

Persistent Preferences for Product Attributes: The Effects of the Initial Choice Context and Uninformative Experience

A. V. MUTHUKRISHNAN
FRANK R. KARDES*

This research investigates the conditions under which persistent preferences for product attributes occur and the processes that lead to these effects. Our theoretical framework suggests that ambiguity in the context in which the initial choices are made determines the level of certainty in the initial preference. Certainty in the initial preference combines with uninformative additional experience to create a shift in the relevance of the attributes and biased information gathering in subsequent choices. These tendencies in turn lead to persistent preferences for the attributes of a previously chosen brand. In experiments 1A, 1B, and 1C, we varied the levels of ambiguity in the initial choice context and additional experience with a chosen brand and studied their effect on preference persistence. The findings offer support to the processes we propose. In experiment 2, we found that additional experience caused persistent preferences even for an irrelevant attribute as long as it was a differentiating attribute in the initial choice. Experiments 3 and 4 found that (a) the relative attractiveness of the chosen brand in the initial choice context and (b) a deliberation that compared the competing attributes in terms of their ability to render certain benefits attenuated the effects found in experiments 1A and 1B.

An important issue in marketing is how consumers form preferences for products and brands. While this issue has been well researched from several angles, there is very little research on the equally important issue of how people develop their preferences for the attributes or aspects of products and brands. Generally, products are viewed as bundles of attributes and benefits (Lancaster 1971). Preferences for attributes are central to several value maximization models of consumer choice, such as various multiattribute utility models (e.g., Hutchinson 1986) and various noncompensatory choice strategies (e.g., the lexicographic heuristic [Tversky 1969] and the elimination-by-aspects heuristic [Tversky 1972]). An extreme form of attribute preference is the tendency to favor persistently an attribute or a set of attributes to the exclusion of other equally relevant or even more relevant attributes. The objectives of this article are to investigate (1) under what conditions people develop persistent preferences for product attributes and (2) what pro-

cesses underlie the development of such persistent preferences. An understanding of the factors that cause a persistent preference for one or more attributes and the process by which this tendency develops is important for two reasons. It can enrich choice theories by going beyond the traditional notion that preferences for attributes are fixed and stable. Further, the persistent preference for attributes may at least partially explain consumer bonding with a brand.

PERSISTENT PREFERENCE FOR THE PRODUCT ATTRIBUTE(S)

Assume that a consumer first chooses a brand that contains a target set of attributes. After a delay, a subsequent choice involves two new brands: one contains the target attributes and the other contains a different set of attributes that are at least as relevant and efficient as the target set. A choice of the brand that contains the focal set by itself may not constitute persistent preference for these attributes, because it may reflect mere inertia (Jeuland 1979). However, if the consumer considers the target attributes to be superior even in the face of additional information that suggests that the two sets render certain benefits with equal efficacy, then there is evidence for choice based on cognitive commitment. Normatively, evidence that is consistent with both a prior hypothesis and its

*A. V. Muthukrishnan is associate professor of marketing at Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong; e-mail: mkmuthu@ust.hk. Frank R. Kardes is professor of marketing at University of Cincinnati; e-mail: frank.kardes@uc.edu. The authors thank George Loewenstein, Amnon Rappoport, Bob Wyer, S. Ramaswami, the editor, the associate editor, and three reviewers for their comments and suggestions. The experimental stimuli can be obtained from the first author.

converse should not strengthen one's confidence in the prior hypothesis. However, the behavioral decision research has demonstrated that subjects often violate this neutral-evidence principle (Pitz 1969; Troutman and Shanteau 1977). Thus, in this article, we will consider two components of preference persistence—the tendency to persist with the focal attributes in subsequent choices and the tendency to associate certain key benefits of the product primarily with the target attribute(s) even under neutral evidence. We propose a theoretical framework that identifies the conditions under which and the process by which these effects occur.

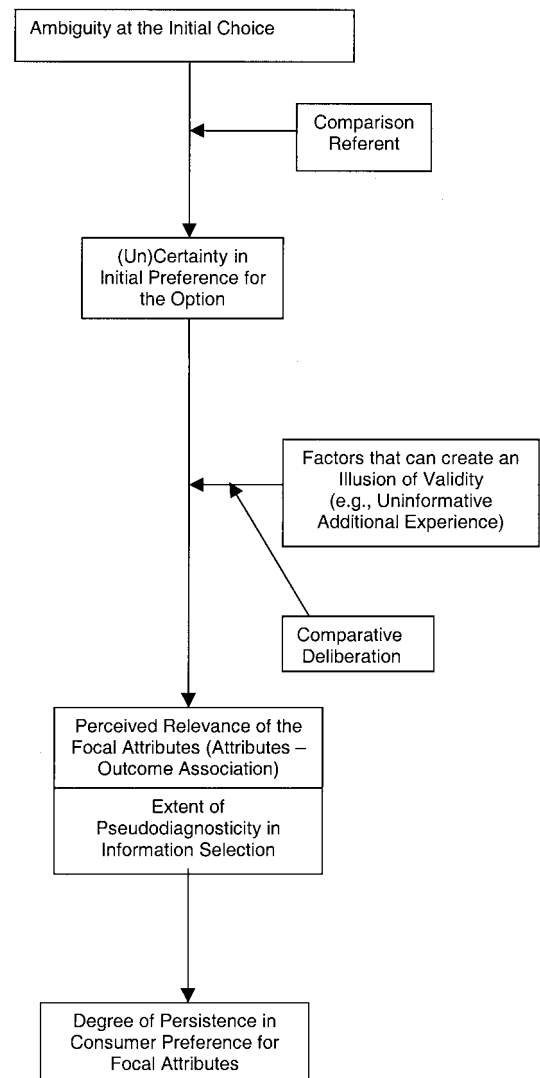
Theoretical Framework

Our theoretical framework outlines the antecedents of and the process that leads to persistent preferences for specific attributes (see Fig. 1). Specifically, we propose that the degree of certainty with which the initial preference for the option is held and the factors that can induce a perception of having accumulated adequate evidence are necessary to strengthen the association between the focal attributes and the positive product benefits. Our framework identifies specific variables that can cause certainty in the initial preference and the perception of having accumulated evidence. Further, our framework also suggests a set of moderators that can attenuate or even reverse the proposed effect. Finally, we propose a process by which preference persistence for attributes occurs. In the following sections, we explain the various links proposed in the framework.

Choice Context Ambiguity and Preference Uncertainty. The level of ambiguity in the choice context may often determine the degree of uncertainty with which preferences are held. Ellsberg (1961) defined ambiguity as a “quality depending on the amount, type, and reliability and unanimity of information” (p. 657). Further, he identified “objectively” ambiguous contexts as those in which “available information is scanty or obviously unreliable or highly conflicting; or where expressed expectations of different individuals differ widely” (pp. 660–661). This broad definition is consistent with more recent conceptualizations that describe ambiguity as caused by missing information that is relevant and that could be known (e.g., Camerer and Weber 1992; Frisch and Baron 1988; Heath and Tversky 1991). We adopt this conceptualization and operationalize ambiguity in terms of the type of information available in the decision context, which determines the ease with which brands can be compared.

In some choices, brand comparisons can easily reveal an option that is superior to all others. We consider such choices to be those characterized by very little ambiguity. Consumers' initial preferences are formed with very little uncertainty, and consumers can easily construct a theory that links any positive outcome that the brand may offer with the key attributes of the brand. When choice sets are characterized by high ambiguity, even side-by-side comparisons may not reveal which option is superior. Ambiguity of this nature is prevalent in the marketplace. Often consumers may come

FIGURE 1
THEORETICAL FRAMEWORK



across choice sets in which each brand may have advantages in terms of some attributes but disadvantages in terms of others (Ha and Hoch 1989). Even though the brands in the choice set are described in terms of the same attributes, the attribute values differ, and across the brands, attributes are negatively correlated. Therefore, choices may involve making trade-offs on key attribute dimensions. Such choice sets can cause high uncertainty in consumer preferences (Shafir, Simonson, and Tversky 1993; Tversky and Shafir 1992).

Consumers may also come across choice sets in which each option contains a unique set of key attributes, but all the options emphasize the same benefits. In these cases again, side-by-side comparisons of brands will not yield a

clearly superior option because of consumer uncertainty regarding the efficacy of these different attributes in rendering certain benefits. Thus, choice sets of this nature also can cause uncertainty in the initial preference because there is at least one other option that may be considered as attractive as the chosen option. We propose that this initial uncertainty persists during the evaluation of brand experience.

Uninformative Experience and the Strength of the Association between Attributes and Positive Outcomes.

A limited experience with the chosen brand helps consumers to learn the benefits of the brand and also the attributes-benefits association. Thus, trial is a necessary condition to form a theory that associates the favorable outcome obtained from the brand with the key attributes of the brand. In some product categories, additional experience beyond a single trial (or limited experience) may be useful in furthering this learning. In other product categories, however, additional trials may provide only nondiagnostic information because there may be very little incremental learning about the product. Nonetheless, even in these instances, additional information, irrespective of its relevance, may enhance confidence in an earlier judgment (Oskamp 1965; Peterson and Pitz 1988). Further, even nondiagnostic additional information may cause a richer representation of the target object, and this representation in turn may be the origin of confidence in judgments (Gill, Swann, and Silvera 1998). Specifically, additional experience, even when it is uninformative, can cause extremely high confidence to the point of an illusion of validity (Einhorn and Hogarth 1978). As explained below, we propose that additional experience interacts with the context in which the initial choice was made to strengthen the association between positive outcome and brand attributes and thus create persistent preferences for these attributes.

Interaction between Additional Experience and the Choice Context.

When the initial choice is made in an unambiguous context, consumers can readily form a theory that links the positive outcome with the salient attributes of the brand even with a single trial of the brand. Additional trials strengthen this theory. Psychological research offers a robust finding that consumers often misinterpret neutral information as supporting a previously held hypothesis. This tendency is known as confirmation bias (Klayman 1995; Rabin and Schrag 1999). Thus, the additional trials, which offer no information beyond that offered by the initial trial, are considered to be evidence that supports the theory of an association between a positive outcome and the product's salient attributes. With additional trials, the perception of having accumulated substantial evidence in support of the hypothesis also increases. Such confirmatory processing of information results in causality overestimation (Sanbonmatsu, Akimoto, and Biggs 1993).

Behavioral decision theory research has also identified another bias in hypothesis testing, the pseudodiagnosticity effect (Beyth-Marom and Fischhoff 1983; Klayman 1995). This effect occurs when people assess the extent to which

the available evidence supports the focal hypothesis but neglect the extent to which the available evidence supports alternative hypotheses (Doherty et al. 1979; Fischhoff and Beyth-Marom 1983). Because of this tendency as well as the propensity to make inductive inferences (Klar 1990), after uninformative additional experience, consumers whose initial preferences were certain may associate the positive benefits of the brand predominantly with the focal set of attributes. For example, after using a lotion with aloe vera as the key ingredient, people may infer that the extra moisture in their skin is due to aloe vera without testing whether other ingredients can also create the same degree of moisture. In subsequent decisions, people often actively search for information that bears on the validity of the focal theory and neglect information that bears on the validity of alternative theories (Klayman 1995; Mynatt, Doherty, and Dragan 1993). Therefore, preference for the focal attribute(s) persists through subsequent choices even when the brand that originally offered the focal attributes is no longer available.

However, the initial choice contexts that involve a high degree of ambiguity create preference uncertainty both before and immediately after choice. This initial uncertainty lingers and prevents consumers from acquiring extreme confidence in their preferences even after extensive experience. Further, the greater deliberation that occurs in high-ambiguity choice contexts reinforces prior learning that two different sets of attributes render the same benefits with equal efficacy. Thus, these contexts preclude a focal theory or hypothesis that links the positive outcome with any target set of attributes. Because there is no focal hypothesis to begin with, even with additional experience consumers either do not consider the positive outcomes of the brand to be unique, or, even if they do consider them unique, they cannot associate the outcome with any specific attributes. When the choice context causes high uncertainty in terms of preference, consumers tend to defer choice or seek additional information (Bettman et al. 1993; Dhar 1997; Tversky and Shafir 1992). Because of consumers' need for additional learning, in subsequent decisions, they tend to choose information in an appropriate manner so as to test the relative efficacy of the attributes. Thus, the tendencies to resolve uncertainty and to seek additional, diagnostic information weaken persistent preference for the attributes of a previously chosen brand. Experiments 1A, 1B, and 1C test our predictions concerning the effects of initial choice context and the level of experience on persistent preference for the focal attributes and the process that accounts for these effects. Experiment 2 examines preference persistence for a patently irrelevant attribute. In this experiment, we use an additional manipulation that determines whether the attribute-brand outcome association is strong or weak, which, in turn, determines the degree of preference persistence.

Comparison Referent as a Moderator. Our framework identifies two moderators of the effects of initial choice context and experience on preference persistence. One important moderator is the presence or absence of a salient

comparison brand to serve as a reference point. Research on consumer choice suggests that in decisions under uncertainty, consumer preferences are often constructed and are context dependent (e.g., Bettman, Luce, and Payne 1998; Slovic 1995). That is, preference for an option is determined not only by the characteristics of that option but also by the properties of other options in the choice set (Huber, Payne, and Puto 1982; Simonson and Tversky 1992). For example, for the same attribute contents, consumers may perceive greater benefits from a brand when it is portrayed as the best brand rather than the second best in the choice set (Muthukrishnan 1995). Likewise, the level of certainty in preference may be determined by a comparison process and more specifically by the position of the chosen brand in the choice set. We call the brand that competes with the focal brand the comparison referent. If consumers know that a comparison brand that is superior to the focal brand in terms of attribute values exists, even if it is unavailable, consumers will be uncertain about their initial preference even after choosing the focal brand. Thus, in our theoretical framework, comparison referent serves as a moderator of the effect of experience on preference persistence even under low ambiguity. In this instance, interestingly, the effect of experience may even reverse. A superior comparison referent causes the consumer to infer that the option he or she chose does not reflect his or her true preference. With additional experience, this belief may be held with a greater certitude, and, thus, the belief may acquire sufficient strength to induce the consumer to switch away from the focal attributes in a subsequent choice. Thus, extensive experience may lead to lesser preference persistence for the focal attributes. This proposition is tested in experiment 3.

Comparative Deliberation as a Moderator. The second moderator that our framework proposes is comparative deliberation. We argue that when ambiguity in the initial choice context is low, experience causes persistent preferences for the target set of attributes because it enhances the pseudodiagnosticity in hypothesis testing. If this is indeed the case, this effect should attenuate if consumers are provided an opportunity to deliberate upon the competing sets of attributes and make a subsequent choice. Although consumers' initial preferences are held with greater certainty and the focal attributes–benefits associations are stronger because of extensive experience, comparative deliberation may cause consumers to recall a subset of their prior learning about the benefits that the competing set of attributes can produce. Therefore, consumers may realize that the competing sets of attributes offer more or less similar benefits, and in subsequent decisions, they do not exhibit persistent preferences for attributes. We examine this proposition in experiment 4.

EXPERIMENT 1A: AMBIGUITY, EXPERIENCE, AND PREFERENCE PERSISTENCE

In this experiment, we examine the proposition that consumers whose initial preferences are less uncertain develop

a tendency for pseudodiagnostic hypothesis testing after uninformative additional experience with a brand. This tendency in turn leads to a persistent preference for the attributes of the chosen brand. However, consumers whose initial preferences were more uncertain do not develop pseudodiagnostic tendencies and thus do not persist with the focal attributes in a subsequent choice in spite of having extensive experience with a brand that contains the focal attributes. This experiment and all subsequent experiments in this research were conducted in two sessions separated by two days.

Method

Experimental Design. A 2 (ambiguity in the initial choice context) \times 2 (experience) between-subjects factorial design was employed. Based on prior research (Muthukrishnan 1995), the levels of experience were manipulated as six additional trials after an initial trial before choice (extensive experience) or no additional trial after the initial trial (limited experience).

Subjects. Subjects for this experiment and all subsequent experiments were volunteers recruited from several marketing classes. Because skin lotions are marketed primarily toward women, only female subjects were included. As compensation for their participation, the subjects earned extra class credit and also received HK\$50. In the present experiment, usable responses were obtained from 157 subjects.

Product Stimuli. Stimuli in this experiment and all subsequent experiments were brands of skin lotion that claimed to contain only natural ingredients. The choice of product category was based on two considerations. First, a product category was needed in which subjects could examine attribute values and then form beliefs and expectations based on these values. These initial beliefs needed to be verified by experience. Second, a product category that could easily be tried in an experimental setting was required. The category of skin lotions satisfied these criteria. To suppress the effects of brand familiarity, the stimuli were restricted to the subcategory of all-natural lotions.

Procedure. Table 1 summarizes the manipulations employed and the measures obtained in all our experiments. The general procedure was common to all experiments. Subjects were invited to participate in a skin lotion choice experiment. To prevent random brand switching or variety seeking, they were also told that about 15 percent of the subjects participating in the experiment would receive, as a gift, a brand they chose during a predetermined round of the experiment (known only to the experimenter). Thus, it was always in their best interest to choose the brand they thought was superior. Afterward, subjects were asked to read a magazine story that provided information about the key ingredients of the products. This story familiarized subjects with the importance of the key attributes of natural lotions and the benefits derived from these attributes. Subjects were told that while certain attributes such as aloe vera, vitamin E, and cocoa

TABLE 1
MANIPULATIONS AND MEASURES IN VARIOUS EXPERIMENTS

Experiment	Manipulations	Measures on day 1 (other than choice)	Measures on day 2 (other than choice)
1A	Experience; ambiguity via nonoverlapping sets of attributes	None	Superiority rating; information selection
1B	Experience; ambiguity via nonoverlapping sets of attributes	Certainty in initial choice; perceived relevance	Superiority rating
1C	Experience; ambiguity via negatively correlated attributes	Certainty in initial choice	Information selection
2	Experience; salience of irrelevant attribute	Perceived relevance	None
3	Experience; comparison referent (inferior or superior)	Certainty in initial choice	None
4	Comparative deliberation	None	Superiority rating

NOTE.—In experiments 1 to 3, experience was manipulated at two levels—extensive (six additional trials) vs. limited (no additional trial). In experiment 4, subjects in both conditions had extensive experience.

butter indeed offered certain key benefits such as skin moisturizing and cleansing, other attributes such as cucumber water and lemongrass were unimportant or irrelevant.

A pretest revealed that subjects process this information and develop perceptions of importance consistent with the magazine story. After receiving the general instructions and product class information, subjects were shown a brand-by-attribute matrix that described four brands in terms of seven attributes. Subjects were asked to inspect the information carefully and then make a choice. Fictitious brand names were used to label the alternatives. These names were rated as equally desirable in a pretest.

At this point, the ambiguity of the choice context was manipulated. In the low-ambiguity context, all four brands were described in terms of the same attributes. Except on a minor attribute (lemongrass), the focal brand possessed better values than the other brands in the choice set. Within this condition, one-half of the subjects were given samples that had vitamin E, jojoba extracts, and papaya extracts (set A) as the key product attributes, and the other half were given samples that had aloe vera, cocoa butter, and apricot extracts (set B) as their key attributes. The brands did not vary in terms of three other attributes.

In the high-ambiguity condition, the four brands were classified into two subcategories. While four attributes were common to the two subcategories, three key attributes did not overlap across the two subcategories (one subcategory contained the set A attributes of vitamin E, jojoba extracts, and papaya extracts; the second subcategory contained the set B attributes of aloe vera, cocoa butter, and apricot extracts). Except on the minor attribute of lemongrass, the brands did not vary in terms of the values of the nonunique attributes. Thus, in the low-ambiguity condition, there was only one brand superior to others (Botanical Spring); in the high-ambiguity condition, there were two brands (Botanical Spring and Herbal Abundance) that could potentially be considered equally attractive.

After this initial choice, each subject was asked to try all four brands in the choice set in a blind test (brand names

concealed) and then to choose the one she liked the best. Each subject was made to believe that whatever brand she chose on the basis of the trial was in fact the same brand that she had chosen earlier on the basis of the information provided in the matrix. Thus, the experiences of the subjects confirmed the information given in the matrix. This deception was necessary to minimize curiosity-related switching in the latter half of the experiment.

The experience manipulation was then administered.¹ Subjects in the extensive-experience condition were asked to try the brand that they liked six more times. There was a two-minute interval between each trial. The cover story given to those in the extensive-experience condition was that previous research had shown that people can evaluate lotions more accurately after a series of trials. After each trial, subjects in this condition were given paper towels to wipe off any excess lotion. Subjects in the limited-experience condition were not given any additional trial. Subjects in both conditions were asked to return after two days to complete the experiment.

On returning, subjects were given the critical-choice task. They were asked to assume that once again they needed to buy lotions. This time they happened to visit another store, which did not stock the original set of brands. Instead, they encountered two new brands, for which descriptions were provided in a matrix. One of the two brands was described in terms of set A attributes, and the other was described in

¹A pretest ($N = 24$) confirmed the uninformative nature of the additional experience. In this pretest, subjects were asked to try one of two real brands of lotions that were used in the main experiment (with brand name concealed) either once or seven times. We provided no information about the attributes. After subjects used the lotion, we asked them to list the properties of the lotion. Then, we measured subjects' overall evaluation of the lotion on a nine-point scale and also measured their beliefs on several benefit dimensions, such as moisturizing, cleansing, and conditioning, on nine-point scales. There was no difference between the two brands in terms of any of the variables, and the data were pooled. We observed that the two trial conditions did not vary in terms of any of these ratings. (For example, the number of properties listed were 2.67 and 2.83 in the one-trial and seven-trial groups, respectively; $F < 1$, Omega-squared < 0.005 .)

TABLE 2

PERSISTENT PREFERENCE FOR THE FOCAL ATTRIBUTES AND PSEUDODIAGNOSTIC TENDENCY ACROSS LEVELS OF AMBIGUITY AND EXPERIENCE (EXPERIMENT 1A)

Dependent variable ambiguity	Limited experience		Extensive experience	
	Low ambiguity	High ambiguity	Low ambiguity	High ambiguity
Proportion of subjects that chose focal set of attributes at time 2 (%)	9/39 (23.1)	10/40 (25.0)	24/39 (61.5)	13/39 (33.3)
Proportion that exhibited pseudodiagnostic tendency (%)	8/39 (20.5)	15/40 (37.5)	22/39 (56.4)	14/39 (35.9)
Perceived superiority of the focal attribute set	5.03	4.98	6.02	5.08

terms of set B attributes (henceforth, the brands will be referred to as set A and set B). Thus, for those in the low-ambiguity condition, depending on the attribute set they received on day 1, either set A or set B served as the focal attributes, and the other served as the competitor. For those in the high-ambiguity condition, attributes of the brand they had chosen served as the focal attributes and the other three attributes served as the competitor. Before making the critical choice, subjects were asked to try the two brands of lotion. The same lotion was presented in two different containers with their real names concealed. The brand that was described in terms of the focal attributes was named Botanical Glory, and the brand that was described in terms of the competing attributes was named Natural Blossom. Thus, depending on the time 1 attribute set condition, Botanical Glory was described in terms of either set A (vitamin E, etc.) or set B (aloe vera, etc.) attributes. Subjects were given three options: choose Botanical Glory, choose Natural Blossom, or express indifference between the two.

After the choice task, subjects once again tried the two brands after a 30-minute delay during which time tasks not relevant to this article were administered. Subjects were asked to rate the superiority of one set of attributes over the other based on their most recent experience (of the two identical brands with different attribute descriptions). Subjects responded to three nine-point scales that measured the superiority (in terms of rendering certain benefits) of the three, nonoverlapping attributes that described the brands in set A vis-à-vis those contained in set B. For example, one scale was anchored by "aloe-vera protects the tenderness of the skin much better than Vitamin E" (1) and "Vitamin E protects the tenderness of the skin much better than aloe-vera" (9). Subjects were instructed to check the scale midpoint (5) if they thought that both the attributes were equal in terms of rendering the benefit. If they considered one attribute to be superior to the other, their ratings indicated both the direction and the magnitude of superiority. The scales were scored so that a higher number indicates greater perceived superiority for the target attributes. The purpose of this task was to test the extent to which neutral, irrelevant information in the form of experiencing the two

identical brands was overweighed in different experimental conditions.

Following another 30-minute delay after the superiority-rating task, subjects were told that they would choose a brand of lotion once again but were asked to acquire additional information before making another choice. Subjects then received a set of six envelopes that contained information on six attributes that did not overlap across sets A and B from day 1. The envelopes were sealed, but on the outside of each envelope, the attribute label as well as an alphabetical label appeared. Subjects were told that each envelope contained additional information on the respective attribute. Further, they were instructed that because of cost constraints, they could buy no more than two envelopes. Subjects were asked to indicate the two envelopes they wanted to buy by writing the alphabetical labels on a separate choice record.

Results

Choice at Time 2 and Perceived Superiority of the Focal Attributes. The key dependent variable was the proportion of subjects that chose the brand that contained the focal attributes at time 2. The results of a binary logit analysis of the choice data revealed a marginally significant interaction between ambiguity and experience (Wald $\chi^2 = 3.21$, $p < .08$). Further, follow-up analyses revealed that experience had a significant effect on the choice of the focal brand under the initial choice contexts of low ambiguity (Wald $\chi^2 = 11.09$, $p < .01$) but not under high-ambiguity initial contexts (Wald $\chi^2 = 0.66$, $p > .4$). As expected, under low-ambiguity contexts, a greater proportion of subjects chose the brand that contained the focal attributes under extensive experience than under limited experience (see Table 2 for the choice proportions). Another follow-up analysis suggested that within the extensive-experience condition, focal brand choice was greater under low ambiguity than under high ambiguity (Wald $\chi^2 = 6.05$, $p < .02$).

Similarly, we obtained a significant ambiguity-by-experience interaction for the dependent variable of perceived superiority of the focal attributes ($F(1, 153) = 4.16$, $p <$

.05). A follow-up analysis suggested that the effect of experience on focal attributes' ratings were significant under low ambiguity ($F(1, 153) = 10.3, p < .01$), but not under high ambiguity ($F < 1$; see Table 2 for the means).

Pseudodiagnosticity in Information Selection. Subjects were to choose two attributes out of a set of six on which to receive additional information. Diagnostic hypothesis testing involves selecting a pair of attributes that lead to the same benefit (e.g., if subjects chose aloe vera and vitamin E, both of which lead to the same benefit of skin protection, their response was classified as diagnostic selection). Thus, "diagnosticity" refers to seeking information that can potentially falsify the focal hypothesis. Pseudodiagnostic (selective) hypothesis testing would involve asking for information for two attributes (which lead to two different benefits) of the brand that was chosen earlier.

A judge blind to the experimental conditions as well as one of the authors classified the responses as diagnostic or pseudodiagnostic, and perfect agreement was attained. We also analyzed data following a liberal criterion of diagnosticity. As long as a subject asked for information about two attributes, of which one belonged to the target set and the other of which belonged to the competing set, her response was classified as diagnostic. All other responses were classified pseudodiagnostic. Because the results of the two analyses converged, we report only the results obtained from the classification that set a liberal criterion of pseudodiagnosticity.

The categorical dependent variable of diagnosticity was submitted to a binary logit analysis in which ambiguity and experience served as the independent variables. The analysis revealed a significant experience-by-ambiguity interaction (Wald $\chi^2 = 5.89, p < .02$). The effect of experience on pseudodiagnostic tendency was significant under low ambiguity (Wald $\chi^2 = 9.94, p < .01$) but not under high ambiguity (Wald $\chi^2 = 0.02, p > .88$). In each cell, the proportion of subjects who exhibited pseudodiagnostic tendency was as predicted (see Table 2).

Mediational Tests. To test whether persistent preference for the focal attributes is mediated by pseudodiagnostic information selection, we conducted the Baron and Kenny (1986) mediational tests. The time 2 choice data were submitted to a logistic regression analysis that included, along with the two independent variables, pseudodiagnosticity as a covariate. The inclusion of the covariate caused the ambiguity-by-experience interaction to be nonsignificant (Wald $\chi^2 = 0.44, p > .5$). The effect of pseudodiagnosticity was significant (Wald $\chi^2 = 34.84, p < .001$). Further, under low ambiguity, the inclusion of pseudodiagnosticity as an additional term reduced the effect of experience on choice of the focal attributes (Wald $\chi^2 = 2.33, p > .12$).

Similarly, the inclusion of pseudodiagnosticity reduced the previously significant interaction between ambiguity and experience on perceived superiority of the focal attributes to nonsignificance ($F(1, 152) = 1.02, p > .3$). The effect of pseudodiagnosticity was significant ($F(1, 152) =$

$38.28, p < .001$). Additionally, under low ambiguity, the effect of experience on the perceived superiority of the focal attributes was reduced to nonsignificance when the covariate was included in the model ($F(1, 152) = 1.54, p > .25$).

EXPERIMENT 1B: AMBIGUITY, EXPERIENCE, AND A SHIFT IN RELEVANCE OF FOCAL ATTRIBUTES

Except for a few changes, in this experiment, we followed the same design and procedure as in experiment 1 (see Table 1). On day 1, immediately after they chose a brand based on the information provided in the brand-by-attribute matrix, subjects rated the degree of certainty of their choice on a nine-point scale (1 = uncertain and 9 = certain). After the experience manipulation was administered, subjects rated the relevance of the focal set as well as the competing set of attributes (in all six attributes) for the effectiveness of a lotion on a nine-point scale (1 = not at all relevant and 9 = extremely relevant). On day 2, subjects were not given the information selection task.² Two hundred forty-two subjects participated in this experiment.

Results

Manipulation Check. We suggested that our manipulation of ambiguity of the initial choice set would induce uncertainty in the initial preference. Accordingly, data on certainty in preference measured before experience were submitted to a two-factor between-subjects ANOVA. As expected, the effect of ambiguity was significant ($F(1, 238) = 25.16, p < .001$) and in the predicted direction ($M_{\text{low}} = 6.11$ and $M_{\text{high}} = 5.08$). Neither the effect of experience nor its interaction with ambiguity was significant (F 's < 1).

Choice at Time 2 and the Mediational Role of the Judged Relevance of the Focal Attributes. As in the previous experiment, results obtained from a logit analysis of the choice data revealed a significant experience-by-ambiguity interaction (Wald $\chi^2 = 6.54, p < .02$). Follow-up analyses revealed that experience resulted in greater preference persistence under low ambiguity (Wald $\chi^2 = 11.21, p < .01$) but not under high ambiguity (Wald $\chi^2 = 0.14, p > .7$; see Table 3 for the choice proportions in various cells). Because the results of the dependent variable of perceived superiority of the focal attribute followed exactly the same pattern as the choice results, we do not discuss this measure (Table 3 presents the means).

Perceived relevance of the focal attributes was computed by averaging the ratings of the three attributes ($\alpha = 0.93$), and the data were submitted to a two-factor ANOVA.

²To conduct a conservative test of our propositions, we offered about 50 percent of the subjects in each cell a 5 percent price reduction on the brand that contained competing attributes. Because this manipulation did not affect the choice pattern in any of the four cells, we pooled data across this factor, and this manipulation is not discussed.

TABLE 3

PREFERENCE UNCERTAINTY, PERCEIVED RELEVANCE OF THE FOCAL ATTRIBUTES, AND PERSISTENT PREFERENCE FOR THE FOCAL ATTRIBUTES ACROSS EXPERIMENTAL CONDITIONS (EXPERIMENT 1B)

Dependent variable	Limited experience		Extensive experience	
	Low ambiguity	High ambiguity	Low ambiguity	High ambiguity
Proportion of subjects that chose focal attributes at time 2 (%)	15/61 (24.6)	16/61 (26.2)	33/60 (55.0)	14/60 (23.3)
Preference uncertainty	6.05	5.13	6.17	5.03
Perceived relevance of the focal attributes	5.14	5.16	6.46	5.01
Perceived superiority of the focal attribute set after "neutral" evidence	5.13	5.10	5.92	5.08

The analysis uncovered a significant experience-by-ambiguity interaction ($F(1, 238) = 8.66, p < .01$). Within the low-ambiguity contexts, perceived relevance of the focal attributes was greater in the extensive-experience condition than in the limited-experience condition ($F(1, 238) = 14.1, p < .01$; see Table 3 for the means). Inclusion of perceived relevance as a covariate in the logistic regression of choice data reduced the experience-by-ambiguity interaction to nonsignificance (Wald $\chi^2 = 1.11, p > .29$). The effect of the mediator was highly significant (Wald $\chi^2 = 58.64, p < .001$). Further, within the low-ambiguity contexts, perceived relevance mediated the effect of experience on the choice of focal attributes (Wald χ^2 [experience] = 2.28, $p > .13$ and Wald χ^2 [perceived relevance] = 32.38, $p < .001$).

EXPERIMENT 1C: AMBIGUITY IN THE FORM OF NEGATIVELY CORRELATED ATTRIBUTES

In consumer decisions, choice sets may include competing brands that contain both advantages and disadvantages (Hogarth 1986; Luce 1998). For example, in a choice set, brand A may contain more of attribute 1 and less of attribute 2, and brand B may contain more of attribute 2 and less of attribute 1. Ambiguity occurs when a consumer considers these two attributes equally relevant for the decision. That is, whether the consumer chooses A or B, to gain advantage in terms of one attribute, the consumer needs to give up advantage in terms of the other attribute. The objective of the present experiment is to generalize the findings of experiment 1A using a different manipulation of ambiguity.

Method

We retained only the extensive-experience condition of experiment 1A and within this condition manipulated ambiguity. Based on a pretest, we identified restoring lost moisture and protecting the tenderness of the skin as the two key benefits that are equally important to our subjects. In the same pretest, after reading a magazine story on lotions, subjects identified cocoa butter and vitamin E as the ingre-

dients causing these two key benefits and also considered these two attributes equally important. In both conditions, four brands were described in terms of these two attributes and four other, less important attributes. As in experiment 1A, in the low-ambiguity condition, the choice set was constructed in such a way that the focal brand was clearly superior to others. In the high-ambiguity condition, one of the brands contained more vitamin E and less cocoa butter, and another brand contained more cocoa butter and less vitamin E. They did not vary in terms of the other four attributes. The levels were based on a pretest ($N = 20$) in which subjects saw either a low-ambiguity or a high-ambiguity choice set and responded to a question that measured preference uncertainty. The actual question was "How certain are you that you can choose a brand that is best in this choice set?" and the responses were obtained on a nine-point scale (1 = very uncertain and 9 = very certain). As expected, subjects in the high-ambiguity context felt more uncertain (4.80) than did those in the low-ambiguity condition (6.70; $F(1, 18) = 10.94, p < .01$). This manipulation of ambiguity was also used earlier in consumer research (Ha and Hoch 1989).

In the main experiment, just before their choices, subjects were reminded via a magazine story on skin care that these two attributes lead to two different but equally important benefits. Because the choice set contained two potential focal brands, for each subject, based on her choice, one of these two brands was classified as the focal brand and the other as the competing brand. In this experiment we did not obtain perceived superiority of the focal attribute ratings because of time constraints. Instead, as in experiment 1B, we measured preference uncertainty immediately after the choice but before experience. On day 2, subjects saw two new brands, and the choice between them involved the same trade-off as in the high-ambiguity day 1 choice, although the attribute values were slightly different.³ The remainder of the procedure was the same as in experiment 1A.

³The first day's choice was between brand A (which contained 12 mg of vitamin E and 8 mg of cocoa butter) and brand B (which contained 8 mg of vitamin E and 8 mg of cocoa butter). The second day's choice was between brand X (14 mg vitamin E and 10 mg cocoa butter) and brand Y (10 mg

Results

The initial choice context had a significant effect on the choice of focal versus competing attributes (Wald $\chi^2 = 4.65$, $p < .04$). As predicted, compared with 21 out of 34 (61.8 percent) in the initial context of low ambiguity, only 12 out of 34 (38.2 percent) in the high-ambiguity context chose the focal attributes. The diagnosticity data followed a similar pattern, although the effect was only marginally significant (20 out of 34 [about 60 percent] in the low-ambiguity context and 13 out of 34 [about 40 percent] in the high-ambiguity context exhibited pseudodiagnostic tendency; Wald $\chi^2 = 2.84$, $p < .1$). When diagnosticity was included along with ambiguity as a predictor of the choice of the focal versus competing attributes, the effect of ambiguity was reduced considerably (Wald $\chi^2 = 2.51$, $p > .11$).

Although our pretest results suggested that the two ambiguity conditions varied in terms of preference uncertainty before choice, in the main experiment, we did not obtain a significant difference between the two conditions in terms of preference uncertainty after choice ($M_{\text{high}} = 5.29$ and $M_{\text{low}} = 5.06$; $F < 1$). Most probably, ambiguity of this nature caused greater deliberation to generate reasons for choices.

Discussion

In experiments 1A and 1B, we examined how ambiguity interacts with product experience and influences persistent preference for the focal attributes in subsequent choices. We also examined the effects of these factors on the tendency to consider a set of focal attributes to be superior to a set of equally efficient competing attributes after having neutral experience (trying the same lotion under different descriptions). When the initial choice set induces greater ambiguity and thereby greater preference uncertainty, there is a lesser likelihood of developing persistent preferences even after extensive experience. However, when there is little ambiguity in the initial choice, even uninformative additional experience creates persistent preferences for the focal attributes. In experiment 1C, we used a different manipulation of ambiguity and replicated the key results of experiment 1A.

We proposed the tendency to confirm one's prior theory as the process. That is, in the contexts of low ambiguity, because the initial preferences were less uncertain, extensive experience created an opportunity to confirm and strengthen their tentative hypothesis about the attributes-brand outcome association. We also found that when consumers had an opportunity to seek additional evidence and test their hypothesis, they sought evidence that could potentially support their hypothesis, and this tendency mediated the effects of ambiguity and experience on persistence with the focal attributes in subsequent choices.

The finding of experiment 1B that establishes the media-

tional role of perceived relevance in the effect of ambiguity-by-experience interaction on persistent preference for the focal attributes is central from our theory viewpoint. That is, this variable may serve as a proxy measure for the strength of consumers' association between product attributes and outcomes. Once this association is strengthened, subjects persist in their preference for the focal attributes. Further, perceived relevance explains the difference between the limited- and extensive-experience conditions within the low-ambiguity contexts. As our framework proposes (Fig. 1), the results of experiments 1A to 1C together suggest that although the additional experience is uninformative, when the initial preferences are certain, experience enhances the relevance of the focal attributes and also induces a selective or pseudodiagnostic tendency in information selection for subsequent choices. These tendencies in turn result in persistent preferences for the focal attributes.

EXPERIMENT 2: ATTRIBUTE SALIENCE IN THE INITIAL CHOICE CONTEXT AND PERSISTENT PREFERENCES FOR IRRELEVANT ATTRIBUTES

In this experiment, we generalize the findings of experiments 1A through 1C to an irrelevant attribute (an attribute with which consumers normally do not associate the favorable brand outcomes). Although certainty in the initial preference is a necessary condition, only when the irrelevant attribute is highly salient in the initial choice context does additional experience lead to preference persistence. The process in this instance is very similar to the one we proposed earlier. That is, salience of an attribute combined with a single trial offers a theory about the association between product attributes and a positive outcome, and this theory is confirmed with uninformative additional experience. Once the association is strengthened, a shift in perceived relevance of these attributes occurs, and this shift leads to persistent preferences for these attributes.

Method

One hundred fifty-four subjects participated in this experiment. Except for the choice sets used on day 1 and day 2, we followed by and large the same procedure as in experiment 1A. Salience of the focal attribute was the key manipulation on day 1. In the high-salience set, one of the four alternatives (the target brand) had a higher level of an unimportant attribute (cucumber water). The brands contained exactly the same levels of the other seven attributes. In the low-salience condition, the target brand (Botanical Spring) possessed advantages over other brands in terms of cucumber water and two moderately important attributes (apricot extract and chamomile flower). The specific nu-

vitamin E and 14 mg cocoa butter). In both choices 4 mg of vitamin E needs to be given up to gain 4 mg of cocoa butter and vice versa.

TABLE 4

CHOICE PROPORTION AND PERCEIVED RELEVANCE OF THE IRRELEVANT ATTRIBUTE ACROSS LEVELS OF EXPERIENCE AND SALIENCE (EXPERIMENT 2)

Dependent variable	Limited experience		Extensive experience	
	Low salience	High salience	Low salience	High salience
Proportion of subjects whose choice was based on irrelevant attribute (time 2) (%)	13/36 (36)	15/39 (38.5)	15/39 (38.5)	27/37 (73)
Judged relevance	5.50	5.15	5.14	6.64

meric values of the attributes of the target brand were the same across the two conditions.⁴

We administered the initial choice and the experience manipulation exactly in the same manner as in the previous experiments. After using the lotion, subjects in all conditions responded to a questionnaire that measured the relevance of several attributes of skin lotions. The relevance of each attribute was measured on two nine-point scales anchored by not at all relevant/extremely relevant and not at all useful/extremely useful ($r = 0.81$ for the scales pertaining to cucumber water). The relevance of cucumber water served as the key variable, as described in the next section.

Two days later, subjects received descriptions of two new brands. One of the new brands (the focal brand) contained less of the two most important attributes (aloe vera and cocoa butter) but a higher amount of cucumber water and apricot extract than the other brand. The brands did not vary in terms of other attributes. The focal brand name was counterbalanced, and we found that the brand name did not influence subjects' choices in any manner. Therefore, data were pooled across this factor. Subjects chose between the two brands and gave the reasons for their choice.

Results

Choice at Time 2. We predicted that experience creates persistent preference for an unimportant attribute only when that attribute was salient in the initial choice set. The results of a binary logit analysis revealed that this was indeed the case. The experience-by-salience interaction was significant (Wald $\chi^2 = 3.92$, $p < .05$). A follow-up analysis revealed that the simple effect of experience was significant under high salience (Wald $\chi^2 = 8.73$, $p < .01$) but not under low salience (Wald $\chi^2 = 0.04$, $p > .8$; see Table 4 for proportions in various experimental cells). The results, thus, reveal that salience by itself does not create preference persistence. Additional experience, even though it is uninformative, is

also necessary to induce persistent preferences for the unimportant, focal attribute.

Judged Relevance of the Focal Attribute. Subjects' judgments of the relevance of cucumber water were submitted to a two-way (experience \times salience) between-subjects ANOVA. The experience-by-salience interaction was significant ($F(1, 150) = 7.96$, $p < .01$). As expected, the effect of experience was significant under high salience ($F(1, 150) = 10.4$, $p < .01$) but not under low salience ($F < 1$; see Table 4 for the means). Although at time 2 the focal brand contained a higher amount of apricot extract also, neither of the main effects of experience and salience nor their interaction was significant for the dependent variable of relevance of apricot extracts. Therefore, apricot extract could not have been the criterion of choice for subjects in the extensive-experience/high-salience condition. Instead, cucumber water was the most likely criterion. A mediational analysis examined this conjecture.

Mediation Analysis. We proposed that the differential choice patterns obtained in the high-salience conditions were due to a shift in the perceived relevance of the salient but unimportant attribute. As expected, the previously significant effect of experience was reduced to nonsignificance when judged relevance was included in the model (Wald χ^2 decreased from 8.73, $p < .01$, to 1.64, $p > .2$) and judged relevance remained significant (Wald $\chi^2 = 25.31$, $p < .001$). Hence, judged relevance of the irrelevant attribute mediates the effect of experience on persistence preference for this attribute.

Discussion

The results of experiment 2 offer additional evidence for our proposition that the initial choice context determines whether experience leads to persistent preference for an attribute. Interestingly, the preference persistence occurs even for an irrelevant attribute in a different choice context. Unlike in the previous experiments, the level of ambiguity was constant (low) across the two contexts, but the salience of the irrelevant attribute was manipulated. Salience caused a shift in the perceived relevance of the irrelevant attribute under extensive experience and thus led to preference persistence. When subjects try the lotion for the first time, any

⁴We used two different sets of attributes to describe the lotions. For one half of the subjects, the lotions were described in terms of the set A attributes from experiment 1, and for the other half, the descriptions were in terms of the set B attributes. Because neither the main effect of this replication factor nor its interaction with other experimental factors was significant, we pooled data across these two sets and report the results of the pooled data.

positive outcome of the lotion may be attributed to an unimportant ingredient only when this unimportant attribute was salient in the initial choice context. Prior research suggests that often people consider the salient rather than the most relevant cues the causal agents of an outcome (Einhorn and Hogarth 1986) and judgments based on salient but irrelevant information are confidently held (Griffin and Tversky 1992). Additional experience, although uninformative, confirms the theory and, therefore, strengthens the association between the irrelevant attribute and the positive outcome of the brand. Subsequently, the preference for this focal attribute increases to such an extent that subjects prefer the irrelevant attribute to other, more important attributes. The results emphasize the role of the initial choice context in learning choice rules. Although Einhorn and Hogarth (1988) conjectured this possibility, we have not come across any research that demonstrated this important effect.

EXPERIMENT 3: COMPARISON REFERENT AS A MODERATOR

In this experiment, we examine the role of an additional contextual variable in the relationship between the ambiguity-experience combination and preference persistence for attributes. Our framework predicts that even when the initial choice context is unambiguous, an awareness that a superior brand exists within this product category can reduce the pseudodiagnostic tendency. Additionally, in this instance experience may weaken preference persistence because consumers will develop a feeling of satiation with a not-so-great brand and in turn with its attributes. We propose that the target brand is compared with a referent brand and the relative superiority of the target brand is what determines the level of preference certainty and, in turn, persistent preference for the focal attributes.

Method

Usable data were obtained from 121 subjects. The main manipulation of this experiment was the ordinal position in terms of the overall value of the target brand in the initial choice set. That is, the choice set contained either an inferior or a superior referent with respect to the target brand. In either condition, the brands in the choice set were described in terms of the same seven attributes as in the low-ambiguity contexts of experiments 1A and 1B. In the inferior-referent condition, the target brand was the best brand available in the choice set in terms of the attribute values. In the superior-referent condition, the target brand was portrayed as the second-best brand in terms of attribute values. Subjects in this condition were told that the best brand in the set was not available in the market and their choices would be limited to the remaining four brands. Thus, subjects in the superior-referent condition saw five brands, including an unavailable brand that was superior to the target brand. Immediately after subjects chose a brand based on the information provided in the matrix, we assessed the level of

uncertainty in their preferences exactly in the same manner as in experiment 1B.

Experience manipulation was then administered. While everyone in the inferior-referent condition had extensive experience with the focal brand, within the superior-referent condition, one-half of subjects had limited experience, and the other half had extensive experience. Thus, there were three experimental conditions: (1) inferior referent and extensive experience, (2) superior referent and limited experience, and (3) superior referent and extensive experience. We also measured subjects' judgment about brand satisfaction and confidence in this judgment; however, because these measures are not central to our theory, we do not discuss them. On day 2, subjects were not administered the information selection task. The remainder of the procedure was exactly the same as in experiment 1.

Results

Choice at Time 2. We first contrasted the inferior-referent/extensive-experience group with the superior-referent/extensive-experience group. The contrast was significant (Wald $\chi^2 = 10.72$, $p < .01$). While in the inferior-referent/extensive-experience condition, 65 percent chose the brand that contained the focal attributes (26 out of 40), in the superior-referent/extensive-experience group only 27.5 percent (11 out of 40) chose this brand. A second contrast that compared the superior-referent/extensive-experience and superior-referent/limited-experience groups revealed a marginally significant effect (Wald $\chi^2 = 3.80$, $p < .06$). The proportion of subjects who chose the focal brand in the superior-referent/limited-experience condition (20 out of 41; 48.8 percent) was more than that in the superior-referent/extensive-experience condition (27.5 percent). The result suggests that within the superior-referent condition, additional trials in fact undermine persistent preference to the focal attributes.

Uncertainty in the Initial Preference. As expected, preference uncertainty was greater in the superior-referent conditions pooled together ($M = 5.09$) than in the inferior-referent condition ($M = 6.125$, $F(1, 118) = 7.97$, $p < .01$). Further, preference uncertainty acted as a mediator and explained the difference between the two groups in terms of choice of the focal attributes. The choice proportions were 31 out of 81 for the superior-referent group and 26 out of 40 for the inferior-referent group. Inclusion of preference uncertainty reduced Wald χ^2 from 7.71 ($p < .01$) to 0.51 ($p > .45$); the effect of preference uncertainty was highly significant (Wald $\chi^2 = 32.28$, $p < .01$).

Perceived Superiority of the Focal Attributes. For the dependent variable of perceived superiority of the focal attribute, we performed two planned contrasts. We first compared the two initial choice contexts for those who had extensive experience. Second, we compared the two levels of experience within the superior-referent context. Because these two contrasts were not orthogonal, we applied the

Dunn-Bonferroni corrections to control for type I error (Winer, Brown, and Michels 1991).

As expected, subjects' superiority ratings of the focal attributes were greater in the inferior-referent context than in the superior-referent context, although both groups had the same level of extensive experience with the focal brand (M 's = 6.53 vs. 4.31). The difference was significant ($t_{\text{critical}} = 2.99, p < .01$). Within the superior-referent condition, the difference between the limited experience and extensive experience was marginally significant, and as expected the ratings were lesser in the extensive-experience condition ($M_{\text{limited}} = 5.20, M_{\text{extensive}} = 4.31; t_{\text{critical}} = 2.15, p < .1$).

Discussion

This experiment once again highlights the role of the initial choice context in the development of persistent preferences for attributes. Specifically, the referent with which the target brand is compared can influence preference persistence even when ambiguity in the initial context is uniformly low. Thus, this experiment tested the proposition that availability of a comparison referent moderates our theoretical propositions within the low-ambiguity contexts (see Fig. 1). Although it is useful to conceive utility of two types—decision utility and experience utility (Kahneman, Wakker, and Sarin 1997)—our findings suggest that, in certain situations, utility out of choice itself can shape the utility derived out of experience. This experiment also identifies situations in which, compared with limited experience, greater experience can inhibit preference persistence.

EXPERIMENT 4: THE MODERATING ROLE OF COMPARATIVE DELIBERATION

The results obtained in experiments 1 and 2 suggest that at the time of initial choice, because of the nature of the choice set, subjects in the low-ambiguity contexts who have had extensive experience with the target brand focus exclusively on the target attributes. However, people in the high-ambiguity condition pay equal attention to the two sets, deliberate on the benefits offered by the two sets of attributes, and think of the effectiveness of the two sets in rendering these benefits. Evidence from experiment 1A suggests that uncertainty in preference does explain the low degree of persistent preference for the attribute in these conditions. If considering the benefits of these two sets of attributes simultaneously is what attenuates persistent preference for attributes even under extensive experience, such a manipulation should have the same effect even under an initial choice context of low ambiguity. This prediction is examined in experiment 4.

The objective of this experiment is to investigate a deliberation manipulation that may potentially attenuate preference persistence. Adopted from the debiasing paradigm (Arkes 1991), this manipulation involved increasing atten-

tion to nonfocal attributes by asking subjects to think about the benefits of the competing sets of attributes, rank the importance of all attributes prior to performing the choice task, and also deliberate on the reasons for these judgments. During these deliberations, consumers may recall their prior learning (from the magazine story they read earlier) that the competing sets of attributes can render the key benefits with more or less the same efficacy. We call this type of thought the comparative deliberation.

Method

We retained only the extensive-experience/low-ambiguity condition of previous experiments. Within this condition, we administered the deliberation manipulation. For those in the control condition, the procedure was exactly the same as in experiment 1A except that we did not administer the information selection task. In the deliberation condition, the first task on day 2 was to rank both set A and set B attributes (six in all) according to their importance. Subjects were asked to think about the benefits of these six attributes first and then assign the rankings. We presumed that this instruction for deliberation prompted subjects to recall the contents of the magazine story on lotions that they had read two days earlier, compare set A and set B attributes, and realize that the two sets of attributes can lead to similar key benefits. We did not specify any maximum time for deliberation; most subjects took between three and five minutes to complete deliberation. After this task, subjects ranked the six attributes in terms of their importance. Subjects also stated the reasons for their ranking. Subjects were provided with six blank lines to write their explanations. The remainder of the procedure was the same as in experiment 1A. As in experiment 1A, subjects had the option of choosing the focal brand or the competitor brand or expressing indifference between the two. Further, the attribute superiority ratings were collected in exactly the same manner as in experiment 1A. Thirty-seven subjects were randomly assigned to one of two groups.

Results and Discussion

First we examined the ranks assigned to the various attributes. The average ranks assigned to the three focal attributes were 1.73, 3.21, and 5.26, respectively. The ranks assigned to the corresponding competitor attributes were 1.90, 3.37, and 5.52. The differences were not significant. Time 2 choices were analyzed as a function of the deliberation manipulation. The effect of deliberation on choice at time 2 approached significance (Wald $\chi^2 = 3.21, p < .07$). While in the control condition 66.67 percent of the subjects chose the brand that contained the focal attributes, only 36.84 percent in the deliberation condition chose this brand. Similar effects were obtained for the perceived superiority ratings. We submitted the attribute superiority ratings to a single factor ANOVA. The effect of deliberation was significant ($F(1, 33) = 4.06, p < .05$). As expected, subjects in the control condition gave a higher rating of

superiority to the focal set (6.04) than did those in the deliberation condition (4.95).

As our framework predicted, comparative deliberation reduced the magnitude of the preference persistence for attributes. Specifically, based on their deliberation about the benefits offered by the competing set of attributes, subjects in this condition were less certain about the superiority of the focal attributes than were those in the no-deliberation condition. Additional thinking might have occurred while ranking the attributes and providing reasons for these rankings. Subjects thus reduced the tendency to develop persistent preference for attributes in spite of low ambiguity in the initial choice context and extensive experience. Thus, this experiment suggests an additional moderator for the effects of low ambiguity and extensive experience on preference persistence.

GENERAL DISCUSSION

The present research furthers our understanding of how persistent preference for product attributes develops. We proposed that in the choice contexts that create very little preference uncertainty, the initial preference for the focal attribute offers a tentative causal theory that links the attributes of the chosen brand with the key benefits of the product. The results of experiments 1A to 1C offer support to the proposition that factors that create an illusion of having accumulated adequate evidence (such as uninformative product experience) can strengthen this causal theory and thus cause preference persistence for the focal attributes.

Experiment 2 demonstrates that these effects can also obtain with respect to irrelevant product attributes as long as these attributes are salient at the initial choice context. The findings extend those of Carpenter, Glazer, and Nakamoto (1994) by showing that not only does a salient but irrelevant attribute influence initial brand preferences but it also influences subsequent brand preferences even when the initially preferred brand is no longer available. Moreover, extensive experience with a salient brand increases preference for an irrelevant differentiating attribute even when other, more relevant attributes are available from other brands.

The findings of experiment 3 suggest that initial preferences are self-perpetuating because of the selective interpretation of repeated consumption experiences. It is generally assumed that in hedonic product categories (e.g., lotions, perfumes, beverages), tastes and preferences are guided more by experience with the product than by any other type of information. The present research shows that an appraisal based on experience is influenced by the context in which initial choices are made. Thus, our findings lend additional support to the idea that product experiences can be altered through the use of subtle framing procedures (Hoch and Ha 1986; Hoyer and Brown 1990; Levin and Gaeth 1988). Finally, experiment 4 shows that even under low ambiguity and extensive experience, persistent attribute preference does not obtain when consumers are asked to deliberate on the benefits of the competing sets of attributes.

Deliberation of this nature facilitates a comparison of otherwise noncomparable attributes and sensitizes consumers to the minimal difference between the competing sets of attributes in terms of rendering certain key benefits.

The interaction between the choice context and experience in preference formation is an underexplored area of research in marketing as well as in psychology. The results of the experiments reported in this article contribute to our understanding of the contextual factors under which extensive experience with a product is likely to increase, decrease, or have no effect on persistent preference for product attributes. In addition, these experiments identify the processes that account for these effects.

Limitations

In this research, we hypothesized that persistent preference for product attributes is driven by biases in hypothesis testing. However, we acknowledge that in several instances, simpler, reinforcement theories can also account for persistent preferences. Nonetheless, the intuitive theories learned via an associative learning mechanism may later induce biased information processing (Broniarczyk and Alba 1994; Sanbonmatsu et al. 1998). Further, in all our experiments, we led subjects to believe that the brand they chose on the basis of blind trial was the same as the one they had chosen earlier on the basis of the attribute information provided in the matrix. It is plausible that this component of our experimental procedures could have caused subjects in the extensive-experience condition to recall the attributes of the chosen brand and associate them with the favorable brand outcomes. Because we did not measure memory for specific attributes on day 2, we cannot rule out this alternative process, which is normatively appropriate.

The present research shows that ambiguity reduces the effect of experience on the overemphasis of the status quo attributes. It should be noted that we obtained this critical effect for a less consequential product. As suggested by prior research, when the decisions are more consequential, ambiguous contexts induce conflict and therefore defensive avoidance. Here, there is a greater likelihood of choice being deferred until the ambiguity is resolved in some manner (Dhar 1997; Luce, Bettman, and Payne 1997). Therefore, we limit our findings pertaining to ambiguity to only the initial choices that do not create either an extreme degree of conflict or its affective consequences.

The research findings may be applicable mainly for categories in which the initial choice context creates some anticipated utility from product use (Elster and Loewenstein 1992) and experience does not clearly disconfirm this initial expectation. Further, we limit our investigation to only categories in which experience offers positive outcomes. However, this characteristic will be very likely with most brands in most product categories. Moreover, our findings on preference persistence may be more relevant for credence attributes because the benefits these attributes claim are relatively harder to evaluate in the short run (Nelson 1970). Thus, a consumer can easily construct his or her own causal

theory about attributes and brand performance. Pseudorelevant factors (seemingly relevant but not relevant objectively) such as additional, uninformative experience or additional thought about the focal attributes that does not enhance knowledge about these attributes can strengthen these causal theories. Product categories such as cosmetics, nutritional supplements, and physical exercise gadgets promise benefits that cannot be verified in the short run, and product use in these categories is typically uninformative.

The results are unlikely to generalize to attributes that produce satiation or boredom with repeated consumption (e.g., typically the attributes of food items). Additionally, lesser uncertainty in the initial choice can create causal theories most likely in the case of new products in which consumers may possess very little knowledge about the attributes. Further, it is more likely in these categories that a relatively new entrant may be portrayed to be clearly superior to the existing options and thus reduce preference uncertainty in the initial choice.

Implications for the Psychology of Persistence

Belief Perseverance. Research on belief and preference persistence by and large has emphasized the anchor-and-adjustment process. That is, the initial position serves as an anchor, and, on encountering new information, people do not adjust the initial position sufficiently. For example, early research on the psychology of persistence shows that first impressions often persevere even when subsequent evidence contradicts these initial impressions (the primacy effect; e.g., Kelley 1950). Similarly, research on the perseverance effect shows that people continue to hold on to their initial beliefs even when these beliefs are based on evidence that is subsequently discredited or negated (e.g., Ross, Lepper, and Hubbard 1975). While this is a plausible mechanism, research in this stream is silent in regard to the conditions under which the primacy or anchoring effect will occur (see Hogarth and Einhorn [1992] for an exception).

Attitude Strength. Research on attitude strength emphasizes the objective relevance of information and the degree of elaboration. For example, this research shows that attitude persistence (i.e., stability over time) and resistance to counterpersuasion increase with the elaboration of product-relevant and attitude-consistent information (Haugtvedt and Wegener 1994). In our research the degree of elaboration was constant across the experimental conditions, and, instead, our focus was on an entirely different set of factors.

Status Quo Bias. Behavioral decision theory research suggests that preference for status quo options is a robust phenomenon (Samuelson and Zeckhauser 1988). This phenomenon is explained by a variety of mechanisms such as loss aversion (Tversky and Kahneman 1991), regret avoidance (Bell 1982), sunk costs (Thaler 1980), drive for consistency (Akerlof and Dickens 1982), or sheer inertia (Jeu-land 1979). While the explanations we propose—strength of association between attributes and brand outcomes and

pseudodiagnostic tendency in information selection—are consistent with some of the earlier explanations in a broader sense, nonetheless, they are unique. Further, with the explanations we propose, it is easier to identify specific antecedents of preference persistence and a set of moderators.

Contrast Effects and Persistence. A stream of research that is more directly relevant to the theme of our investigation is research on the change-of-standard effect. It shows that judgments of a target that are formed in one context influence subsequent judgments of the target even when the context changes (Higgins and Lurie 1983). For example, in jury decision-making research, a target judge seems lenient when the other judges give higher sentences (harsh context), and the target judge seems harsh when the other judges give lighter sentences (lenient context). These contrast effects persist even when participants later rate the target judge in a new, moderate (i.e., neither harsh nor lenient) context. Similarly, Sherman, Ahlm, and Berman (1978) found that contrast effects influence whether an object (social issue) is considered important or unimportant and that this judgment, in turn, influences subsequent behavior concerning the object if the prior judgments are made salient. It should be noted that the main focus of this research stream was to demonstrate that judgments caused by one category of context effects—the contrast effects—do persist.

CONCLUSION

Our theory and the evidence from all the experiments offer a much more comprehensive account of the phenomenon of preference persistence. As mentioned earlier, an interaction between the initial choice context and experience determines the strength of association between the attributes of the chosen brand and key product benefits and thus leads to persistent preferences. An understanding of the effects of the initial choice context and product experience may help marketers to devise strategies to achieve brand equity.

In this research, we identified only a subset of determinants of preference persistence. Future research may examine the roles of additional determinants and extend our theoretical framework. For example, an investigation of conditions under which persistence preference for attributes occurs even when the initial preferences are uncertain may be a useful extension of the theory proposed in this article. Further, preference persistence may be explained by several processes ranging from behavioral reinforcement to cognitive biases. It will be useful to identify conditions under which one of these processes explains observed behavior better than the others do. Future research may also consider additional factors such as the type of conflict induced by the choice set and the effect of these factors on preference persistence.

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