Interaction Effects of Consumers’ Product Class Knowledge and Agent Search Strategy on Consumer Decision Making in Electronic Commerce

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Abstract—This paper investigates the interaction effects between the search strategy of software agents and consumers’ product class knowledge in the context of consumers seeking to purchase cars on the Internet. The research design used was a 2 x 4, between-groups, completely randomized, two-factor, factorial design. The independent variables that were manipulated were product class knowledge (HIGH KNOWLEDGE, LOW KNOWLEDGE) and agent search strategy (elimination by aspects (EBA STRATEGY), weighted average method (WAD STRATEGY), profile building (PROFILE STRATEGY), simple hypertext (HYPERTEXT STRATEGY)). The dependent variables that were measured were satisfaction with the decision process (SATISFACTION), confidence in the decision (CONFIDENCE), trust in the agent’s recommendations (TRUST), propensity to purchase (PURCHASE), perceived cost savings (SAVINGS), and cognitive decision effort (EFFORT). Significant differences were found in the affective reactions of the subjects toward the agent/application depending on the level of product class knowledge possessed by the subjects. Subjects with high product class knowledge had more positive affective reactions toward agents/applications that used the PROFILE strategy as compared to the EBA and WAD strategies. Subjects with low product class knowledge had more positive affective reactions to agents/applications that used the PROFILE strategy as compared to the EBA and WAD strategies.

Index Terms—Decision strategies, electronic commerce, product class knowledge, search engines, software agents.

I. INTRODUCTION

Marketing managers in the consumer goods industry face a new frontier of electronic information and commerce. Understanding buyer behavior in this new marketing channel is crucial. Marketing managers would like to present consumers with information on which to base their decisions. The information presented has to be such that it allows consumers to make decisions and select products that best match their tastes and needs [1]. Otherwise, consumers’ incentive to seek out information will be minimal [2]. Presenting such information is not simple. On the one hand, a vast amount of information could be relevant, even very relevant to some consumers. On the other hand, presenting superfluous information might impede consumers’ ability to make good decisions [1]. If consumers were predictable and all alike, presenting information would be simple—marketing managers could provide only the information that is deemed most relevant by all the consumers. However, because of the heterogeneity between consumers, and within consumers at different points in time, almost none of the potentially available information is universally perceived as relevant. Rapid advancements in Internet technology have offered a solution to this dilemma in the form of computerized decision aids that use software smart agents to provide an intelligent interface to the consumer.

The phenomenon of consumers purchasing products on the Internet is relatively new. In this business model, consumers select items to purchase from electronic shopping malls by making queries to databases using software tools such as software smart agents. This has raised a host of interesting research issues that need to be investigated. The influence of electronic decision aids on satisfaction with the decision process, confidence in the decision, and the propensity to purchase has not been examined previously and is of crucial importance.

The objective of this research is to understand why consumers react the way they do to different forms of agent technology and to identify mechanisms that will enable us to optimize the cognitive fit between an individual’s knowledge and expertise and the decision strategy used by the software agent. To achieve this objective, four different decision environments were created, which varied the process used for filtering the information. The strategies used by the software agents for information filtering are discussed below.

1) The Weighted Average (WAD) strategy uses all the information about the subject’s preferences and computes a weighted preference matching score for each alternative based on the degree to which the attribute values of that alternative match the attribute values entered by the subject as their preferred values and the preference weights allocated to each of the attributes by the subject. The alternatives are then sorted by the computed preference matching scores and this sorted list is presented to the subject in descending order of the preference matching score. The subject can browse this list and narrow their choice set by first selecting the subset of alternatives he would like to consider further in their decision process and then systematically eliminating alternatives from the choice set until he arrives at their final choice. The design of the application using the WAD strategy is similar to that of the Personal Logic web site (www.personalogic.com).

2) The Elimination By Aspects (EBA) strategy [3] obtains cutoff values from the decision maker on a set of product attributes. Alternatives that do not meet these specified...
criteria are eliminated from the choice set and the remaining alternatives make up the reduced choice set.

3) The Profile Building (PROFILE) strategy matches the user with “similar others” based on their demographic profile (age, household income, gender, educational level). The agent deduces the user’s preferences by matching him with a group of similar individuals based on their demographic profile and expressed preferences and predicts that their preferences in the product category under consideration will also be similar to the user’s. The agent will query the user for ratings on cars previously owned. Based on the demographic profile of the user, and the ratings of previously owned cars, the agent will group the user with other individuals who responded similarly and recommend the current car models that those individuals have rated positively, inferring the user’s similar preferences. Choices made by these similar others in the product category under consideration are used to form the recommended reduced choice set for the decision maker.

The data to set up the different profiles was provided by IntelliChoice Inc., Campbell, CA. Six different profile categories were created which included “Commuter,” “College Freshman,” “Executive,” “Soccer Mom,” “Sport Driver,” and “Weekend Warrior.” The Amazon.com web site employs such a profile-based strategy. The design of the application using the PROFILE strategy is similar to that of the Firefly web site (www.firefly.net).

4) The Simple Hypertext (HYPERTEXT) strategy does not provide any information filtering support to the user. The user is presented with a set of hypertext links to all the alternatives and is allowed to narrow the choice set at their pace by sequentially eliminating alternatives from the initial choice set.

II. THEORETICAL DEVELOPMENT OF HYPOTHESES

Many factors, including demographics and prior product class experience, have been studied in an attempt to account for individual differences in consumers’ responses to a given set of information [4]–[6]. Drawing on the information processing paradigm, this paper examines the effect of prior knowledge on information search behavior. A crucial element in the information processing model of human behavior is information stored in memory—i.e., prior knowledge. Much empirical evidence supports the view that prior knowledge affects information processing activities [7]–[11]. A number of studies have found a negative relationship between the amount of product experience and the amount of external search [6], [12]–[16]. An explanation for these results holds that experienced consumers perform more efficient information searches because they know which attributes are most useful for discriminating between brands and can more quickly determine which alternatives are inferior. Knowledgeable consumers substitute internal search for external search, thus reducing their amount of external search for information. Furthermore, knowledgeable consumers search more efficiently. Knowledgeable consumers recognize product alternatives as belonging to categories and subcategories [17]. Efficiency in information search may occur in attribute selection as well as in alternative selection. Specifically, highly knowledgeable consumers may search only those attributes that are useful for discriminating among alternatives. Knowledgeable consumers possess three types of knowledge that contribute to search efficiency by allowing a quicker elimination of unsuitable alternatives: criteria for evaluating attributes, perceived covariance of attributes, and usage situation knowledge. Knowledge of criteria for evaluating attributes permits the individual to decide whether an alternative is acceptable by allowing him to compare it to reference points stored in memory. Knowledge of attribute covariance allows inferences to be made about some attributes without external search. Usage situation knowledge leads to earlier—and possibly more accurate—categorization of alternatives, based on their appropriateness for the intended usage situation. And finally, in situations where known brands rather than hypothetical or unknown brands are used, knowledge of the attribute values of available brands is used as a substitute for more effortful external search.

In providing agent services to consumers, intelligent agent tools depend on the accuracy of preference prediction to provide benefits to the consumer [18]. The majority of the literature examining intelligent agent-assisted electronic commerce assumes that consumers possess and are able to convey established preferences in the product category. An important property of the constructive viewpoint is that preferences will often be extremely context-dependent. As such, an agent’s goal in a choice situation characterized by constructive preferences is not just to inform, provide alternatives and uncover existing preferences, but to help the consumer build preferences with the ultimate goal of aiding in choice.

An expert is someone who has acquired domain-specific knowledge through experience and training. This knowledge results in observable differences in cognitive processes but may or may not lead to better performance in judgment and decision making. This definition is consistent with most research reported in the behavioral decision-making literature. To formulate a judgment, a decision maker must select, evaluate, and combine information that is available either internally or externally. Empirical findings indicate that knowledgeable decision makers are more selective in the information they acquire [19], [20], are better able to acquire information in a less-structured environment [21], are more flexible in the manner in which they search for information [19], and agree more than novices regarding what information is important [22]. A finding that has widespread support is that experts are more confident in their decisions than are novices [23].

How problems are cognitively represented affects the strategy by which problems are solved. Experts and novices have been found to exhibit differences in their problem-solving strategies. Experts categorize problems on the basis of solution procedures or underlying concepts, whereas novices tend to categorize problems on the basis of surface features [11], [24]. Because of this difference, experts use more efficient top-down or knowledge-based strategies, starting with known quantities to deduce unknowns [19], [24]. Should a solution path fail, the decision maker can trace back a few steps and then proceed.
again, a valuable process in determining what actions are appropriate. The bottom-up or means-end decision strategy used by novices is not so practical. Decision makers start with the goal and determine what conditions are necessary to achieve the goal. Because novices focus their attention on goals instead of essential features of the task, learning is inhibited; they devote insufficient attention to acquiring valid schemas. The net effect is that experts are credited with having better-developed procedural knowledge [25]. If experts’ procedural knowledge is appropriate for the task, they can encode and interpret information more quickly than can novices [7], [19], [24]. They evoke a knowledge framework that is based on prior experience that expedites problem solving [26]. A view that addresses the effects of task characteristics on expert judgments is that simple, well-structured domains do not give experts the opportunity to display their unique skills [19], [21]. Instead, general knowledge is sufficient to solve the problem. There are benefits to expertise if the combination rules are complex (environments that lend themselves to nonlinear cue use) and the task requires the decision maker to evaluate inputs [19].

Traditional laboratory tasks that organize the problem space by arranging decision alternatives and attributes in a matrix are inappropriate to use when studying expertise effects on judgment or choice processes [21]. In the real world, all the attributes and alternatives may not be readily available when the decision maker first confronts the problem. Providing a matrix in the laboratory therefore could eliminate the special advantages that experts have in structuring problems. Domain expertise benefits consumers when the intended usage situation was complex, that is, when many attributes could be potentially relevant [21]. In contrast, there were no significant expertise effects when the intended usage situation was simple. Task characteristics, as opposed to individual differences, are the most important determinants of behavior when the task is well-defined and unambiguous [27]. Individual differences take precedence as task ambiguity increases.

Problems can be characterized as structured, structurable, or unstructured for a particular problem solver at a given point in time [28]. A problem is structured if the solver can readily identify a viable solution strategy. This might be the result of prior experience solving the problem or of a problem being stated in such a way that identifying a solution strategy is transparent. The application in which the search agent uses the PROFILE strategy would work well for structured problems since the solution strategy is apparent to even the novice user. A problem is structurable if additional information would produce a solution strategy or if the solver can reformulate the problem into manageable subproblems, perhaps with the aid of a structuring methodology. Although this class of problems is called structurable, only those with access to the right information or knowledge can structure it reliably. The applications in which the search agent uses the EBA strategy or the WAD strategy would work well for structurable problems because an expert with high product class knowledge would be able to add structure to the problem and formulate a solution strategy, whereas a novice with low product class knowledge would not be able to add structure to the problem because of a lack of product class knowledge. For structurable problems, a complex but knowable solution strategy exists. A problem is inherently unstructured if a reliable solution strategy cannot be located by any means. The HYPERTEXT strategy would be termed as unstructured because even experts cannot utilize their product class knowledge to formulate a solution strategy to this problem. Problems that are unstructured are not necessarily unsolvable. When faced with an unstructured problem, one is forced to employ less reliable methods and hope for the best [28].

When tasks are inherently unstructured (e.g., for the HYPERTEXT strategy), even experts cannot apply known solution strategies. Instead, they must use heuristics, and their resulting judgments are subject to all the biases associated with human judgment processes [29]. Expert performance under these conditions is oftentimes poor [30]. Conversely, in domains that can be characterized as well structured (e.g., for the PROFILE strategy), general problem-solving knowledge could be sufficient to solve the problem. Novices, therefore, could be expected to induce reasonable problem-solving strategies on the spot, so their performance might rival that of experts. It is with tasks in the middle category, the set of ill-structured but structurable problems (e.g., the EBA and WAD strategies), that experts would be expected to significantly outperform novices. Problems of this nature are information rich and require large amounts of internal knowledge [31]. Using existing knowledge, experts can reformulate, decompose, and/or impose constraints onto the problem, all of which reduce the size of the problem space and hence its ambiguity [31]–[33]. The problem is now internally represented as one or more structured problems. Therefore, within the category of structurable problems, the more structure that is provided in the problem’s initial condition the better novices will do, decreasing the performance differential between experts and novices. As problems become more ill-structured, the performance differential between experts and novices also should decrease, because of experts’ decreasing ability to structure the decision problem. The relationship among expertise, initial problem structure, and decision performance is illustrated in Table I.

To be useful, this conceptualization requires us to be able to identify factors affecting a problem’s structure. Early researchers in this area propose that a problem’s initial structure is a function of how clearly specified are the goals, inputs, and/or allowable transformation rules-procedures used to integrate data inputs to reach a decision [33]–[36]. A list of problem
attributes that contribute to a problem’s level of structure has been identified [28]. A set of problem characteristics is provided in Table II. For a problem to be (at least initially) ill-structured, at least one of these characteristics must be ambiguous.

<table>
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<th>TABLE II</th>
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<td><strong>PROBLEM CHARACTERISTICS THAT AFFECT STRUCTURE</strong></td>
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<td><strong>Goals</strong></td>
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To formulate a judgment about a prespecified criterion, a decision maker first must decide which inputs to use [37]. Empirical findings on information search point to dual benefits of expertise. On the one hand, expertise facilitates information processing, potentially increasing the amount of search; but on the other hand, expertise allows for more efficient searching, potentially decreasing search [21], [38]. Whether the facilitating effect or the efficiency effect dominates in a specific context depends partly on the demands of the task. If the decision maker has access to large amounts of external information, much of which is irrelevant or redundant, it is likely that experts will be more selective in their use of available information than will novices, because they can activate domain-specific schemas that provide direct attention to relevant information. In contrast, novices are less able to discern the diagnosticity of the available data and/or the relationships among them.

Previous studies have found that experts find attributive statements such as those provided by the WAD and the EBA strategies informative, whereas novices consider benefit statements such as those provided by the PROFILE strategy informative [39], [40]. When attribute information is presented, as in the EBA and WAD strategies, experts have the knowledge to infer the benefits implied by attribute information and are likely to be motivated to make such inferences as a basis for judgments because they perceive attribute information to be highly informative. A technical attribute focus is likely to be effective because experts are able to infer all of the related benefits and find the technical description to be more convincing [41]. By contrast, it seems unlikely that experts would process a benefits only message, such as that provided by the PROFILE strategy, in detail or be persuaded by such an appeal. The absence of attribute information prevents experts from using their knowledge to evaluate the claimed benefits. Without this information, experts may reject the communication as uninformative.

Novices are expected to respond differently than experts to the attribute-oriented (EBA and WAD) and benefit-oriented (PROFILE) appeals. Physical features may be meaningless to novices, so advertisements directed at them are structured around easily comprehended benefits [41]. This implies that attribute-oriented information (EBA and WAD) would not be informative and therefore not processed in detail by novices. By contrast, communications that focus on benefits (PROFILE) could be understood and perceived as informative by novices.

When subjects are using the EBA strategy, as the decision process requires consideration of each product attribute and expression of cutoff values for some of the attributes, it seems reasonable to expect that it will be easier for individuals with high product class knowledge as compared to individuals with low product class knowledge. Thus the EBA strategy will be preferred by individuals with high product class knowledge as compared to individuals with low product class knowledge. Experts prefer to use noncompensatory strategies like elimination by aspects and tend to process attribute information more efficiently than novices [3], [42]. Experienced consumers know which attributes are useful for distinguishing between options and may search only on those [21].

While knowledgeable consumers are well equipped to process attribute information, individuals with low product class knowledge will likely find such a task more difficult. Attribute-oriented messages are found to be less informative to novices [41], [43] as they do not process attribute information as efficiently as experts. Given the added effort for individuals with low product class knowledge to process attribute information, it is expected that they will show negative affective reactions to the agent/application when the agent is using the EBA strategy.

**Hypothesis 1a:** Subjects who have high product class knowledge will have more positive affective reactions to applications in which the search engines use the elimination by aspect filtering strategy than subjects who have low product class knowledge.

As the Weighted Average strategy requires consideration of each product attribute and expression of preference with regard to each, it seems reasonable to expect that it will be easier for individuals with high product class knowledge and thus will be preferred by them.

**Hypothesis 1b:** Subjects who have high product class knowledge will have more positive affective reactions to applications in which the search engines use the weighted average filtering strategy than subjects who have low product class knowledge.

Given their inability to process attribute information as efficiently as individuals with higher levels of product knowledge, consumers with low product class knowledge have been found to seek more summary information [21]. Because of the lower level of effort required, individuals with low product class knowledge are predicted to prefer the PROFILE strategy as compared to the EBA or WAD strategies. Conversely, individuals with high product class knowledge may base their search only on product attributes [21]. The absence of attribute information in the PROFILE strategy prevents experts from using their knowledge to evaluate alternatives. Without this opportunity experts may reject the communication as uninformative [43] and will have negative affective reactions toward agents/applications that use the PROFILE strategy.

Thus, it is predicted that individuals with high product class knowledge will show less favorable response to agents using the PROFILE strategy than individuals with low product class knowledge.
knowledge. The logic behind this is that experts are not permitted to use their attribute knowledge; rather, their preferences are inferred by matching them with “similar others.” An underlying factor in this negative response may also have to do with the actual source of the recommendation—unidentified similar others versus an internal agent algorithm driven by the user’s own preferences. Consumers trust their own opinions more than they trust the opinions of others [44], [45]. While other individuals are thought to exhibit knowledge or reporting biases [46], making information provided by other sources ambiguous, self-generated information is less likely to be contaminated by knowledge or reporting biases.

Hypothesis 1c: Subjects who have low product class knowledge will have more positive affective reactions to applications in which the search engines use the profile building filtering strategy than subjects who have high product class knowledge.

Since subjects with high product class knowledge have a greater ability to discriminate among alternatives and to eliminate undesirable alternatives from the choice set, it is expected that they will experience more positive affective reactions to the HYPERTEXT strategy than subjects who have low product class knowledge. However, because of the lack of agent support in filtering the information, it is expected that subjects in both the groups will experience significantly negative affective reactions to the HYPERTEXT strategy as compared to the EBA, WAD, and PROFILE strategies.

III. DESCRIPTION OF VARIABLES

The scale items used to measure each of the constructs is presented in Appendix A.

A. Independent Variables Being Manipulated

1) Agent Search Strategy (STRATEGY): Agent Search Strategy refers to the search and decision strategy employed by the agent in making recommendations to the user. The system was designed to have four treatment conditions, viz. Weighted Average Strategy (WAD), Elimination By Aspects Strategy (EBA), Profile Building Strategy (PROFILE), and Simple Hypertext Strategy (HYPERTEXT).

2) Product Class Knowledge (KNOWLEDGE): Product class knowledge refers to the knowledge about the product and the familiarity with the product which the subject has.

B. Dependent Variables

1) Trust in the Agent’s Recommendations (TRUST): Trust in the agent’s recommendations refers to the degree to which the subject feels that the software agent has recommended alternatives to him that most closely match their preferences.

2) Propensity to Purchase (PURCHASE): Propensity to Purchase represents the subject’s perception that he would purchase the selected alternative following the experiment if he were going to make a purchase in that particular product class.

3) Satisfaction With the Decision Process (SATISFACTION): Satisfaction with the Decision Process represents the subject’s subjective state of satisfaction with all aspects of the computerized decision process immediately after the decision has been made.

4) Confidence in the Decision (CONFIDENCE): Confidence in the Decision refers to the confidence expressed by the subject that he has selected the best alternative from the set of feasible alternatives.

5) Perceived Cost Savings (SAVINGS): Perceived Cost Savings reflects the degree to which the subject feels that the use of the system has helped him to realize significant cost savings in their purchase decision.

6) Cognitive Decision Effort (EFFORT): Cognitive Decision Effort refers to the psychological costs of processing information. This represents the ease with which the subject can perform the task of obtaining and processing the relevant information in order to enable him to arrive at their decision.

IV. RESEARCH METHODOLOGY FOR EXPERIMENT 1

A. Industry Selection

The product category “cars” was selected to maximize the likelihood of a wide variation in product class knowledge for the subject group used in the experiment. There are more than 400 car models currently available in the U.S., and there exists a large number of attributes that customers typically use in their selection of cars.

B. Experiment Design

The research design used was a 2 × 4, between-groups, completely randomized, two-factor, factorial design. The independent variables manipulated were product class knowledge (HIGH KNOWLEDGE, LOW KNOWLEDGE) and agent search strategy (EBA STRATEGY, WAD STRATEGY, PROFILE STRATEGY, HYPERTEXT STRATEGY). Subjects in each group (HIGH KNOWLEDGE and LOW KNOWLEDGE) were randomly assigned to one of the four treatment conditions (EBA, WAD, PROFILE, HYPERTEXT). The experiment was administered to 160 MBA students. Independent samples testing was used. Twenty subjects were assigned to each cell. The 2 × 4 design resulted in eight cells as is illustrated in Fig. 1.

C. Factors Controlled in the Experiment

In order to test the hypothesized effects, the following factors were controlled in the experiment.

1) Information Presentation Format and Graphics: This was achieved through the use of a web site on a local server, designed specifically for this research.

<table>
<thead>
<tr>
<th>Agent Filtering Strategy Employed</th>
<th>Elimination By Aspect Strategy (EBA)</th>
<th>Weighted Average Strategy (WAD)</th>
<th>Profile Building Strategy (PROFILE)</th>
<th>Simple Hypertext Strategy (HYPERTEXT)</th>
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<tr>
<td>Subject Groups</td>
<td>High Product Class Knowledge</td>
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<td>Low Product Class Knowledge</td>
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Fig. 1. The 2 × 4, between-groups, two-factor experiment design.
2) **Information Content of the Web Sites**: For each alternative which the subject examined, the set of attributes for which information was provided was the same. The attributes used included model year, body type, price, size (number of passengers, number of doors, cargo capacity), technical features (engine type, transmission type, drive train type, brake type, number of cylinders, fuel efficiency, acceleration, braking distance, towing capacity), safety record and features (anti-lock brakes, airbags, child safety locks, traction control), maintenance costs, car manufacturer, and country of manufacture. In addition, a photograph of the car model under examination was also placed on the web site.

3) **Download Time of the Web Pages**: The download time of the web pages was constant for all the alternatives.

4) **Number of Alternatives in the Feasible Set**: The initial choice set presented to the subjects was the same, regardless of the treatment condition.

5) **Choice Task**: All the respondents were given the same choice task, a setting in which they were asked to select a car to purchase from among the cars in the database.

6) **Market Segment**: The sample is based on a convenience sample of MBA students. This represents a fairly homogeneous market segment for the decision making task.

These controls limit the generalizability of the research, but are necessary to test the effects of interest.

### D. Choice Environment

A laboratory experiment served as the vehicle for testing the hypotheses. Eight workstations in a behavioral decision laboratory provided a controlled environment where subjects participated in the experiment.

### E. Choice Procedures

Subjects were first administered a preexperiment questionnaire intended to determine initial knowledge in the product category. This included measures of familiarity with the product category and knowledge about the product category. The preexperiment questionnaire was also used to collect demographic information from the subjects (e.g., their age, household income, education level, gender, etc.). The level of product class knowledge was manipulated by providing each of the subjects who were identified following the initial questionnaire as belonging to the group “high product class knowledge” with training on product attributes and features. This consisted of a series of screens of terminology used to describe and assess attributes of the product. Subjects were able to click on any of the terms and receive additional information. Subjects in the “low product class knowledge” group received no training on the product category. All subjects were then required to list from memory the attributes that they would use in their purchase decision for this product. This provided a more objective measure of product class knowledge. Consumers who have a consumption vocabulary are better able to develop and express preferences in a product category [47]. The subjects in each of the two groups “high” and “low” product class knowledge were then allocated at random to one of the four treatment conditions. After completion of the choice task, subjects were asked to rate the choice task on the following dependent variables: cognitive effort, confidence in their decision, satisfaction with the decision process, propensity to purchase, perceived cost savings, and trust in the product alternatives recommended by the agent.

### F. Manipulation Check

The initial subjective measure of product class knowledge showed some difference in product class knowledge between subjects in the “high product class knowledge” and “low product class knowledge” groups. The initial measure of product class knowledge was done by using a multitem seven-point Likert scale measure. Means for product class knowledge (high knowledge = 4.52; low knowledge = 2.17; \( p = 0.08 \)) were significantly different. Following the training task, the subjects were asked to list the attributes they would consider in their purchase decision for cars. This was done to test subjects’ objective knowledge about the product category. The number of distinct, correct answers to the question was tallied to come up with an objective knowledge score. An independent scorer familiar with the product category and blind to the hypotheses being tested also graded the subjects’ responses. Interrater reliability was 0.93. The scores on this objective measure of product class knowledge differed significantly between the “high product class knowledge” and the “low product class knowledge” groups in the direction predicted, with subjects in the “high product class knowledge” group being more knowledgeable about the terminology and choice factors than those in the “low product class knowledge” group (\( F(1,158) = 12.99; p = 0.001 \); mean high knowledge = 6.82; mean low knowledge = 3.15; scores ranged from 0 to 11 for the list of car attributes considered).

### V. RESULTS FOR EXPERIMENT 1

Following extensive pretests, the measures used in the main experiment were found to have values for Cronbach \( \alpha \) ranging from 0.73 to 0.94. The results of the reliability tests are presented in Table III. From this analysis, it can be concluded that the measures used had high reliability. Factor analysis of the data indicated that the scale items loaded onto the constructs they were \textit{a priori} expected to load on. There were no cross-loadings. Furthermore, the number of factors that emerged was identical to those expected. Thus, there is statistical evidence to

<table>
<thead>
<tr>
<th>Acronym</th>
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<tr>
<td>SATISFACTION</td>
<td>Satisfaction with the Decision Process</td>
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<tr>
<td>CONFIDENCE</td>
<td>Confidence in the Decision / Choice</td>
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</tr>
<tr>
<td>TRUST</td>
<td>Trust in the Agent’s Recommendations</td>
<td>.84</td>
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<td>PURCHASE</td>
<td>Propensity to Purchase</td>
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<td>KNOWLEDGE</td>
<td>Product Class Knowledge</td>
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support the claim that the scales have adequate unidimensionality, convergent, and discriminant validity at the monomethod level of analysis. Hence it can be concluded that the measures used had high validity. The results of the factor analysis are presented in Table V(a) and (b). The measures used for the dependent variables SATISFACTION, CONFIDENCE, TRUST, PURCHASE, SAVINGS, and EFFORT were represented as the mean-centered scores of the seven-point Likert scale items used to measure these constructs. Correlation analysis shows that product class knowledge is significantly correlated with several dependent variables, including satisfaction with the decision process \( (r = 0.23, p = 0.037) \), trust in the agent’s recommendations \( (r = 0.27, p = 0.05) \) and cognitive decision effort \( (r = -0.21, p = 0.039) \). The results of the correlation analysis are presented in Table IV.

To rule out any potentially confounding effects, the sample means for computer familiarity were statistically compared across cells. Results of these tests indicated that each cell contained subjects who, on average, had the same level of computer familiarity. In addition, subjects were distributed approximately equally across cells. Results of these tests indicated that each cell had the same level of computer familiarity. Hence, effects detected between subjects with HIGH KNOWLEDGE and subjects with LOW KNOWLEDGE were not confounded.

Table VI presents the cell means obtained for each of the dependent variables. Table VII presents the summary of the statistical analyses (F-values) for Experiment 1. The weighting for the planned contrasts was consistent with the hypotheses being tested [48]. The discussion of the results obtained for each of the dependent variables is presented below.

### A. Satisfaction With the Decision Process (SATISFACTION)

A two-factor 2 x 4 ANOVA was performed to test the interaction effects of the independent variables “product class knowledge” (KNOWLEDGE) and “agent search strategy” (STRATEGY) on the dependent variable “satisfaction with the decision process” (SATISFACTION). The factors used were KNOWLEDGE and STRATEGY. This analysis yielded a significant overall interaction effect \( F(3, 152) = 8.23, p < 0.001 \). The absence of interaction effects between KNOWLEDGE and STRATEGY for the dependent variable SATISFACTION is clearly demonstrated in Fig. 2.

This was followed by an investigation of the simple effects of the independent variable KNOWLEDGE on the dependent variable SATISFACTION. For the EBA STRATEGY, subjects with HIGH KNOWLEDGE experienced higher SATISFACTION than subjects with LOW KNOWLEDGE, \( F(1, 152) = 11.54, p < 0.001 \). For the WAD STRATEGY, subjects with HIGH KNOWLEDGE experienced higher SATISFACTION than subjects with LOW KNOWLEDGE, \( F(1, 152) = 12.62, p < 0.001 \). For the PROFILE STRATEGY, subjects with LOW KNOWLEDGE experienced higher SATISFACTION than subjects with HIGH KNOWLEDGE, \( F(1, 152) = 7.29, p < 0.01 \). For the HYPERTEXT STRATEGY, no significant difference in SATISFACTION was detected between subjects with HIGH KNOWLEDGE and subjects with LOW KNOWLEDGE, \( F(1, 152) = 1.95, p > 0.10 \).

Examination of the cell means shows clearly that for the...
TABLE VI
CELL MEANS FOR EACH EMOTION AS A FUNCTION OF AGENT SEARCH STRATEGY AND PRODUCT CLASS KNOWLEDGE FOR EXPERIMENT 1

<table>
<thead>
<tr>
<th></th>
<th>EBA</th>
<th>WAD</th>
<th>PROFILE</th>
<th>HYPERTEXT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>SATISFACTION</td>
<td>5.11</td>
<td>.125</td>
<td>5.32</td>
<td>.135</td>
</tr>
<tr>
<td>CONFIDENCE</td>
<td>3.39</td>
<td>.138</td>
<td>5.63</td>
<td>.143</td>
</tr>
<tr>
<td>PURCHASE</td>
<td>4.18</td>
<td>.138</td>
<td>4.25</td>
<td>.135</td>
</tr>
<tr>
<td>SAVINGS</td>
<td>1.56</td>
<td>.144</td>
<td>1.41</td>
<td>.141</td>
</tr>
<tr>
<td>EFFORT</td>
<td>2.71</td>
<td>.61</td>
<td>2.96</td>
<td>.75</td>
</tr>
</tbody>
</table>

TABLE VII
SUMMARY OF THE STATISTICAL ANALYSES (F-VALUES) FOR EXPERIMENT 1

<table>
<thead>
<tr>
<th></th>
<th>SATISFACTION</th>
<th>CONFIDENCE</th>
<th>TRUST</th>
<th>PURCHASE</th>
<th>SAVINGS</th>
<th>EFFORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x 4 ANOVA to test the overall interaction effect F(1,152)</td>
<td>8.23 a</td>
<td>6.58 a</td>
<td>9.17 a</td>
<td>6.92 a</td>
<td>6.19 a</td>
<td>5.71 a</td>
</tr>
<tr>
<td>Simple effect of KNOWLEDGE for EBA strategy F(1,152)</td>
<td>11.54 b</td>
<td>12.17 b</td>
<td>13.85 b</td>
<td>8.72 b</td>
<td>10.17 b</td>
<td>10.17 b</td>
</tr>
<tr>
<td>Simple effect of KNOWLEDGE for WAD strategy F(1,152)</td>
<td>12.62 b</td>
<td>12.29 b</td>
<td>14.63 b</td>
<td>7.91 b</td>
<td>9.69 b</td>
<td>9.77 b</td>
</tr>
<tr>
<td>Simple effect of KNOWLEDGE for PROFILE strategy F(1,152)</td>
<td>7.29 b</td>
<td>8.91 b</td>
<td>12.19 b</td>
<td>10.97 b</td>
<td>10.91 b</td>
<td>6.91 b</td>
</tr>
<tr>
<td>Simple effect of KNOWLEDGE for HYPERTEXT strategy F(1,152)</td>
<td>1.95 a</td>
<td>.92</td>
<td>2.33</td>
<td>1.12</td>
<td>.45</td>
<td></td>
</tr>
<tr>
<td>Simple effect of STRATEGY for HIGH KNOWLEDGE F(1,152)</td>
<td>6.19 a</td>
<td>8.53 a</td>
<td>8.92 a</td>
<td>5.41 a</td>
<td>7.91 a</td>
<td>5.17 a</td>
</tr>
<tr>
<td>Simple effect of STRATEGY for LOW KNOWLEDGE F(1,152)</td>
<td>5.87 a</td>
<td>2.91 a</td>
<td>7.96 a</td>
<td>4.94 a</td>
<td>6.11 a</td>
<td>5.31 a</td>
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<tr>
<td>Planned contrast F(1,152) (HIGH, EBA) + (HIGH, WAD)</td>
<td>10.92 a</td>
<td>13.11 a</td>
<td>13.19 a</td>
<td>10.51 b</td>
<td>14.42 a</td>
<td>12.91 a</td>
</tr>
<tr>
<td>Planned contrast F(1,152) (LOW, PROFILE) vs. (HIGH, PROFILE) + (HIGH, HYPERTEXT)</td>
<td>.85 a</td>
<td>1.12 a</td>
<td>1.27 a</td>
<td>1.77 a</td>
<td>.47 a</td>
<td>.67 a</td>
</tr>
<tr>
<td>Planned contrast F(1,152) (LOW, EBA) + (LOW, WAD) + (HIGH, HYPERTEXT)</td>
<td>1.29 a</td>
<td>.81</td>
<td>2.42</td>
<td>1.33</td>
<td>2.29</td>
<td></td>
</tr>
<tr>
<td>Complex interaction effect of F(1,152) to test the interaction effects of KNOWLEDGE (HIGH, LOW) × STRATEGY (EBA, PROFILE)</td>
<td>12.37 a</td>
<td>4.17 b</td>
<td>11.92 a</td>
<td>12.91 b</td>
<td>4.72 c</td>
<td>16.12 a</td>
</tr>
</tbody>
</table>

* p < .001, b p < .01, c p < .05, All other p’s > .05

EBA STRATEGY and the WAD STRATEGY, SATISFACTION was higher for the HIGH KNOWLEDGE group as compared to the LOW KNOWLEDGE group. For the PROFILE STRATEGY, SATISFACTION was higher for the LOW KNOWLEDGE group as compared to the HIGH KNOWLEDGE group. The examination of the simple effects of the independent variable STRATEGY on the dependent variable SATISFACTION yielded significant results for both levels of KNOWLEDGE. For the HIGH KNOWLEDGE group, F(3,152) = 6.19, p < 0.001. For the LOW KNOWLEDGE group, F(3,152) = 5.87, p < 0.001.

This was followed by a series of planned contrasts to investigate the effect of the independent variable STRATEGY on the dependent variable SATISFACTION. The weighting for the planned contrasts was consistent with the hypotheses being tested [48]. A planned contrast comparing the combined data from the cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY) with the combined data from the cells (HIGH KNOWLEDGE, PROFILE STRATEGY) and (HIGH KNOWLEDGE, HYPERTEXT STRATEGY) indicated that subjects with HIGH KNOWLEDGE experienced significantly higher SATISFACTION when using the EBA STRATEGY or the WAD STRATEGY as compared to those who used the PROFILE STRATEGY or the HYPERTEXT STRATEGY, F(1,152) = 10.92, p < 0.001. A one way ANOVA conducted on the two cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY), combined for the purpose of the planned contrast, did not yield a significant difference, F(1,38) = 0.83, p > 0.10. A one way ANOVA conducted on the two cells (HIGH KNOWLEDGE, PROFILE STRATEGY) and (HIGH KNOWLEDGE, HYPERTEXT STRATEGY), combined for the purpose of the planned contrast, did not yield a significant difference, F(1,38) = 1.29, p > 0.10. A planned contrast comparing the data from the cell (LOW KNOWLEDGE, PROFILE STRATEGY) with the combined data from the cells (LOW KNOWLEDGE, EBA STRATEGY), (LOW KNOWLEDGE, WAD STRATEGY), and (LOW KNOWLEDGE, HYPERTEXT STRATEGY) indicated that subjects with LOW KNOWLEDGE experienced significantly higher SATISFACTION when using PROFILE STRATEGY as compared to those who used the EBA STRATEGY, the WAD STRATEGY, or the HYPERTEXT STRATEGY, F(1,152) = 12.37, p < 0.001. A one way ANOVA which was conducted on the three cells (LOW KNOWLEDGE, EBA STRATEGY), (LOW KNOWLEDGE, WAD STRATEGY), and (LOW KNOWLEDGE, HYPERTEXT STRATEGY) which were combined for the purpose of the planned contrast did not yield a significant difference, F(2,57) = 1.67, p > 0.10. Examination of the cell means shows clearly that the HIGH

![Fig. 2. KNOWLEDGE × STRATEGY interaction for SATISFACTION.](image-url)
KNOWLEDGE group experienced higher SATISFACTION when using the EBA STRATEGY or the WAD STRATEGY and the LOW KNOWLEDGE group experienced higher SATISFACTION when using the PROFILE STRATEGY.

This was followed by a complex interaction contrast to investigate the interaction effects of the independent variables KNOWLEDGE and STRATEGY on the dependent variable SATISFACTION. The weighting for the complex interaction contrast was consistent with the hypothesis being tested [48]. A complex interaction contrast to detect the interaction effects of KNOWLEDGE (HIGH, LOW) and STRATEGY (combined EBA + WAD, PROFILE) yielded a significant result $F(1, 152) = 14.28, p < 0.001$. From the above-mentioned series of statistical analyses, it was concluded that there exists a strong interaction effect between the independent variables KNOWLEDGE and STRATEGY on the dependent variable SATISFACTION. Subjects with HIGH KNOWLEDGE experience significantly higher SATISFACTION when using the EBA STRATEGY or the WAD STRATEGY. Subjects with LOW KNOWLEDGE experience significantly higher SATISFACTION when using the PROFILE STRATEGY.

B. Confidence in the Decision (CONFIDENCE)

A two-factor $2 \times 4$ ANOVA was performed to test the interaction effects of the independent variables “product class knowledge” (KNOWLEDGE) and “agent search strategy” (STRATEGY) on the dependent variable “confidence in the decision” (CONFIDENCE). The factors used were KNOWLEDGE and STRATEGY. This analysis yielded a significant overall interaction effect $F(3, 152) = 6.58, p < 0.001$. The presence of interaction effects between KNOWLEDGE and STRATEGY for the dependent variable CONFIDENCE is clearly demonstrated in Fig. 3.

This was followed by an investigation of the simple effects of the independent variable KNOWLEDGE on the dependent variable CONFIDENCE. For the EBA STRATEGY, subjects with HIGH KNOWLEDGE experienced higher CONFIDENCE than subjects with LOW KNOWLEDGE, $F(1, 152) = 12.29, p < 0.001$. For the WAD STRATEGY, subjects with HIGH KNOWLEDGE experienced higher CONFIDENCE than subjects with LOW KNOWLEDGE, $F(1, 152) = 8.91, p < 0.01$. For the HYPERTEXT STRATEGY, no significant difference in CONFIDENCE was detected between subjects with HIGH KNOWLEDGE and subjects with LOW KNOWLEDGE, $F(1, 152) = 0.92, p > 0.10$. Examination of the cell means shows clearly that for the EBA STRATEGY and the WAD STRATEGY, CONFIDENCE was higher for the HIGH KNOWLEDGE group as compared to the LOW KNOWLEDGE group. For the PROFILE STRATEGY, CONFIDENCE was higher for the LOW KNOWLEDGE group as compared to the HIGH KNOWLEDGE group. An investigation of the simple effects of the independent variable STRATEGY on the dependent variable CONFIDENCE yielded significant results for both levels of KNOWLEDGE. For the HIGH KNOWLEDGE group, $F(3, 152) = 8.53, p < 0.001$. For the LOW KNOWLEDGE group, $F(3, 152) = 2.91, p < 0.05$.

This was followed by a series of planned contrasts to investigate the effect of the independent variable STRATEGY on the dependent variable CONFIDENCE. The weighting for the planned contrasts was consistent with the hypotheses being tested [48]. A planned contrast comparing the combined data from the cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY) with the combined data from the cells (HIGH KNOWLEDGE, PROFILE STRATEGY) and (HIGH KNOWLEDGE, HYPERTEXT STRATEGY) indicated that subjects with HIGH KNOWLEDGE experienced significantly higher CONFIDENCE when using the EBA STRATEGY or the WAD STRATEGY as compared to those who used the PROFILE STRATEGY or the HYPERTEXT STRATEGY. $F(1, 152) = 13.11, p < 0.001$. A one way ANOVA which was conducted on the two cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY) which were combined for the purpose of the planned contrast did not yield a significant difference, $F(1, 138) = 1.12, p > 0.10$. A one way ANOVA which was conducted on the two cells (HIGH KNOWLEDGE, PROFILE STRATEGY) and (HIGH KNOWLEDGE, HYPERTEXT STRATEGY) which were combined for the purpose of the planned contrast did not yield a significant difference, $F(1, 138) = 0.81, p > 0.10$. A planned contrast comparing the data from the cell (LOW KNOWLEDGE, PROFILE STRATEGY) with the combined data from the cells (LOW KNOWLEDGE, EBA STRATEGY), (LOW KNOWLEDGE, WAD STRATEGY), and (LOW KNOWLEDGE, HYPERTEXT STRATEGY) indicated that subjects with LOW KNOWLEDGE experienced significantly higher CONFIDENCE when using PROFILE STRATEGY as compared to those who used the EBA STRATEGY, the WAD STRATEGY, or the HYPERTEXT STRATEGY. $F(1, 152) = 4.17, p < 0.05$. A one way ANOVA which was conducted on the three cells (LOW KNOWLEDGE, EBA STRATEGY), (LOW KNOWLEDGE, WAD STRATEGY), and (LOW KNOWLEDGE, HYPERTEXT STRATEGY) which were combined for the purpose of the planned contrast did not yield a significant difference, $F(2, 57) = 2.19, p > 0.10$. Examination of the cell means
showed clearly that the HIGH KNOWLEDGE group experienced higher CONFIDENCE when using the EBA STRATEGY or the WAD STRATEGY and the LOW KNOWLEDGE group experienced higher CONFIDENCE when using the PROFILE STRATEGY.

This was followed by a complex interaction contrast to investigate the interaction effects of the independent variables KNOWLEDGE and STRATEGY on the dependent variable CONFIDENCE. The weighting for the complex interaction contrast was consistent with the hypothesis being tested [48]. A complex interaction contrast to detect the interaction effects of KNOWLEDGE (HIGH, LOW) and STRATEGY (combined EBA + WAD, PROFILE) yielded a significant result $F(1,152) = 7.81, p < 0.01$. From the above-mentioned series of statistical analyses, it was concluded that there exists a strong interaction effect between the independent variables KNOWLEDGE and STRATEGY on the dependent variable CONFIDENCE. Subjects with HIGH KNOWLEDGE experience significantly higher CONFIDENCE when using the EBA STRATEGY or the WAD STRATEGY. Subjects with LOW KNOWLEDGE experience significantly higher CONFIDENCE when using the PROFILE STRATEGY.

C. Trust in the Agent’s Recommendations (TRUST)

A two-factor $2 \times 3$ ANOVA was performed to test the interaction effects of the independent variables “product class knowledge” (KNOWLEDGE) and “agent search strategy” (STRATEGY) on the dependent variable “trust in the agent’s recommendations” (TRUST). The factors used were KNOWLEDGE and STRATEGY. This analysis yielded a significant overall interaction effect $F(2,114) = 9.17, p < 0.001$. The presence of interaction effects between KNOWLEDGE and STRATEGY for the dependent variable TRUST is clearly demonstrated in Fig. 4.

This was followed by an investigation of the simple effects of the independent variable KNOWLEDGE on the dependent variable TRUST. For the EBA STRATEGY, subjects with HIGH KNOWLEDGE experienced higher TRUST than subjects with LOW KNOWLEDGE, $F(1,114) = 13.85, p < 0.001$. For the WAD STRATEGY, subjects with HIGH KNOWLEDGE experienced higher TRUST than subjects with LOW KNOWLEDGE, $F(1,114) = 14.63, p < 0.001$. For the PROFILE STRATEGY, subjects with LOW KNOWLEDGE experienced higher TRUST than subjects with HIGH KNOWLEDGE, $F(1,114) = 12.19, p < 0.001$. Examination of the cell means shows clearly that for the EBA STRATEGY and the WAD STRATEGY, TRUST was higher for the HIGH KNOWLEDGE group as compared to the LOW KNOWLEDGE group. For the PROFILE STRATEGY, TRUST was higher for the LOW KNOWLEDGE group as compared to the HIGH KNOWLEDGE group. An investigation of the simple effects of the independent variable STRATEGY on the dependent variable TRUST yielded significant results for both levels of KNOWLEDGE. For the HIGH KNOWLEDGE group, $F(2,114) = 8.92, p < 0.001$. For the LOW KNOWLEDGE group, $F(2,114) = 7.96, p < 0.001$.

This was followed by a series of planned contrasts to investigate the effect of the independent variable STRATEGY on the dependent variable TRUST. The weighting for the planned contrasts was consistent with the hypotheses being tested [48]. A planned contrast comparing the combined data from the cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY) with the data from the cell (HIGH KNOWLEDGE, PROFILE STRATEGY) indicated that subjects with HIGH KNOWLEDGE experienced significantly higher TRUST when using the EBA STRATEGY or the WAD STRATEGY as compared to those who used the PROFILE STRATEGY, $F(1,114) = 13.19, p < 0.001$. A one way ANOVA which was conducted on the two cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY) which were combined for the purpose of the planned contrast did not yield a significant difference, $F(1,38) = 1.27, p > 0.10$. A planned contrast comparing the data from the cell (LOW KNOWLEDGE, PROFILE STRATEGY) with the combined data from the cells (LOW KNOWLEDGE, EBA STRATEGY), (LOW KNOWLEDGE, WAD STRATEGY) indicated that subjects with LOW KNOWLEDGE experienced significantly higher TRUST when using the PROFILE STRATEGY as compared to those who used the EBA STRATEGY or the WAD STRATEGY, $F(1,114) = 11.92, p < 0.001$. A one way ANOVA which was conducted on the two cells (LOW KNOWLEDGE, EBA STRATEGY) and (LOW KNOWLEDGE, WAD STRATEGY) which were combined for the purpose of the planned contrast did not yield a significant difference, $F(1,38) = 0.93, p > 0.10$. Examination of the cell means shows clearly that the HIGH KNOWLEDGE group experienced higher TRUST when using the EBA STRATEGY or the WAD STRATEGY and the LOW KNOWLEDGE group experienced higher TRUST when using the PROFILE STRATEGY.
ANOV A was performed to test the interaction effects of the independent variables KNOWLEDGE and STRATEGY on the dependent variable PURCHASE. Subjects with HIGH KNOWLEDGE experienced significantly higher PURCHASE than subjects with LOW KNOWLEDGE, subjects with HIGH KNOWLEDGE experienced higher PURCHASE. For the EBA STRATEGY, no significant difference, $F(1, 152) = 2.33, p > 0.10$. Examination of the cell means shows clearly that for the EBA STRATEGY and the WAD STRATEGY, PURCHASE was higher for the HIGH KNOWLEDGE group as compared to the LOW KNOWLEDGE group. For the PROFILE STRATEGY, PURCHASE was higher for the LOW KNOWLEDGE group as compared to the HIGH KNOWLEDGE group. An investigation of the simple effects of the independent variable STRATEGY on the dependent variable PURCHASE yielded significant results for both levels of KNOWLEDGE. For the HIGH KNOWLEDGE group, $F(3, 152) = 5.41, p < 0.01$. For the LOW KNOWLEDGE group, $F(3, 152) = 4.94, p < 0.01$. This was followed by a series of planned contrasts to investigate the effect of the independent variable STRATEGY on the dependent variable PURCHASE. The weighting for the planned contrasts was consistent with the hypotheses being tested [48]. A planned contrast comparing the combined data from the cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY) with the combined data from the cells (HIGH KNOWLEDGE, PROFILE STRATEGY) and (HIGH KNOWLEDGE, HYPERTEXT STRATEGY) indicated that subjects with HIGH KNOWLEDGE experienced significantly higher PURCHASE when using the EBA STRATEGY or the WAD STRATEGY as compared to those who used the PROFILE STRATEGY or the HYPERTEXT STRATEGY, $F(1, 152) = 10.51, p < 0.01$. A one way ANOVA which was conducted on the two cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY), $F(1, 152) = 7.91, p < 0.01$. For the PROFILE STRATEGY, subjects with LOW KNOWLEDGE experienced higher PURCHASE than subjects with HIGH KNOWLEDGE, $F(1, 152) = 10.97, p < 0.001$. For the HYPERTEXT STRATEGY, no significant difference in PURCHASE was detected between subjects with HIGH KNOWLEDGE and subjects with LOW KNOWLEDGE, $F(1, 152) = 2.33, p > 0.10$. Examination of the cell means shows clearly that for the EBA STRATEGY and the WAD STRATEGY, PURCHASE was higher for the HIGH KNOWLEDGE group as compared to the LOW KNOWLEDGE group. For the PROFILE STRATEGY, PURCHASE was higher for the LOW KNOWLEDGE group as compared to the HIGH KNOWLEDGE group. An investigation of the interaction effects of the independent variables KNOWLEDGE and STRATEGY on the dependent variable TRUST. Subjects with HIGH KNOWLEDGE experienced significantly higher TRUST when using the EBA STRATEGY or the HYPERTEXT STRATEGY, $F(1, 38) = 1.77, p > 0.10$. A one way ANOVA which was conducted on the two cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, HYPERTEXT STRATEGY) yielded a significant difference, $F(1, 38) = 2.42, p > 0.10$. A planned contrast comparing the combined data from the cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY), $F(1, 152) = 10.51, p < 0.01$. A one way ANOVA which was conducted on the two cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY), $F(1, 152) = 7.91, p < 0.01$. For the PROFILE STRATEGY, subjects with LOW KNOWLEDGE experienced higher PURCHASE when using the EBA STRATEGY or the WAD STRATEGY as compared to those who used the PROFILE STRATEGY or the HYPERTEXT STRATEGY, $F(1, 152) = 10.51, p < 0.01$. A one way ANOVA which was conducted on the two cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY), $F(1, 152) = 7.91, p < 0.01$. 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This was followed by a series of planned contrasts to investigate the effect of the independent variable STRATEGY on the dependent variable PURCHASE. The weighting for the planned contrasts was consistent with the hypotheses being tested [48]. A planned contrast comparing the combined data from the cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY) with the combined data from the cells (HIGH KNOWLEDGE, PROFILE STRATEGY) and (HIGH KNOWLEDGE, HYPERTEXT STRATEGY) indicated that subjects with HIGH KNOWLEDGE experienced significantly higher PURCHASE when using the EBA STRATEGY or the WAD STRATEGY as compared to those who used the PROFILE STRATEGY or the HYPERTEXT STRATEGY, $F(1, 152) = 10.51, p < 0.01$. A one way ANOVA which was conducted on the two cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY), $F(1, 152) = 7.91, p < 0.01$. 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A one way ANOVA which was conducted on the two cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY), $F(1, 152) = 7.91, p < 0.01$. For the PROFILE STRATEGY, subjects with LOW KNOWLEDGE experienced higher PURCHASE than subjects with HIGH KNOWLEDGE, $F(1, 152) = 10.97, p < 0.001$. For the HYPERTEXT STRATEGY, no significant difference in PURCHASE was detected between subjects with HIGH KNOWLEDGE and subjects with LOW KNOWLEDGE, $F(1, 152) = 2.33, p > 0.10$. Examination of the cell means shows clearly that for the EBA STRATEGY and the WAD STRATEGY, PURCHASE was higher for the HIGH KNOWLEDGE group as compared to the LOW KNOWLEDGE group. For the PROFILE STRATEGY, PURCHASE was higher for the LOW KNOWLEDGE group as compared to the HIGH KNOWLEDGE group. An investigation of the simple effects of the independent variable STRATEGY on the dependent variable PURCHASE yielded significant results for both levels of KNOWLEDGE. For the HIGH KNOWLEDGE group, $F(3, 152) = 5.41, p < 0.01$. For the LOW KNOWLEDGE group, $F(3, 152) = 4.94, p < 0.01$. This was followed by a series of planned contrasts to investigate the effect of the independent variable STRATEGY on the dependent variable PURCHASE. The weighting for the planned contrasts was consistent with the hypotheses being tested [48]. A planned contrast comparing the combined data from the cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY) with the combined data from the cells (HIGH KNOWLEDGE, PROFILE STRATEGY) and (HIGH KNOWLEDGE, HYPERTEXT STRATEGY) indicated that subjects with HIGH KNOWLEDGE experienced significantly higher PURCHASE when using the EBA STRATEGY or the WAD STRATEGY as compared to those who used the PROFILE STRATEGY or the HYPERTEXT STRATEGY, $F(1, 152) = 10.51, p < 0.01$. A one way ANOVA which was conducted on the two cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY), $F(1, 152) = 7.91, p < 0.01$. 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series of statistical analyses, it was concluded that there exists a strong interaction effect between the independent variables KNOWLEDGE and STRATEGY on the dependent variable PURCHASE. Subjects with HIGH KNOWLEDGE experience significantly higher PURCHASE when using the EBA STRATEGY or the WAD STRATEGY. Subjects with LOW KNOWLEDGE experience significantly higher PURCHASE when using the PROFILE STRATEGY.

**E. Perceived Cost Savings (SAVINGS)**

A two-factor 2 x 4 ANOVA was performed to test the interaction effects of the independent variables “product class knowledge” (KNOWLEDGE) and “agent search strategy” (STRATEGY) on the dependent variable “perceived cost savings” (SAVINGS). The factors used were KNOWLEDGE and STRATEGY. This analysis yielded a significant overall interaction effect $F(3, 152) = 6.19, p < 0.001$. The presence of interaction effects between KNOWLEDGE and STRATEGY for the dependent variable SAVINGS is clearly demonstrated in Fig. 6.

This was followed by an investigation of the simple effects of the independent variable KNOWLEDGE on the dependent variable SAVINGS. For the EBA STRATEGY, subjects with HIGH KNOWLEDGE experienced higher SAVINGS than subjects with LOW KNOWLEDGE, $F(1, 152) = 10.17, p < 0.01$. For the WAD STRATEGY, subjects with HIGH KNOWLEDGE experienced higher SAVINGS than subjects with LOW KNOWLEDGE, $F(1, 152) = 9.09, p < 0.01$. For the PROFILE STRATEGY, subjects with LOW KNOWLEDGE experienced higher SAVINGS than subjects with HIGH KNOWLEDGE, $F(1, 152) = 10.91, p < 0.001$. For the HYPERTEXT STRATEGY, no significant difference in SAVINGS was detected between subjects with HIGH KNOWLEDGE and subjects with LOW KNOWLEDGE, $F(1, 152) = 1.12, p > 0.10$. Examination of the cell means shows clearly that for the EBA STRATEGY and the WAD STRATEGY, SAVINGS was higher for the HIGH KNOWLEDGE group as compared to the LOW KNOWLEDGE group. For the PROFILE STRATEGY, SAVINGS was higher for the LOW KNOWLEDGE group as compared to the HIGH KNOWLEDGE group. An investigation of the simple effects of the independent variable STRATEGY on the dependent variable SAVINGS yielded significant results for both levels of KNOWLEDGE. For the HIGH KNOWLEDGE group, $F(3, 152) = 7.91, p < 0.001$. For the LOW KNOWLEDGE group, $F(3, 152) = 6.11, p < 0.001$.

This was followed by a series of planned contrasts to investigate the effect of the independent variable STRATEGY on the dependent variable SAVINGS. The weighting for the planned contrasts was consistent with the hypotheses being tested [48]. A planned contrast comparing the combined data from the cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY) with the combined data from the cells (HIGH KNOWLEDGE, PROFILE STRATEGY) and (HIGH KNOWLEDGE, HYPERTEXT STRATEGY) indicated that subjects with HIGH KNOWLEDGE experienced significantly higher SAVINGS when using the EBA STRATEGY or the WAD STRATEGY as compared to those who used the PROFILE STRATEGY or the HYPERTEXT STRATEGY, $F(1, 152) = 14.42, p < 0.001$. A one way ANOVA which was conducted on the two cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY) which were combined for the purpose of the planned contrast did not yield a significant difference, $F(1, 38) = 0.47, p > 0.10$. A one way ANOVA which was conducted on the two cells (HIGH KNOWLEDGE, PROFILE STRATEGY) and (HIGH KNOWLEDGE, HYPERTEXT STRATEGY) which were combined for the purpose of the planned contrast did not yield a significant difference, $F(1, 38) = 1.33, p > 0.10$. A planned contrast comparing the data from the cell (LOW KNOWLEDGE, PROFILE STRATEGY) with the combined data from the cells (LOW KNOWLEDGE, EBA STRATEGY), (LOW KNOWLEDGE, WAD STRATEGY), and (LOW KNOWLEDGE, HYPERTEXT STRATEGY) indicated that subjects with LOW KNOWLEDGE experienced significantly higher SAVINGS when using PROFILE STRATEGY as compared to those who used the EBA STRATEGY, the WAD STRATEGY, or the HYPERTEXT STRATEGY, $F(1, 152) = 4.72, p < 0.05$. A one way ANOVA which was conducted on the three cells (LOW KNOWLEDGE, EBA STRATEGY), (LOW KNOWLEDGE, WAD STRATEGY), and (LOW KNOWLEDGE, HYPERTEXT STRATEGY) which were combined for the purpose of the planned contrast did not yield a significant difference, $F(2, 57) = 2.39, p > 0.10$. Examination of the cell means shows clearly that the HIGH KNOWLEDGE group experienced higher SAVINGS when using the EBA STRATEGY or the WAD STRATEGY and the LOW KNOWLEDGE group experienced higher SAVINGS when using the PROFILE STRATEGY.

This was followed by a complex interaction contrast to investigate the interaction effects of the independent variables KNOWLEDGE and STRATEGY on the dependent variable SAVINGS. The weighting for the complex interaction contrast was consistent with the hypothesis being tested [48]. A complex interaction contrast to detect the interaction effects of KNOWLEDGE (HIGH, LOW) and STRATEGY (combined EBA + WAD, PROFILE) yielded a significant result $F(1, 152) = 11.92, p < 0.001$. From the above-mentioned
series of statistical analyses, it was concluded that there exists a strong interaction effect between the independent variables KNOWLEDGE and STRATEGY on the dependent variable SAVINGS. Subjects with HIGH KNOWLEDGE experience significantly higher SAVINGS when using the EBA STRATEGY or the WAD STRATEGY. Subjects with LOW KNOWLEDGE experience significantly higher SAVINGS when using the PROFILE STRATEGY.

F. Cognitive Decision Effort (EFFORT)

A two-factor 2 x 4 ANOVA was performed to test the interaction effects of the independent variables “product class knowledge” (KNOWLEDGE) and “agent search strategy” (STRATEGY) on the dependent variable “cognitive decision effort” (EFFORT). The factors used were KNOWLEDGE and STRATEGY. This analysis yielded a significant overall interaction effect $F(3, 152) = 5.71, p < 0.001$. The presence of interaction effects between KNOWLEDGE and STRATEGY for the dependent variable EFFORT is clearly demonstrated in Fig. 7.

This was followed by an investigation of the simple effects of the independent variable KNOWLEDGE on the dependent variable EFFORT. For the EBA STRATEGY, subjects with high KNOWLEDGE experienced lower EFFORT than subjects with low KNOWLEDGE, $F(1, 152) = 10.17, p < 0.01$. For the WAD STRATEGY, subjects with high KNOWLEDGE experienced lower EFFORT than subjects with low KNOWLEDGE, $F(1, 152) = 9.77, p < 0.01$. For the PROFILE STRATEGY, subjects with low KNOWLEDGE experienced lower EFFORT than subjects with high KNOWLEDGE, $F(1, 152) = 6.91, p < 0.01$. For the HYPERTEXT STRATEGY, no significant difference in EFFORT was detected between subjects with high KNOWLEDGE and subjects with low KNOWLEDGE, $F(1, 152) = 0.45, p > 0.10$. Examination of the cell means shows clearly that for the EBA STRATEGY and the WAD STRATEGY, EFFORT was lower for the HIGH KNOWLEDGE group as compared to the LOW KNOWLEDGE group. For the PROFILE STRATEGY, EFFORT was lower for the LOW KNOWLEDGE group as compared to the HIGH KNOWLEDGE group. An investigation of the simple effects of the independent variable STRATEGY on the dependent variable EFFORT yielded significant results for both levels of KNOWLEDGE. For the HIGH KNOWLEDGE group, $F(3, 152) = 5.17, p < 0.01$. For the LOW KNOWLEDGE group, $F(3, 152) = 5.31, p < 0.01$.

This was followed by a series of planned contrasts to investigate the effect of the independent variable STRATEGY on the dependent variable EFFORT. The weighting for the planned contrasts was consistent with the hypotheses being tested [48]. A planned contrast comparing the combined data from the cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY) with the combined data from the cells (HIGH KNOWLEDGE, PROFILE STRATEGY) and (HIGH KNOWLEDGE, HYPERTEXT STRATEGY) indicated that subjects with HIGH KNOWLEDGE experienced significantly lower EFFORT when using the EBA STRATEGY or the WAD STRATEGY as compared to those who used the PROFILE STRATEGY or the HYPERTEXT STRATEGY, $F(1, 152) = 12.91, p < 0.001$. A one way ANOVA which was conducted on the two cells (HIGH KNOWLEDGE, EBA STRATEGY) and (HIGH KNOWLEDGE, WAD STRATEGY) which were combined for the purpose of the planned contrast did not yield a significant difference, $F(1, 38) = 0.67, p > 0.10$. A one way ANOVA which was conducted on the two cells (HIGH KNOWLEDGE, PROFILE STRATEGY) and (HIGH KNOWLEDGE, HYPERTEXT STRATEGY) which were combined for the purpose of the planned contrast did not yield a significant difference, $F(1, 38) = 2.20, p > 0.10$. A planned contrast comparing the data from the cell (LOW KNOWLEDGE, PROFILE STRATEGY) with the combined data from the cells (LOW KNOWLEDGE, EBA STRATEGY), (LOW KNOWLEDGE, WAD STRATEGY), and (LOW KNOWLEDGE, HYPERTEXT STRATEGY) indicated that subjects with low KNOWLEDGE experienced significantly lower EFFORT when using PROFILE STRATEGY as compared to those who used the EBA STRATEGY, the WAD STRATEGY, or the HYPERTEXT STRATEGY, $F(1, 152) = 16.12, p < 0.001$. A one way ANOVA which was conducted on the three cells (LOW KNOWLEDGE, EBA STRATEGY), (LOW KNOWLEDGE, WAD STRATEGY), and (LOW KNOWLEDGE, HYPERTEXT STRATEGY) which were combined for the purpose of the planned contrast did not yield a significant difference, $F(2, 57) = 1.92, p > 0.10$. Examination of the cell means shows clearly that the HIGH KNOWLEDGE group experienced lower EFFORT when using the EBA STRATEGY or the WAD STRATEGY and the LOW KNOWLEDGE group experienced lower EFFORT when using the PROFILE STRATEGY.

This was followed by a complex interaction contrast to investigate the interaction effects of the independent variables KNOWLEDGE and STRATEGY on the dependent variable EFFORT. The weighting for the complex interaction contrast was consistent with the hypothesis being tested [48]. A complex interaction contrast to detect the interaction effects of KNOWLEDGE (HIGH, LOW) and STRATEGY (combined EBA + WAD, PROFILE) yielded a significant result $F(1, 152) = 10.17, p < 0.01$. From the above-mentioned series of statistical analyses, it was concluded that there exists a strong interaction effect between the independent variables.
KNOWLEDGE and STRATEGY on the dependent variable EFFORT. Subjects with HIGH KNOWLEDGE experience significantly lower EFFORT when using the EBA STRATEGY or the WAD STRATEGY. Subjects with LOW KNOWLEDGE experience significantly lower EFFORT when using the PROFILE STRATEGY.

VI. RATIONALE FOR EXPERIMENT 2

Given these differing responses to agent search strategies based upon the level of product class knowledge of the user, the next step was to examine more closely the specific characteristics of each strategy that contribute to this interaction, alterations to which could eliminate the interaction effect.

VII. THEORETICAL DEVELOPMENT OF HYPOTHESES FOR EXPERIMENT 2

Decision environments that are characterized by higher tradeoff difficulty and/or higher conflict will be associated with increased negative emotion as well as increased tendencies for decision makers to choose avoidant options [49]. The ability to choose an avoidant option (skip making the decision) is found to reduce this negative emotion [49]. Hence, the ability to avoid specifying preference values for certain attributes or to provide a neutral response (“don’t know” or “don’t care”) may reduce individuals’ negative response toward the agent search strategy. Additionally, if individuals are permitted to provide a measure of their confidence in their preference specifications, they may feel more confident that the recommendation given by the agent reflects a weighting of the attributes in terms of their confidence level. It is expected that by modifying the application in the following two ways, the negative affective reactions of subjects with low product class knowledge toward agents/applications which use the EBA and WAD strategies will be eliminated or significantly reduced.

1) Increasing the amount of information provided: When the subjects are expressing their preference values for the attributes and when they are browsing the attribute information for the alternatives, instead of just being presented with the attribute names on the screen, they are presented with hypertext links for each attribute. If they click the hypertext link for any attribute, they are presented with a screen of information that provides detailed information about that attribute.

2) Increasing the degree of control the subjects have in expressing their preferences and making their decisions: This increase in the degree of control is achieved through three mechanisms:

a) The subjects are given the option to skip attributes when expressing preference or cutoff values for the attributes when they are using the WAD and EBA decision strategies.

b) The subjects are given the option of specifying confidence levels in their preference specifications for each attribute.

c) The subjects are given the option of returning to the preference specification stage from any stage in the decision process and changing the preference values specified. Thus, after subjects have obtained some information about attributes, they are able to utilize that information in specifying their preferences.

Hypothesis 2: Changes to the functionality of the application such as: 1) increasing the amount of information provided in the description of each attribute and 2) increasing the degree of control the subject has in expressing their preferences and making their decision, will reduce the negative affective reactions of subjects with low product class knowledge toward the agents/applications which employ the EBA and WAD strategies.

VIII. RESEARCH METHODOLOGY FOR EXPERIMENT 2

One hundred twenty MBA students participated in the study. The subjects used in Experiment 2 were different from the subjects used in Experiment 1. This was done to eliminate bias due to history effects and learning effects. Measures of subjective knowledge for the product category were taken. Subjects identified as belonging to the group “high product class knowledge” received further training in the product class. Subjects identified as belonging to the group “low product class knowledge” did not receive further training. This was done to manipulate product class knowledge. Subjects in each of the groups “high” and “low” product class knowledge were then randomly assigned to one of three treatment conditions—MODIFIED EBA, MODIFIED WAD, or PROFILE. This yielded a sample size of 20 subjects for each of the cells in the 2 x 3 research design. The HYPERTEXT strategy was omitted from Experiment 2 since it did not yield any significant results in Experiment 1. Following the experiment, measures of affective response to each agent search strategy such as satisfaction with the decision process, confidence in the decision, propensity to purchase, perceived cost savings, cognitive decision effort, and trust in the agent’s recommendations were taken.

IX. RESULTS FOR EXPERIMENT 2

Table VIII presents the cell means obtained for each of the dependent variables in Experiment 2 when the modified applications were used as the treatment conditions. The 2 x 3, two-factor ANOVAs which were conducted did not yield any significant overall interaction effects between the independent variables KNOWLEDGE and STRATEGY for any of the dependent variables SATISFACTION, CONFIDENCE, TRUST, PURCHASE, SAVINGS, or EFFORT. The planned contrasts that were conducted yielded only one significant result: that subjects in the HIGH KNOWLEDGE group expressed significantly higher positive affective preferences for the MODIFIED EBA STRATEGY and the MODIFIED WAD STRATEGY as compared to the PROFILE STRATEGY. Subjects in the LOW KNOWLEDGE group did not express significantly higher positive affective preferences for the PROFILE STRATEGY as compared to the MODIFIED EBA STRATEGY or the MODIFIED WAD STRATEGY. Thus the interaction effects of KNOWLEDGE and STRATEGY were significantly reduced by modifying the EBA and WAD treatment conditions to increase the degree of control provided to the user and to increase the amount of information provided to the user. Examination of the cell means shows clearly that the LOW KNOWLEDGE group
responded much more positively to the modified EBA and WAD strategies than they did in Experiment 1.

X. CONCLUSION

The experimental results presented here demonstrate that the cognitive fit of agent search strategy and subjects’ product class knowledge has a significant impact on consumers’ ability to integrate information, to understand inputs to their judgments, and to be confident about their judgments. This research has implications for a number of settings within the realm of marketing and consumer behavior, especially in the electronic commerce environment. Understanding the reasons behind individuals’ varying reactions to agent strategies based on the level of their product class knowledge allows web retailers to modify their web sites and include functionality in their agents/applications to make the agents’ search strategy more appealing to both those with high as well as low product class knowledge. Specific recommendations to managers would include making at least two agent search strategies (WAD or EBA, and PROFILE) available to users and allowing users to use the one they prefer. Alternatively, managers could include the functionalities demonstrated in Experiment 2 which reduce negative reactions to strategy selection which will enable them to design their web sites so as to provide the optimal interface for a given task environment.

A. Managerial Implications

This research has significant managerial implications in terms of providing guidelines for the design of web sites in order to optimize the interface between the consumer and the system.

1) Design of User Interfaces for Electronic Commerce: This research should help designers of web sites to make accurate generalizations about the effects of computerized decision aids on strategy selection which will enable them to design their web sites so as to provide the optimal interface for a given task environment.

2) Impact on Consumer Satisfaction and Confidence: Given the large number and variety of decision aids currently emerging on the Internet, it is imperative that we investigate how these decision aid formats impact consumer satisfaction and confidence in the decision. This is necessary to avoid consumer perceptions of nonutility, and ultimately nonuse of the computerized decision aids.

3) Marketing Strategy of Online Vendors: Many merchants who have set up electronic shopping malls on the Internet fear that the reduced cognitive search effort associated with this environment will lead to increased price competition and lower profit margins [2], [54]. This may lead to merchants adopting a strategy of providing a suboptimal web site so as to make it difficult for consumers to use this medium to obtain price comparisons, quality comparisons and comparisons across web sites. This research has demonstrated that optimizing the cognitive fit of agent search strategy with consumers’ product class knowledge results in an increased perception of cost savings among consumers and increased satisfaction with the decision process. This will lead to the consumers using this channel more extensively to search for pre-purchase information and making their purchases through this channel. Merchants who adopt the strategy of not providing the optimal interface to consumers on their web sites will risk losing a substantial portion of the business that will be transacted via this channel.

B. Limitations of the Research

As with any experimental investigation, there are a number of limitations present in this research. This research was restricted to the selection of cars on the Internet. Clearly, a variety of choice situations as well as products must be investigated before generalizable comments can be made to guide the development of computerized decision aids. Another limitation of this research is the composition of the group that participated in the study. The sample is homogeneous, and presumably has greater than average cognitive capabilities. A more diverse sample would have offered greater opportunity for generalization of the findings.

C. Directions for Future Research

This research has examined the influence of computerized decision aids on decision making and their impact on different aspects of performance and satisfaction with the decision process. Much more work needs to be done on examining the influence away from information that is most important for the task at hand [52], [53].

TABLE VIII
CELL MEANS FOR EACH EMOTION AS A FUNCTION OF AGENT SEARCH STRATEGY AND PRODUCT CLASS KNOWLEDGE FOR EXPERIMENT 2

<table>
<thead>
<tr>
<th></th>
<th>HIGH PRODUCT CLASS KNOWLEDGE</th>
<th>LOW PRODUCT CLASS KNOWLEDGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MODIFIED EBA</td>
<td>MODIFIED WAD</td>
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<tr>
<td>SATISFACTION</td>
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<td>5.41, 1.40</td>
</tr>
<tr>
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<tr>
<td>TRUST</td>
<td>5.26, 1.31</td>
<td>5.29, 1.37</td>
</tr>
<tr>
<td>PURCHASE</td>
<td>4.31, 1.37</td>
<td>4.27, 1.36</td>
</tr>
<tr>
<td>SAVINGS</td>
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<td>5.76, 1.39</td>
</tr>
<tr>
<td>EFFORT</td>
<td>2.57, .55</td>
<td>2.94, .74</td>
</tr>
</tbody>
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of these computerized decision aids on consumer preferences. Some of the potential research areas are discussed below.

1) Use of Query-Based Decision Aids in Different Information Environments: Ample evidence exists that information is not simply acquired in reaction to pre-defined preferences, but that it also helps decision makers define their own values and preferences as they engage in the process of acquiring information [3], [55]. In other words, the information itself changes the way preferences are constructed, and therefore one cannot define the decision space in advance. There exist potential liabilities for computerized decision aids in dynamic environments in which innovation can change the correlation structure of alternatives in the environment. As long as the information environment is stable and does not change much, the structure of preferences can be expected to have some stability. Hence in such environments, computerized decision aids can be beneficial. However, in situations in which information changes over time, consumers served by computerized decision aids alone would be unlikely to notice the changing correlational structure of the environment. In these environments, additional mechanisms would need to be built into the system to continuously update the knowledge base. Expert systems could play a vital role in these decision environments.

2) Planning Upgrade Paths: Under some circumstances, it might be better to have a simple user interface that does not require much effort to learn and use. The advantages of such interfaces are primarily at the initial stages of usage, when knowledge is low. Over time, as knowledge accumulates, the advantages of more powerful and flexible interfaces become more apparent. The challenge for marketing managers is to provide consumers with information systems that change over time such that they fulfill the consumers’ short-term needs without sacrificing the consumers’ long-term interests.

APPENDIX A

SCALE ITEMS USED TO MEASURE THE CONSTRUCTS

The following scale items were used to measure the constructs. The respondents were told to mark each of the responses on a seven-point Likert scale ranging from “Strongly Disagree” to “Strongly Agree.”

A. Independent Variables Being Manipulated

1) Product Class Knowledge (KNOWLEDGE):
   K.1 I am an expert in cars.
   K.2 I am very experienced in purchasing cars.
   K.3 I am very knowledgeable about cars.
   K.4 I understand the features of cars well enough to evaluate the alternative car models.
   K.5 I am not at all familiar with cars (r).
   K.6 I have a great interest in cars.

B. Dependent Variables

1) Trust in the Agent’s Recommendations (TRUST):
   T.1 I believe that the alternatives which the agent recommended were consistent with the preferences I expressed.

T.2 The agent can be trusted to recommend alternatives which closely match the preferences I expressed.
T.3 I am convinced that the agent recommended alternatives which most closely matched my preferences.
T.4 The alternatives recommended by the agent were not credible (r).
T.5 The agent recommended alternatives which were consistent with my preferences.
T.6 The agent has probably used my preference specifications in recommending alternatives to me.
T.7 It is questionable whether the agent used my preference specifications in recommending alternatives to me (r).
T.8 The agent can relied on to use my preference specifications when it recommends alternatives to me.
T.9 The agent can be depended on to recommend alternatives which closely match my preferences.

2) Propensity to Purchase (PURCHASE):

P.1 I would like to purchase this car.
P.2 If I purchased a car right now I would purchase this car model.
P.3 I would purchase this car if I had the money available.
P.4 I feel a strong urge to purchase this car.
P.5 I am willing to pay the price quoted for this car.
P.6 It is very likely that I will purchase this car.
P.7 I would definitely like to purchase this car.
P.8 It is important that I purchase this car.

3) Satisfaction With the Decision Process (SATISFACTION):

S.1 This system is one of the best ways to select a car.
S.2 If I could do it over again, I’d rather not use this system to select a car (r).
S.3 I am not happy that I used this system to select a car (r).
S.4 This system was very useful in helping me to select the best car model to suit my requirements.
S.5 If I had to select a car in future, and a system such as this was available, I would be very likely to use it.
S.6 If my friend was searching for information in order to purchase a car, and I knew that a system such as this was available, I would be very likely to recommend this system to him.

4) Confidence in the Decision (CONFIDENCE):

C.1 I am confident that I selected the best car model to suit my needs.
C.2 I am confident that I selected the car model which best matches my preferences.
C.3 I am not confident that I selected the best car model (r).
C.4 There are probably other car models I should have examined more closely (r).
C.5 I would select this same car model if I had to make the decision again.
C.6 This is clearly the best car model available for my budget.
5) Perceived Cost Savings (SAVINGS):
SAVE.1 By using this system to select a car, I was able to obtain the best value for my money.
SAVE.2 The use of this system has enabled me to save a lot of money in purchasing a car.
SAVE.3 If I had not used this system I would have obtained a better deal for my money (r).
SAVE.4 This car is a real bargain.
SAVE.5 This system enabled me to compare the prices of different car models very efficiently.
SAVE.6 I could have obtained a better deal from a car dealer (r).

6) Cognitive Decision Effort (EFFORT):
E.1 The task of selecting a car model using this system was very frustrating.
E.2 I easily found the information I was looking for (r).
E.3 The task of selecting a car model using this system took too much time.
E.4 The task of selecting a car model using this system was easy (r).
E.5 Selecting a car model using this system required too much effort.
E.6 The task of selecting a car model using this system was too complex.

REFERENCES


Gene Rathnam is a Senior Partner at Satyam Consulting Services, Chicago, IL. He has published over 20 refereed journal articles and over 30 articles in refereed conference proceedings. His research focuses on electronic commerce and information systems management. He is the recipient of several grants from the National Science Foundation.