MEMORY AND DECISION MAKING

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The focus in this chapter is on consumer memory and how it influences consumer choice. A small but growing literature exists on consumer memory, and the literature on consumer decision making is vast (see, e.g., reviews in this volume by Meyer and Kahn and by Bettman, Johnson, and Payne). Surprisingly, however, overlap between these two research streams has been minimal. Thus, our primary purpose in writing this chapter is to advocate an agenda for future investigations rather than to review a well-established body of consumer research, though, by necessity, we also partially accomplish the latter. Though speculative, we hope that what we have to say about the role of memory in consumer choice stimulates research that will eventually replace the present conjectures with more solid empirical evidence.

INTRODUCTION

The majority of consumer memory research has focussed on the memory of consumers for advertising—either as the focal dependent variable or as a mediator of advertising’s effects on attitudes and persuasion. This research is clearly important in its own right. However, with very few exceptions, this work has not come to grips with how advertising effects on memory and attitudes are translated into actual behavior, that is, into choice by consumers from among alternative brands or products.

Similarly, despite the enormous attention our field has devoted to psychological analysis of consumer decision processes, the paradigms that have been developed have minimized the role of memory, and only a handful of papers have explicitly considered its role in choice.

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Perhaps the focal topic in the past fifteen years of consumer decision research, as well as in the allied field of behavioral decision theory, has been how task and context factors affect the decision rules used to combine information about alternatives in order to arrive at a final choice (e.g., Einhorn 1971; Klein and Bither 1987; Johnson, Payne, and Bettman 1988; Wright 1975; Wright and Weitz 1977). As documented by Bettman et al. in the present volume, the consumer has been viewed as choosing from among alternative compensatory and noncompensatory combination heuristics, trading off effort required to execute the rules with expected accuracy or optimality of the choice.\footnote{In this stream of research, the limited capacity of working memory has played a central theoretical role, but very few papers have been concerned with the influence of long-term memory.}

A prototypical empirical study might test the hypothesis that one rule would be employed in one task condition, whereas a second rule would be employed in a second task condition. Clearly, an adequate test of this hypothesis requires the researcher to be able to specify both the complete set of alternatives and their values on any relevant attributes. This is true whether the researcher plans to infer process indirectly, using shifts in decision outcomes associated with changes in rule use, or to examine process directly, using process tracing data. Typically, tight control over the brands and attributes that the consumer can consider is achieved by employing unfamiliar or hypothetical brands, perhaps displayed in a brands-by-attributes matrix (e.g., Payne 1976; Payne, Bettman, and Johnson 1988). Note that these controls make scientific sense given the very interesting questions this research has been designed to address. If, for example, real and familiar brands were used, subjects might use idiosyncratic inputs that create error variance in decision outcomes. Moreover, if inputs are retrieved from memory rather than given explicitly by the researcher, it is difficult to record exactly what inputs were used and, therefore, to identify the choice heuristic employed.

However, these controls also exact a cost. We argue that by adopting research paradigms that assign memory a subordinate role, decision researchers have framed out of the picture some of the most interesting and practically important questions in real world consumer choice. Our analysis of the role of memory in consumer choice will center on four key questions:

1. Which of the available brands or alternatives are considered, and why?

2. What information is processed in evaluating each brand considered, and why?

3. How are these inputs combined to arrive at a final choice?

4. How do memories of past decisions alter the answers to questions 1, 2, and 3?

As the discussion above implies, existing consumer choice research has been very strong in its analysis of Question 3 but the paradigms adopted to illuminate this issue have obscured the remaining three issues—issues that may explain far more variance in choice outcomes in the real world. Interestingly, even the combination rules used by consumers are influenced by memory, although we shall refer the reader to the chapter on choice processes by Bettman et al. for a fuller review, limiting our focus to the remaining three questions.\footnote{Two of the most interesting results come from the research of Biehal and Chakravarti. First, processing operations at the time of the initial encoding operation affect memory organization (brand-based versus attribute-based), and this influences the brand-versus-attribute-based nature of subsequent choice processing (Biehal and Chakravarti 1982). Second, a very robust result is that with large choice sets composed of physically present brands, one observes a two-step phased decision process. Consumers first engage in some noncompensatory attribute-based screening, whittling the entire set of alternatives down to some two or three candidate brands. Then, they engage in compensatory evaluation of the reduced set—e.g., by additive difference. Biehal and Chakravarti (1986) showed that when consumers must decide from among choice sets that include some physically present brands and some that must be recalled, the two-phase process was rare. Instead, choice processes were fragmented in nature, with three or four phases being typical. The reason for this seems to be in the nature of the processing operations that subjects...}
Lynch and Srull (1982) used the label “stimulus-based choice” to describe decision making when all relevant brand and attribute information is physically present at the time of choice. They noted that, in the real world, consumers often make choices in which some or all of the relevant information is not directly present when the choice is made. In pure “memory-based choice,” all relevant information must be recalled from memory, as when one must remember what one has heard about videotaped movies prior to renting one. In “mixed choice,” some of the relevant information is physically present, and some must be recalled from memory, as when a shopper must decide whether to buy one of the shirts physically present in Store B or return to Store A to buy one seen earlier.

Lynch and Srull’s focus was primarily on whether the inputs to choice were externally available or whether they had to be recalled from memory (Question 2, in the previous list). Nedungadi (1989) pointed out that a similar distinction can be made with respect to whether the identities of the relevant alternatives are externally available, or if they have to be recalled from memory (Question 1). For example, if one is in a grocery store choosing a brand of canned tomatoes, all alternatives are shelved together and their names need not be generated from memory. Thus, at least with respect to the generation of a consideration set of alternatives, this decision is stimulus-based, although the consumer may choose to rely solely on inputs retrieved from memory in choosing from among these brands. At the other extreme, as when choosing a restaurant for dinner, the set of candidate alternatives might be purely memory-based. In the same decision, the generation of candidate alternatives might be “mixed” if the consumer consults the Yellow Pages for a partial list of possibilities, or if he or she is driving past several restaurants while trying to remember what other restaurants in the general area might be appealing.

Our contention is that very few decisions in the real world are purely “stimulus-based” with respect to the generation of alternatives and the inputs used and, therefore, the laboratory paradigms that our field has developed are representative of only a small fraction of the universe of choices in the real world. The reason for this is that memory plays a very large role in many decisions that, in principle, could be purely stimulus-based.

For example, choosing brands of packaged goods from a grocery store display could be purely stimulus-based if the shelf environment supplies the names of all relevant alternatives and the package information provides all relevant inputs for choosing. However, in most such decisions, memory factors play a crucial role. This is true for three key reasons that Lynch and Srull (1982) did not recognize when they suggested distinctions among stimulus-based, memory-based, and mixed choices:

1. The external stimulus environment is usually so complex that consumers must recall what they are seeking, both in terms of product categories and brands, in order to find the relevant choice alternatives in the display. For this reason, we assert that, in addition to recognition processes, grocery shopping also involves recall as an important component.

2. Even when the consumer looks at a grocery store display of a product category without preconceptions, memory factors influence the ease with which specific brands “catch one’s eye” and enter into the consideration set.

3. Motivation levels are usually too low and time too scarce for consumers to scan all brands displayed in a given product category (Park, Iyer, and Smith 1989)—a phenomenon that cannot be easily captured in laboratory studies of stimulus-based choice. One reason for this low motivation is that consumers have a (perhaps unwarranted) belief that they already possess enough relevant
knowledge to make a choice that satisfied their objectives, and that information in the store environment would not alter their preferences if it were examined. Observational studies of shopping for frequently purchased packaged goods (e.g., Dickson and Sawyer 1986; Hoyer 1984) show extremely low levels of external search. For example, Dickson and Sawyer reported that shoppers buying margarine, coffee, toothpaste, and cold cereal averaged 12 seconds from the time the display was approached to the time the selected brands was placed in their carts, with only 1.2 brands inspected on average. Similarly, in Hoyer's observations of laundry detergent purchases, the median number of packages examined was 1.2, with even fewer packages physically picked up (1.1), suggesting very low levels of using package information at the point of purchase.

Some have looked at data such as these and drawn the conclusion that attempts to explain purchase in terms of "choice" of "information processing" are fundamentally misguided (e.g., Kassarjian 1978, 1982, 1986; Olshavsky and Granbois 1979). We disagree. First, such a conclusion ignores the possibility that purchases accompanied by almost no in-store search could simply be the result of a purely memory-based decision made earlier, such as when one clips a coupon at home and decides to use it the next time one goes to the store. Second, even when such a decision is made in the store, it seems likely that complex processing goes on below the level of conscious awareness (Janiszewski 1990). Third, such a conclusion ignores the effects of knowledge calibration and mental set. Consumers may avoid inspection of particular alternatives because they feel sufficiently knowledgeable about them (Bettman and Park 1980; Johnson and Russo 1984) or because they fail to think flexibly about product usage (cf. Langer 1989), which potentially leads to overconfidence or missed opportunities. Finally, such conclusions suffer from an overly narrow view of the inputs in a decision, presuming that product "attributes" must be processed for a meaningful choice to occur.

MEMORY FOR BRANDS

There has been very little research directly testing hypotheses about the role of memory in the formation of consideration sets. This is surprising for at least two reasons. First, the consideration set (also called the evoked set) is widely recognized as an important concept for understanding decision making (Howard and Sheth 1969; Narayana and Markin 1975; Silk and Urban 1978; Urban 1975). In fact, Hauser (1978) reported an analysis of brand choice in which 78 percent of the explainable variation across consumers was attributable to whether the brand was included in the consumer's consideration set. Only 22 percent of the variation was attributable to consumers' preferences among brands in their consideration sets. Second, the important role of brand awareness (measured by brand recall or brand recognition) is cited in most texts on advertising management (see Rossiter and Percy 1987 for an extensive treatment) and is a central construct in the well-known hierarchy-of-effects model of advertising effectiveness (Lavidge and Steiner 1961; Ray et al. 1973). Moreover, several researchers have reported that brand recall measures (such as top-of-mind awareness) are (1) sensitive to differing levels of advertising exposure and (2) strongly correlated with brand choice (Axelrod 1968; Haley and Case 1979; Nedungadi and Hutchinson 1985).

We suspect that the scarcity of research on memory and consideration sets is because the consideration set has traditionally been thought of as a relatively static construct. That is, consumers are assumed to "have" specific evoked sets that are composed of alternatives which they find acceptable. These sets of alternatives are assumed to be considered on each choice occasion. Variation in choice across occasions is typically assumed to result from changes in brand preference, from changes in attribute importance, or from simple stochastic variation.

Hauser's measure of variation was based on information theory rather than statistical variance.
(e.g., McAlister and Pessinier 1982). Only recently have changes in the composition of the consideration set been proposed as a possible source of individual level choice variation (e.g., Baker et al. 1986; Hauser and Wernerfelt 1990; Nedungadi 1989).

In the remainder of this section we discuss two general ways in which memory can affect the formation of consideration sets. First, in some situations, consumers must retrieve decision alternatives from memory. For example, in deciding where to eat lunch we might recall several nearby restaurants. In this case, decision-related information serves as a "cue" for retrieval. Second, many shopping situations present the consumer with a large number of potential alternatives. In this case recall is not necessary; however, consumers must recognize an item as a potential alternative before it can be considered. Items that are familiar to the consumer are likely to be recognized more frequently and more quickly than unfamiliar items.

**Product Recall: Cue-Based Criteria for Inclusion in the Consideration Set**

In the most extreme case, consumers must rely entirely on memory in the formation of a consideration set. An internal need, such as hunger, gives rise to some potential solution, such as finding a restaurant. Somehow the consumer must retrieve particular restaurants from memory. Subjectively, these alternatives simply "come to mind." Most modern theories of memory hypothesize that the process mediating such recall is associative. That is, the current contents of awareness "bring to mind" other ideas and events that are associated with them. This process is referred to as associative cuing, and recently retrieved memory items are said to serve as cues that guide subsequent retrieval. For example, feeling hungry may be associated with restaurants, and the abstract concept of restaurants may be associated with particular restaurants. In some cases, these associations may be direct; in others they may be mediated by associations to other information such as attributes or specific personal experiences. As retrieval progresses, information that is relevant to the decision is held in "active memory." Other information is allowed to "fade from memory." In general, cues are believed to exert a dominant influence on the quantity and quality of recalled information.4

**The Size of the Consideration Set.** The size of the consideration set is a simple but extremely important aspect of decision making. This is especially true for relatively small size sets because the average choice probability for each alternative drops dramatically as the consideration set size increases (i.e., average choice probabilities are 1.0, 0.5, 0.33, and 0.25 for set sizes of 1, 2, 3, and 4, respectively). In fact, most investigators have reported small set sizes, generally ranging between 2 and 8 (e.g., Hauser and Wernerfelt 1990; Reilly and Parkinson 1985; Urban 1975). In most cases, "checklist" measures, which do not require subjects to recall alternatives, have been used. In situations where alternatives must be recalled, it is likely that set sizes are even smaller.

Similarly, whenever consumers are motivated to increase the size of their consideration set, they will be limited by their ability to recall potential alternatives and may be forced to engage in various types of external search. For example, Hauser and Wernerfelt (1990) presented a model in which the size of the consideration set on a given choice occasion reflects a trade-off between the cost of searching for and evaluating more alternatives and the increase in utility that can be expected from such an increase in consideration set. Clearly, good memory for alternatives reduces many aspects of the cost of search and, therefore, results in "better" choices (i.e., choices with higher expected utilities).

The most relevant experimental paradigm in

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memory research for understanding product recall during choice is the category production task (Bousefield and Sedgewick 1944; Gruenewald and Lockhead 1980). Subjects in these experiments are instructed to recall as many instances as possible from a particular category. In marketing research, this paradigm is used to obtain top-of-mind and share-of-mind measures of brand awareness.

Figure 1.1 illustrates two factors that affect the number of recalled items. The most obvious factor is the total number of items known to the subject (i.e., vocabulary size). This number can be estimated by the asymptote of a curved function fitted to recall data (i.e., the dashed line in Figure 1.1). The second, less obvious factor, is the speed with which items are recalled. This can be estimated by the rate parameter of the same fitted function. Thus, when time is limited some consumers may recall more alternatives than others either because they are aware of more alternatives or because they recall items more quickly. In a study of brand name recall for cold remedies, Hutchinson (1983) found that expert consumers differed from novices in estimated vocabulary size, but not in rate of recall. We suspect that there are many situational factors, such as motivation, that can affect the rate of recall. Further research that manipulates consumer and situational factors is needed in this area.

In many situations, some but not all alternatives are physically present and the consideration set must be "completed" by retrieving additional alternatives. It might be expected that the physically presented items facilitate memory by providing external cues. In some instances (discussed later), this occurs. Within a given category, however, such “part-list” cues typically inhibit the recall of other items (see Nickerson, 1984, for an excellent review). Alba and Chattopadhyay (1985) found similar inhibitory effects for part-list cuing on the recall of shampoo brand names. For example, in one experiment, males recalled about fifteen brands when no cues were provided, but recalled only nine brands when five brands were provided as cues (thus, the total brands available was actually less, fourteen versus fifteen). The degree of inhibition was not always this dramatic; however. For males, recall always decreased as the number of provided brands increased, but interestingly, no effect was found for females. The authors attributed this to greater product familiarity (discussed in more detail subsequently).

**FIGURE 1.1** Brand Name Recall as a Function of Time for a Typical Subject

![Graph showing brand name recall as a function of time](image)
The Likelihood of Recalling Particular Alternatives. In the absence of external information, successful brand recall is a necessary, but not sufficient, condition for inclusion in the consideration set. Unacceptable alternatives will be rejected even though they are recalled. Given small consideration set sizes and the large number of brands in many product categories, recall of brands, per se, is potentially an inefficient first step in the choice process. Several factors mitigate this inefficiency, however. For instance, it is well known that more preferred brands are recalled earlier than less preferred brands (Axelrod 1968; Haley and Case 1979; Nedungadi and Hutchinson 1985; Ward and Loken 1986). Another important factor making recall more efficient during the formation of the consideration set is that decision criteria also serve as retrieval cues. So, if a consumer wants a restaurant that is fast and inexpensive, then restaurants that are highly associated with those properties become more retrievable. All properties are not equally effective in improving recall, however. In the remainder of this section we discuss several factors that have been found to be related to the effectiveness of retrieval cues in facilitating the recall of particular memory items.\footnote{Here and throughout we focus on recall from semantic memory rather than recall from previously learned lists. Although the literature on list learning is extensive, most naturally occurring choice situations involve recall based on the consumer's general knowledge of the product class rather than recall from some specific previous learning experience. Moreover, most of the factors discussed here have been found for both types of recall.}

Barsalou (1983, 1985) investigated the differences between naturally occurring taxonomic categories, such as, restaurants and fruits, and goal-derived categories, such as "things not to eat on a diet." Barsalou found that both types of categories exhibited a reliable "graded structure" as measured by prototypicality ratings. Unlike taxonomic prototypicality (which was correlated within overall similarity), goal-derived prototypicality was correlated with only one or two attributes. It is easy to imagine consumer situations in which the consideration set would be better described as either taxonomic or goal-derived. Of special interest in the present context is the fact that prototypicality ratings were strongly related to recall only for taxonomic categories. A prototypicality effect was present, but greatly reduced, for goal-derived categories.

In subsequent research, Barsalou and Ross (1986) found goal-derived categories (which were defined by single attributes) to be less established in memory than common taxonomic categories (i.e., automatic frequency counting was observed for the latter, but not for the former). They also found, however, that extensive experience with goal-derived categories was sufficient to make them comparable to taxonomic categories.

Recent work by Ratneshwar and Shocker (1988, 1989) has shown that goal-derived product categories that are defined by usage situations can be as well established in memory as taxonomic categories. Moreover, recall based on usage situation cues is strongly related to situation-specific ratings of prototypicality, but not to overall taxonomic prototypicality. This is
consistent with the results of Barsalou and Ross (1986) and supports the idea that people use decision criteria as retrieval cues during the formation of consideration sets. Over time such consideration sets come to be well established categories in memory. Of course, many decision-making situations may be more "ad hoc" in nature (cf. Barsalou 1983, 1985). Infrequent purchases, such as "food to buy for a camping trip," seem likely to require consideration sets that are not already defined by appropriate decision criteria and must be assembled from categories in memory.

Taken together, these findings strongly suggest that although people may "know" all of the members of a category or all of the attributes of a brand, and even though they may be able, in principle, to use any attribute to include or eliminate brands from consideration, the accessibility of this information in memory will vary greatly. In particular, the categorical structure of memory and the contextual cues that prime different aspects of that structure are likely to exert a strong influence on which information will be accessible. On the one hand, it should prove difficult for manufacturers to position themselves in a particular "niche" of the market, if that niche does not conform to some welldocumented category or subcategory. On the other hand, in situations in which the consideration set is essentially ad hoc category, its composition may be less controlled by memory and, therefore, highly sensitive to advertising and in-store promotional cues (see Alba and Hutchinson 1987). In the first case, decisions will be framed by the consumer (either deliberately or as the result of past decisions based on memory). In the second case, decisions will be framed by contextual cues that result from marketing actions or mere happenstance.

The Composition of the Consideration Set. In addition to influencing the recall of particular alternatives, the categorical structure of memory is likely to influence which brands co-occur in the consideration set. Brand names tend to be recalled in categorical clusters (Hutchinson 1983; see also Bousefield and Sedgewick 1944; Friendly 1979; Gruenewald and Lockheed 1980). This phenomenon is readily apparent in Figure 1.2. Brands that are recalled together are likely to co-occur in the same consideration set. It is well known that the composition of the consideration set can bias choice in a number of ways (e.g., agenda effects—Kahn, Moore, and Glazer 1987; Hauser 1986; Tversky and Tattah 1979; decoy effects—Huber, Payne, and Puto 1982; similarity effects—Tversky 1972; and phantom effects—Farquhar and Pratkanis 1989).

Recently, Nedungadi (1989) has demonstrated that choice outcomes can be affected by manipulating factors that affect brand recall but not brand preference. Nedungadi primed particular brands with a prior task and observed a strong direct effect of priming on choice. That is, brands were chosen more often when they were primed than when not primed. More revealing, however, was the fact that an unprimed brand in the same subcategory as a primed brand was also chosen more frequently (unless the subcategory was always highly accessible). For example, when choosing a place to eat lunch, subjects were more likely to think of hamburger restaurants than sandwich shops. If a previous task had primed a less-preferred sandwich shop, then a more-preferred sandwich shop was chosen with greater frequency even though it had not been directly primed. Presumably, the less-preferred sandwich shop cued the entire subcategory.

Nedungadi's results are consistent with partial list cuing studies in which specific category members have been given as cues for the recall of a list of words from several categories (Nickerson 1984). When single members from each of several of the categories are provided as retrieval cues, total recall is improved. The improvement, however, results because more categories are recalled (i.e., people fail to retrieve entire categories in the uncued condition). The number of items per category is not improved. In fact, if multiple within-category cues are provided, then recall of the remaining category members is inhibited. Also, Alba and Chattopadhyay (1985) reported evidence that subcategory cuing can inhibit recall for other subcategories. Their procedure closely resembled
FIGURE 1.2 Clustering in Brand Name Recall for a Typical Subject

the types of cuing that might be expected to result from exposure to comparison advertising.

Taken as a whole, current research suggests that there is a trade-off between the negative and the positive effects of subcategory and brand-level cuing. At one extreme, anything that cues subcategories that would otherwise be forgotten will facilitate recall for members of that subcategory. At the other extreme, whenever several members of the same subcategory are cued, recall of the remaining members will be inhibited. We noted in our earlier discussion of part-list cuing for shampoo brands that only males showed inhibition effects. If females were more knowledgeable about shampoos and differentiated them into several subcategories, then the positive effects of subcategory cuing would have been more likely to occur. In general, we suspect that one critical factor is how strong a subcategory is as a retrieval cue for particular brands. In Nedungadi's experiment, positive effects were only observed for brands that were the most preferred within their subcategory. Presumably, this was because such brands are more strongly associated with the subcategory than are less preferred brands. Again, this is a promising area for future research.

Noncategorical Cues. Most research has supported the idea that semantic memory has a strongly categorical organization. In particular, category names are very effective retrieval cues, and items in the same category or subcategory tend to be recalled at the same time. One important exception to this generalization can be found when people are able to use visual or spatial cues. The usefulness of visual imagery as an aid to memorization is well known and used in many memory improvement techniques (Childers and Houston 1984; Lutz and
Lutz 1977; MacInnis and Price 1987). More relevant in this context is the use of the spatial aspects of the information that is being retrieved. For example, Indow and Togano (1970) reported that recall of Japanese cities was qualitatively different from the normal pattern (e.g., Figure 1.1) when subjects were instructed to recall cities from north to south. Cities were produced at a relatively fast and constant rate (as if people were scanning a mental map). Without such instructions, the pattern of recall was similar to that of most other categories.

In some situations, consumers may develop good mental maps of where alternatives are located—stores in a shopping mall, departments in a grocery store, automobile dealerships in a city, and so forth. These spatial locations may be used to construct considerations sets even though they are relatively unrelated to the categorical structure of the choice alternatives. In fact, Hutchinson, Mantrala, and Ramam (1990) found that respondents in brand recall tasks reported using store shelf imagery as a recall cue about as often as they reported using product categories or personal preference. This was true for both taxonomic recall and recall of consideration sets. Interestingly, the store-related response was more frequent for the recall of soft drinks than for the recall of beverages in general. Category-based cues showed an opposite trend, and preference-related cues were equally frequent in the two tasks. Also, for soft-drink recall only, there was a comparably high frequency of respondents reporting the use of vending-machine imagery as a recall cue. These results were preliminary in nature, but clearly illustrate the potential complexity of the recall process during the formation of consideration sets.

**Summary.** When decision making is completely memory-based, there are at least three ways in which brand recall can affect choice outcomes. First, the number of recalled alternatives has an obvious effect on the size of the consideration set. As the size of the consideration set increases, the probability of choosing any particular alternative decreases. Recall can be enhanced by factors such as consumer expertise and motivation. Also, brands that are recalled first tend to inhibit the recall of other brands. Second, brands that are preferred or prototypical of the product class tend to be recalled more frequently and more quickly. Thus, such brands enjoy a memory-based advantage relative to their competitors. Finally, brands that are similar tend to be recalled at the same time. This increases the likelihood that they will co-occur in the same consideration sets and thereby compete more directly with each other. In all three cases, recall plays an important role because alternatives that are not recalled obviously cannot be chosen.

**Product Recognition: Familiarity-Based Criteria for Inclusion in the Consideration Set**

The intended meanings and operational measures of product familiarity have varied widely in the consumer literature (e.g., Alba and Hutchinson 1987; Bettman and Park 1980; Brucks 1985; Johnson and Russo 1981, 1984; Punj and Staelin 1983; Sujan 1985). Often, product familiarity has been treated synonymously with product knowledge. Here we adopt the narrower definition of Alba and Hutchinson (see also Baker et al. 1986; Brucks 1986; Jacoby et al. 1986). Specifically, familiarity is defined as the number of product-related experiences that have been accumulated by the consumer. It is contrasted with expertise, which is the ability to perform product-related tasks successfully. In the context of memory, familiarity is often used as a generic term for the strength of the memory trace of a single stimulus or the strength of the association between two stimuli. This usage is consistent with the present definition insofar as it is commonly assumed that the strength of a memory trace is an increasing function of the number of stimulus exposures.

Although its antecedents may be different, familiarity guides the consumer’s attention to specific brands in the same general way that perceptual salience guides attention. Thus, the effects of familiarity on choice are potentially as
strong as those found for perceptual salience. For example, Fazio, Powell, and Williams (1989) measured subjects' attitudes towards 100 common consumer brands and measured, through response latencies, the accessibility of those attitudes in memory. At the end of the experiment, ten of the original products were displayed on a table, and subjects were allowed to choose five of these as a reward for participation. The physical prominence of these products was manipulated by displaying five in the front row and five in the back row. When subjects' attitudes were less accessible, there was a stronger tendency for them to choose products in the front row over those in the back row. Indeed, when subjects' attitudes were accessible, there was no significant effect of display prominence on probability of choice. This result implies a trade-off between memory factors and physical salience in controlling the contents of the consideration set.

In this section we discuss results from three fundamental areas of memory research that are related to familiarity: name recognition, brand identification, and the accessibility of product positioning.

**Name Recognition.** In many ostensibly stimulus-based shopping situations, consumers are presented with a large number of choice alternatives. In the most extreme case, the information immediately available consists of brand names only. For instance, most music stores display cassette recordings alphabetically by artist. If the choice has been made prior to coming into the store, this facilitates finding the desired tape. If, however, the shopper wants to browse, the alphabetical display is of little or no help because it is unrelated to the similarities and differences that exist among types of music. In such situations, mere familiarity with the artist's name may determine whether particular alternatives are considered. Browsing in the Yellow Pages is similar insofar as the alternatives within a particular category are listed alphabetically. In fact, a moment's reflection reveals that such displays are rather commonplace in many retail and catalog shopping situations. Often there is substantial "competition" among brands merely to be noticed. Brands that are unnoticed cannot be included in the consideration set. In this subsection, we review cognitive research on the recognition of words and suggest how the results of this research may be related to consumer choice.

Word recognition experiments typically present words in some perceptually degraded fashion (e.g., visually masked, briefly exposed, with missing letters, etc.) and require subjects to read each word aloud or simply indicate whether it is an actual English word. Because virtually any memory of the word is sufficient to respond correctly, performance on these tasks is regarded as a measure of the lower threshold of familiarity.

**PERCEPTUAL ENHANCEMENT.** The results of a large number of experiments indicate that repeated exposures to a word increase the ease with which it is recognized (Morton 1969, 1979). This effect has been labeled perceptual enhancement (Jacoby 1983a). Thus, words that occur frequently in the language (or in stores and advertisements) are perceptually enhanced relative to words that occur infrequently. However, recency of exposure exerts a strong transient effect. A single exposure to a word that occurs infrequently in the language can compensate for the recognition advantage normally enjoyed by high-frequency words. These effects of single exposures have been shown to last for at least a week (Jacoby 1983a; Tulving, Schacter, and Stark 1982), but not for as long as a year (Salasoo, Shiffrin, and Feustel 1985, 1985a).

Perceptual enhancement due to recent exposures appears to be fairly stimulus-specific. Murrell and Morton (1974) found that percep-
tual enhancement generalized to semantically related words, but not to words that were visually similar (see also Jacoby and Brooks 1984; Morton 1979; Witherspoon and Allan 1985). For example, prior exposure to "bored" enhanced subsequent recognition of "boring" but not "born." Furthermore, a lack of generalization has been found to printed words from pictures, spoken words, and self-generated words (Jacoby 1983b; Morton 1979). These results suggest that differences in context due to "merely" perceptual factors may reduce the amount of enhancement. Thus, product usage, per se, or exposure to the brand name in word-of-mouth discussions or radio advertising may not facilitate package recognition in the store. This also suggests that the common practice of including photos of the product's package as part of television and magazine advertisements is well advised.

Interestingly, several studies report that perceptually enhanced words actually "feel" easier to read (Witherspoon and Allan 1985; Johnston, Dark, and Jacoby, 1985). This sensation has been called perceptual fluency. Assuming that a feeling of familiarity is generally positive, perceptual fluency may affect attitude as a peripheral cue (Petty, Cacciopo, and Schuman 1981) or as a "mere exposure" effect (Obermiller 1985; Zajonc and Markus 1982). In fact, perceptual enhancement often occurs in the absence of recognition of the word as a previously presented stimulus. Furthermore, Gordon and Holyoak (1983) found that affect due to mere exposure transferred to new stimuli that were similar to the mere exposure stimuli, and that prototypicality was more predictive of affect than repetition per se.

LEXICAL "CODES." In addition to these relatively transient effects for well-known words, quite persistent effects have been demonstrated for repeated exposures to pseudowords (i.e., pronounceable nonwords). These results are especially relevant for brands with essentially nonsense names (e.g., Exxon) or names unrelated to the product concept (e.g., Apple computers), and they are most directly applicable when the brands are either in the introductory phase of the product life cycle or have significant numbers of first-time purchasers. Nonsense words are initially much more difficult to recognize than well-known words. However, they approach the level of well-known words after as few as five exposures (Feustel, Shiffrin, and Salasoo 1983; Salasoo et al. 1985). Not only does this form of familiarity develop quickly, it is relatively enduring (remaining comparatively strong a year after exposure). Salasoo et al. conclude that a permanent memory "code" is established after a few exposures to a word. Presumably, this code is a principal link between words and their cognitive and affective meanings. Therefore, this level of familiarity is a necessary prerequisite for further development of brand memory.

Brand Identification. Word recognition experiments address forms of familiarity that develop with little or no conscious effort or intention. Stimulus identification experiments, on the other hand, typically involve subjects who are trying to learn specific responses for specific stimuli, or subjects who are trying to remember which one of a set of particular items occurred previously. The amount and the pattern of errors is the dependent measure of principal interest. In the vast majority of these experiments the responses are verbal. Put simply, subjects are attempting to name unfamiliar or poorly remembered items.

Naming is a very basic form of familiarity and may be regarded as the "gateway" to more complicated types of learning and memory. If a brand is not correctly identified, then newly encoded information cannot be integrated with existing knowledge. If a brand is misidentified, then new information is attributed to a competitor (e.g., Keller 1989; Loken, Ross, and Hinkle 1986; Reece 1984). We examine naming because (1) often brands cannot be considered if they cannot be recalled by name and (2) if very few specific brand names are known, consideration sets are likely to be determined by external factors such as salespersons, store inventory, or magazine content (editorial or advertising).
THE MAGIC NUMBER SEVEN, PLUS OR MINUS TWO. In his classic paper on human limitations in information processing capacity, George Miller (1956) reviewed a large number of identification experiments. Unfortunately, this paper and its magical number are mainly cited in reference to the normal limit on immediate memory. The identification results are generally overlooked. These results suggest that about seven levels can be accurately identified on any given perceptual dimension (i.e., about 2.8 bits of information can be “transmitted” in a stimulus-response task). However, dimensions can be combined to increase capacity. Thus, experiments using six or more acoustic dimensions resulted in as many as 150 identifiable sounds. The fundamental insight to be gained from this research is that the ease and accuracy of identification depends critically on how items are represented in memory (i.e., their subjective dimensionality). Thus, it is not surprising to find that consumers can identify only a few size levels of eggs but 31 varieties of ice cream (assuming that ice cream has more perceived attributes than eggs).

THE ROLE OF SIMILARITY. The dimensionality of memory representations not only determines the level of accuracy in identification, it determines which stimuli will be confused with which other stimuli. That is, misidentifications are not random; rather, similar items are confused and dissimilar items are easily distinguished. For example, Loken, Ross, and Hinkle (1986) found that the similarity in physical appearance of two brands was significantly related to consumer perceptions of a common business origin between them. Similarly, Keller (1988) found that brands that were evaluated similarly were more confusable than those that were not evaluated similarly.

A number of early and recent studies have demonstrated that confusion errors are well predicted by mathematical models that are based on multidimensional scaling representations of the stimuli (Luce 1963; Nosofsky 1986; Shepard 1958, 1987; Smith 1980). Moreover, these similarity-based models are naturally extended to account for categorization and recog-
nition tasks (e.g., Medin and Schaffer 1978; Nosofsky 1984, 1986; Nosofsky, Clark, and Shin 1989; Shepard and Chang 1963; Shepard, Hovland, and Jenkins 1961). The central idea, called the “mapping hypothesis,” is deceptively simple. It asserts that a wide variety of behavior can be understood within a straightforward stimulus-response framework. Moreover, once the mapping between individual stimuli and identification responses (e.g., names) has been modeled, many other behaviors can be modeled by adding a second mapping from names to the final response. From this perspective, identification and the representations in memory of individual stimuli play a central role in many cognitive processes (Shepard 1987).

Identification provides a natural point of connection between familiarity and positioning. Multidimensional scaling and cluster analyses of similarity and preference data have long been used in marketing research to describe product positioning (i.e., consumer perceptions of competing brands). However, the central role of memory in these types of tasks is seldom discussed. Also, readers interested in mathematical models of consumer behavior will find the identification literature a natural point of connection between memory-based models and traditional models of choice (e.g., the recent work by Nosofsky cited earlier; see also Meyer and Kahn in this volume).

The Accessibility of Product Positioning. Even when consumers observe a particular product in the store they may not consider it for purchase because they do not recognize it as a potential alternative or, more likely, because they do not recognize it fast enough. For example, consumers looking for a headache remedy may only consider the first few brands that catch their attention even though there are twenty such brands on the shelf in front of them (cf. Fazio et al. 1989). In such a “race” for consideration, the accessibility of product positioning may play an important role (cf. Nedungadi 1989).

A number of cognitive researchers have investigated the accessibility of various properties of items, such as attributes or category mem-
bership. In a typical experiment, complete or partial sentences, such as "An apple is a fruit." or "apple—fruit," are presented to subjects who must then respond "true" or "false." In some cases, target categories are presented followed by pictures of possible members. Reaction times and error rates have been the principal dependent measures for most types of experiments (often referred to as sentence verification tasks). Several well-known results are relevant to the issue of positioning accessibility. First, category membership is verified more quickly for prototypical members than for atypical members (e.g., McCloskey and Glucksberg 1979; Murphy and Brownell 1985; Rosch and Mervis 1975; Smith, Shoben, and Rips 1974). Also, items are verified more quickly as members of "basic level" categories, than as members of subordinate or superordinate categories (Murphy and Smith 1982; Rosch et al. 1976). Basic level categories are moderately abstract and represent the level of inclusiveness at which within-category similarity is maximized and between-category similarity is minimized (see Murphy 1982; Murphy and Medin 1985; Rosch 1978; Rosch et al. 1976; Smith and Medin 1981; Tversky and Hemenway 1984). For instance, car, rather than vehicle or sedan, and shirt, rather than clothing or tank top, have been identified as basic level categories. Precise theoretical formulations of basic level categories have been elusive; however, it seems likely that perceived similarity alone is an insufficient criterion. For example Murphy and Medin (1985) have argued that basic level categories represent the level of abstraction at which people formulate naive theories about the world. In particular, it is the pattern of perceived causal relations that determine the basic level, and the perceived similarities derive from perceived causation.

An important exception to these results, however, was demonstrated by Murphy and Brownell (1985). They showed that this basic level superiority applied only to items that were typical of the basic level. Items that are atypical of the basic level are verified most quickly at the subordinate level. For example, a picture of a man's dress shirt is verified more quickly as a shirt than a dress shirt. A tank top, however, is more quickly identified as a tank top than a shirt. Interestingly, most of Murphy and Brownell's stimuli were consumer products, although no brand names were used. Also, Sujan and Bettman (1989) have recently reported several experiments demonstrating that when brand positioning emphasizes very unusual attributes, the brand is perceived as belonging to a "niche" product subcategory rather than as a differentiated competitor in the primary category.

Finally, several studies have shown that these types of accessibility effects are sensitive to context. Roth and Shoben (1983) demonstrated that verification times were related to context-specific prototypicality ratings, but not to context-free ratings. For example, they found that tea was more typical than coffee as a beverage consumed by secretaries during a midmorning break, but coffee was more typical for a truck driver starting his day at a truck stop. This clearly parallels the results of consumer research regarding usage situations (e.g., Belk 1975; Dickson 1982; Ratneshwar and Shocker 1989; Srivastava, Alpert, and Shocker 1984). Similarly, Barsalou was able to identify context-dependent and context-independent attributes for various objects (e.g., "floats" is context-independent for a life preserver, but context-dependent for a basketball).

Summary. There are several ways in which familiarity can affect choice by increasing product recognition. First, familiar brands are likely to be perceptually enhanced. This gives them a competitive advantage in the "race" for consumer attention as consideration sets are being formed in the store. Second, familiarity reduces the misidentification of brands, increasing the likelihood that out-of-store events translate into appropriate in-store results. For example, familiarity should reduce the extent to which advertised benefits are mistakenly attributed to similar competitors. Finally, the accessibility of product positioning affects which brands will be recognized as members of a desired product category. In particular, prototypical alternatives are recognized more quickly. For exam-
ple, if a consumer is shopping for meat for a cookout, steaks might be easily recognized and fish passed by without a thought because grilled steak is commonplace but grilled fish is somewhat unusual. In all of these cases, ease of recognition has the potential to affect choice because consumers are often making decisions under some form of time pressure and are naturally guided to alternatives that somehow "stand out" from their competitors. In this regard, product recognition is the internal counterpart to perceptual salience.

The foregoing discussion has laid out memory factors that determine what brands are considered for choice. We now turn to an analysis of the determinants of what inputs are used to evaluate those brands that are considered. The next section examines pure memory factors that lead to poor memory for some types of information and good memory for other types. Many of the psychological principles we discuss here are equally relevant to an analysis of factors influencing recall of advertising, as advertising is but one mode of acquiring information about products. However, we will consider work on advertising recall in detail only insofar as it provides theoretically relevant implications for the analysis of consumer choice. Following our review of memory for attributes, we will build the case for why the inputs used for choice cannot be understood solely in terms of selective encoding and recall, because of the task objectives that are peculiar to choice tasks.

MEMORY FOR ATTRIBUTES

As important as it is to remember product alternatives, meaningful brand selection cannot occur without knowledge and understanding of the attributes that characterize those alternatives. This information can be gleaned from a variety of sources, including advertising, direct experience, package information, and word-of-mouth sources. Regardless of the original source of product information in memory, two different questions about attribute information are especially pertinent to consumer decision making. The first deals with the issue of how well consumers can be expected to remember the form and content of explicit messages. This question has been raised with respect to the absolute amount of information remembered as well as the accuracy with which it is represented in memory. The second question assumes some degree of imprecision in memory and asks whether there are any systematic ways in which information is forgotten or distorted.

Amount and Accuracy

Numerous factors can affect the amount of recall, including such intuitive ones as frequency of exposure, level of involvement, delay interval, and level of expertise. We will touch on several of these factors later in this chapter. At this point, however, a more fundamental question pertains to how well information is remembered under conditions conducive to recall; that is, when involvement is relatively high, time delays are short, and the information is nontechnical and representative of everyday discourse.

Naturally, memory performance will vary as a function of what is measured. For example, recall of the syntactic and lexical details of a message can be quite poor (see Alba and Hasher, 1983, for a discussion). Though such details are generally unimportant, the existence of verbatim memory would lessen the effectiveness of some deceptive methods (discussed subsequently). More worrisome are the findings related to memory for the semantic content of televised and print communications reported by Jacoby and Hoyer (1982, 1989). Though framed in terms of comprehension, this research can be considered in terms of consumer memory in the sense that many of the reported instances of incomprehension would have been averted had accurate recall of the messages been achieved. Instead, subjects either incorrectly identified or were unable to identify the validity of a significant proportion (nearly one-third) of restated assertions from ads or logical conclusions based on those assertions. This occurred despite immediate testing after message presentation and a level of involvement that likely exceeded that of most real-world contexts.
Researchers and policymakers may debate the merits of emphasizing the relative amounts of accurate versus inaccurate recall reported in this research (cf. Jacoby and Small 1975). In principle, however, memory failure, by itself, need not be a problem of great concern. When consumers feel that their memories contain insufficient information for a decision, external search generally is an option. Whether, in fact, search is conducted is a choice that can be left to the consumer—although policymakers can do much to insure and improve the availability, accessibility, and usability of product-related facts (see Alba and Hutchinson, in press, for a discussion). A significant problem does arise, however, when consumers recall distorted versions of a communication. In such cases, external search is unlikely because consumers misassess the true state of their knowledge. Unfortunately, the interpretive and elaborative processes that distort memory are not uncommon.

**Interpretation.** A ubiquitous process in discourse processing is the idiosyncratic interpretation of the nominal words and phrases used to convey meaning. The message sender rarely spells out the complete and precise meaning of every assertion, but relies instead on the receiver's ability to make simple inferences. In the best cases this procedure results in smoother communication without loss of accuracy. However, accuracy is clearly a victim of misinterpretation resulting from the receiver's honest misunderstanding of the sender's intent or, more objectionably, from the sender's attempt to deceive. For example, a consumer may interpret "not expensive" as "inexpensive," thereby misconstruing a relatively benign assertion by an advertiser (cf. Harris and Monaco 1978). Alternatively, an automaker may point out that its model has more leg room than Competitor X, more head room than Competitor Y, and more trunk space than Competitor Z, purposely implying that its offering is especially roomy, when, in fact, each comparison is made to a competitor who fares particularly poorly on each specified dimension (Harris 1977).

Unlike the case in which consumers make poor decisions because they resist external search, *caveat emptor* is a less valid response here because misinterpretation may occur despite repeated exposure to deceptive assertions (Alpert, Golden, and Hoyer 1983), forewarnings about the possibility of misinterpretation (Harris, Teske, and Ginns 1975), and even explicit training to avoid it (Bruno 1980). In addition, combined with an inability to recall verbal information verbatim, most memory-based attempts to reinterpret the original message are not likely to succeed.

Even when made accurately, some forms of interpretation may reduce decision quality. This specifically applies to interpretations that simplify an assertion or series of assertions. For example, "rapid acceleration" is a plausible interpretation of the more detailed fact "goes from zero to sixty in six seconds." Similarly, the adjective "comfortable" accurately summarizes the attributes implied in the words "bucket seats," "adjustable steering wheel," "plush carpeting," and "roomy." The practical importance of such interpretations involves their memorability. Across several contexts, simplified or summary information has been shown to be easier to remember than the details from which it is derived (e.g., Kintsch and van Dijk 1978). As a result, its relative impact in judgment should increase over time (cf. Cantor and Mischel 1977; Carlston 1980; Higgins and King 1981; Lingle and Ostrom 1979; Wyer and Srull 1986).

A simple demonstration of this in a consumer context has been provided by Alba, Marmorstein, and Chattopadhyay (1989). They likened abstract inferences to product positionings within a market. They created two fictitious brands of cameras and positioned them in terms of being technically sophisticated (Brand A) or easy to use (Brand B) in separate advertisements. Each ad made pufferylike claims about its dimension of strength but also described specific attributes regarding both technical strength and ease of use. Based strictly on these attributes, however, Brand B dominated Brand A on both dimensions, even though only Brand B's ease-of-use was emphasized. Subjects were shown Brand A and then,
immediately afterward or two days later, they were exposed to Brand B. After examining Brand B they were asked to evaluate it relative to Brand A on each dimension. Results showed that regardless of the amount of delay between exposure to the two ads, Brand B was rated superior to Brand A in terms of ease of use by 94 percent of the subjects. Thus, when both the positioning of the brands and their actual attributes favor the brand seen most recently, correct decisions obtain. However, a different pattern was found for technical superiority. When the two ads were seen consecutively, 68 percent of the subjects correctly identified Brand B as superior, presumably on the basis of its superior attributes. When two days separated exposure, this figure was reduced to 36 percent. Apparently, as memory for details of the first brand decreased over time, the more abstract positioning of the alternatives dominated evaluation. Thus, reliance on interpreted information can lead to erroneous decisions even if the interpretation is accurate.

**Elaboration and Reconstruction.** The second avenue through which memory may be distorted involves elaboration and reconstruction. These processes result in inferences about product attributes that are not implied in the actual product description.

A variety of such inferences have been described elsewhere (Alba and Hutchinson 1987), and we review them only briefly here. Evaluation-based inferences (or “halo effects”) result in the transfer of affect from one concept to another (Beckwith and Lehman 1975; Cooper 1981; Nisbett and Wilson 1979). Thus, evaluation of individual attributes of a product may be biased by one’s overall perception of the product. Similarity-based inferences derive from the resemblance between two objects. Thus, consumers may assess the quality and features of a new or unfamiliar brand based on its apparent similarity to a known brand (cf. Cohen 1982; Gilovich 1981; Loken et al. 1986). Such analogical reasoning can be quite erroneous if the perceived similarity of the two brands is driven by perceptually salient but nondiagnostic features. Correlational inferences occur when two attributes are believed to covary frequently and, consequently, information about one is used to infer information about the other (cf. Erikson, Johansson, and Chao 1984; Hoch 1984; John, Scott, and Bettman 1986). The price-quality inference is a common example. Finally, typicality inferences occur when consumers infer that a product possesses a particular attribute because it is typical of brands in that product class (cf. Arkes and Harkness 1980; Crocker 1984; Sujan and Dekleva 1987).

Depending on the inference and the situation, inference making may be virtually irresponsible and unconscious. At other times inferences may be intentionally substituted for search based on the perceived costs of search and the assessed likelihood that the inference is valid. In still other cases, inference making may fail to occur if not prompted externally. Recently, Dick, Biehal, and Chakravarti (in press) have discussed the situational properties that can affect the likelihood and impact of different types of inferences in the decision process. In particular, they note, in addition to the obvious task demands which can prompt or suppress inference making, that (1) information that serves as a basis for an inference must be available and accessible and (2) the impact of a particular inference will depend on its perceived diagnosticity vis-à-vis the diagnosticity of other inferences. Thus, for example, evaluation-based inferences require recall of prior judgments, and correlational inferences are contingent on a database from which a rule can be constructed. Because memory for various types of information that form the bases for inferences differ, so too does the potential for each inference to occur. Further, given a situation in which inference making is not constrained by memory, the extent to which an inference is formed and used in making a decision will vary as a function of its perceived reliability. In their particular study, Dick et al. report that correlational inferences are favored over evaluation-based inferences.

This research represents an important initial attempt to examine the independent effects of accessibility and diagnosticity. As an interesting aside, it should be noted that perceived
reliability of an inference may be determined not only by the strength of its logical foundation but also by memory itself. That is, inferences may also be firmly incorporated into a consumer’s beliefs as a result of memory failure. This can occur in two ways. First, inferences made at the time of information encoding may not be identified as such at the time of informational retrieval. That is, the consumer may forget the source of the inferred belief. More important, research suggests that when a source cannot be identified, there is a tendency to attribute remembered information to an external source (Johnson, Raye, Foley, and Foley 1981). Thus, when the belief consists of an inference, an undeserved level of validity may be ascribed to it. Further, independent of source effects, there exists a bias to believe that facts retrieved from memory are valid (Collins, Wannock, Aiello, and Miller 1975). Overall, then, as time passes, inferences are likely to become more influential in the evaluation process.

The second memory-mediated source of false beliefs involves reconstruction. Not all inferences are generated at the time of exposure. Instead, consumers may accurately encode a message but intrude unstated attributes during later attempts to recall it. Alternatively, an attribute may be encoded accurately but forgotten. At the time of retrieval it may then be inferred, most likely in a way that is consistent with previously held beliefs. Thus, when price information cannot be recalled accurately, errors are in the direction of the consumer’s prior expectations (Helgeson and Beatty 1987). In both cases the intrusions are generally plausible and, as with interpretive inferences, the consumer may have little motivation to verify them.

**Summary.** Verbatim recall of product information is rare. Consumers aware of their memory loss may compensate with additional search but may also infer missing information. More subtly, due to memory failure, inferences that are made may later be misidentified as part of an external message or as part of common knowledge, thereby conferring the message with an unwarranted truth status. This, in turn, should reduce motivation to validate product beliefs with external information. Thus, the effects of memory are pervasive, affecting not only the need for inference making but also the perception of inferences after they are made.

**Retrieval Biases**

Interpretive and elaborative inferences actively distort memory by creating unintended or untrue meanings. Memory also may be biased in the absence of such distortion through the process of selective retrieval. A subset of the attribute information encoded by a consumer may be accurately retrieved, but what is retrieved may be unrepresentative of all that is known. This should be distinguished from selective search or selective exposure in which there is a failure to learn information. As was true of memory for brands, attribute memory is largely determined by attentional factors, familiarity, the presence of retrieval cues, and the level of competitive interference (see, e.g., Burke and Srull 1988; Keller 1987). These are well known main effects. In the following pages we focus on how these fundamental moderators of memory may favor some attributes over others as inputs to decision making.

**Salience.** Attention to and recall of product attributes are determined by their salience, which can be affected by a variety of factors. In the best case, salience will be internally driven and correspond to the importance consumers assign to the attributes. Indeed, there exists a long history of research across several domains showing that recall is related directly to the perceived importance of information (e.g., Johnson 1970; Kintsch and van Dijk 1978; Lichtenstein and Brewer 1980; Voss, Vos- onder, and Splich 1980). In some cases, as when particular attributes are personally very important, they will be recalled very well even when processing conditions are adverse (Barth and Thein 1985). In the extreme case, processing of such information may verge on being automatic. Thus, even under highly distracting conditions, consumers may encode and later
recall attributes they consider important for evaluation (cf. Ratneshwar, Mick, and Reitinger 1989).

Such outcomes are heartening and suggest that consumers will make decisions that, if not objectively optimal, are at least consistent with their personal values. The problem with this scenario, of course, is that consumers do not always possess well formed beliefs about attribute importance (cf. Fischhoff, Slovic, and Lichtenstein 1980; Jacoby, Troutman, Kuss, and Mazursky 1986; Wind and DeVita 1976). In such cases salience may be determined externally, perhaps via repetition or by the format in which it is conveyed (cf. Finn 1988). In addition, there may be characteristics of the information itself that makes it inherently salient. In a previous section the effects of cuing on brand recall were discussed. In that context, cuing was shown to affect the size and composition of the evoked set. In the context of attributes, such increases in salience may be discussed in terms of "problem framing," whereby the effective weight, of attributes in decision making are altered by manipulations of either the perceptual salience or the memory accessibility of that information (e.g., Gardener 1983; MacKenzie 1986; Wright and Rip 1980).

In the seminal work on this phenomenon, Wright and Rip (1980) demonstrated that repeated reference to certain product dimensions increased their influence in subsequent judgments by consumers. Other studies have shown that decisions can be influenced more subtly simply by increasing the prominence of some facts without explicitly suggesting that they are very important. In addition, some of these studies have shown that memory can mediate the effect. For example, Reyes, Thompson, and Bower (1979) showed that by manipulating the vividness of a piece of information one could vary the influence of that information in a later judgment. Moreover, the vividness manipulation was effective only when the judgment was made well after exposure to the message. When judgment immediately followed message exposure, the critical information was salient regardless of its vividness. After a delay, however, information was more memorable if presented in a vivid rather than pallid fashion, and, therefore, it was more likely to be incorporated into the decision.

In a similar vein, Gardner (1983) showed that by making a product feature very prominent in an ad, one could increase both its memorability and its effect on attitude (see also MacKenzie 1986). Interestingly, she also found that the enhanced recall of the prominent attribute came at the expense of the nonprominent attributes contained in the ad.

When the presence of salient information results in reduced consideration and usage of nonsalient information during evaluation, the cause is sometimes ambiguous. Attention-related reasons include the differential processing of salient and nonsalient facts at the time of exposure and the tendency to recall only the most easily remembered facts at the time of retrieval (cf. Fischhoff, Slovic, and Lichtenstein 1978). Alternatively, the salience of some facts may inhibit recall of other facts despite effortful attempts to retrieve them. The former has been examined by Kiesiulius and Sternthal (1984, 1986). They demonstrated that vivid stimuli prompt disproportionate amounts of elaboration, which in turn leads to higher recall and a greater persuasive effect. When the opportunity to elaborate is limited, a corresponding decrease in attitude change results. On the other hand, Alba and Chattopadhyay (1985) demonstrated that recall of product attributes can be inhibited at the time of recall and independently of attention at the time of exposure. Using a part-list cuing procedure, their subjects viewed product attributes under identical conditions but, in line with traditional findings, recall of uncued attributes decreased as a function of the number of attributes cued at the time of retrieval. Subsequent research showed the effect due, at least in part, to the inhibiting effects of the salient cues (Alba and Chattopadhyay 1986). Thus, when some facts are particularly salient, they are continually and unavoidably retrieved during attempts to recall the remaining information. All this suggests that advertisers may be able to inhibit consideration of threatening competitors and unfavorable attributes by making salient in their ads.
nonthreatening competitors and their own attribute strengths.

As noted, salience need not be determined solely by the messenger. By virtue of their unusualness, inherent vividness, or personal relevance, some types of information will exert a greater influence on memory and judgment than others. For example, visual images may have more impact than verbal descriptions (cf. Childers and Houston 1984). Similarly, people overestimate the relative risk of events that are unusual, newsworthy, and personally salient, perhaps because instances of such events are highly available in memory and are therefore overgeneralized (Lichtenstein, Slovic, Fischhoff, Layman, and Combs 1978; see also Folkes 1988). This suggests that consumers will be suboptimal in the way they purchase insurance, and it explains why relatively low-risk dietary hazards, such as the presence of Alar on apples, elicits such an extreme consumer reaction.

Although the effects of salience have been described primarily in terms of recall, it is important to note that salient concepts can also affect the interpretation of stimulus information, particularly if the stimulus is ambiguous. Thus, awareness of brand name or country of origin may influence how positively or negatively a product attribute is assessed (See Hong and Wyer 1989). Similarly, advertisements that explicitly promote a product dimension may guide how that dimension is evaluated—even when the evaluation is based on direct experience with the product (Hoch and Ha 1986). Other interpretive effects may be much more subtle. For example, a moderately priced product may be perceived as being more (or less) expensive than usual if the consumer has been unobtrusively exposed to a set of relatively inexpensive (or expensive) brands from the same product class (Herr 1989). Thus, the increased salience that results from the temporary priming of one price category biases the perception of products in another. The importance of these interpretive effects, combined with the scarcity of relevant empirical research, makes this an important area for future research.

More consistent with the notion of problem framing are cases in which the unobtrusively primed information affects the recall and usage of particular attributes during product choice. For example, it has been shown that for noncomparable products (e.g., cameras and computers), people may base their evaluations on abstract dimensions that are held in common (Bettman and Sujan 1987; Johnson 1984). By surreptitiously priming a common dimension (e.g., reliability), it is possible to guide consumers into making decisions in terms of that dimension (Bettman and Sujan 1987).

More important, the effects of such priming can interact with memory (Srull and Wyer 1980; see also Higgins, Rholes, and Jones 1977). When subjects are primed with an evaluative dimension prior to exposure to an ambiguous description of an object, evaluation of the object tends to be consistent with the prime. Moreover, the effects of the prime are larger when a long interval occurs between exposure to the description and judgment. This result is consistent with the previously described study by Alba et al. (1989). As delay increases, memory for the original detailed information decreases, whereas higher-order interpretations made salient by the prime remain stable. Thus, over time, evaluations become dominated by and more consistent with the original interpretation of the object.

It should be apparent at this point that the manipulation of salience by others can have very adverse effects on consumer decision making. In general, salient information is given disproportionate amounts of attention and is recalled in disproportionate amounts. Thus, consumers will be biased in their use of information relative to stimulus-based situations or situations in which memory is complete and attributes are given objectively correct importance weights. For example, Edell and Staelin (1983) compared consumers' responses to print ads that varied in the format of information found in one portion of each ad (text alone, pictures alone, or text plus pictures). As predicted, pictures alone seemed to depress support and counterarguments about attributes that a normative sample had rated as important for evaluating the target products. Presumably, the pictures alone allowed attention to dwell on
affectively pleasant, easy to process aspects of the pictures that were not truly relevant to judging the brands.

The especially distressing aspect of all this is that salience effects are most likely to influence product novices and other vulnerable segments of the population (Alba and Hutchinson in press). Experts are less likely to conform to an advertiser’s framing of a problem and can remember nonsalient information more completely (see Alba and Hutchinson 1987). Novices, on the other hand, find it more difficult to challenge an advertiser’s claims and will preferentially recall salient attributes, especially after a delay. Thus, salience manipulations influence those consumers who are least capable of making optimal decisions.

Repetition. As noted, repeated presentation of a stimulus may enhance its salience, which in turn may increase its impact on decision making. Repetition also facilitates recall (Crowder 1976; Sawyer 1973). Thus, heavy advertising should heighten recall of both the brand name and the attributes associated with it. And, as with previously discussed salience effects, differences in recall that result from differential repetition across brands and attributes should exert its greatest influence on memory-based decisions.

We take special note of repetition-related salience not only because repetition is a fundamental advertising variable, but also because research has identified three unintended effects of repetition. First, repetition may affect the amount of attention paid to an ad. Thus, high levels of repetition may lead to “wearout,” wherein lower amounts of attention are paid to each additional exposure, and recall ceases to improve (Craig, Sternthal, and Leavitt 1976). However, alterations in presentation, such as when an ad is repeated in different media, may affect the rate of wearout. For example, when a television version of an ad is followed by a radio version, people actively reprocess the former during exposure to the latter (Edell and Keller 1989). Second, repetition may have adverse effects on a consumer’s affective reactions to a message, perhaps by producing boredom or annoyance or by affording greater opportunity for counterargumentation (Calder and Sternthal 1980). Both effects are undesirable from an advertiser’s perspective. A third outcome is undesirable from a consumer’s perspective. That is, messages that become familiar through repetition also have a tendency to be perceived as more valid, independent of their actual validity (Bacon 1979; Hasher, Goldstein, and Toppino 1977).

Consistency. Although our emphasis has been on external manipulations, there are numerous internal processes that can lead to many errors in decision making. In general, these processes involve the biased recall of information that is consistent with prior knowledge, beliefs, and decisions.

For example, as discussed in the context of inference, consumers may have a sense of attribute typicality. To the extent that this is true, research suggests that, except for extremely unusual features, recall of product information will increasingly favor typical attributes as time elapses (Schmidt and Sherman 1984; Smith and Graesser 1981; Sujan and Bettman 1989). When little time has elapsed, people have reasonably good memory for both typical and atypical features. Over time, however, episodic recall diminishes and increasing reliance is placed on general knowledge to cue recall. Because general knowledge tends to cue typical features, beliefs about the product should become stereotyped, thereby reducing the consumer’s ability to discriminate among brands.

Sawyer (1976) has adopted this notion to assess the potential long-term impact of corrective advertising. He argues that if the corrective claim is not well integrated into general knowledge, recall of information about the offending brands will come to resemble recall prior to exposure to the corrective claim. This argument is based on the atypical nature of the corrective claim compared with what the consumer has long believed to be true about the brand.

In addition to the pure memorability of typical versus atypical claims, retrieval may be influenced by the conceptual foundation of those
claims. Specifically, the encoding of a "fact," especially an unfamiliar or nonintuitive one, may initiate attempts to justify or explain it. In the process, beliefs or hypotheses may be constructed that persist after the fact has been discredited (Anderson, Lepper, and Ross 1980). Thus, to the extent that erroneous product beliefs stimulate or are derived from a more encompassing theory, they may be difficult to correct because the theory persists beyond memory for specific claims and counterclaims.

Regardless of the reason for the persistence of an erroneous belief, the problem will be compounded when corrective or qualifying claims are made inconspicuously, inasmuch as the memory constraints on the recall side will be compounded by attentional deficits on the encoding side (cf. Burke, DeSarbo, Oliver, and Robertson 1988).

Biased recall can result not only from objective assessments of typicality but also from errors in reasoning. Foremost among them is the widely reported and pervasive tendency known as confirmation bias, in which information search, interpretation, and recall are conducted in such a way as to confirm rather than disconfirm one's beliefs. This, in part, accounts for the phenomenon of illusory correlation, wherein people overestimate the relationship between variables (e.g., between price and quality). To the extent that correlations are computed from memory, perception of the relationship will be overstated because recall of confirming cases (i.e., high-priced, high-quality products and low-priced, low-quality products) will exceed recall of disconfirming cases (i.e., high-priced, low-quality products and low-priced, high-quality products). (See Crocker 1981.) This offers another reason why strong beliefs may be formed in the absence of strong data.

Analogous confirmatory processes have been reported for recall of information pertaining to actual decisions that are unrelated to personal beliefs and prior hypotheses. In some cases there seems to be a tendency to search for information that affirms an answer or decision (Koriat, Lichtenstein, and Fischhoff 1980). In other cases it appears the information supportive of a previous decision is more accessible than other information (Dellarosa and Bourne 1984; see also Hoch 1984). Such information is more closely associated with the decision and is cued by the decision at the time of recall. In still other cases, information may be preferentially recalled simply because it is given more attention at the time of exposure. Thus, attributes about chosen brands are recalled at a higher level than attributes of rejected brands (Biehal and Chakravarti 1983; Loken and Hoverstad 1985). Although the opportunity to examine both types of attributes may be equal at the time of choice, most decision rules result in more frequent examination of the ultimately preferred brands.

Related to the situation in which misassessment of knowledge results in inadequate search, preferential recall of decision-consistent attributes should result in overconfidence (Koriat et al. 1980). Thus, consumers may assess their decisions and decision-making abilities more favorably than is justified.

The research discussed thus far portrays a rather dismal picture of the human ability to learn from experience (see also Hoch and Deighton 1989). Through the processes of selective encoding and recall, information that should cause us to broaden our beliefs, moderate our attitudes, and recognize our abilities instead results in stereotyped beliefs, polarized attitudes, and overconfidence in our consumer decisions.

Of course, learning does take place and experience does have salutary effects; the effect of biases is to reduce the rate of learning and thereby increase exposure requirements. However, the empirical evidence on consistency effects is not monolithic. Specifically, the results do not extend uniformly to cases in which information is received less passively than during hypothesis testing. In some instances recall is superior both for information that is highly consistent and for information that is highly inconsistent with prior beliefs. Thus, assertions that contradict what one believes or has been led to expect may be well recalled because they elicit strong reactions (cf. Judd and Kulik 1980) and/or because they are surprising and initiate attempts to understand them, thereby increasing
the extent they become elaborated and connected to other recallable information in memory (Houston, Childers, and Heckler 1987; Srull, Lichtenstein, and Rothbart 1985).

Weber and Crocker (1983) present a more extensive model of adaptation to discrepant information (see also Sujan and Bettman 1989). They outline three types of cognitive reaction that might take place. First are bookkeeping reactions, which make small adjustments to existing knowledge to accommodate the discrepancy. For example, if a consumer buys an overripe apple at an always reliable grocery store, he or she might adjust accordingly and consequently believe that the store is usually reliable. The second reaction is called subtyping. This refers to the construction of an entire subcategory of exceptions to a general rule, as when a consumer who initially believes the only good electronics products are made in Japan does further search and revises the belief to reflect the existence of several European and American firms. The third reaction is more extreme. Conversion reactions result in dramatic alterations in point of view. For example, examination of the Consumer Reports article on sparkling waters may result in a switch in the perception of Perrier from seeing it as a chic and unique beverage to seeing it as a pretentious club soda substitute.

Extensive examinations of these reactions have not yet been conducted over time. Evidence described previously suggests that bookkeeping reactions might be least durable. On the other hand, conversion reactions might be quite durable because they represent fundamental changes in outlook.

Summary. As in other areas of human information processing, research on memory has tended to accentuate the negative. Instances of misinterpretation, misallocation of attention and importance weights, and biased memory predominate. It is unclear to what extent such findings result from researcher bias in the selection of experimental contexts or in the presentation of results (cf. Christensen-Szalanski and Beach 1984; 1987; Nisbett, Krantz, Jepson, and Kunda 1983). Nor is it clear to what extent memory actually affects final purchase (cf. Funder 1987). Two important facts are apparent, however. First, the potential effects are large. For example, the causes of the apparent failure of a major public policy initiative, namely corrective advertising (see Armstrong, Gurol, and Russ 1983), can be traced in part to some of the principles of encoding and retrieval discussed here. Second, to whatever extent consumers are affected in the real world, the impact is likely to be felt most strongly by the least knowledgeable segments of the market.

A final methodological point is also worth noting. Recent research on the measurement of advertising impact has addressed the relative merits of recall versus recognition tests and has generally focussed on the sensitivity of each (e.g., Singh, Rothschild, and Churchill 1988). It is important to add that these two measures are unequally affected by the salience effects and the consistency effects described here. Specifically, such effects occur most strongly on recall tests and may virtually disappear on recognition tests (Alba and Hasher 1983; Alba and Hutchinson 1987). Thus, while arguments may be made from a managerial perspective regarding the value of recognition tests to tap awareness and learning of ads, such tests may mask biases that exist in consumer choice contexts that require the free recall of attribute information.

MEMORY AND DECISION MAKING

The preceding section hinted at the role of memory in product evaluation, but the focus was on the remembrance of attributes, per se. In this final section we directly address the issue of memory-based decision making.

Even in mundane consumer decisions, there are dozens of inputs available in memory and in the external environment that could potentially be considered in making one’s choice, but only a few of these will actually be used as inputs to the choice on a given occasion. For example, one of the authors of this chapter frequently runs out to get a quick take-out lunch, and finds himself standing between Burrito Brothers and
Falafel King restaurants, trying to decide which to patronize. On various occasions within the past month, the decision has been made based on answers to the following questions: "Where did I go yesterday?" "Which line is longer?" "How many minutes do I have until my next appointment?" "Should I be merciful to the people I will be meeting all afternoon, and avoid anything with garlic?—If so, walk one more block to TCBY Yogurt." "How much money do I have in my wallet?" "Maybe I won't get a chance to eat right away—what can I get that won't be inedible if it sits in the bag for awhile?" "Do I want something vegetarian, or something with meat?" "Do I want a big lunch or a small one?" "Are we planning to have tacos for dinner tonight?" Fortunately, all of these issues do not seem to arise on a single occasion—otherwise, our protagonist might consistently find that darkness has fallen before he has been able to make his selection. Instead, in each case the choice is made based on one or two of these considerations. Because of this, the final choice depends crucially on what small subset of the potential inputs the consumer happens to retrieve or to note in the external environment, and to actually incorporate into the decision.

Hoyer's (1984) field observation of laundry detergent purchases (cited earlier) provides more systematic evidence in support of the previous arguments. Immediately after consumers had placed a brand of detergent in their shopping carts, they were approached and asked the reasons for their brand choices. "Choice tactics" cited included price considerations ("cheaper"); "I use less so it costs less"), performance considerations ("works in cold water"; "removes stains"), pure affect ("I like it"; "I love it"), and normative considerations ("my wife told me to buy it"; "my mother always used it"). The most striking aspect of the responses given was that less than 10 percent of all consumers gave more than one reason for their selections.

It could be argued that respondents' true, unobservable decision processes were more complex, and that they simply said only as much as they felt was required to satisfy the interviewer. Similarly, one could argue that the actual decision was made at home, and that, therefore, the entire set of reasons was no longer accessible in memory. However, one could as easily maintain that these self-reports overstated the degree of thought that entered into the choices and that many consumers simply identified the brand that they bought last time and placed it in their shopping carts without deliberation, or that their choices were based upon pure affect without supporting reasons.

Though these interpretations must remain speculative, we see data like those reported above as evidence that for many repetitive and unimportant choices, decision processes are extremely simple. We are struck by the impression that these processes are an order of magnitude less effortful than what is typically observed in laboratory studies of consumers' use of "simplifying heuristics," where, for example, consumers might shift from a compensatory heuristic to the use of a conjunctive rule under adverse task conditions. Indeed, if Hoyer's results are to be taken at face value, one cannot even speak of "multi-attribute" choice rules, as the choice on a given occasion is essentially "uni-attribute" or "uni-input"! Moreover, the qualitative character of the inputs cited suggests that they are retrieved from memory rather than simply read from package or display information, as does the supporting data by Hoyer cited earlier suggesting that external search was minimal.

For all of these reasons, it is important to understand the processes that determine which small sample of inputs from the universe of possibilities might actually be used as a basis for choice. Feldman and Lynch (1988) proposed a simple theoretical framework to address this issue, and Lynch, Marmorstein, and Weigold (1988) modified and elaborated this framework.

**Feldman and Lynch's Framework**

Feldman and Lynch attempted to explain the likelihood that a potential input in memory (e.g., an attribute, the memory of one's own prior behavior, one's attitude, one's reaction to an advertisement, another person's suggestion, etc.) would actually be used in making a mem-
ory-based judgment or decision. Let us call the focal potential Input A. As stated by Lynch et al. (1988), the likelihood that Input A will be used as an input to some judgment or choice is the following:

1. a positive function of the accessibility of Input A in memory (e.g., Biehal and Chakravarti 1983, 1986; Keller 1987, 1988; Tybout, Sterntahl, and Calder 1983);
2. a positive function of the perceived diagnosticity of Input A for the decision—i.e., the degree to which the decision suggested by Input A alone is perceived to allow one to attain one’s task objectives (e.g., Costley and Brucks 1989; Lichtenstein and Srull 1985);
3. a negative function of the accessibility of alternative diagnostic inputs (B, C, D) in memory (e.g., Bettman and Sujan 1987; Higgins and Rholes 1978)
4. a negative function of the diagnosticity of alternative inputs (B, C, D) that are accessible in memory (e.g., Hoch and Ha 1986; Levin and Gaeth 1988; Lynch et al. 1988).

These simple propositions are compatible with a number of theoretical mechanisms. Lynch et al. (1988) suggested that decisions arise from an anchoring and adjustment type of process, in which inputs (or related “chunks”) are sequentially retrieved with the consumer updating the implications of already considered evidence with each new input retrieved. The order of retrieval is a function of the accessibility of each input, but accessible information can be actively disregarded if it is perceived to be nondiagnostic. The cumulative diagnosticity of evidence considered up to that time is monitored (relatively effortlessly). Memory search stops after a number of searches fail to retrieve new inputs, or when the cumulative diagnosticity counter passes some threshold. This threshold depends on involvement in the decision, among other factors.

In this view, motivational direction can affect the set of cues used in judgment by determining task objectives and, hence, which types of information are diagnostic. For example, in choosing a gift for a friend, one’s objective may be to select something of symbolic significance, or to buy something generally “appropriate” before the store closes, or to buy something of lasting value. Motivational intensity can affect inputs either actively, by causing information perceived as nondiagnostic to be ignored, or passively, by causing processing to stop after considering a few salient or accessible inputs—but before retrieving other less accessible inputs that may also be diagnostic.

In the sections that follow, we use this framework to interpret recent research both on determinants of inputs to memory-based judgment, and on determinants of memory-based choice. Though our central concern is with the latter topic, memory-based judgment has received more extensive study both in consumer research and in social psychological work on person impressions and on the link between delayed attitude and the recall of a persuasive message.

Research on the Link Between Recall and Memory-Based Judgment

Reliance on memory for “Facts” or “Attributes”. Suppose that consumers are exposed to an advertisement for a product at Time 1 and at Time 2 we measure their attitudes toward the product and their ability to recall specific claims made in the ad. Typically, the set of claims encoded at Time 1 includes elements with varying evaluative implications for how one should evaluate the product, but consumers will remember only some subset of these claims at Time 2. One hypothesis is that the consumer’s attitude at Time 2 will be a function of the sum or average of the evaluative implications of the subset recalled at the time (McGuire 1968), or the sum or average of the consumers’ recalled cognitive responses (e.g., Edell and Staelin 1983; Greenwald 1968; Kiesilius and Sterntahl 1984, 1986; Wright 1980). In either case, holding constant the information originally encoded at Time 1, attitude judgments at Time 2 will be more positive if the subset consumers happen to remember at Time 2 is predominantly positive rather than predominantly negative. Therefore, all of the factors reviewed in the previous
section on selectivity in memory for attributes might be predicted to have straightforward consequences for judgment outcomes.

For example, in the mock jury decision-making study by Reyes et al. (1980) cited earlier, the relative vividness of evidence favoring the prosecution and defense was manipulated, holding constant the content of the evidence. This manipulation had no effect on immediate judgments of the defendant's guilt or innocence. (Kiesielius and Sternthal 1984, 1986; McGill and Anand 1989; and Schedler and Manis, 1986, have reported conditions under which vividness affects such immediate judgments.) When the same subjects returned after a 48-hour delay, subjects were asked to remember as many of the defense and prosecution arguments as possible, and then were asked to judge guilt or innocence again, as if they "were deciding the case now for the first time." Recall data showed that when prosecution rather than defense evidence had been vivid, subjects recalled more of the former evidence; the reverse was true when defense evidence had been relatively more vivid. In line with this, subjects judged the defendant to be more guilty when the prosecution rather than the defense evidence had been relatively more vivid.

This notion that there should be a strong correlation between the evaluative implications of specific information recalled about an attitude object and memory-based attitude judgments is intuitively quite plausible. However, in a conceptual replication of the Reyes et al. study, Schedler and Manis (1986) used causal modeling analysis to conclude that vividness affected both memory for facts and judgments of guilt or innocence, but that memory did not mediate the effects of vividness on judgments. Moreover, in the context of advertising, several field studies report a weak relationship between ad recall and persuasion (Gibson 1983; Grass and Wallace 1969; Ross 1982). Other laboratory studies have failed to find evidence of recall-judgment correlations, or these studies found that such correlations are observed in some circumstances but not in others (e.g., Beattie and Mitchell 1985; Dickson 1982; Hastie and Park 1986; Keller 1987; Lichtenstein and Srull 1985; Loken and Hoverstadt 1985; Sherman, Zehner, Johnson, and Hirt 1983). In a related way, other experimental variables seem to have different effects on memory for specific attributes than on overall judgments (e.g., Anderson and Hubert 1963; Dreben, Fiske, and Hastie 1979; Riskey 1979), and studies show that the persistence of persuasion over time is unrelated to the persistence of recall (e.g., Watts and McGuire 1964).

Reliance on Memory for Abstractions, Inferences, and Summary Judgments. A partial explanation for the perplexing results cited above is that consumers' memory-based judgments are based on recalled abstractions, inferences, and summary judgments that were generated at the time of initial exposure to specific product information. In Feldman and Lynch's (1988) parlance, the accessibility of such alternative diagnostic inputs should decrease reliance on retrieved details. As noted earlier in this chapter, such abstractions can be retrieved and used independently of the raw attribute information on which they were originally based.

A classic illustration of this phenomenon comes from Lingle and Ostrom's (1979) research in social cognition on person impressions. Subjects made stimulus-based judgments of their suitability for some specified occupation based on one to seven traits (e.g., "How good a lawyer would a conscientious, shy, and intelligent person be?"). Next, subjects were asked to judge the suitability of the same person for either a similar or a dissimilar occupation without further exposure to the original trait information. There was no effect of the number of traits initially presented on the time required to make the second judgment, suggesting that subjects were not retrieving and reintegrating the original trait information, but were instead relying on their retrieved initial judgments. Other authors have also found support for such judgment retrieval processes (e.g., Lingle, Geva, Ostrom, Lieppe, and Baumgardner 1979; Lingle, Dukerich, and Ostrom 1983; Loken 1984).

Lingle and Ostrom's concept of judgment retrieval parallel's Wright's (1975) "affect refer-
ral" heuristic, whereby consumers do not process any specific attribute information in making brand choices but simply choose the alternative for which their retrieved affect is most positive. It is interesting to consider the potential role of such processes in explaining the rapid decisions reported in the observational studies of supermarket shopping behavior cited earlier. It should be apparent that these affect/judgment referral processes require low levels of effort, but may be highly adaptive if no new brands are introduced, product modifications are infrequent, and one's usage purpose remains unchanged.

The notion that initial summary judgments, once made, can take on lives of their own and affect related judgments and behavior is illustrated by Sherman, Ahlm, Berman, and Lynn's (1978) study of contrast effects on judgment, and their relation to subsequent behavior. Subjects rated the importance of recycling in the context of either a set of important or a set of unimportant issues. As might be expected, recycling was judged to be more important if rated in the context of unimportant rather than important issues. However, contrast effects on rating of the importance of recycling carried over to subsequent recycling behavior (i.e., more recycling behavior in the "unimportant context" condition in which recycling was rated as relatively important) only when the ratings were made salient. (See Higgins and Lurie, 1983, for a related example of how contrast effects influence initial categorizations that are, in turn, used as a basis for memory-based judgments independent of the information that led to those categorizations.)

**Effects of Delay on Reliance on Specific Facts Versus Summary Evaluations.** Given that memory-based judgments seem to be based on the evaluative implications of recalled specific facts in some studies and on recalled summary evaluations and abstractions in others, what can explain the conditions under which consumers rely on each type of input to make memory-based judgments? Several authors have suggested that reliance on summary evaluations and abstractions might increase over time because the ability to retrieve specific facts decays more rapidly than the ability to retrieve more global judgments (Alba and Hutchinson 1987; Carlston 1980; Chattopadhyay and Alba 1988; Higgins and Rholes 1978; Kardes 1986; Lingle et al. 1979). However, the empirical evidence for this assertion has been mixed at best. Some findings seem clearly consistent with this conjecture, such as the Alba et al. (1989) results cited earlier on the persistence of memory for abstract positioning information rather than for the specific detail conveyed in advertising. However, other studies have been less supportive. For example, Kardes (1986), failed to find an effect of time on the influence of initial judgments.

At this point, one can only speculate about the reasons for the inconsistencies among studies with respect to whether or not the impact of abstractions and prior summary judgments increases over time relative to the impact of recalled specific details. First, we should note that "all things being equal" claims made by some authors that memory for specific detail should decay more rapidly than summary judgments are usually accompanied by an admission that the distinction between summary judgments and details in memory is almost unavoidably confounded with other factors related to memorability, such as distinctiveness and amount of interfering information. For instance, in the oft-cited study by Lingle et al. (1979, Experiment 2), subjects were asked to judge the suitability of a person for an occupation based on a small photograph and detailed information about eleven traits. Either one day or one week later, subjects returned for a second session and were shown the photo they had seen earlier. They were then asked to recall the exact rating they had assigned on a twenty-one point scale, and to recognize the original eleven traits in a list including these traits and an additional eleven trait foils. Recognition accuracy declined significantly over time, while memory for their evaluations did not. Ninety-seven percent of all subjects were able to reproduce their previous ratings within a scale point.

First, given that subjects had only one judgment to remember and eleven traits, the sup-
rior recall and persistence of the former is not surprising. By the same token, we should not be surprised to find poor memory for prior abstract judgments and summary evaluations under conditions in which many such judgments are made about closely related objects within a single experimental session (Baumgardner, Leippe, Ronis, and Greenwald 1983; Keller 1987). Indeed, it seems possible to arrange conditions so that many different abstract judgments about brands or persons are made based on a small amount of detailed information. Here, memory for the detailed information might be better and more persistent over time than memory for the judgments.

Second, it is obvious that if, in a given study, memory for detailed information has dissipated completely after a delay, while memory for abstractions and summary evaluations has not, memory-based judgments will be dominated by the latter and not the former. However, under conditions in which both types of information are remembered but to different degrees, it seems necessary to consider more than just the relative accessibilities of these types of information. Clearly, the perceived diagnosticity of each also plays an important role (cf. Baker and Lutz, 1988; Keller 1989). This theme will arise repeatedly in the sections that follow.

"On Line" Versus "Memory-Based" Judgment and the Effects of Processing Goals at the Time of Initial Exposure to a Brand. An apparent consensus has formed that memory-based evaluations will correlate with the evaluative implications of recalled specific facts primarily when there is no existing attitude toward the target. Whether such an attitude exists is, in turn, a function of a number of factors (see Hastie and Park, 1986, for a review), including processing goals at the time of initial encoding. Beattie and Mitchell (1985), Lichtenstein and Srull (1985, 1987), Hastie and Park (1986), and Loken and Hoverstad (1985) have all theorized that if consumers initially receiving information about a brand have a goal of forming an evaluation or impression of that brand, the evaluation will be formed "on-line." As a consequence, in making subsequent memory-based judgments about that brand they will be able to retrieve that evaluation directly rather than compute an evaluation based on specific facts retrieved. If, however, the processing goal at the time the consumer initially receives information about a brand does not lead to the formation of a brand impression "on-line," subsequent memory-based judgments will depend on the evaluative implications of specific facts retrieved.

Hastie and Park's (1986) theoretical review argued that this "memory-based" versus "on-line" distinction is the central variable that explains when memory-based judgments about an object will or will not correlate with the evaluative implications of recalled facts about that object. Their theory implies that whenever some overall summary judgment is available in memory because it was formed "on-line," it will be used in preference to specific facts.

This hypothesis has intuitive appeal and is consistent with other heuristics people use to simplify decision making, particularly affect referral (Wright 1975). We would argue, though, that this hypothesis is incomplete as an account of most nonroutinized cases of memory-based consumer decision making for three reasons that can be cast in terms of Feldman and Lynch's accessibility-diagnostic framework. First, it presumes that overall judgments will be accessible whenever they are available in memory. As noted earlier, associative interference among brands may make it difficult to recall memory for one's overall evaluations of consumer products (Baumgardner et al. 1983; Keller 1987, 1989a). Second, it understates the role of attribute recall under conditions in which prior judgments exist by focussing on episodic recall—for example, by focussing on recall of the content of advertising (Gibson 1983). Consumer purchase may rely more on recall of general knowledge about the brands considered, both because of general knowledge's greater accessibility and perceived diagnosticity.

Third, and most critical, the Hastie and Park (1986) hypothesis presumes that people regard overall evaluations and other summary judgments to be highly diagnostic for later related decisions, even if those later decisions in-
volve somewhat different dimensions, and are more diagnostic for memory-based decisions than for specific recalled factual information. We would argue that this assumption may hold under some (but not all) conditions in the realm of social judgment, but it fits badly with circumstances typical of consumer decision making. It is ironic that research on the distinction between "on-line" versus "memory-based" judgment has given such heavy emphasis to the effects of processing objectives at the time of initial encoding as a determinant of whether or not brand attitudes and other judgments are formed "on-line," but has neglected almost entirely the effect of objectives at the time of memory-based decision making on what types of information are perceived by consumers to be diagnostic (cf. Alba et al. 1989; Baker and Lutz 1987; Biehal and Chakravarti 1982).

In the course of social judgment it is considerably more efficient to recall an evaluation of another individual than to generate one anew from memory each time that individual is encountered. Judgment-referral serves as a sufficiently diagnostic tool because judgments about a person often may be generated in isolation, and a simple affective or evaluative response is all that is required by the decision context. Moreover, people have elaborate "implicit personality theories" about how traits and behaviors of people covary (Kardes 1986; Lingle, Altom, and Medin 1984; Rosenberg and Sedlak 1972), making even prior judgments on somewhat different dimensions diagnostic. In the product domain, though, consumers must deal with so many product classes that their typical level of knowledge about any one is rather low. Thus, they are less likely to have well practiced, accessible inference rules for relating one abstract dimension to another, unless those dimensions cut across many product categories (Simmons 1988). This reduces both the accessibility and the diagnosticity of these earlier, indirectly related judgments at the time of later decisions.

Also, products are rarely considered in isolation, and recalled judgments may provide an inadequate basis for decision making unless they are extreme. Ultimate decisions often require greater deliberation and may hinge on the specific attributes of the product and/or the consumption situation. In essence, we argue that many product judgments possess a choice component. It follows that when alternatives cannot be separated on the basis of the global evaluations tied to them, these evaluations will be nondiagnostic and attribute recall will play a significant role.

Judgment versus Choice: Effects of Task Objectives on Diagnosticities of Inputs

In his classic review of contingent decision making, Payne (1982) considered differences in information processing between stimulus-based judgment and stimulus-based choice. As discussed by Bettman, Johnson, and Payne in Chapter 2 in this volume, judgment processing is "by alternative"—that is, by reviewing and integrating all information about a single brand or object before moving on to judge another brand or object. Choice processing tends to be more dimensional. Consumers seem to prefer to compare alternatives on each dimension in turn and to integrate the results of these comparisons rather than to integrate all information about each brand into a single overall evaluation and then choose the best alternative by comparing overall evaluations.

By extension, it can be argued that in memory-based and mixed-choice tasks in which levels of involvement are at least moderate, the diagnosticity of an input is largely driven by the ability of that input to discriminate the best alternative from the rest. This causes the diagnosticity of specific attributes to be, in part, contextually determined (Tversky 1977), increasing the attention paid to discriminating or "determinant" attributes (Myers and Alpert 1968). Conversely, decreasing attention is paid to attributes and overall evaluations that do not discriminate. This focus on discrimination in choice tasks can be contrasted with judgment, in which the goal is often to categorize objects, with no requirement to respond to objects differentially if they are largely similar.

For this reason, results from memory-based
and mixed-choice tasks generally violate the earlier mentioned consensus that retrieved specific attributes are used in memory-based decisions only if prior attitudes or judgments do not exist. One such finding comes from Biehal and Chakravarti's (1983, 1986) research on "mixed" choice. In the first phase of their experiment, subjects were exposed to information about four attributes of four hypothetical calculators (A, B, C, and D), and they were instructed either to memorize this information or to choose one of the calculators as a gift. The upshot of this manipulation was that subjects generally had better memory for the brands' attributes when they had memorized this information than when they had acquired it incidentally in making a choice. For subjects making a choice, recall was best for the brand actually chosen.

In a second phase of the experiment, both groups of subjects were asked to make a choice among brands A through D and four new brands (E, F, G, and H). Information about E through H was given externally, but information about the four attributes of A through D, seen earlier, had to be recalled from memory. Moreover, a fifth attribute was described for all eight brands.

Results showed that the brand choices were strongly affected by the ability to retrieve specific attribute information about the initial four brands. Subjects who had initially memorized information about the first four brands had a pattern of choice outcomes virtually identical to those of control subjects who made stimulus-based choices based on full information on the five attributes of all eight brands. However, subjects who had made a prior choice imperfectly recalled the brands they had rejected earlier, and this caused them to tend to select one of the four new external brands—even when these were dominated by one of the four recalled brands.

These results seem contrary to Hastie and Park's (1986) assertion that people will not rely on recalled specific facts in making memory-based decisions when summary evaluations are available. Presumably, subjects who had made prior choices in Biehal and Chakravarti's research had some such evaluation in memory, or at least recall of their own past choice or rejection of each brand. Note, though, that overall evaluations are not particularly informative in "mixed" choice, because the knowledge that one had earlier chosen Brand A or evaluated it highly has no necessary implication for whether it is better or worse than some new set of brands, unless one and not the other is extremely good or bad. One might speculate that if the externally described brands had been clearly worse than the remembered brands, recalled overall evaluations might have been sufficiently diagnostic. Thus, choice outcomes might not have depended on the adequacy of memory for the initial brands.

Lynch, Marmorstein, and Weigold (1988) reported two experiments bearing on the effects of the accessibility and diagnosticity of attribute information and recalled overall judgments. Their first experiment employed a mixed-choice task similar to that of Biehal and Chakravarti. Subjects saw Consumer Reports information about three television sets and evaluated each one. Some subjects then learned information about several new brands, interfering with their ability to recall specific details. Others saw no such interfering information. Then subjects were asked to make a choice between one of the brands seen initially and a new stimulus brand, with external information presented only for the latter. Interest centered on how ability to retrieve attribute information would influence the utilization of recalled attributes and prior evaluations in choice.

Results indicated that under conditions of low interference with attribute memory, subjects making choices made significant use of retrieved attributes but not of recalled prior evaluations, consistent with the Biehal and Chakravarti results cited previously. Under conditions of poor attribute memory, subjects apparently engaged in minimal attempts to retrieve specific attributes but, surprisingly, gave no evidence of reliance on retrieved overall evaluations. Lynch et al. (1988) speculated that this was because the two alternatives had been calibrated to be equally evaluated, so that overall evaluations were nondiagnostic.
To clarify the role of diagnosticity of recalled evaluations, Lynch et al. (1988) performed a second experiment in which subjects first were shown print ads for four brands and were asked to evaluate each brand on two summary dimensions. They were then asked to make a memory-based choice between two of the four brands just seen. Lynch et al. reasoned that if the two summary evaluations favored the same brand, these evaluations would be sufficiently diagnostic as a basis for choice, but if they conflicted they would be nondiagnostic. In line with this, subjects whose evaluations were consistent made significant use of recalled overall evaluations but not of the retrieved specific attribute information conveyed by the ads, whereas the reverse was true for subjects whose evaluations were inconsistent.

Lynch et al. (1988) construed this tendency for diagnosticity of inputs to decisions to depend on their discrimination power in terms of a judgment-versus-choice distinction. However, the research of Chattopadhyay and Alba (1988) indicates that diagnosticity in judgment can be similarly affected if the judgment context is perceived by consumers to call for comparative evaluations. They presented subjects with an advertisement for an automobile either in isolation or in the context of another similar automobile. Attitude toward the target brand was measured along with recall of and inferences about the attributes contained in the ad. Results showed that when the product had been presented in isolation, recall was unrelated to attitude. Interestingly, in this case, attitude was predictable from the abstract inferences subjects generated. These inferences were of the type described earlier that summarize several specific attributes. Thus, in the absence of context, attitudes were generated from relatively nonspecific characterizations of the product, such as its amount of comfort or power. However, when the ad was presented after viewing information about a similar automobile, recall was significantly related to attitude, whereas the abstract inferences were not. The presence of an alternative brand moved the decision context more toward choice and, therefore, prompted subjects to rely on memory for specific attributes prior to making a judgment. Because the two products were similar, abstract inferences were not sufficient to discriminate between them and, therefore, did not serve as a basis for evaluation.

The work of Costley and Brucks (1989) also demonstrates the critical role of diagnosticity and discrimination power in comparative judgment, and shows that the same factors governing the use of overall evaluations versus recalled facts determine which recalled facts will and will not be used. They exposed subjects to a target print ad conveying information about two sets of attributes, one positive and one neutral in evaluative implications. Later, subjects were asked to make a comparative evaluation of the recalled brand in comparison with an external brand shown in another ad. The authors manipulated the accessibility of positive versus neutral information about the memory ad in two ways.

First, the external stimulus ad mentioned either the dimensions on which the memory brand was positive, or those on which it was neutral. Theoretically, this should affect the relative accessibility of attributes of the memory brand by serving as a retrieval cue (Keller 1987) or by inhibiting retrieval of uncued attributes (Alba and Chattopadhyay 1986; Hoch 1984; Keller 1989). The authors reasoned that this manipulation would also affect the diagnosticity of the attribute dimension on which the memory brand was positive versus neutral. The diagnosticity of those dimensions would depend upon whether or not the external brand was described in terms of the same dimensions, so that the two brands could be compared and discriminated on those dimensions (Johnson 1988; Payne 1982; Slovic and MacPhailly 1974). Results showed that this factor explained 16 percent of the variance in recall of positive attributes, and 18 percent of the variance in preferences. The effects on preferences cannot be attributed to diagnosticity alone, because a control group given a stimulus-based choice between the external brand and the brand shown in the “memory” ad showed no effect of which attribute dimensions were mentioned in the ad for the external brand.
A second manipulation varied accessibility of positive versus neutral attributes of the memory brand without manipulating diagnosticity. For half of the subjects, the positive attributes were presented pictorially and the neutral attributes were presented in accompanying text, whereas the reverse was true for the remaining subjects. While this manipulation explained roughly 25 percent of the variance in recall, it explained no significant variance (0.4 percent) in preferences for the memory brand versus the external brand. This suggests that we should be cautious in extrapolating results from other research on recall of visual versus verbal advertising (e.g., Childers and Houston 1984) in order to draw conclusions about the use of this information in decision making. Costley and Brucks interpreted the complete pattern of results to show that accessibility only enhances use of an input if it is also diagnostic—at least under conditions in which alternative inputs are both accessible and diagnostic.

**Accessibility and Diagnosticity of Nonattribute Information**

Our discussion up to this point has focused on the memory accessibility and diagnosticity of two generic types of inputs to choice—specific "attribute" information and prior global judgments. Though these types of inputs have received the most research attention to date, it is useful to think more broadly about the types of inputs that might be used in consumer choice, and how their influence might change over time. The first part of this question has been the topic of much persuasion research and has examined the relative persuasiveness of argument or attribute information and other associated cues (variably called peripheral cues or heuristic cues), such as the characteristics of the spokesperson. The results, summarized in Chapter 7 of this volume (Petty et al.), generally show that strong message arguments are most persuasive when the individual is highly involved in the message and that peripheral information is most persuasive under low-involvement conditions.

Unfortunately, there is a surprising dearth of research on the relative persuasiveness of various types of information over time. Theory suggests that the basic result just described should generalize to cases in which memory plays a larger role. Indeed, it has been demonstrated that the persuasive effect of a message decays less over time when the message was originally processed under high-versus low-involvement conditions (Chaiken 1980; Haugtvedt 1989). This result is plausible and intuitive and stems from the higher memorability and salience of the message arguments following more intense processing.

However, there exists virtually no research that examines the relative persuasiveness of different types of information independent of involvement and as a function of time. Psychologists interested in delayed persuasion effects have rarely examined anything other than attribute information or attribute-related thoughts (see Sawyer and Ward, 1979, for a review). In consumer research there has been very little attention paid to persistence and resistance at all (Lesne and Didow 1987). This is rather stunning, given the multitude of cues contained in an ad and the long-term effects advertising is designed to achieve.

Several exceptions to this rule exist. The first involves the long-studied sleeper effect, in which persuasive effects of a message increase over time. The effect is interesting because it includes precisely the feature of interest here, namely, delayed measurement and messages that contain both central arguments and peripheral cues. Recent attempts to demonstrate reliable sleeper effects have succeeded but require that the message arguments and peripheral cues be memorable in the short term and have roughly equivalent but opposite persuasive impact (see Hannah and Sternthal 1984; Mazursky and Schul 1988; Pratkanis, Greenwald, Leippe, and Baumgardner 1988). In a consumer context this might be exemplified by the presentation of legitimate product attributes in an advertisement by a noncredible manufacturer. In such cases, persuasive impact will increase over time when the impact of the source decays more rapidly than the impact of the attributes. Although this research outlines the conditions that must be met in order to produce what previously appeared to be an ephemeral
effect, it says little about real-world generalizability because it used procedures that were designed to maximize the long-term impact of the message arguments and the short-term impact of the spokesperson, while at the same time hindering the association between the two. One of the key missing elements in all persuasion research concerns the inherent memorability and impact of different types of information.

The second study to examine central and peripheral information over time did not manipulate memorability of the cues and found a different pattern of results; that is, messages became more persuasive over time as the product attributes became less memorable (Alba et al. 1989). In brief, subjects were presented with an ad for a television. The television performed poorly on three important dimensions but also possessed six good, but relatively unimportant, features. Immediately afterward or two days later a comparison brand was presented and subjects were asked to make a choice. The comparison brand dominated the first brand on the important dimension but lacked the additional features. Results showed that the proportion of subjects choosing the comparison brand decreased over time; that is, choice became less optimal. Debriefing showed that, as time passed, memory for the specific features of the first brand declined, but memory of the fact that it had many attributes remained. Thus, unable to make attribute-by-attribute comparisons, subjects chose the brand with the greatest number of attributes, which by most accounts would be considered a peripheral cue (Petty and Cacioppo 1984).

A third set of studies by Moore and Hutchinson (1983, 1985) also pertains to conditions under which nondiagnostic peripheral cues might actually increase their influence on decisions over time. Subjects were exposed to a series of ads that varied in the evaluative reactions they induced. Some ads were very unpleasant (e.g., irritating ads for personal hygiene products), whereas others induced neutral reactions, and others were very pleasant. Subjects were later asked to judge their liking for the brands based upon brand name alone. Both immediately and two days after exposure, brand liking was a positive function of evaluative reactions to the ads themselves. After seven days, however, ratings of brand liking were a J-shaped function of the evaluations of the ad, so that brands associated with very negative ads were rated higher than those associated with more neutral ads. Presumably, this stemmed from the greater attention and elaboration given to evaluatively extreme ads, so that a single exposure to these ads caused a greater increment in subjective brand familiarity than did exposure to more neutral ads. Over time, specific ad and brand reactions were forgotten, but this subjective familiarity became confusable with weak but positive affect and used as a basis for preference ratings as in "mere exposure" effects (Zajonc 1980).

A final series of studies pertaining to the effect of differential use of attribute and nonattribute information over time comes from the fascinating research of Wilson and his colleagues on the disruptive effects of thinking about reasons for our preferences on attitude behavior relations. (See Wilson, Dunn, Kraft, and Lisle (1989) for a review.) In the paradigm used by Wilson and his colleagues, subjects acquire affective reactions to some attitude object or set of objects through direct experience. All subjects are asked to rate their preferences, and subsequently, their behavior toward the objects is measured. For some subjects, though, the preference measures are preceded by instructions to organize their thoughts by thinking about reasons for their preferences, whereas for the remaining subjects this task is replaced by a filler task. The standard result is that attitude or preference measures from subjects who have thought about reasons for their preferences exhibit low correlations with subsequent behavior, whereas these correlations are strong for subjects who rated their preferences without giving reasons. 7

7Millar and Tesser (1986) show that this is true only for behaviors that are consummatory (i.e., performed for the pleasure of the experience, as in Hirschman and Holbrook's 1982 concept of experiential consumption), and that the opposite pattern actually occurs for behaviors that are cognitively driven (i.e., performed for their instrumental value in attaining some objective). Wilson, Kraft, and Dunn (1989) demonstrate that giving reasons reduces attitude behavior correlations only for subjects who are low in prior knowledge about the attitude object.
Wilson et al. explain this result by postulating that much behavior is driven by pure affect, rather than on the basis of cognitions about the attitude object, or more cognitive “attitudes.” (See Cohen and Areni in Chapter 6 of this volume for further justification of an affect-versus-attitude or evaluation distinction.) Affective reactions to people, products, and other objects are caused by factors that are only partially accessible to conscious awareness. When asked to give reasons for preferences, consumers come up with responses that seem sensible to them. They may actually think that these reasons are true. But their reasons tend to be either plausible fabrications or selectively retrieved in a way that is biased toward salient cues. When an attitude measure is administered immediately following self-reflection about one’s reasons, people persuade themselves that they hold the attitudes implied by these reasons. In essence, they form purely cognitive “attitudes.” Because what is most salient will vary considerably among individuals, these purely cognitive attitudes need not differ on average from purely affective responses given to the same measures by subjects who did not give reasons, but these attitudes do have more “error variance.”

When subjects who have given reasons then have an opportunity to engage in behavior related to the persons, products, or objects just rated, their initial choices are in line with the reason-driven preferences they just stated. However, if the behavior is more long term, they sometimes receive affective feedback that the alternatives that they thought they liked do not give them that much pleasure. Thus, they revert to making behavioral decisions based on pure affect. For subjects who did not give reasons, their preference judgments, initial behavior, and long-term behavior are all based on the same affective responses. Thus, attitude-behavior correlations are high.

There seem to be two plausible explanations for the differential effects of giving reasons on short-term versus long-term behaviors. The explanation offered by Wilson et al. (1989) is that affective feedback invalidates the reconstituted preferences formed in response to giving reasons, causing people to revert to choosing based on noncognitive affect. This is in essence a diagnosticity explanation. Alternatively, memory for the reasons generated or for newly formed preferences based on them may decay rapidly, whereas the affective reactions may be retrieved spontaneously and automatically. The less accessible one’s reasons become, the greater the use of the alternative input of affect should be.

In any case, this research has important implications for consumer behavior, both in showing the importance of nonattribute information in influencing preferences and choice and in suggesting how the determinants of behavior can be altered over time due to changes in the accessibility and perceived diagnosticity of potential inputs in memory. It also reaffirms the importance of information processing that goes on below the level of conscious awareness to preferences and behavior, and it provides a challenge to our research that relies so heavily on self-report methods.

Memory, Judgment, and Choice: Implications for Research on the Attitude-Behavior Relationship

Consumer researchers and social psychologists have evinced a long-standing concern with the relationship between attitude toward a brand and behavior toward the same object, and with the factors that affect the strength of this relationship (e.g., Fazio, Powell, and Williams 1989; Fishbein and Ajzen 1975; Wicker 1969). Traditionally, correlation between the two has been taken as presumptive evidence that attitudes cause behavior, although the information processing mechanisms by which this might occur have been given little research attention until recently. Research in the 1980s has made it increasingly apparent that the effects of factors influencing attitude-behavior correlations can be understood in terms of the effects of memory on the inputs used for behavioral choice.

In an important review paper, Fazio and Zanna (1978) built the case that attitude-behavior correlations are stronger when attitudes are
based on direct experiences with the attitude object rather than on second-hand information about the same object. Smith and Swinyard (1983) made a similar point about the effects of product trial versus advertising, arguing that product trial leads to higher information acceptance than advertising because people rarely derogate themselves as sources of information. This implies that the perceived reliability (and thus diagnosticity) of retrieved information acquired by experience would be relatively high. This higher information acceptance leads to the formation of "higher-order" beliefs and affect that are held with more confidence. This is in contrast to the "lower-order" beliefs and affect formed on the basis of exposure to advertising. In line with this, attitude-behavior correlations were significantly stronger when based on product trial rather than advertising.

One interpretation of these results is that attitude-behavior correlations are higher when consumers use retrieved attitudes directly as inputs to choice, as in Wright's (1975) affect-referral notion, rather than basing behavior on some subset of facts or other nonattitudinal inputs. If attitudes formed from trial are held with more confidence, they may be more diagnostic for choice and thus used more than if they are formed on the basis of advertising (cf. Berger and Mitchell 1989).

Fazio has developed in his 1986 paper (see also Fazio, Chen, McDonel, and Sherman 1982; Fazio, Powell and Herr 1983; Fazio, Powell, Sanbonmatu, and Kardes 1986; Fazio and Williams 1986; Fazio, Powell, and Williams 1989) a process model that provides a different potential explanation of the effects of direct experience, focusing on attitude accessibility rather than attitude diagnosticity. He argues that, holding constant the polarity of attitudes, attitudes vary on a dimension of accessibility, ranging from nonattitudes (when no attitude has been formed) to attitudes that are available but not readily accessible, to attitudes that are so accessible that they are retrieved spontaneously on mere observation of the attitude object. Arguably, direct experience, as through product trial, heightens the accessibility of an attitude more than does watching an ad, which may not even prompt the formation of an attitude.

Fazio (1986) maintains that if one's attitude toward the object is accessible, it "colors perceptions" of the object, filtering out attitude-inconsistent information and filtering in attitude-consistent information. In most of his published work, this information being filtered in or out comes from the stimulus environment (e.g., Fazio and Herr 1984; Fazio et al. 1983; Fazio and Williams 1986; Houston and Fazio 1989) rather than from memory. Fazio argues that these filtered perceptions are the proximate cause of behavior. Attitude or affect is not directly used as an input to choice but "guides behavior" only indirectly by screening perceptions. Lynch et al. (1988) suggest two alternative possibilities—that accessible attitudes are used as direct inputs to choice as in Wright's (1975) concept of affect-referral, or that attitudes are used as a basis for retrieving a consideration set of alternative brands or behaviors, with retrieved details used to choose from among the set. Fazio, Powell, and Williams (1989) speculate that in environments in which stimulus information is sparse, the selective perceptions component of their theory may become less important, and people may use retrieved affect directly as an input to choice.

We should note that the designs used by Fazio and his colleagues make it difficult to disentangle two "selective perception" explanations of why accessible attitudes lead to higher attitude-behavior correlations. Their explanation is that accessible attitudes filter in attitude-consistent new information, but filter our new information if it is attitude discrepant. However, it is not possible to rule out the interpreta-

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6 This notion has an interesting parallel to the memory literature on schema theory. Some schema theorists have asserted that the activation of a schema prior to exposure to ambiguous new information causes schema-consistent recall by editing out schema-inconsistent details at the time of encoding. Alba and Hasher (1983) review evidence that allows rejection of this assertion. Preferential recall of schema-consistent information seems instead to be due to effects of the activated schema on interpretation, or to the cueing effects of schemata at the time of retrieval. See also Hastie and Park (1986) for a discussion of how this bears on explanations of memory-judgment correlations.
tion that those with accessible attitudes are more likely to filter out both attitude-consistent and attitude-inconsistent new information. Because consumers think they already know how the object is to be evaluated, they have less motivation to attend to new information. This parallels the finding in the literature on consumer search that those with higher knowledge see fewer benefits of search and thus search less (Newman 1977; Punj and Staelin 1983).

Note that in this case, if attitudes are measured at Time 1 and consumers are exposed to new information at Time 2, attitudes would change less as a consequence of new information if it is edited out. Thus, if the Time 1 attitude measure is correlated with a measure of behavior at Time 3, attitude-behavior correlations would be higher for consumers who had not changed their attitudes, because they had edited out all new information.

The connection of this hypothesis to Sujan’s (1985) work on “piecemeal” processing versus “category-based” processing merits attention (see also Cohen 1982). Sujan studied consumers’ stimulus-based judgments of cameras based on ads that either violated or failed to violate the expectations for the camera category (110 cameras versus 35 mm single lens reflex cameras) established by the ad headline. Based on Fiske and Pavelchak’s (1986) notion of “schema triggered affect,” she predicted that consumers exposed to a novel brand would first attempt to classify it as an instance of a familiar category. If successful, the brand would be evaluated by simply retrieving the affect associated with that category rather than by detailed review of its attributes. If the novel instance could not be matched to a category, its specific attributes would be reviewed and integrated “piecemeal,” as in the traditional multiattribute model. Results were consistent with these hypotheses.

Fazio’s model, in which filtered perceptions are the direct determinants of behavior, suggests a piecemeal mode of processing. If Sujan is correct, and “category-based” processing is the norm unless the evidence grossly violates category knowledge, one can see that (1) both consistent and moderately inconsistent new information could be filtered out if categories and their associated affect are highly accessible, leading to higher attitude behavior correlations, and (2) those with accessible categories would, therefore, be more likely to reconstruct when answering researcher’s questions about perceptions, leading to the appearance that attitude-consistent new information had been selected into the processing.

CONCLUSION

Historically, memory effects on decision making have typically been discussed in terms of the processing constraints imposed by the limited capacity of short-term memory, often under the heading of information load. In this chapter we have attempted to highlight the potential importance of long-term memory. We have taken the relatively extreme position that the effects of long-term memory are so pervasive and fundamental as to cast doubt on the existence of any purely stimulus-based decisions in the real world. The basis for our position lies not only in the mundane observation that few consumer decisions take place in the presence of complete information but also in the belief that memory exerts itself even in stimulus-intense environments through its effects on attention and perception.

If one accepts our argument concerning the role of memory, then one must also conclude that our understanding of much real-world consumer behavior is dismally low. As noted at the outset, most traditional decision research has treated memory as an annoyance, requiring experimental control, rather than as a target for investigation. Thus, we are left with a meager database from which to generalize. Unfortunately, extrapolation to memory contexts from traditional paradigms may be folly. Memory appears to affect not only the amount of information that enters into the decision process but also the type of information considered and the heuristics used to process it. Also unfortunate is our inability to extrapolate from other domains, such as social judgment, that have explicitly considered the effects of memory.
The character of the decision process may be highly sensitive to the task required. Judgment tasks and choice tasks may invoke significantly different decision strategies.

Our purpose in writing this chapter is not to lament our current state of knowledge but rather to provide incentive for corrective action. The opportunities are clear. However, in order to exploit them a broader conceptualization of memory is necessary, as is a rethinking of the paradigms we choose to employ.

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