipulated, respondents in the need for justification condition would be expected to be more involved with the task. However, the converse is not true: the respondents who were more involved with the task need not have a higher need for justification. Their greater involvement in the task could be a result of their interest and higher knowledge about the product class.

Hypothesis H_4: The hypothesis that the attraction effect will be influenced by the perceived decoy-target similarity is supported for beer and cars. Perceived similarity has a positive impact on the attraction effect. When the perceived decoy-target similarity increases, the expected share, E_L(target), increasingly underestimates the observed share, O(target), captured by the target brand. Similar results have been observed in past studies that used strong decoys (Huber, Payne, and Puto 1982). If the decoy and the target are considered almost identical, one should expect the decoy and the target to evenly split the share held by the target before the introduction of the decoy. In other words, a critical region extends around a brand in which effectively *no* attraction effect will be observed. As the similarity decreases, substitution between the target and decoy decline, up to the point beyond the critical region when attraction effects dominate. It is likely that the perception of the decoy for TV set fell within this critical region for most of the respondents; therefore, the attraction effect decreases, with an increase in the perceived target-decoy similarity. The results suggest that a closer look at the mean similarity levels of the decoy is warranted. It appears that an overall similarity level of around plus 3 may be the minimum necessary for the decoy to aid the target (Table: A2–A4). In light of this, it is interesting to note that the coefficient for TV sets is negative, *albeit* not significantly so. This suggests that the effect of similarity on the attraction effect may not be linear.

Hypothesis H_5: This hypothesis is supported for all products. Higher magnitudes of preference strength for a brand lead to a lower attraction effect. Preference strength has a major impact on the attraction effect. It is the most important variable in determining the level of the attraction effect. For example, for beer the coefficient for the preference strength is about five times that of the next variable, decoy share (Table 1). The magnitude of the effect of preference strength on the attraction effect is the strongest for beer and the weakest for cars. The importance of preference strength is also manifested in the significant but smaller indirect effects for cars and beer. Thus we conclude that the attraction effect will be lower if strength of preference is high, i.e., when relative preference is high and centrality of preference is low.

Hypothesis H_{6a}: For all the products used in the study, perceived decoy popularity has a significant effect on the attraction effect in the expected direction. This result supports hypothesis H_{6a}. For TV sets, the direct effect is dominant, while for cars and beer it is mediated by decoy share. (This issue is discussed in detail in relation to H_{6b}.) The attraction effect increases as the perceived decoy popularity increases. As a result, if one introduces a brand that people perceive to be very popular, the positive effects on the intended target appear to be substantial and significant.

Hypothesis H_{6b}: Observed decoy share has a significant positive effect on the attraction effect for cars and beer. For TV sets, the decoy share is relatively low and does not have a significant effect on the attraction effect. It appears that the decoy must capture considerable share to have an impact on the attraction effect. The level of this share could depend on the product category. What can be definitely said is that the decoy shares for cars and beer (.259 and .285) are large enough to have a significant impact on the decision structure of the respondents, thereby leading to an increase in the attraction effect. On the other hand, the decoy share for TV sets (.170) is much lower and does not produce an appreciable attraction effect.

The levels of the perceived decoy popularity and the share captured by the decoy follow an interesting pattern for these products. The perceived decoy popularity is comparable for cars and beer (20.44 and 21.37) and is more than 25% higher than for TV sets (16.30). Once again, decoy share is comparable for cars and beer (.259 and .285) and more than 50% higher than for TVs (.170). It is plausible that decoys which capture a large enough share have a significant effect on the attraction effect. For cars and beer, the increase in perceived decoy popularity goes more toward increasing the share captured by the decoy. Thus, the effect of decoy popularity on the attraction effect is mediated by the decoy share. On the other hand, when the decoy does not gain as much share, decoy share is seen to have hardly any impact on the attraction effect. In this case, the decoy popularity has a direct impact on the attraction effect. Therefore, we observe that decoy share has a significantly positive effect on the attraction effect for cars and beer, while the perceived decoy popularity has only an indirect effect for these products. On the other hand, for TV sets perceived decoy popularity has a significant positive direct effect on the attraction effect, and the effect of decoy share is insignificant.

DISCUSSION AND CONCLUSIONS

The purpose of our research was to develop a better understanding of the attraction effect by studying the im-

pact of certain antecedent variables on the attraction effect. By examining the phenomenon at the ratio level, we were able to model the effects of the antecedent variables and their interrelationship in a unifying framework. It should be noted that this analysis requires that the attraction effect be defined and measured at the individual level. To maintain comparability across the products, the same model was used across all three products. However, we conclude that the effects of these variables are moderated by the product class.

The pattern of results confirms the conclusions of earlier researchers that the attraction effect depends on the product-decoy combination (cf., Huber Payne, and Puto 1982). Preference strength for a brand has the strongest influence on the attraction effect phenomenon. The negative coefficient implies that the customers with a strong conviction in their decisions do not exhibit the attraction effect. For the practicing manager, the implication of this finding is that the introduction of a decoy will help the target brand only if the customers have a low relative preference for the brand or if the customers are not sure about their choice between the core set brands.

In the Huber and Puto (1983, p. 37) study, the phenomenon is observed in the three-brand core set condition. Conversely, a brand with high consumer loyalty will not gain much share upon the introduction of a decoy brand. The effect of preference strength is largest for the least involved product category used in this study, i.e., beer. Thus, it is more important for managers of lower involvement products to build up their customer base so that the customers become die-hard loyals. Future researchers should determine if this pattern holds for even less involved products, e.g., instant coffee and breakfast cereal (Zaichkowsky 1985).

The popularity explanation for the attraction effect is a viable one. The results show that as the perceived decoy popularity increases, the attraction effect increases. Popularity has a direct effect if the share captured by the decoy is low, while it operates indirectly through the decoy share when the share of the decoy is relatively large. Social influences have been shown to shape individual's beliefs and behaviors (Asch 1955). The perception of a decoy being liked by many people puts pressure on the respondents to conform to the "group" and alter their decisions to be in line with it. In some ways, this is comparable to the "need to justify" explanation put forward by Simonson (1989, p. 166), who concludes that the attraction effect is higher for subjects in the "need for justification" condition. Could it be that the higher perceived popularity of the decoy makes the justification easier? Scharfstein and Stein (1990, p. 465) suggest that professional managers will "follow the herd" *if they are concerned about how others will assess their ability to make sound judgments* (italics added). In "following the herd," these managers tend to ignore significant private information. Respondents in our study appear to ignore their previous preferences about the brands in the core set when confronted with a popular decoy. Consequently, the attraction effect is influenced by the perceived popularity of the decoy.

Would a manager wish to introduce a second decoy brand, even if it reduces the market share of the current offering, i.e., the target brand? The answer is a qualified yes. Moorthy and Png (1992) demonstrate theoretically that such introductions could be an optimal strategy. Although there is some cannibalization, the firm might find the introduction of the decoy to make economic sense so long as the loss of share for the target is *proportionately* less compared to the loss for the competitive brand. Our attraction effect formulation—the net change in market share of the firm's principal brand (target) after adjustment for the expected proportional loss based on the constant ratio model—fits this line of reasoning. Therefore, our definition of attraction effect is managerially meaningful and consistent with observed real world strategies (Moorthy and Png 1992). However, having made the case for the proportionately adjusted estimate of the attraction effect, we acknowledge that the other definitions (*cf.*, Huber, Payne, and Puto 1982) also merit attention.

Coupled with the conclusions of previous researchers in the attraction effect area, our results suggest that the problem of cannibalization may be overemphasized in such conditions, and the managers may be overlooking the beneficial effects of the similar decoy. Relative similarity of the decoy-target over that of the decoy-competitor appears to have a positive impact on the share captured by the target when the decoy is introduced. This is the essence of the attraction effect and is contrary to the cannibalization concept. Therefore, a manager should not rule out the introduction of brands perceived as similar to an existing brand.

Information relevance and task involvement have a significantly negative impact on the attraction effect. The effect of product class knowledge is significant only for beer. Among the products used in this study, students appear to be most knowledgeable about beer (surprise!). Beer is a frequently purchased product, and the expertise level is also the highest for beer, 18.32 compared to 17.00 and 13.08 for cars and TV sets, respectively. These results vindicate the central thesis of our study: *Attraction effect will be minimized under conditions which facilitate or aid decision making.*

The attraction effect for the individual will be diminished by making the information more meaningful—by presenting the appropriate information in an organized and useful manner that matches the consumers' stored knowledge, by making the choice task more relevant—by presenting interesting choices or by increasing the relevance of the product class, and by educating the customers—by telling them about the product category and its relevant attributes. Therefore, a competitor's defensive strategy should be to make the choice task among the brands in a product category as simple as possible. If a firm does not do this, the "cognitive miser" con-

sumer will surely do it, much to the detriment of the competitive brand.

The explained variance for the attraction effect factor ranges from over 11.5% to about 42%. For higher involvement products, the attraction effect appears to be lower. The lower explained variance for cars and TV sets could also be the result of not using price as an alternative dimension, thereby reducing the overall reality of the task. Even though these values are considered appreciable—between medium and large (Cohen 1977)—there are certain issues that could be considered to improve the predictive power in future studies in this area.

Several other factors could also influence the attraction effect. First, the form and order of the presentation of stimuli has been shown to significantly affect decision making. Tversky (1969) has shown that under certain experimental conditions intransitivities can be predicted. Depending on the information display, people engage in either holistic or decompositional processing. Under holistic processing, the alternatives are evaluated on an overall basis, whereas during decompositional processing the alternatives are compared on each attribute. These different forms of processing could lead to inconsistencies in choice.

Attraction effect researchers have used only verbally presented tasks. Also, the manipulation of the decoy position will be stronger under a graphical presentation of the choice task, because the respondents will clearly see the position of the decoy. This could enhance the attraction effect and lead to a stronger test of the theory. Researchers have shown that the response mode affects the cognitive processes and the adaptive selection strategy used by people (*cf.*, Einhorn and Hogarth 1981; Payne 1982). Response mode may have a significant impact on the attraction effect as well. People tend to use choice heuristics more often with complex tasks (Shugan 1980; Wright 1975). While these factors were not incorporated in this study, they appear to be promising research avenues.

Our choice of products and the definition of the core set with only two brands using only two dimensions was based on previous research in the area (cf., Huber, Payne, and Puto 1982). This could limit the generalizability of this study. These issues were dictated by the need to keep this study comparable to those done in the past. Further research needs to be conducted on testing some of the explanations for the attraction effect; defining the domain of the effect and its practical consequences; and the major issues associated with the modeling of consumer choices that are influenced by the attraction effect. This study tests several of the many factors that influence this phenomenon. Overall, we find that a simple model incorporating the hypothesized antecedent variables provides a reasonable fit across the three products and explains a significant amount of the variation in the choice patterns of the respondents.

APPENDIX

I. DEFINITION OF THE ATTRACTION EFFECT

If choice is proportional to utility of the object, the probability of choosing brand X from the set (X,Y), $P(X;Y)$ is

$$P(X;Y) = \frac{U(X)}{U(X) + U(Y)}$$

If a decoy brand W is introduced and there is *no* attraction effect, then the probability of choosing X from the set (X,Y,W) is

$$P(X;Y,W) = \frac{U(X)}{U(X) + U(Y) + U(W)}$$

and $P(X;Y,W) \leq P(X,Y)$. However, if there is an attraction effect (i.e., the newly introduced brand created a "favorable impression" of X), *then the utility of X has increased to $U(X^*)$, where $U(X^*) > U(X)$*. Consequently, the probability of choosing X from the set (X,Y,W) in the presence of attraction effect is

$$P(X^*; Y,W) = \frac{U(X^*)}{U(X^*) + U(Y) + U(W)}$$

Since, $U(X^*) > U(X)$, it necessarily holds that $P(X^*;Y,W) > P(X;Y,W)$ (since utilities are defined to be in the positive range). That is, the choice probability of X is greater with attraction effect than without it. If the increase in the utility of X resulting from the attraction effect is large (i.e., $U(X^*) - U(X)$ is large), then $P(X^*;Y,W)$ could well be greater than $P(X;Y)$, which is the definition of attraction effect used by some researchers. Their definition is a special case of the definition used in this manuscript. Although our definition does not preclude this interpretation, it is broader in scope, because it includes all cases where the introduction of a decoy creates a favorable impression of the target brand. (That is, an attraction effect exists if $U(X^*) > U(X)$.)

II. OPERATIONALIZATION OF THE ATTRACTION EFFECT

If the initial core set contains two brands, a target brand X and a competitor brand Y, then let the probability of choosing X and Y be $P(X;Y)$ and $P(Y;X)$, respectively. Also, $P(X;Y) + P(Y;X) = 1.0$. Let the new target brand W that is introduced have an observed choice probability of $P(W;X,Y)$. The proportionality principle would suggest that this brand W would reduce the share of X and Y in the following manner:

$$P^*(X) = P(X;Y)^*(1 - P(W;X,Y)) \text{ and}$$

$$P^*(Y) = P(Y;X)^*(1 - P(W;X,Y))$$

Let the actual probability for target brand X after the introduction of brand W be $P(X;Y,W)$. Then attraction effect is defined as the difference between the observed probability and

Table A1
OPERATIONAL MEASURES AND CONSTRUCT RELIABILITIES

Preference strength
x1: Relative preference: share of target brand in the core set, $P(X;Y)$.
x2: Centrality of preference or uncertainty in preference, $P(X;Y)*\{1 - P(X;Y)\}$
*Perceived decoy popularity**
Rate your perception of the popularity of Brand {*name of brand*}.
x3: industry leader/not an industry leader
x4: very popular/not at all popular
x5: widely accepted/not widely accepted
x6: many like it/few like it
Cronbach's α = (0.89; 0.93; 0.95)**
Decoy similarity
x7: Difference between the ratings of the perceived similarity between the decoy and the core set members.
How similar do you perceive the following brand pairs to be: (Circle #).

	Very similar						Very dissimilar
Brands *Y* and *W*	1	2	3	4	5	6	7
Brands *X* and *W*	1	2	3	4	5	6	7

Product class expertise
x8: know very little about (*product class*)/know very much about (*product class*)
x9: experienced/inexperienced
x10: uninformed/informed
x11: expert buyer/novice buyer
Cronbach's α = (0.90; 0.90; 0.90)
Product class familiarity
x12: Usage: Six-packs of beer consumed per week, hours of TV watched per week, miles driven/month ('00).
x13: Purchasing—amount spent in an average week or month.
x14: Purchasing frequency—only for beer (reverse-worded)
In an average month, how often do you *buy* beer? Include all your purchases either at grocery stores or bars.
1—never 2—less than once a month
3—once a month 4—once in two weeks
5—once a week 6—more than once a week
Decoy share
y1: Share of decoy in decoy augmented choice set, $P(W;X,Y)$
Task involvement
y2: How stimulating was the choice task?
y3: How enjoyable was the choice task?
y4: How interesting was the choice task?
y5: How exciting was the choice task?
Responses were recorded by circling a number on the following scale.

Not at all						Very much
1	2	3	4	5	6	7

Cronbach's α = (0.93; 0.89; 0.95)
Perceived information relevance
y6: How relevant was the information?
y7: How meaningful was the information?
y8: How important was the information?
y9: How useful was the information?
y10: How helpful was the information?
Responses were recorded by circling a number on the following scale.

Not at all						Very much
1	2	3	4	5	6	7

Cronbach's α = (0.94; 0.94; 0.96)
Attraction effect
y11: Deviation from the share expected under Luce's model.

*Unless stated otherwise, the number of scale points for all scales is seven.
**Read as Cronbach's α for (beer; cars; TV sets).
Note: *x1–x14* are exogenous variables, while *y1–y11* are endogenous variables.

Table A2

CORRELATION MATRIX AND DESCRIPTIVE STATISTICS OF MEASURES—BEER (n = 359)

	x1	*x2*	*x3*	*x4*	*x5*	*x6*	*x7*	*x8*	*x9*	*x10*	*x11*	*x12*	*x13*	*x14*	*y1*	*y2*	*y3*	*y4*	*y5*	*y6*	*y7*	*y8*	*y9*	*y10*	*y11*
x1	1000																								
x2	−334	1000																							
x3	006	018	1000																						
x4	007	004	749	1000																					
x5	−002	064	738	736	1000																				
x6	−052	057	553	622	690	1000																			
x7	129	−070	154	121	131	106	1000																		
x8	014	−044	−017	−070	016	004	−056	1000																	
x9	−068	014	028	026	073	044	001	637	1000																
x10	025	−032	015	−020	039	008	−049	770	622	1000															
x11	005	056	−058	−056	014	017	−036	753	693	735	1000														
x12	−099	036	−048	−048	012	019	−138	646	615	589	647	1000													
x13	−131	051	−033	−032	079	048	−129	474	477	439	508	662	1000												
x14	−053	048	−074	−035	018	−021	−058	510	484	476	514	622	529	1000											
y1	234	−142	134	094	158	134	−028	012	−030	−025	−008	−033	−034	−004	1000										
y2	032	091	−006	−001	020	089	−028	139	110	137	155	169	078	096	−026	1000									
y3	051	073	011	−005	026	059	−010	161	155	133	181	188	108	143	017	756	1000								
y4	−018	079	−049	−037	−019	039	−022	189	216	163	212	234	180	139	−026	756	809	1000							
y5	023	062	−052	−026	−013	073	−071	151	150	124	172	183	121	121	044	727	821	811	1000						
y6	−076	086	−033	−014	009	042	110	121	132	131	166	099	095	125	−195	282	240	257	201	1000					
y7	−043	083	−050	−073	−049	−025	019	163	149	161	211	125	132	118	−166	297	286	330	259	812	1000				
y8	−090	103	−039	−053	−034	023	001	104	111	091	178	068	090	044	−183	260	205	228	199	728	810	1000			
y9	−117	102	026	025	039	051	012	145	105	108	131	069	090	065	−161	184	148	210	141	728	765	791	1000		
y10	−106	087	−009	−002	051	070	044	116	076	095	113	081	118	062	−213	131	099	168	085	681	717	699	813	1000	
y11	−457	179	−007	007	−028	−003	009	−058	−035	−071	−058	−081	−096	−038	−039	−054	−069	−032	−053	−026	−097	−093	009	−087	1000
Mean	.591	.201	5.17	5.23	5.27	5.70	3.14	4.57	4.53	4.79	4.43	3.29	1.26	1.55	.285	2.98	2.85	3.28	2.69	4.51	4.21	4.32	4.36	4.30	.046
SD	.203	.052	1.61	1.53	1.59	1.49	1.69	1.69	1.78	1.62	1.71	1.72	1.37	.88	.149	1.42	1.39	1.55	1.36	1.56	1.59	1.63	1.69	1.64	.133
Min	.050	.000	1	1	1	1	−3.00	1	1	1	1	0	.00	.000	.000	1	1	1	1	1	1	1	1	1	−.755
Max	1.000	.250	7	7	7	7	6.00	7	7	7	7	5	7.00	4.00	.900	7	7	7	6	7	7	7	7	7	.540

Correlations are presented without decimals. Read −334 as −0.334.
x1, *x2*, *x3*, ..., *y11* are explained in Table A1.

Table A3

CORRELATION MATRIX AND DESCRIPTIVE STATISTICS OF MEASURES—CARS (n = 330)

	x1	*x2*	*x3*	*x4*	*x5*	*x6*	*x7*	*x8*	*x9*	*x10*	*x11*	*x12*	*x13*	*y1*	*y2*	*y3*	*y4*	*y5*	*y6*	*y7*	*y8*	*y9*	*y10*	*y11*
x1	1000																							
x2	−616	1000																						
x3	119	−069	1000																					
x4	119	−043	814	1000																				
x5	173	−104	748	816	1000																			
x6	090	−130	748	761	762	1000																		
x7	204	−065	048	022	066	007	1000																	
x8	138	−038	126	059	060	060	074	1000																
x9	049	−011	153	108	094	097	016	657	1000															
x10	166	−103	127	089	111	091	072	787	633	1000														
x11	126	−064	093	021	057	037	063	669	674	632	1000													
x12	−012	042	−043	−023	−070	008	−063	274	212	274	230	1000												
x13	007	042	016	009	022	057	011	249	139	211	169	403	1000											
y1	242	−129	386	376	351	327	−021	129	096	102	117	035	027	1000										
y2	119	−073	110	111	106	122	−050	063	041	083	002	−045	−023	072	1000									
y3	068	−056	091	079	116	086	002	081	039	089	024	−042	−006	054	804	1000								
y4	078	−043	123	108	144	121	068	044	−010	051	−039	−0100	−025	038	762	847	1000							
y5	106	−066	154	143	168	130	046	067	061	080	005	−078	020	080	795	865	840	1000						
y6	−015	050	046	010	050	034	150	−096	−083	−044	−153	−127	−082	012	345	329	422	362	1000					
y7	013	−009	086	071	085	109	175	−037	−010	009	−104	−081	−063	053	385	361	428	425	843	1000				
y8	016	019	053	060	072	083	170	−055	−010	023	−085	−106	−084	013	318	295	403	357	791	812	1000			
y9	055	−050	077	036	078	082	128	−067	−071	−023	−130	−180	−102	008	300	264	377	315	756	752	789	1000		
y10	058	−046	047	009	052	025	113	−138	−148	−070	−212	−170	−139	−003	309	291	374	327	729	700	732	833	1000	
y11	−164	138	030	032	036	048	064	015	014	005	039	064	−026	107	−047	−022	−009	−043	−080	−029	−051	−062	−127	1000
Mean	.625	.201	4.95	5.14	5.08	5.27	3.18	4.40	4.18	4.61	3.81	3.22	7.69	.259	3.32	3.12	3.38	3.01	4.38	4.18	4.41	4.24	4.21	.011
SD	.184	.052	1.68	1.59	1.61	1.57	1.74	1.55	1.64	1.51	1.64	4.17	7.62	.159	1.55	1.58	1.66	1.63	1.51	1.51	1.61	1.66	1.60	.100
Min	.100	.000	1	1	1	1	−5.00	1	1	1	1	0	0	.000	1	1	1	1	1	1	1	1	1	−.337
Max	1.00	.250	7	7	7	7	6.00	7	7	7	7	25	50	.850	7	7	7	7	7	7	7	7	7	.495

Correlations are presented without decimals. Read −616 as −0.616.
x1, *x2*, *x3*, ..., *y11* are explained in Table A1.

Table A4

CORRELATION MATRIX AND DESCRIPTIVE STATISTICS OF MEASURES—TVs (n = 359)

	x1	*x2*	*x3*	*x4*	*x5*	*x6*	*x7*	*x8*	*x9*	*x10*	*x11*	*x12*	*x13*	*y1*	*y2*	*y3*	*y4*	*y5*	*y6*	*y7*	*y8*	*y9*	*y10*	*y11*
x1	1000																							
x2	−522	1000																						
x3	049	−114	1000																					
x4	091	−102	850	1000																				
x5	054	−076	798	878	1000																			
x6	063	−059	757	819	849	1000																		
x7	103	−091	096	109	117	183	1000																	
x8	102	−070	024	035	060	048	−058	1000																
x9	115	−048	050	060	088	067	013	707	1000															
x10	089	−038	049	054	086	057	−097	748	647	1000														
x11	141	−100	−007	013	023	−011	−020	697	725	645	1000													
x12	−136	087	−052	−044	004	−030	006	183	149	199	098	1000												
x13	−050	−009	−019	042	083	030	−034	197	164	170	159	187	1000											
y1	077	−046	397	386	352	368	125	−025	056	004	016	−068	−016	1000										
y2	−034	089	039	066	062	094	−034	197	164	170	159	082	004	027	1000									
y3	−014	061	034	076	071	096	−005	242	181	212	179	158	033	074	831	1000								
y4	−051	110	002	019	056	066	−024	212	162	195	145	178	035	008	821	869	1000							
y5	−053	117	−011	004	008	036	−031	225	182	190	156	135	−014	−004	787	868	858	1000						
y6	108	−102	028	026	043	063	086	162	122	141	102	075	046	−040	465	430	466	389	1000					
y7	070	−073	044	006	060	051	072	165	116	160	111	119	020	−025	500	460	513	436	845	1000				
y8	068	−062	056	062	086	061	067	196	146	182	111	061	018	−067	439	399	467	388	821	851	1000			
y9	029	−000	053	014	081	081	053	147	118	098	065	034	025	−027	427	391	473	390	796	846	845	1000		
y10	006	−017	096	054	104	090	032	129	115	102	063	062	−039	−019	448	418	459	369	770	821	795	877	1000	
y11	−360	127	079	047	095	058	−052	−032	−062	019	−010	075	−037	023	043	046	038	049	−139	−078	−121	−099	−085	1000
Mean	.598	.211	4.02	4.10	4.04	4.14	2.41	3.19	3.36	3.48	3.05	11.98	4.21	.1700	2.80	2.62	2.83	2.48	3.97	3.81	4.00	3.94	3.93	.057
SD	.173	.050	1.64	1.70	1.67	1.77	1.87	1.55	1.59	1.60	1.53	10.21	5.57	.126	1.40	1.34	1.48	1.36	1.60	1.61	1.64	1.64	1.59	.135
Min	.100	.000	1	1	1	1	−4.00	1	1	1	1	.000	.000	.000	1	1	1	1	1	1	1	1	1	−.801
Max	1.00	.250	7	7	7	7	6	7	7	7	7	72.0	50.0	.900	6	6	6	7	7	7	7	7	7	.715

Correlations are presented without decimals. Read −522 as −0.522.
x1, *x2*, *x3*, ..., *y11* are explained in Table A1.

Table A5
THE STANDARDIZED FACTOR LOADINGS FOR THE MULTIPLE ITEM CONSTRUCTS IN MEASUREMENT MODEL

		PRODUCT		
Factor	*Measures*	*Beer*	*Cars*	*TV Sets*
Preference strength	X1	.862	.987	.989
	X2[f]	−.387	−.624	−.533
Perceived decoy popularity	X3[f]	.837	.875	.876
	X4	.854	.921	.945
	X5	.885	.880	.932
	X6	.732	.920	.882
Expertise	X7	.872	.893	.878
	X8	.765	.760	.823
	X9	.844	.860	.818
	X10[f]	.975	.767	.815
Familiarity	X11	.726	.730	.635
	X12[f]	.700	.555	.361
	X13*	.906	—	—
Task involvement	Y2[f]	.828	.855	.877
	Y3	.907	.932	.940
	Y4	.903	.906	.931
	Y5	.896	.928	.916
Information relevance	Y6	.849	.894	.884
	Y7[f]	.904	.896	.928
	Y8	.879	.892	.910
	Y9	.885	.878	.927
	Y10	.826	.837	.897

All the measurement model paths are significant at $p < .001$. For constructs with single indicators, α was assumed as .85, and the path loading was fixed to $(.85)^{0.5}$.

[f]These parameters have been set to one for fixing the metric of the construct.

*Not measured for car and TV sets.

predicted probability using the proportionality principle. Mathematically

$$\text{Attraction Effect} = P(X;Y,W) - P^*(X)$$

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