Relationships Between Information Recall and Subsequent Attitudes: Some Exploratory Findings

BARBARA LOKEN
RONALD HOVERSTAD*

The results of a research study that examines these relationships under a variety of conditions.

EFFECTS OF MEMORY ON ATTITUDES

Although a great deal of consumer research has analyzed memory for stimulus material under various conditions, little is known about the impact of memory on judgment processes. Recently, at least three models have been proposed in an attempt to explain the effects of memory recall on attitudes (Carlston 1980; Ebbesen 1980; Lingle, Dukerich, and Ostrom 1983; Lingle and Ostrom 1979; Ostrom et al. 1980; Wyer and Srull 1980).

One model assumes that people retrieve from memory informational items acquired from various sources and then use these informational items as bases for their attitudes. For example, an attitude toward a product might be formed on the basis of product information recalled from advertising, the product package, or word-of-mouth communication. This "memory-for-facts" approach (Ostrom et al. 1980) underlies most traditional persuasion models (e.g., McGuire 1968), which assume that the retention of message arguments moderates opinion change. It also underlies advertising and consumer behavior models (e.g., Beattie and Mitchell 1985; Percy 1978). Nevertheless, attitudes are often found to be unrelated to the amount recalled from the original information exposure (Fiske et al. 1979; Greenwald 1968; Petty and Cacioppo 1979; Taylor and Fiske 1978), and so there is little support for the "memory-for-facts" model. Furthermore, the experimental variables that
influence recall often influence attitudes differently (e.g., Anderson and Hubert 1963; Loken 1984).

A second approach—the memory-for-attitude model—argues that the amount of original information recalled will not be related to subsequent attitudes. Rather, people form attitudes or impressions at the time they receive information, store them in memory, and later retrieve them as bases for reported judgments. The memory-for-attitude process is economical in the sense that the consumer need not reprocess the original information every time a judgment is made because the initial attitudes or impressions serve as summary evaluations and can be retrieved and used later. Thus, the underlying principle of the memory-for-attitude model is similar to Wright's concept of affect-referral (Wright 1975). The model does not preclude the storage of the original information in memory; this information is incidental to the attitude impression formation process, and if recalled, may be unrelated to the impressions formed earlier.

Although most versions of the memory-for-attitude approach have appeared quite recently, they have received more support in the literature than the memory-for-facts approach. Person-perception research supports this memory-for-attitude approach for certain types of stimuli (e.g., Carlson 1980; Loken 1984). Wright (1975) found that under certain conditions, consumers may recall that they were satisfied with previous purchases and may use this information as a basis for a subsequent decision. It also appears that consumers' thoughts, inferences, or impressions while reading a message may influence the subsequent judgments they make (Olson, Toy, and Dover 1982; Toy 1982; Wright 1980).

A third model assumes that at the time attitudes are measured, consumers will retrieve information under some conditions but not under others, depending upon the original processing task, the information received, or other factors (Lichtenstein and Srull 1985; Loken 1984; Ostrom et al. 1980; Srull 1984). Given the inconsistent relationships between recall and judgments found in prior research, the notion that recalled information relates to attitudes under some conditions but not under others is certainly intuitively satisfying. A logical direction for future research would be to attempt to specify conditions under which recall—judgment relationships will vary and the underlying processes that influence those relationships.

A number of researchers (Lichtenstein and Srull 1985; Ostrom et al. 1980; Srull 1984) have recently argued that a key variable underlying the effects of remembered information on judgments is the receiver's original processing objective. The initial processing objective may influence not only memory for information, but also the extent to which the remembered information will be used later to form judgments. Analyzing both recall and reported judgments enables us to compare the differing effects of the same independent variables on each measure. Furthermore, we are able to examine the relationship between recall and attitudes under conditions wherein, theoretically, information recall should also vary. In the present study, we explore these possibilities by experimentally varying the original processing task and the relevance of information received to the task.

### RECALL OF INFORMATION

#### Processing Task and Recall

An abundance of research has shown that an individual's processing objective (or instructional task) has a strong impact on the nature of the information subsequently remembered. Information is recalled better when it is relevant to a task. (Lingle and Ostrom 1979; Sulin and Dooling 1974; Zadny and Gerard 1974). One explanation of this phenomenon is that information is organized according to the original judgment made, and subsequent information retrieval relies on this organization. People may also pay more attention to information when it has implications for the judgment to be made.

Research in consumer behavior shows similar effects for processing objectives. Consumers remember brand information better when they process advertisement information with the goal of forming a brand evaluation than when they focus on the entertainment aspects of the ad (Mitchell 1983). Consumers remember less about a particular brand when they are making a choice between alternatives than when they are making a specific attempt to recall the attributes (Biehal and Chakravarti 1982) or are being forced to evaluate each alternative individually (Johnson and Russo 1980).

In the present study we examined the effects of processing objectives on information recall and on the relationship between recall and subsequent judgments. We examined how recall and attitudes for products vary under three different modes of evaluation:

1. Whether the product was given selective prior attention in a judgment task
2. Whether the product was chosen in a choice task
3. Whether the basis evaluation was overall likability versus the evaluation of an actual purchase.

#### Attention to a Selected Alternative

In the first set of comparisons, consumers received information about several alternatives with instructions to evaluate only one of these alternatives. Brand-information recall and attitudes toward both (1) the evaluated, i.e., attended to, alternative and (2) an unevaluated, i.e., not attended to, alternative were then measured. Subsequently, information relevant to a decision task should be recalled better than information irrelevant to a decision task. Therefore, we hypothesize that:
H1: Information recall will be better for an evaluated (i.e., attended to) alternative than for a nonevaluated (i.e., nonattended to) alternative.

Chosen versus Rejected Alternatives

We also examined chosen and rejected alternatives in a choice task. In a second set of comparisons, subjects received product information with instructions to choose one product from a set of alternatives. Attitudes toward both the chosen and rejected alternatives were then measured. We hypothesize that:

H2: In a choice condition information about a chosen alternative will be recalled better than information about a rejected alternative.

This hypothesis is based on the assumption that, in a choice task, information tends to be organized around the chosen alternative rather than around the rejected alternatives. Subsequently, recall is better for information pertaining to the chosen rather than to the rejected alternatives.

More importantly, Hypothesis 2 is based on research that has investigated consumer information acquisition in a product-choice situation (e.g., Bettman and Park 1980; Bettman and Zins 1977; Johnson and Russo 1978, 1980). Researchers have argued that consumers, when asked to select their most preferred alternative, may use a phased strategy, eliminating some alternatives early in the choice process on the basis of one or two pieces of information (Bettman and Park 1980; Johnson and Russo 1980; Wright and Barbour 1977). Consumers attend to information about these rejected alternatives less well and subsequently recall it less well than information about the chosen alternative (Johnson and Russo 1980). In an extension of this research, Biehal and Chakravarti (1982, 1983) instructed subjects to either make a choice about a best brand or anticipate a recall task. Under choice instructions, information about rejected alternatives was remembered less well than information about the chosen alternative. Subjects who anticipated a recall task, on the other hand, showed high recall of all alternatives (Biehal and Chakravarti 1982). Hypothesis 2 represents a replication of the findings of Johnson and Russo and Biehal and Chakravarti. The present study extends prior research by exploring the effects of recalled information on attitudes toward chosen and rejected alternatives.

Attention to Product versus Purchase Information

The ability to recall purchase information about a specific brand may depend on whether the consumer, when first exposed to a product, evaluates the product in terms of a generalized attitude toward the product (such as the overall likeability of a brand) or evaluates the product in terms of an attitude toward performing a specific behavior with respect to the product (e.g., evaluating the purchase of the product). Internal brand attributes—appearance or taste—are likely to be relevant when a consumer forms both generalized and specific attitudes. However, certain information not inherent (i.e., external)—e.g., financing conditions—is likely to be relevant only when a consumer forms specific purchase or consumption attitudes. We would expect that if external information were presented along with a brand description, the information would be best remembered if the original objective of the attitude formation involved a specific behavior that encouraged consideration of this information. In a choice task, we hypothesize that:

H3: Recall of purchase information about a chosen alternative will be better when the decision task requires that the subject make a purchase choice that focuses on this information than when the decision task requires that the subject make a product choice or evaluate a particular alternative that does not require the use of this information.

Note that Hypothesis 3 is predicated on a situation where task orientation and consumer attention are manipulated. Therefore, Hypothesis 3 follows directly from the findings cited earlier about information relevance and recall. Based on Hypothesis 2 and research cited earlier, Hypothesis 3 implies that recall differences will occur for a chosen alternative only and not for the rejected alternative.

Summary

We hypothesize that information will be better remembered (1) when attention is specifically directed to judgments where the information is relevant and (2) when the information pertains to a chosen rather than a rejected alternative. Provided that these hypotheses are supported during experimental conditions, we can explore whether independent—experimental—variables affect both recall and judgments similarly. For example, of the three models discussed earlier, only a memory-for-facts model would predict that recall and attitudes will be influenced similarly by independent variables. This model predicts that greater amounts of recalled positive (or negative) information should lead to more positive (or negative) attitudes. Furthermore, direct relationships between recall and attitudes can be assessed. It is particularly interesting to determine whether recall-attitude relationships are greater when information is readily available (presum-
ably under conditions of greater recall) than when it is not readily available (under conditions of lesser recall). Specific hypotheses were not developed for these relationships, since the nature of these analyses is exploratory.

**STUDY OVERVIEW**

We explored all three of the judgment comparisons discussed above in a single experimental design. In a laboratory setting, subjects were given product and purchase information under one of three sets of task instructions: product-choice, purchase-choice, or evaluation. Those subjects given a product-choice task were asked to select their most liked alternative. Subjects given the purchase-choice task were asked to select the alternative that they would most like to purchase. The remaining subjects were asked to evaluate a single alternative. Subsequently, all subjects reported their recall of the original information and completed measures of choice, of their attitudes toward chosen and rejected alternatives, and of their attitudes toward purchasing chosen and rejected alternatives.

In order to verify earlier assumptions about information relevance and recall, we also examined our three hypotheses about subjects’ abilities to recall original product information. We explored the effects of independent measures on attitudes. Additionally, we examined how the ability to recall information affects attitudes under such different conditions as:

1. **When evaluation instructions are present** (relationships involving an alternative selected a priori for evaluation versus relationships involving an alternative not so selected)

2. **When product and purchase choice instructions are present** (relationships involving a rejected alternative versus those involving a selected alternative).

**METHOD**

**Overview of Design and Procedure**

Each subject was given a page of information about four automobiles with instructions to either: (1) choose their most liked automobile, (2) choose the automobile they would most like to purchase, or (3) evaluate whether they liked or disliked one of the four automobiles. The automobile evaluated in the third condition represented one of two alternatives preselected by the experimenter. The two preselected automobile alternatives were designed to be definitely more favorable than the remaining two automobiles. This ensured that the automobiles chosen under the first two conditions would be the same two automobiles as (and therefore comparable to) the automobiles evaluated under the third condition. The two least desirable alternatives were used as filler alternatives and were included in order to increase the amount of information and number of alternatives to be examined by the subjects.

Table 1 outlines the two types of stimulus information provided for the four automobiles. One type was purportedly taken from Consumer Reports and offered data about repairs, comfort, etc. This information, which contained both positive and negative attributes for the automobiles, was constant across conditions. The second type of information provided data about local availability and financing. This information had strong implications for automobile purchase, and its favorableness was manipulated to be either positive, negative, or neither (i.e., no information was provided). In this way the effects of this supplementary purchase information on purchase attitudes could be evaluated.

The design of the experiment included two between-subjects factors: (1) favorableness of purchase information, and (2) task instructions. Each alternative that the subjects were instructed to evaluate under evaluation instructions was initially treated as a separate condition yielding 12 (3 × 4) possible between-subjects conditions. Subjects were randomly assigned to each of the 12 cells of the design. However, in the subsequent analyses the two evaluation conditions were collapsed, making a 3 (favorableness of purchase information) × 3 (task instructions) design.

Subjects first read the page of task instructions and then read the page of automobile information. Subjects were allowed up to three minutes to read the automobile information. Next, subjects participated in an interpolated task: a ten minute questionnaire on an unrelated topic. This task was designed to minimize rehearsal effects. Next, subjects were asked to recall the automobile information they had seen earlier and to answer attitude and choice questions. Subjects were debriefed about the purpose of the experiment at the end of the school term.

**Subjects**

The subjects were 196 students in introductory marketing classes. Participation was voluntary, with a refusal rate of less than 5 percent, since the experiment was conducted during class time. The sample was 46 percent female and 54 percent male.

**Stimuli**

*Consumer Reports Data Table.* The layout of the Consumer Reports data table (Table 1) was adapted from one that might have appeared in the actual publication, although the automobile names used were fictitious. Twelve informational statements (shown in Table 1) were given for each of the four automobiles. This information was worded to favor two alternatives,
### TABLE 1
STIMULUS INFORMATION ON AUTOMOBILES

<table>
<thead>
<tr>
<th>Alternatives</th>
<th>Repair record</th>
<th>Comfort and convenience</th>
<th>On the road</th>
<th>Fuel mileage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Average</td>
<td>Fairly comfortable but low front seats</td>
<td>Stalled, sagged, and hesitated</td>
<td>City-18 expressway-38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rear seat uncomfortable with marginal space</td>
<td>5-speed manual transmission stiff when cold</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate noise level</td>
<td>Erratic handling in emergency maneuvers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active but not harsh ride</td>
<td>Front-wheel drive</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Difficult-to-adjust heater</td>
<td>Good power; brakes with some fade</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Much better than average</td>
<td>Comfortable front seats</td>
<td>Started and ran well</td>
<td>City-21 expressway-38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fairly short on driver leg room</td>
<td>5-speed manual transmission shifted easily</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rear seat hard and marginal for room</td>
<td>Stable and steady handling</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate noise level</td>
<td>Very good power brakes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stiff and tiring ride</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Convenient controls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Better than average</td>
<td>Very comfortable front seats</td>
<td>Surged during acceleration</td>
<td>City-18 expressway-39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fairly short on driver leg room</td>
<td>5-speed manual transmission shifted crisply</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rear seat shaped well but tight for room</td>
<td>Stable, predictable handling</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fairly low noise level</td>
<td>Very good power brakes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active but not uncomfortable ride</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Versatile, integrated air-conditioner but slow-acting heater</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Average</td>
<td>Comfortable front seats</td>
<td>Hesitated even when warm</td>
<td>City-20 expressway-35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Short on driver leg room</td>
<td>5-speed manual transmission has awkward shift pattern</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rear seat low, uncomfortable, and cramped for space</td>
<td>Handling was vague and sluggish</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fairly low noise level</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fairly active ride, uncomfortable on sharp bumps; much worse when carrying a load</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Air-conditioner not fully integrated with heater</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Weak heater</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Financing and dealerships**

[Alternative B] can be purchased at a number of dealerships that are conveniently located. The financing that is being offered (for a limited time) is a special low rate (8–10 percent) that is far below the regular rate, and is available through most of the dealers. But [Alternative C] can be purchased at relatively few out-of-the-way locations, at the regular high rates of financing (16–17 percent). Dealerships for [Alternatives A and D] are conveniently located but financing for both is at the regular rate.
which were listed second and third to minimize order effects on recall. The alternative order was counterbalanced within each cell of the design.

**Purchase Information.** The financing information used in the purchase-choice condition appeared at the bottom of the information page and was headed “Financing and Dealerships.” Information for three financing characteristics was presented. The rate of financing was either low (8–10 percent) or high (16–17 percent). Dealerships were either many or few and were either conveniently or inconveniently located. There were three purchase information conditions; in two conditions both positive and negative information was provided, while the information was neutral in the third. In one condition, purchase information was favorable for one of the four automobile alternatives and unfavorable for another. In a second condition, this was reversed. Information on the other two alternatives was mixed and kept constant across these two situations. The order in which the information and names of these two alternatives appeared was counterbalanced within each cell of the design. In the third condition, the information read: “Information about financing and dealerships does not vary for the four makes of cars.” This meant that the third condition almost represented a no-purchase-information group.

**Instructions**

All four sets of instructions began with the same introductory paragraph:

As consumers, we often make decisions about the products and services that we learn about from TV, magazines, newspapers, or from the people we know. One of the most popular sources of product information is *Consumer Reports*. On the next page, you'll see a list of information about some automobiles that have been evaluated in a past issue of *Consumer Reports*. We've changed the names of the cars, so that their current names are quite different. So try to view them as if they were new cars on the market.

At this point, instructions varied for the individual conditions. The product-choice instructions stated:

We want you to choose the car that you would evaluate most positively. We're interested in finding out how people make purchase decisions about a product based only on information from sources like *Consumer Reports*. We know that chances are you are not presently considering a car purchase. But supposing you were, we're asking you to choose the one car you'd be most likely to buy at this time. Also, information about financing and dealerships is included on the page, since we're really interested in whether you'd want to buy any of the cars at this point in time. Based on the information you see, then, select the one car you'd be most likely to buy at this time.

In contrast, in the evaluation instructions, subjects were asked to focus on a given alternative:

We want you to evaluate *only one* of these cars, the "MD12". We're interested in finding out how people form an opinion about a product based only on information from sources like *Consumer Reports*. We're asking you to form an opinion about only one of these cars, the MD12, which will be identified clearly on the next page. Also, although information about financing and dealerships is included on the page, we're really not interested in whether you'd want to buy the car. We're only interested in whether you would evaluate the MD12 as a car in a positive or negative fashion. Overall, would you evaluate the car favorably? Unfavorably? Neither favorably nor unfavorably?"

The purchase-choice instructions were somewhat different since they instructed subjects to choose the car they would most like to buy. Although in all three conditions subjects were reminded that the automobile information page included financing and dealership information, only the purchase-choice instructions implied that this information would be relevant to a decision. This difference in wording was included to strengthen the instructional manipulation and thereby facilitate subsequent differences in recall. It might also have led to response differences that were due to differences in levels of attention factors instead of the a priori relevance of information for a purchase versus a product choice. Implications for wording the instructions in this manner are examined later in the discussion section. The differences in wording were as follows:

We want you to choose the car that you would most want to buy at this point in time. We're interested in finding out how people make purchase decisions about a product based only on information from sources like *Consumer Reports*. We know that chances are you are not presently considering a car purchase. But supposing you were, we're asking you to choose the one car you'd be most likely to buy at this time. Also, information about financing and dealerships is included on the page, since we're really interested in whether you'd want to buy any of the cars at this point in time. Based on the information you see, then, select the one car you'd be most likely to buy at this time.

**Measures**

*Recall.* After completing the interpolated task, subjects were asked to "try to remember as much as you can of the information" about the automobiles. Subjects were instructed to write down what they remembered "in as much detail as you can," to "make sure you identify the cars you are writing about," and to write "each item on a separate line." Recall was coded for the gist of each attribute and as either correct or incorrect. Three recall scores were computed for each of the two experimental alternatives. First, the total number of correct responses from the *Consumer Reports* table was computed. Scores for this
index ranged from a possible 0 to 12 for each alternative. Second, the number of negative attributes correctly recalled was subtracted from the number of positive attributes recalled. The dichotomous coding of attributes as either positive or negative was assessed independently. The difference score (positive minus negative attribute recall) provided an index of the relative favorableness of recalled information about the two alternatives—a key index in subsequent analyses of recall-attitude relationships. A third recall score was computed by summing the number of correctly recalled purchase attributes pertaining to financing and dealerships. Scores for this purchase-recall index ranged from a possible 0 to 3 for each alternative.

**Attitudes.** Attitudes toward each alternative were measured on four seven-place, evaluative, semantic differentials (good–bad, nice–awful, likable–unlikable, attractive–unattractive). These four highly intercorrelated scales (average \( r = 0.770 \)) were summed to compute a product attitude \( (A_p) \) toward each of the experimental alternatives.

An attitude toward buying each alternative \( (A_b) \) was also computed by summing responses to four evaluative semantic differentials (e.g., "My buying the MD12 at this point in time would... have good–bad consequences, be wise–foolish, be nice–awful, be pleasant–unpleasant"). These purchase attitude scales were highly intercorrelated (average \( r = 0.725 \)). For further discussion of these attitude measures, see Ajzen and Fishbein 1980.

**Choice.** Subjects completed two choice items: (1) "In making a choice between the four cars, which one would you evaluate most favorably?" and (2) "In making a choice between the four cars, which one would you be most likely to buy at this time?" The format of these two items was forced-choice with four alternatives.

### RESULTS

#### Preliminary Checks

Since the analyses would involve comparisons between chosen and unchosen alternatives, it was important to hold three criteria constant across conditions: (1) the choice measure used, (2) the particular alternatives used, and (3) the order in which the alternatives appeared in the informational list. As expected, based on the choice measures, most subjects selected one of the two experimental alternatives that were determined a priori to be the most favorable as their most positively evaluated car (83 percent) or as the car they would be most likely to buy (82 percent). In 8.6 percent of the cases, the most favorably evaluated car differed from the car subjects would most likely buy. Therefore, in order to satisfy the first constant criterion, the product-choice measure was used for defining the chosen or rejected alternative. To satisfy the second and third constant criteria, only the 162 subjects who selected one of the two more favorable experimental alternatives as their chosen alternative were included in subsequent analyses.

#### Recall of Information

We first tested the three hypotheses, all of which pertain to effects of processing objectives on stimulus information recall. First, in the evaluation condition, recall was expected to be better for the evaluated alternative (i.e., the alternative given prior selective attention) than for the nonevaluated alternative (Hypothesis 1). Second, in the two choice conditions, information was expected to be recalled better when it concerned the chosen alternative than when it concerned the rejected alternative (Hypothesis 2). Since the evaluated alternative (in the evaluation condition) was almost always the chosen alternative and the most favorably evaluated alternative, both hypotheses were tested simultaneously. Hypothesis 3 predicted that purchase information about the chosen alternative, not *Consumer Reports* attribute information, would be recalled better in the purchase-choice condition than under either the product-choice or evaluation condition. (In contrast, *Consumer Reports* attribute information about the chosen alternative should be recalled equally well under product-choice, purchase-choice, or evaluation conditions.)

To verify these effects, analyses of variance were performed on recall data with two between-subjects factors—task instructions (product-choice, purchase-choice, or evaluation of a single alternative), and purchase information favorableness (positive, negative, or neutral for the chosen alternative)—and one within-subjects measure (chosen or rejected alternative). Effects of the experimental variables on the three measures of recall (total number of *Consumer Reports* attributes recalled, relative number of favorable *Consumer Reports* attributes recalled, number of purchase—financing and dealership—items recalled) were analyzed. Summary statistics are shown in Tables 2 and 3; analysis of variance tables are shown in Table 4.

---

2 This was done on the basis of attribute-evaluation ratings scales ranging from \(-3\) (extremely bad) to \(+3\) (extremely good) that were collected at the end of the experiment.
Analyses of all three recall indices indicated greater information recall for the chosen alternative than for the rejected alternative (Tables 2, 3, and 4). Separate analyses verified that in the evaluation condition, attribute information recall was better for the alternative being evaluated than for the alternative not being evaluated (3.23 versus 0.89, \(F(1,70) = 21.97, p < 0.001\)). Analyses of recall of the relative number of favorable items revealed the same significant effect (\(F(1,70) = 43.17, p < 0.001\)). That is, more favorable (relative to unfavorable) items were recalled for the alternative being evaluated than for the alternative not being evaluated (2.49 and 1.16, respectively). Therefore, Hypothesis 1 and Hypothesis 2 were supported.

Hypothesis 3 would be supported by an interaction effect between task instructions and the within-subjects factor (chosen or rejected alternative) in analyses of purchase information recall. These effects were observed (Table 3). Purchase information recall associated with the chosen alternative was significantly better when subjects were asked to select the car they would most like to buy (0.42) than when they were asked to select the car they would evaluate most favorably (0.11) or to evaluate a single alternative (0.22). Post-hoc analyses verified that purchase information recall was superior for the purchase choice instructions than for either the product choice instructions (\((t(87) = 2.93, p < 0.05)\) or evaluation (\((t(116) = 2.12, p < 0.05)\) instructions. Recall under the latter two conditions was not significantly different (\((t(117) = 1.16, p > 0.05)\). For the rejected alternative, these differences did not occur: 0.11 (purchase choice), 0.11 (product choice), and 0.10 (evaluation), \(t < 1\). Furthermore, as the data in Table 3 suggest, when subjects were asked to choose the alternative they would most like to buy, positive purchase information about the chosen alternative was recalled better than negative purchase information. This suggests a bias toward recalling positive rather than negative information under choice conditions when this information is relevant to the choice.

### TABLE 2

<table>
<thead>
<tr>
<th>Condition</th>
<th>Amount of Consumer Reports attributes recalled</th>
<th>Relative favorableness of recalled attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard deviation</td>
</tr>
<tr>
<td>Chosen alternative</td>
<td>Evaluate 3.03</td>
<td>2.22</td>
</tr>
<tr>
<td></td>
<td>Product choice 3.66</td>
<td>2.29</td>
</tr>
<tr>
<td></td>
<td>Purchase choice 3.07</td>
<td>1.99</td>
</tr>
<tr>
<td></td>
<td>Total 3.21</td>
<td>1.47</td>
</tr>
<tr>
<td>Rejected alternative</td>
<td>Evaluate 1.49</td>
<td>1.98</td>
</tr>
<tr>
<td></td>
<td>Product choice 1.45</td>
<td>1.62</td>
</tr>
<tr>
<td></td>
<td>Purchase choice 1.53</td>
<td>1.90</td>
</tr>
<tr>
<td></td>
<td>Total 1.49</td>
<td>.64</td>
</tr>
</tbody>
</table>

### TABLE 3

<table>
<thead>
<tr>
<th>Condition</th>
<th>Purchase information</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chosen alternative</td>
<td>Evaluate Positive .32</td>
<td>.63</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Negative .36</td>
<td>.73</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neutral .00</td>
<td>.00</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Product choice Positive .19</td>
<td>.54</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Negative .15</td>
<td>.55</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neutral .00</td>
<td>.00</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Purchase choice Positive .68</td>
<td>1.00</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Negative .42</td>
<td>.79</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neutral .07</td>
<td>.27</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total .25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rejected alternative</td>
<td>Evaluate Positive .12</td>
<td>.33</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Negative .18</td>
<td>.50</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neutral .00</td>
<td>.00</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Product choice Positive .19</td>
<td>.54</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Negative .15</td>
<td>.55</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neutral .00</td>
<td>.00</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Purchase choice Positive .05</td>
<td>.23</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Negative .33</td>
<td>.65</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neutral .00</td>
<td>.00</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total .10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Therefore, the results support our three hypotheses introduced earlier: (1) information about the evaluated alternative was recalled better than information about the non-evaluated alternative, (2) information about the chosen alternative was recalled better than information about the rejected alternative, and (3) financing and dealership attributes were recalled better under purchase-choice than under product-choice instructions.5

**Attitudes**

An analysis of variance using the same design factors was performed on purchase attitudes. We noted earlier that one means for examining the effects of recall on judgments is to determine whether experimental variables influence the recall and attitudes measures similarly. A memory-for-facts model would predict that variables’ effects on attitudes should follow the same pattern as variables’ effects on recall. Since more positive or negative purchase information is remembered for a chosen alternative under a purchase-choice condition than under a condition produced by another set of instructions, the model predicted that purchase attitudes should be more extremely positive or negative under a purchase-choice condition. In reality, the difference in attitudes under positive and negative purchase information situations was greater in the product-choice condition, where subjects were asked to choose their preferred automobile (5.50 attitude rating in the positive information and 2.62 attitude rating in the negative information situation).

In a purchase-choice condition, where subjects were asked to choose the automobile they would most like to buy, the attitude rating was 5.26 in a positive information and 4.08 in a negative information situation. The evaluation condition actually showed an increase in favorableness from positive (3.24) to negative (4.14) information situations. (As expected, in the neutral information situation, purchase attitudes toward the chosen alternative tended to fall between the means of positive and negative information situations.) The three-way interaction of task instructions, purchase information favorableness, and chosen versus rejected alternative was not significant ($F(4,153) = 1.12, p > 0.05$), verifying that the effects on recall were different from the effects on purchase attitudes.6

---

5Results also show no main effect for instructional condition on the amount of Consumer Reports attributes recalled for the chosen alternative. As expected, Consumer Reports attribute information appeared to be relevant to (i.e., recalled equally well for) both product and purchase attitudes.

6The same analyses indicated that the chosen alternative was, of course, rated more favorably (4.02) than the rejected alternative ($-1.17$), ($F(2,153) = 129.45, p < 0.001$). This finding is also consistent with the hypothesis that a phased strategy is more likely to occur under a choice task. Eliminated alternatives may be evaluated relative to the few pieces of information used to discount them and consequently be evaluated more negatively. Additionally, the chosen alternative may be rated more positively due to a commitment to that alternative as a result of the choice process. Given that there are several reasons why attitudes toward chosen alternatives should be more positive than attitudes toward rejected alternatives, a comparable test for the effects of Consumer Reports information on product attitudes (as compared to the effects of this information on recall) is not reported.
Recall-Attitude Correlations

Two sets of correlation coefficients were computed to explore the relationship between information recall and attitudes. First, the number of favorable Consumer Reports attributes recalled about the chosen or rejected alternatives was correlated with attitudes toward each of these alternatives. Second, the number of purchase—financing and dealership—items that subjects recalled was summed, and the total was given either a positive or negative score, depending on whether the recalled item was negative or positive. This score was correlated with purchase attitudes. Separate correlations were obtained for each of the three instructional conditions—evaluation, product choice, and purchase choice. In order to isolate the effects of positive and negative purchase information, neutral information situations were eliminated from analyses involving purchase information recall. Furthermore, to eliminate possible correlation biases that might result from different mean responses for individual cells of the design, a within-cell estimate of the correlation was computed. This was obtained by subtracting out from each individual's score the mean recall or attitude score for each cell of the experimental design. Summary correlations are presented in Table 5.

Evaluation versus Choice Instructions. When subjects were instructed to evaluate a single alternative, correlations between information recall and subsequent attitudes were consistently low and nonsignificant (see Table 5, column 1). This result occurred regardless of whether the recall-attitude correlations pertained to the evaluated or nonevaluated alternative, or to the product or purchase attitude.

The pattern of correlations under choice instructions was quite different from that under evaluation instructions (see Table 5, column 2). We examine here two sets of comparisons. First, correlations tended to be more positive in the choice rather than the evaluation conditions. When the correlations between these instructional conditions were compared, one difference, between purchase information recall and product attitudes toward the rejected alternative (r = 0.35 versus −0.03), was significant (z = 1.97, p < 0.05). Second, correlations in choice conditions tended to be more positive for the rejected than for the chosen alternative. When these correlations were compared, the difference involving purchase information recall and product attitudes was again significant (z = 2.10, p < 0.05). Furthermore, three of the four correlations for the chosen alternative were nonsignificant (p > 0.05), and all four of the correlations for the rejected alternative were significant (p < 0.05).

Two Choice Instructions. Few correlational differences occurred as a function of type of choice condition (see Table 5, columns 3 and 4). The pattern of correlations in product-choice conditions did not differ meaningfully from the pattern of correlations in purchase-choice conditions, nor are differences in correlations between the two conditions significant (p > 0.05). Comparisons between correlations involving product and purchase attitudes yield no discernable pattern of differences for either chosen or rejected alternatives (see Table 5, column 5).

Summary. In evaluation conditions, attitudes were not related to subjects' ability to recall information. In contrast, in choice conditions, information recall was sometimes related to attitudes. The overall pattern of correlations suggests that the use of information recall to form attitudes may be more likely in a choice than in an evaluation task. It also appears that people may be more likely to retrieve original purchase information to form an attitude for the rejected alternative than to form an attitude toward the chosen alternative. In our study few differences occurred as a result of the type of choice condition (product versus purchase) or type of attitude formed (product or
DISCUSSION

Independent Variable Effects on Information Recall versus Attitudes

Information was recalled better when it concerned a chosen rather than a rejected alternative (cf., Johnson and Russo 1980). This result may be due to the information's greater relevance to the focal point of the subject's attention or to the enhanced ability to organize information around a chosen (as opposed to a rejected) alternative. The explanation based upon a phased strategy of choice processes could also account for these latter differences between chosen and rejected alternatives (Johnson and Russo 1980). A choice-process explanation that assumes that people eliminate unfavorable brands early in the process (when they encountered the first unfavorable attribute) would argue that people should both (1) recall more information about the chosen than the rejected alternative, and (2) recall more favorable information about the chosen than the rejected alternative.

In keeping with past research (Lingle and Ostrom 1979; Mitchell 1983; Ostrom et al. 1980), our results also showed that information recall depended upon the relevance of the information to the processing task. Information was recalled better when it had implications for the evaluated alternative than when it did not. Purchase information was recalled better when the information was relevant to the decision task (purchase choice instructions) than when it was not (product choice instructions). In the present study the latter finding may have been influenced either by levels of attention factors (the instructions implied that purchase information either would or would not be relevant to the task) or by the specific nature of the decision task (purchase choice versus product choice and the perceived relevance of the information to each task).

Analyzing the effects of favorableness of purchase information enabled us to determine whether similar effects occurred for both recall and attitudes. They did not. Although more information was recalled under purchase choice conditions than under other instructional conditions, attitudes were not found to be more extreme under the former than under the latter conditions. These results are inconsistent with the memory-for-facts model, which predicts the use of recalled stimuli to form attitudes and suggests more extreme attitudes under conditions of greater recall.

Informational Bases of Attitudes

A major finding concerning the use of product information recall in attitude formation is that people do not consistently retrieve and use the original product information in the formation of their attitudes, nor do they consistently ignore these specific facts. A key variable that may moderate recall/attitude relationships is the nature of the initial processing objectives. Relationships between recalled facts and attitudes were nonsignificant in the case of an evaluation task and often significant in the case of a choice task.

Evaluation Conditions. Findings for the evaluation conditions are generally consistent with person-perception research. Past research (Anderson and Hubert 1963; Dreben, Fiske, and Hastie 1979; Lingle et al. 1979; Lingle and Ostrom 1979), which typically uses an evaluation (as opposed to a choice) task, suggests that attitudes or impressions of a target object are formed at the time information is received and stored in memory separately from the information on which they are based. The present results involving an evaluation task appear to favor a memory-for-attitude model over a memory-for-facts model. These results are also consistent with persuasion research that reports low relationships between argument recall and attitude change (Petty and Cacioppo 1981) and research that finds that the cognitive processes affecting information recall differ from processes affecting judgment formation (Anderson and Hubert 1963; Carlston 1980; Loken 1984; Ostrom et al. 1980; Petty and Cacioppo 1981; Taylor and Fiske 1978; Wyer, Srull, and Gordon 1984). This conclusion also extends prior research (e.g., Carlston 1980) since it apparently applies to both product and purchase attitudes and to attitudes toward both the evaluated and nonevaluated alternatives.

Evaluation versus Choice Conditions. In contrast to the evaluation conditions, the choice conditions yielded significant correlations between the number of recalled informational items and the number of subsequently formed attitudes. These results suggest some support for a memory-for-facts model in choice conditions. The question is, why would people be more likely to retrieve and use recalled information to form an attitude in a choice task than in an evaluation task? One possible answer is that choice

---

7The study design also enables us to explore the effects of information valence on the relationship between information recall and attitudes. Correlations between purchase attitudes (\(A_p\)) and purchase recall were nonsignificant when information about the chosen alternative was either positive \(r = 0.12\) or negative \(r = -0.03\), but significant when information about the rejected alternative was either positive \(r = 0.27, p < 0.05\) or negative \(r = 0.32, p < 0.01\). Consistent with earlier findings, information recall was more highly related to attitudes for the rejected than for the chosen alternative, and valence was apparently not a factor.
task subjects did not initially form an attitude toward each alternative. Each subject may have made a choice (a summary representation) without first making an overall favorableness judgment. Chosen and rejected alternatives may have been evaluated relative to one another ("I like X better than the others") rather than in absolute values of favorableness or unfavorableness ("I like X extremely well").

This explanation, which relies on the nature of the stored representation, is consistent with Bettman's (1979, 1982) argument that an overall evaluation of each alternative need not be formed before a choice is made. Bettman argues, in fact, that certain conditions—e.g., a matrix display, the availability of all brand information to be used in forming a choice, and facilitating task instructions (all found in the present research for choice condition subjects)—should encourage choice processes without the formation of attitudes toward alternatives. In the evaluation conditions, subjects were asked explicitly to form a positive or negative attitude toward an alternative. This representation in memory probably sufficed for reporting their attitudes, precluding the need to reprocess and use recalled facts. In the choice conditions, the choice representation in memory may have required additional elaboration for an attitude to be formed.

**Choice versus Rejected Alternatives.** In the choice conditions, information recall was more consistently related to attitudes when the measures concerned the rejected alternative than when they concerned the chosen alternative. Two possibilities that consider the processes underlying the choice task might account for this finding.

In a phased choice strategy, unfavorable alternatives are eliminated early in the process, as soon as the first unfavorable attributes have been encountered. It follows that information about the chosen alternative should be retained better and is more apt to be elaborated upon than information about rejected alternatives. Subjects should have in their memories richer representations of the chosen alternative than of the rejected alternatives. Later, when reporting an attitude toward the rejected alternative, subjects should not have a well formed representation or attitude toward the rejected alternative. Therefore, subjects should be more inclined to return to salient information that can be recalled (e.g., unfavorable information), which had been used earlier to disqualify the alternative. In contrast, an attitude toward the chosen alternative should be based on the representation formed earlier (enriched further, perhaps, by recalled salient information).

A second possibility does not assume any causal relationship between attitudes and recall. Both recall and an initial representation of the rejected alternative may have been based upon the few pieces of highly salient (unfavorable) information that were used to discount the alternative; yet, the initial representation (rather than recall) may have served as the basis for the subsequent attitude. Attitudes toward the chosen alternative may have also been based on an initial representation, but the representation would have been based on all available information, rather than on information most readily recalled.

The nature of our research design does not permit us to select one interpretation over the other. Clearly, however, the data raise important issues and possibilities about how information is processed in both evaluation and choice tasks.

**Future Research Directions**

Future research might attempt to develop research designs and procedures that would examine the various possibilities discussed in this article for differences in relations between recall and attitudes. The methodology used in this report relies heavily upon correlational data between information recall and reported attitudes. A causal relationship has been implied (i.e., informational recall affects attitudes rather than the reverse) that may not be justified. While the proposed causal direction seems the more theoretically plausible, it is conceivable that stimulus factors influenced both recall and attitudes or that initial attitudes affected recall. One methodological consideration for future research might be to obtain an initial attitude measure during exposure to the original information. However, this measure may also be problematic since it would encourage all subjects to form the initial attitude and would dilute effects that might otherwise have differentiated experimental conditions.

The recall index used here, which is consistent with indices used in prior psychological research, might be developed further to reflect more accurately the complexity with which judgments are made. Future research might attempt to weight each recalled attribute by its relative contribution to the attitude. Such indices might use likelihood judgments, attribute evaluation, importance weights, or other weighting procedures to enhance their usefulness.

Finally, other procedures for evaluating the effects of memory on judgments might be useful in future research. Reaction time or cognitive response data (somewhat limited by the assumptions underlying them; cf., Ericsson and Simon 1980; Lingle 1983) could shed new light on this research area.

**Concluding Remarks**

The most important conclusion to be drawn from these data is that, under many conditions, attitudes may not be based upon recalled facts. The issue was raised that attitudes may be based upon initial impressions stored at the time information is received and then subsequently retrieved and used when attitudes
are reported or decisions are made. Although not explicitly tested in this experiment, the data reported here are not inconsistent with this conclusion. The present findings suggest that future research might focus upon the conditions under which individuals form and retrieve the original information and upon the conditions in operation when individuals retrieve original impressions. This conclusion implies that the human memory models that assume a strong relationship between information recall and subsequently reported judgments may be flawed.

Our results also suggest that individuals do not simply receive and store information in memory to be recalled at a later point in time. Rather, it appears that people may engage in active cognitive processing upon receipt of information as well as at other points in time. Processed information may be stored in memory along with some of the originally presented information to be retrieved as situations arise, requiring the use of either type of information. This notion runs counter to the traditional thinking underlying the memory-for-facts model, which assumes that information is stored only in the form in which it is received.

The models explored in this study were developed in cognitive and social psychology settings. Their application to consumer choice settings is relatively new but consistent with procedures used in their development. The implications of using recalled facts versus impressions in a shopping environment are made clear by considering the value of memory cues for the consumer. Under conditions in which an evaluative impression is retrieved (e.g., the product is rated favorably or unfavorably), it is not clear that cues that rely on original product information retrieval will influence consumer attitudes. Additional research methods are needed to better understand what conditions are in play when consumers use stimulus facts versus stored impressions in attitude formation.

[Received June 1983. Revised April 1985.]

REFERENCES


