

Marketing the Unfamiliar:

The Role of Context and Item-Specific Information in Electronic Agent Recommendations

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Abstract

Electronic agents have the capacity to help consumers discover new products and generate demand for unfamiliar products. This paper explores how consumers respond to recommendations of unfamiliar products made by electronic agents. Across three studies using simulated music shopping agents, we show that: (1) Additional recommendations of familiar products serve as a context within which unfamiliar recommendations are evaluated. (2) When the presentation of the recommendations makes unfamiliar and familiar products appear similar, evaluative assimilation results. (3) When additional, information about the unfamiliar products is given, consumers discriminate them from the familiar products, producing evaluative contrast. These results establish that information that leads to higher evaluations when context is absent, can lead to contrast and lower evaluations in the presence of attractive contextual recommendations. Furthermore, we show that evaluations of the electronic agent do not depend on the same factors that influence evaluations of the recommendations, indicating that designers of electronic agents may need to balance their desire to sell products against their desire to build customer loyalty. Other theoretical and managerial implications of our results are discussed.

The Internet offers consumers access to many alternatives with relatively low search costs. Many authors have suggested that as the amount of information available on the Internet increases, consumers will increasingly turn to particular sites and technologies that can filter and summarize the alternatives (Alba et al. 1997; Maes 1999; West et al. 1999). Electronic agents provide one such technology.

Electronic agents are software programs designed to help consumers sort through available products on the Internet. They perform a variety of tasks, including defining needs, forming consideration sets, making recommendations, and negotiating purchases (West et al. 1999). In this paper, we consider recommendation agents: electronic agents designed to review products and present recommendations on the basis of the preferences of the user. We examine how recommendation set composition and information about the recommended products affect consumer preferences for unfamiliar products. We propose a theoretical account for how these factors influence the agent's ability to sell products. Our research suggests how agent recommendation sets should be constructed to increase consumer demand for new, unfamiliar products.

Many existing web sites offer consumers recommendations. In some cases, these recommendations are not based on information about the consumer's individual preferences. For instance, a music retailer may simply provide a listing of CDs that are best sellers within a particular category. Increasingly, electronic retailers are incorporating electronic agents to provide personalized recommendations to their customers. These agents use the customer's individual preferences to provide a more attractive set of recommendations. Thus, unlike traditional electronic retail sites which function primarily as electronic catalogs, sites using electronic agents have characteristics that are often attributed to competent salespeople, such as

adapting to customer needs (Weitz 1978; Sujan, Sujan and Bettman 1988). For a review and assessment of agent technology, see Ariely, Lynch, and Aparicio (2000) and Gershoff and West (1998).

Electronic agents supply consumers with a list of recommendations, sometimes with additional information about the recommendations. Some of the recommended items may already be familiar to the consumer and others unfamiliar. In this paper, we explore how consumers react to unfamiliar recommendations, given a recommendation set and information about the new products.

Unfamiliar recommendations are of special interest for a number of reasons. Most pragmatically, unfamiliar recommendations represent an important source of revenue. Both consumers and retailers benefit when an agent can recommend unique products that best meet the customer's needs. Second, behavioral research suggests that consumers view unfamiliar recommendations negatively (e.g., Park and Lessig 1981). This implies that unfamiliar recommendations may be more difficult to sell and may have negative consequences for the retailer. Thus, retailers may need to take special precautions when attempting to sell unfamiliar products. Third, because consumers do not possess strong pre-existing beliefs about unfamiliar alternatives, these alternatives are likely to show the greatest response to managerial strategies that attempt to position the products. In this paper, we explore how consumers react to unfamiliar recommendations and evaluate agent strategies for presenting unfamiliar recommendations.

The Role of Recommendation Context: Assimilation and Contrast

Imagine that you are shopping for rock CDs at a site that uses an electronic agent. The site has a profile of your listening preferences based on your past search behavior, purchases, and answers to questions designed to elicit your preferences. Your profile indicates that you are a fan

of both rock and jazz. Suppose the electronic agent recommends “Spirits in the Field” by the Arthur Blythe Trio. You are unfamiliar with both the CD and the artist. If no other information is provided about the CD, you have little information on which to evaluate it, and are therefore unlikely to buy it.

What if the agent recommends the above CD along with several other titles with which you are more familiar? In this case, you have considerably more information on which to base your evaluation. For instance, if the other recommended CDs are ones that you own and listen to frequently, you may infer that the unfamiliar CD is of similar quality (and may be similar on more tangible dimensions). In this case, it is unlikely that you will purchase the contextual recommendations because you already own these CDs. Nonetheless, providing those contextual recommendations may affect your likelihood of buying the unfamiliar CD.

Context has been shown to affect preference for familiar stimuli (e.g., Cooke and Mellers 1998; Mellers and Cooke 1996; Simonson and Tversky 1992; Tversky and Kahneman 1991). Other work has shown that context helps consumers interpret unfamiliar stimuli (e.g., Sen 1998; Wright and Rip 1980). We believe that context is likely to be especially important for understanding consumers’ reactions to agent recommendations. First, the algorithms by which electronic agents make their recommendations are not obvious to the consumer, unlike interactions with a human agent where many additional cues to process and motivation exist. This implies that consumers must evaluate electronic agents primarily on the results of the process – the recommended alternatives. If an agent recommends CDs that are familiar and well liked, the consumer may consider this as evidence that the agent “understands” his or her preferences.

Second, the Internet is an ideal medium in which to exploit the effects of context (Peterson, Balasubramanian, and Bronnenberg 1997). Web page designs can be changed dynamically and individualized for each consumer. It is easy to embed specific recommendations within an existing recommendation set. Designers can provide or conceal specific information about the alternatives. And presentation formats can be varied so that particular comparisons are made more or less salient. Thus, consumers' use of electronic agents raises interesting behavioral and managerial questions regarding information processing and judgment.

How might recommendation context affect the evaluation of unfamiliar recommendations? We consider two potential responses to contextual recommendations: If consumers adjust their evaluation of the unfamiliar recommendation in the direction of the familiar recommendations, they are said to engage in assimilation. If consumers adjust their evaluation of the unfamiliar recommendation in the direction opposite to that of the familiar recommendations, they are said to engage in contrast. When might contextual recommendations produce assimilation? Users of electronic agents may believe that a single algorithm generates all of recommendations shown, especially in the absence of additional information about these recommendations. Unfamiliar recommendations possess little diagnostic value, whereas familiar recommendations allow the user to evaluate the agent's accuracy. Thus, if the familiar recommendations are good, the agent's accuracy is likely high, and if the agent's accuracy is high, the unfamiliar recommendations are also likely good.

When might contextual recommendations produce contrast? Consumers often compare products to salient alternatives, which serve as standards. Such comparisons tend to focus on the differences that exist between alternatives and magnify any existing differences (Tversky 1977; Tversky and Gati 1978; Shafir 1993). Contextual recommendations provide a set of salient

comparisons relative to which unfamiliar recommendations can be compared. When little information is provided about the unfamiliar recommendations, there is little to compare. But, as discussed in the next section, when information about the unfamiliar recommendations becomes available, consumers may compare unfamiliar and familiar recommendations with a focus on their differences. Because the unfamiliar recommendations are perceived to be different from the familiar recommendations, their overall attractiveness is also likely to differ.

A considerable body of research has investigated the conditions under which assimilation and contrast are observed. An important result of this literature is that it is possible to alter the processing of contextual information to produce assimilation in one situation and contrast in another (Biernat, Manis, and Kobrynowicz 1997; Bless and Schwarz 1998; Bless and Waenke 2000; Stapel and Koomen 1998; Stapel, Koomen, and Velthuijsen 1998; Stapel and Winkielman 1998). A variety of factors have been found to affect processing, including the timing of information (Jordan and English 1989; Jordan and Uhlarik 1985), the descriptive information provided (Wedell, Parducci, and Geiselman 1987; Fiske and Pavelchak 1986), the availability of a salient referent (Abele and Petzold 1998; Biernat, et al. 1997; Stapel and Koomen 1998), and the cognitive resources available to the consumer (Martin and Achee 1992; Meyers-Levy and Tybout 1997). In general, factors that tend to emphasize the similarity between the target and the context or cause people to consider target and context items as a unit result in assimilation, whereas factors that emphasize the differences between target and context or cause people to compare context to target result in contrast (Bless and Schwarz 1998; Bless and Waenke 2000; Stapel and Koomen 1998; Stapel, Koomen, and Velthuijsen 1998; Stapel and Winkielman 1998). Previous research has focused on informational factors that are descriptively discriminating but evaluatively neutral (Fiske and Pavelchak 1986; Fiske 1998). In this paper, we extend this

research to show that information per se can be individuating and that positive individuating information can result in either assimilation or contrast, as outlined below.

The Role of Item-Specific Information

In addition to providing a set of recommendations, a second technique that electronic agents use to increase the attractiveness of unfamiliar recommendations is to provide users with additional information about the new product (Alba et al. 1999). In some cases, this information is data from other consumers or critics. For instance, a book retailer might provide average ratings of the book submitted by readers, a reviewer recommendation, or reader testimonials. In other cases, the additional information may allow the consumer to more directly experience particular characteristics of the product. Book retailers often provide excerpts from the book and pictures of the book jacket. Recent advances in computer software and hardware have allowed retailers to provide consumers with much more realistic information about their products, including the audio and video clips that are now common at electronic music and video retail sites.

There is reason to believe that providing consumers with additional information about recommended products will benefit the recommending site. To the extent that a retail site offers more information than other retail sites, that retailer should be preferred. But what is the impact of this additional information on the consumer's evaluation of unfamiliar recommendations? On the one hand, providing additional information may make unfamiliar recommendations more attractive, particularly to the degree that the information highlights the qualities of the product that are generally most attractive to consumers. On the other hand, the information provided, although positive, may serve to distinguish the unfamiliar recommendation from the more familiar recommendations, thereby decreasing its attractiveness. We propose that positive and

neutral information about the recommendations and the manner in which the recommendations are presented affects the processing of contextual information. Specifically, when information tends to distinguish the unfamiliar recommendations from the familiar recommendations and comparison is easy, consumers will contrast unfamiliar and familiar recommendations, resulting in lower evaluations of the unfamiliar recommendations. On the other hand, if positive individuating information is omitted or if the information provided makes unfamiliar and familiar recommendations appear similar, consumers will assimilate the unfamiliar recommendations toward the familiar recommendations, resulting in higher evaluations of the unfamiliar recommendations.

H1: When electronic agents provide a context of familiar, attractive recommendations and present the unfamiliar recommendations without individuating information, consumers will assimilate unfamiliar recommendations in the direction of the familiar recommendations resulting in higher evaluations of the unfamiliar recommendation.

H2: When electronic agents provide a context of familiar, attractive recommendations and present individuating information, consumers will contrast unfamiliar and familiar recommendations resulting in lower evaluations of the unfamiliar recommendation.

To summarize, we provide a theoretical argument for how the evaluation of unfamiliar recommendations depends on recommendation context and recommendation information. Our analysis makes a counter-intuitive and heretofore unexamined prediction: providing both a positive recommendation context and positive individuating information about the new items can decrease the perceived attractiveness of the new products. In doing so, we add to extant literature on assimilation and contrast by highlighting the role of positive information in creating evaluative contrast.

Context and Informational Influences on Agent Evaluations

Designers of electronic agents have multiple goals. They cannot concern themselves merely with how consumers respond to unfamiliar recommendations; they must also consider how the customer will evaluate the electronic agent. How might contextual recommendations affect agent evaluations? Little is known about the unfamiliar recommendations, so they possess little diagnostic value for assessing the agent. Familiar recommendations, on the other hand, possess considerable diagnostic value. If customers like the familiar recommendations, they are likely to believe that the agent can accurately predict their preferences. Thus, we predict that the consumers will find electronic agents more capable when they provide a set of well-liked familiar recommendations than when they do not, even if those recommendations are unlikely to be purchased.

H3: Consumers will evaluate electronic agents higher when they provide a set of familiar, attractive contextual recommendations than when they do not.

Such a result would have considerable managerial significance as it implies that, under certain circumstances, sites can simultaneously increase attitudes toward new products and toward their site by demonstrating that they understand the consumer's preferences.

Will information specific to the new item affect agent evaluations? We may find a main effect of information if consumers prefer agents that provide them with additional information. We may also observe an interaction between context and information, but the form of that interaction may be different from that predicted for evaluations of unfamiliar recommendations in Hypotheses 1 and 2. Given a set of positive familiar recommendations, Hypotheses 1 and 2 predict that unfamiliar recommendations will be less attractive when product information is provided and more attractive when it is not provided. However, consumers may not incorporate their impressions of the unfamiliar recommendations into their judgment of the agent.

Consumers may form an impression of the agent based only on the most diagnostic cues – the familiar recommendations – and ignore the relatively nondiagnostic unfamiliar recommendations. Product information about the new items may be used only when the recommendation context of familiar items is absent. Thus, we predict a disassociation between agent evaluations and the evaluations of the unfamiliar alternatives.

H4: When electronic agents provide positive information about the recommendations, agent evaluations will be higher only in the absence of a context of well-liked familiar recommendations.

To summarize, we hypothesize that the primary determinant of agent evaluations will be the recommendation context of familiar items. Thus, we predict a disassociation between agent evaluations and the evaluations of the unfamiliar alternatives they recommend.

In this paper, we report the results of three studies designed to investigate the effects of the two web design variables discussed: Recommendation context and item-specific information in electronic agent recommendations. In each case, we examine the effects of these variables on the attractiveness of unfamiliar recommendations and the electronic agent. We use agent interfaces of our own construction to avoid contamination by preexisting attitudes toward an agent or site, taking care to parallel existing electronic agent interfaces. Our research extends the theoretical work on assimilation and contrast, especially by examining the role of positive information in the process of evaluative contrast. It extends the work on source effects by suggesting processes by which a recommending source and its recommendations may be evaluated differently. It also affords new opportunities for the study of consumer–agent interactions.

In Study 1, we present unfamiliar recommendations in isolation or combined with familiar, well-liked recommendations. We also provide information that is either the same or differs between the familiar and unfamiliar recommendations. We find that subjects are more

likely to purchase unfamiliar recommendations when information is similar across recommendations than when it differs, consistent with our thesis. In Study 2, we examine this result more directly in situations in which the recommendation context is made more or less salient and positive individuating information about the unfamiliar recommendations is provided. We find that unfamiliar recommendations result in assimilation to a salient recommendation context in the absence of individuating information and contrast in its presence. Agent evaluations are consistently more favorable in the presence of a positive recommendation context. In Study 3, we directly test the role of item-specific information in contextual processing. Consistent with our theory, we show that unfamiliar recommendations are judged less similar to familiar recommendations in the presence of item-specific information, and that the effects of information on similarity mediate the relationship between information and evaluations of unfamiliar recommendations. Together, these three studies provide insight into the role of context and item-specific information in the evaluation of unfamiliar recommendations. Furthermore, they underscore the relevance of using principles of information processing to understand consumers' reactions to electronic commerce innovations.

General Method

In all of our studies, we used similar methods: Each study involved two sessions. In the first session, subjects completed a pencil-and-paper questionnaire purporting to study current preferences for music. Subjects saw a list of 100 popular CDs spanning many musical genres. Subjects were first asked to identify 10 CDs that they liked very much. They were then asked to rate their familiarity with and liking of these CDs. Unbeknownst to the subjects, these data were used to construct the recommendations they were shown in the second session.

In the second session, subjects were asked to interact with an electronic agent. Subjects interacted with a computer program that first asked them a variety of questions about their music preferences. They were asked what musical genres they liked and to compare different artists. They were also asked their age and sex, and the zip code in which they grew up. Then they saw a status bar indicating that the agent was building a preference profile for them. These steps were taken to increase subjects' beliefs that they were interacting with an actual electronic agent.

After these steps were complete, they were given a set of recommended CDs that varied in familiarity and item-specific information provided. In all conditions, two unfamiliar CDs were recommended. In Studies 1 and 2, both unfamiliar CDs were fictitious to insure that familiarity was low, whereas in Study 3, one unfamiliar CD was fictitious and the other was real, but unknown to our subjects. In some conditions familiar CDs selected from subjects' responses on the first session survey were included. Because music preferences are idiosyncratic, each subject received six familiar CDs that he or she rated as most attractive. Thus, although the identity of the familiar CDs varied from subject to subject, the degree to which each subject liked the familiar recommendations was controlled. Studies also presented information about the CDs, although different information was presented in each study.

Subjects then evaluated each of the unfamiliar CDs and the degree to which the agent captured their preferences. Subjects also rated the similarity between familiar and unfamiliar items in Study 3. All subjects were asked to write a short paragraph describing how they thought the agent had developed the recommendations they saw. Any subject who mentioned the first session survey was excluded from the analyses. In fact, only one subject (in Study 1) was removed for this reason – subject protocols suggested that subjects believed that they were interacting with a real, and quite skilled electronic agent.

Study 1: The Contextual Dependence of Unfamiliar Recommendations

Study 1 was designed to evaluate the role that contextual information plays in evaluating unfamiliar recommendations. In this study, we presented unfamiliar recommendations by themselves or within a context of familiar recommendations. We manipulated the similarity of the familiar and unfamiliar recommendations in the context conditions by presenting information that was either the same across the two sets of recommendations (similar context condition) or differed across the two sets of recommendations (dissimilar context condition). To assess assimilation and contrast, we compared ratings of the unfamiliar recommendations in each of these context conditions to one in which no contextual recommendations were given.

Suppose an agent returned a set of recommendations some of which you liked and others of which were unfamiliar to you. In addition, the agent told you that all of the CDs had been recommended by a particular reviewer. This information is likely to make you perceive the CDs as similar. A substantial body of research shows that when items are viewed as part of a group, the ratings of particular items within the group are assimilated towards the other items in the group (e.g., Stapel and Koomen 1998). This research implies that providing the same review source information for all CDs should result in greater assimilation, making the unfamiliar CDs appear more attractive.

Alternatively, suppose that the agent had returned the same list of recommendations, except that different (but equally informative) review sources had recommended the familiar and unfamiliar CDs. In this case, providing the reviewer information serves to distinguish the familiar and unfamiliar recommendations. Hypothesis 2 and the research just cited suggests that information that decreases the similarity between familiar and unfamiliar recommendations should result in contrast, making the unfamiliar recommendations appear less attractive.

Furthermore, Hypothesis 3 predicts that familiar recommendations will be the primary determinant of agent evaluations and that in the presence of context; information on reviewer endorsement would have little effect. The design of Study 1 did not allow a test of Hypothesis 4, the effects of information in the absence of context, as the informational and contextual manipulations were confounded.

Method

Study 1 used three between-subjects conditions to manipulate recommendation context and information. In each, we presented the same two unfamiliar CDs, both endorsed by the same reviewer. In the no context (control) condition, the two recommendations were presented in isolation. In the similar context condition, the agent recommended six high-preference CDs and two unfamiliar CDs. All eight CDs were endorsed by the same review source. In the dissimilar context condition, subjects also saw six familiar, well-liked CDs and two unfamiliar CDs. However, in this case the six familiar CDs had received an endorsement from a different review source than the source endorsing the two unfamiliar CDs. To avoid the effects of pre-existing review source preferences, we used fictitious reviewers. The endorsements *Diskhaus Five Stars*, *SoundNet Top Pick*, *CD Station Hit*, and *MMR ChartTopper* were randomly assigned to unfamiliar and familiar alternatives. All information was provided on a single screen. Subjects rated their likelihood of buying each of the familiar CDs using a 1 (*Not Very Likely*) to 9 (*Very Likely*) scale. They then rated the degree to which the agent captured their preferences using a 1 (*Not Very Much*) to 9 (*Very Much*) scale.

A total of 65 undergraduate business students at a large northeastern university participated. Forty-eight had previously completed the CD preference assessment task (Session 1). Nineteen subjects were in the Control condition, 12 in the Similar condition, and 17 in the

Dissimilar condition. We report only these data, as we could not control the attractiveness of the contextual recommendations for the subjects who did not take part in the first session.

Results

Do Context Effects Depend on Item Information? Hypothesis 1 predicts that when information is similar across familiar and unfamiliar recommendations, assimilation of the contextual information will result, thus making unfamiliar recommendations appear more attractive. Across unfamiliar CDs, the mean purchase likelihood rating was 2.5 in the similar condition and 2.0 in the control condition. The difference between the similar and control conditions was marginally significant ($t_{60} = 1.3, p < .1$) and in the direction predicted by Hypothesis 1.

Hypothesis 2 predicts that when information differs between unfamiliar and contextual recommendations, consumers will tend to contrast the sets, thus making unfamiliar recommendations appear less attractive. Subjects rated the unfamiliar CDs higher in the control condition ($M = 2.0$) than in the dissimilar condition ($M = 1.6$). Unfamiliar CDs were significantly more likely to be purchased in the control condition than in the dissimilar condition ($t_{70} = 1.72, p < .05$), consistent with Hypothesis 2.

How Does Item Information Affect Agent Evaluations? Hypothesis 3 predicts that agent evaluations will depend on the inclusion of well-liked recommendations. In Study 1, the mean agent evaluations were 2.2, 7.2, and 7.4 in the control, similar, and dissimilar conditions, respectively. Subjects evaluated the agent significantly lower in the control condition than in both the similar ($t_{72} = 14.1, p < .001$) and the dissimilar ($t_{74} = 16.4, p < .001$) condition, consistent with Hypothesis 3. Furthermore, the evaluations of the similar and dissimilar agents did not differ significantly ($t_{68} = 0.8, ns$), indicating that additional information provided about the

familiar and unfamiliar recommendations has no impact on agent evaluations. Thus, we find that although the configuration of information had a substantial impact on the relationship between context and the evaluations of unfamiliar recommendations, it had no discernible effect on the evaluations of the agents themselves. Instead, agent evaluations seemed to be determined primarily by the presentation of a positive recommendation context, with little regard for how familiar and unfamiliar recommendations related to each other.

Discussion

Study 1 provides convincing evidence that contextual recommendations affect the evaluations of unfamiliar products. Perhaps of greater relevance, Study 1 demonstrates that the information one provides about the recommendations determines the mechanism by which recommendation context is processed. Evaluations of the unfamiliar recommendations are significantly higher in the similar context, where assimilation is predicted, than in the dissimilar context, where contrast is predicted. We explore the processes of assimilation and contrast in greater detail in Studies 2 and 3.

Do these results imply that managers can sell unfamiliar CDs by providing a positive context? Unfortunately, the purchase likelihood ratings we observed were quite low (with means ranging from 1.6 to 2.5 on a 1 to 9 scale), across all conditions. However, it may be possible for managers to combine such a manipulation with other promotional devices or repeated exposures so as to increase the absolute attractiveness of the unfamiliar CDs. More important, these results identify a theoretical mechanism that can be used to overcome consumers' general negativity towards unfamiliar recommendations (cf. Park and Lessig 1981). These results offer designers of electronic agents both an opportunity and a caution. They suggest that providing a positive recommendation context unconditionally may hurt rather than help sales. Information about the

unfamiliar items must not distinguish them from the familiar contextual items, or consumers may contrast the two sets resulting in lower evaluations for the unfamiliar recommendations. In Studies 2 and 3, we unconfound item-specific information from the manipulation of context and examine its role in the evaluation of unfamiliar recommendations.

Study 2: Item-Specific Information and Recommendation Context

In Study 1, we manipulated the processing of contextual recommendations by providing information about review source that was either the same or different for familiar and unfamiliar recommendations. However, there exist a variety of other types of information on the Internet that may affect contextual processing and have a stronger impact on purchase likelihoods. When shopping for music, consumers typically examine biographies of the artist, pictures, and even short samples of her music.

How will including information about the new items affect the processing of contextual information? As long as the music samples are likeable, consumers will find the unfamiliar CDs more attractive than when they are provided without music. However, including music clips may also cause contextual information to be processed in a different manner. In particular, because music samples provide vivid individuating information, they may induce customers to compare the unfamiliar recommendations to the other recommendations provided. Much research has shown that when context and target items are distinguished, contrast results (Meyers-Levy and Tybout 1997; Seta, Martin and Capehart 1979; Stapel and Spears 1996). It is possible that providing well-liked contextual recommendations tends to increase the attractiveness of unfamiliar alternatives, as does providing likeable music clips. However, providing both cues simultaneously may lower evaluations of the unfamiliar recommendations because the item-

specific information induces contrast. We examined this counter-intuitive possibility along with possible boundary conditions on contextual effects in Study 2.

Designers of electronic agents have considerable flexibility in how they present recommendations and information about those recommendations, and some formats may be better than others. In particular, it is possible to present information in ways that tend to either emphasize or de-emphasize contextual comparisons. For example, an electronic agent could present all recommendations simultaneously on the same page. This organization makes the contextual recommendations especially salient and increases the ease with which recommendations can be compared. Alternatively, an electronic agent could present recommendations sequentially, with different recommendations appearing on different screens, making it harder to compare the recommendations.

How might the temporal organization of the recommendations affect the use of context? Some research suggests that context has impact only when it is salient (cf. Taylor 1979). This research implies that because contextual comparisons are more salient when the context and target recommendations are presented simultaneously, the effects of context should be amplified. When context and target recommendations are presented on the same screen and individuating information is absent, assimilation should result. Assimilation should be less when context and target recommendations are presented on separate screens. Similarly, when item-specific information is provided, contrast effects should be strongest in the simultaneous presentation format, and weaker in the sequential presentation format. This does not necessarily imply that assimilation and contrast will not occur with sequential presentation, only that the assimilation and contrast obtained should be of lesser magnitude than with simultaneous presentation.

Perceptual research, on the other hand, suggests a different result for presentation format. Studies of perceived line length (Jordan and English 1989; Jordan and Uhlarik 1985) and face perception (Wedell, Parducci, and Geiselman 1987) have shown that simultaneous presentation of context and target tends to result in assimilation of the target towards the context, whereas sequential presentation of context and target tends to produce contrast. This work predicts that unfamiliar recommendations will be judged as more attractive in the simultaneous format, but as less attractive in the sequential format. As this work has not examined the effects of individuating information, our research also addresses the boundary conditions of presentation format and its interaction with item-specific information.

In summary, we predicted that for evaluations of the unfamiliar items, the effect of context would be such that when item-specific information is absent, assimilation occurs (H1) and when item-specific information is present, contrast occurs (H2). Furthermore, we predict that presenting familiar and unfamiliar recommendations simultaneously (sequentially) increases (decreases) the effects of context. The design of Study 2 allowed us to also examine both hypotheses relating to agent evaluations. Specifically we predicted a disassociation between item and agent evaluations such that agent evaluations are primarily influenced by the presence of familiar context rather than information about the unfamiliar alternatives or their presentation (H3), and that item-specific information plays a role in agent evaluations only in the absence of context (H4).

Method

Study 2 was based on a 3 (context) \times 2 (information) between-subjects factorial design. In the control condition, subjects saw only the two unfamiliar recommendations. In the sequential condition, subjects first saw six high-preference CDs on one screen. They clicked a

“Continue” button, and then saw the two unfamiliar recommendations on a different screen. In the simultaneous condition, subjects saw six high-preference familiar CDs and two unfamiliar CDs on the same screen. In the information present condition, subjects heard a short music clip (about 10 seconds in duration) prior to evaluating each of the unfamiliar CDs. Clips were not provided in the information absent condition.

Two music clips were selected on the basis of pre-testing. We pre-tested a set of instrumental clips to select clips that were considered attractive (mean ratings of 6.1 and 6.4 on 7-point scales, where “7” was like very much) but unfamiliar (mean ratings of 1.9 and 2.0 on 7-point scales, where “7” was very familiar). These clips (from a Dutch web site) were randomly assigned to each of the unfamiliar CD titles. All subjects in the information present conditions heard the same clips.

A total of 118 subjects from a large northeastern university participated in session 2. Eighty-four of these had also completed the first session survey. A total of 13, 12, and 14 subjects participated in the simultaneous, sequential, and control conditions without music, respectively, and 16, 14, and 15 participated in the corresponding conditions with music.

Results

As anticipated, providing music clips had a strong positive impact on subjects’ ratings of the unfamiliar recommendations ($F_{1,79} = 296, p < .001$). There was no significant main effect of context ($F_{2,79} < 1, ns$), but there was a significant interaction between context and information ($F_{2,79} = 68.8, p < .01$). We will explore the nature of this interaction in the following sections by examining simple effects of context for each level of information.

Context Effects in the Absence of Item-Specific Information. Hypothesis 1 predicts that, when no item-specific information is provided, consumers will tend to assimilate unfamiliar

recommendations in the direction of the contextual recommendations thus judging them more positively. However, we also predict that this effect will be stronger when context is more salient (simultaneous condition), and decline as context becomes less salient (sequential condition) or absent (control condition). Mean ratings of the unfamiliar CDs are shown in Figure 1. Error bars represent one standard error of the mean.

Insert Figure 1 about here.

Across unfamiliar CDs in the information absent condition, mean ratings were 3.38, 2.46, and 2.00 in the simultaneous, sequential, and control contexts, respectively. The difference between the simultaneous and control conditions was statistically significant ($t_{25} = 2.25, p < .05$). This result indicates that when context was present and salient, subjects assimilated the unfamiliar recommendations in the direction of the positive recommendation context, consistent with Hypothesis 1. The difference between the sequential condition and the other two conditions did not reach significance ($t_{23} = 1.23$ for simultaneous vs. sequential and $t_{24} = 0.74$ for sequential vs. control). Although the difference between the simultaneous and sequential condition did not reach significance, the ratings of unfamiliar alternatives had been reduced to the point that it was statistically indistinguishable from the condition where context is entirely absent.

Context Effects in the Presence of Item-Specific Information. Hypothesis 2 predicts that, when item-specific information about the alternatives is provided, consumers will tend to contrast unfamiliar and familiar recommendations. When attractive music clips are provided, presenting well-liked familiar recommendations along with the unfamiliar recommendations will result in the unfamiliar recommendations appearing less attractive. Furthermore, we expect that this effect will be stronger when context is more salient. Thus, we predict that unfamiliar

recommendations will be judged more positively when positive item-specific information is available and the context is weak (sequential condition) or absent (control condition) than when recommendation context is present and salient (simultaneous condition).

Across unfamiliar CDs in the information present condition, mean ratings were 3.75, 5.07, and 4.70 in the simultaneous, sequential, and control conditions, respectively. The difference between the simultaneous condition and the other two conditions was significant ($t_{28} = 1.86, p < .05$ for simultaneous vs. sequential and $t_{29} = 1.70, p < .05$ for simultaneous vs. control). The sequential and control condition means did not differ significantly ($t_{27} = 0.26, ns$). The evidence is consistent with Hypothesis 2; when music clips were available, providing a positive and salient recommendation context resulted in lower ratings of the unfamiliar recommendations, a contrast effect. However, this effect appears labile; simply separating the familiar and unfamiliar recommendations onto separate pages caused the contrast effect between recommendation set and experiential information to disappear.

Context versus Item-Specific Experience. Another way to view these data is to ask whether recommendation context overshadows the effects of item-specific information. Subjects tended to view unfamiliar CDs as more attractive when they had additional information about them, even when that information consisted of only a short music sample. The main effect of information was significant ($F_{1,78} = 25.2, p < .001$). When recommendation context was absent (control condition) or less salient (sequential condition), the effects of information were pronounced ($t_{24} = 3.6$ in the sequential condition and $t_{27} = 5.2$ in the control condition, both $ps < .001$). When recommendation context was available and salient (simultaneous condition), on the other hand, item-specific experience had no discernible effect ($t_{27} = 0.5, ns$). This result suggests that while recommendation context may be beneficial in particular situations, it may also serve to

overshadow any positive experiential information provided. Of course, this effect is expected to depend on the evaluative strength of the information.

How Do Context and Information Affect Agent Evaluations? The preceding results suggest that a positive recommendation context can either make unfamiliar recommendations appear more or less attractive, depending on whether item-specific experience is provided. Do context and item-specific experience also affect agent evaluations? Mean agent evaluations are shown in Figure 2. We found significant main effects of context ($F_{2,79} = 45.5, p < .001$) and information ($F_{1,79} = 6.4, p < .01$), and a significant context \times information interaction ($F_{2,79} = 37.2, p < .001$). When no item-specific information was provided, the mean agent ratings were 8.0, 7.2, and 1.7 in the simultaneous, sequential, and control conditions, respectively. The control condition differed significantly from the other two conditions ($t_{26} = 17.0, p < .001$ for simultaneous vs. control and $t_{24} = 8.06, p < .001$ for sequential vs. control). The mean agent evaluations for the simultaneous and sequential conditions did not differ significantly ($t_{24} = 1.0, ns$).

When music clips were provided, mean agent evaluations followed an identical pattern and were 7.5, 7.0, and 5.3 in the simultaneous, sequential and control conditions, respectively. Again, the rating of the control agent was significantly different from that of the simultaneous ($t_{29} = 2.92, p < .01$) and sequential ($t_{27} = 2.00, p < .05$) conditions, but the simultaneous and sequential conditions did not differ ($t_{28} = 0.68, ns$). Finally, mean evaluations differed as a function of information for subjects in the control context ($t_{27} = 4.65, p < .001$) and was higher when information was provided (5.3 versus 1.7) but not for the other two contexts ($t_{28} = 1.3$ for simultaneous and $t_{24} = 0.1$ for sequential, both $ps > .1$).

Insert Figure 2 about here.

These results indicate that subjects prefer agents who provide a positive recommendation context, consistent with hypothesis 3. They also show that providing additional information has no impact on attitudes toward the agent when a positive recommendation context is available, consistent with Hypothesis 4.

Discussion

One approach to increasing the attractiveness of unfamiliar items is to provide consumers with positive experiential information that relates specifically to the product. As technology improves and becomes more widespread, it is becoming increasingly easy to provide consumers with this sort of information via their web browser (at least for particular product categories). But how do item-specific information and recommendation context interact to determine the attractiveness of an unfamiliar suggestion?

Study 2 shows that the same context of familiar recommendations can affect the evaluation of an unfamiliar recommendation in different ways depending on the information provided. When item-specific information is absent, consumers tend to assimilate unfamiliar recommendations in the direction of a salient recommendation context. When item-specific information is provided, on the other hand, consumers tend to contrast familiar and unfamiliar recommendations, resulting in lower item evaluations. These contextual effects appear quite sensitive to temporal factors; presenting familiar and unfamiliar recommendations on different screens eliminated both assimilation and contrast. Our findings of assimilation and contrast do not extend to ratings of agent competence, which are driven by the presence or absence of high-

quality recommendations. Positive experiential information affects agent evaluations only when context is absent, consistent with Hypothesis 4.

In sum, Study 2 corroborates the key result of Study 1, that providing item-specific information can alter how consumers process contextual recommendations, reversing the effects of context on unfamiliar recommendations. However, neither Study 1 nor Study 2 provides direct evidence of the underlying mechanism that results in assimilation or contrast. In Study 3, we show that providing item-specific information about the unfamiliar recommendations causes consumers to view them as less similar to the familiar recommendations, and that this effect mediates the effect of item-specific information on product evaluations.

Study 3: Recommendation Similarity and Contextual Effects

The two preceding studies indicate that familiar recommendations can provide a context relative to which unfamiliar recommendations are evaluated, and that either assimilation or contrast can result. We claim that assimilation is invoked when consumers view the familiar and unfamiliar recommendations as similar or of the same type, whereas contrast is invoked when consumers view familiar and unfamiliar recommendations as different sets. Although this view is consistent with much research on contextual effects, the preceding studies do not provide any direct evidence of a mediating effect of similarity. In Study 3, we assess subjects' perceptions of the similarity between familiar and unfamiliar CDs. This enables a direct test of the effects of item-specific information on recommendation similarity. We also change the nature and amount of information on the unfamiliar alternatives to reflect information typically found on Internet music sites. In addition, we ask subjects to estimate their reservation price for each of the unfamiliar CDs so that we can examine the managerial significance of these effects. We use both a fictitious and a real unfamiliar CD to ensure that the effects are generalizable. As in the

previous studies, we measure agent evaluations to confirm the disassociation between agent and item evaluations found in Studies 1 and 2.

In Study 3, we use three contextual conditions: In the control condition, the agent recommends only two unfamiliar CDs. In the unrelated context condition, the agent recommends the same two unfamiliar CDs along with six CDs that are familiar and liked by the subject. All eight recommendations are presented simultaneously. In the related context condition, the agent recommends the same two unfamiliar CDs along with six familiar, well-liked CDs. Again, all recommendations are given simultaneously, but context is further strengthened by telling subjects that the unfamiliar CDs represent new artists that were chosen through a collaborative filtering process – people who liked the familiar CDs also tended to like the recommended unfamiliar CDs. These three levels of context were crossed with two levels of information about the unfamiliar CDs. In the information absent condition, only the names of the artist and the titles of the CDs were provided. In the information present condition, subjects were also given a short biography of the band, a picture of the band or CD cover art, and a 30 second clip of music from the CD. Thus, the information present condition in this study closely resembles the information that is typically available when purchasing CDs from online retailers.

Method

Study 3 differed from Study 2 in the way in which context was manipulated and in the item-specific information provided about the unfamiliar recommendations. Control conditions were virtually identical across the two studies, and the unrelated condition in Study 3 was virtually identical to the simultaneous condition in Study 2. Study 2 examined the effects of dampening context through sequential presentation of context. Conversely, Study 3 attempted to further strengthen context by relating the familiar and unfamiliar items with the addition of the

following statement between the familiar and unfamiliar recommendations: “People who liked the above CDs also like the following similar CDs by new artists.”

Unlike Studies 1 and 2, in Study 3 only one of the two unfamiliar CDs recommended (Tula: *Tonight and Forever*) was fictitious. The music and image for this CD were taken from existing artists with whom subjects had no familiarity, and we constructed the artist’s biography. For the other unfamiliar CD, we identified a CD that pre-testing showed was unfamiliar to our subjects. We used both actual and fictitious CDs to demonstrate that our earlier results did not depend on the fictitious nature of the unfamiliar CDs. The biography, image, and sound clip for the real CD (The Figgs: *Sucking in Stereo*) were taken from a popular online CD retailer. Thus, our Study 3 materials paralleled those found on Internet sites.

Subjects answered the same preliminary music preference questions as in Studies 1 and 2. Following this, they were shown a set of recommendations on a single page. Subjects in the information present condition were told to click on each unfamiliar CD to receive the additional information about the artist. Subjects were not permitted to continue to the dependent measures until the information had been accessed for both unfamiliar CDs. Subjects then rated their likelihood of purchasing each of the unfamiliar CDs, and the maximum value they would pay to buy that CD. Subjects in the related and unrelated conditions then rated the similarity of the first unfamiliar CD to each of the first three familiar CDs and of the second unfamiliar CD to each of the second three familiar CDs in random order. No differences existed among pairwise similarity ratings, so the six measures were averaged to produce a single similarity index. Subjects then rated the agent and were debriefed.

101 undergraduate students at a large Northeastern university participated in return for class credit. Of these, 65 had previously completed our pencil-and-paper music questionnaire.

These 65 subjects were randomly assigned to each condition, with eleven serving in each condition except for the no information control condition, which had ten subjects.

Results

Context Effects in the Absence of Item-Specific Information. Hypothesis 1 predicts that in the absence of item-specific information, subjects will tend to assimilate unfamiliar recommendations towards the evaluations of the familiar recommendations. This effect should be significant for both the unrelated and the related conditions, although it may be stronger for the related condition if consensual preference information makes the context more salient. Mean purchase likelihood ratings of the unfamiliar CDs are shown in Figure 3 and mean reservation prices are shown in Figure 4. Error bars represent one standard error of the mean. As predicted, mean likelihood ratings for the related and unrelated information absent conditions are significantly greater than that of the information absent control condition, indicating assimilation ($t_{19} = 4.20, p < .01$ for related versus control and $t_{19} = 3.72, p < .01$ for unrelated versus control). Purchase likelihood ratings did not differ significantly between the related and unrelated condition, indicating little influence of consensual preference information ($t_{20} = 0.18, ns$).

Insert Figure 3 about here.

The assimilation effects were even more pronounced for reservation prices. Subjects were willing to pay a mean of \$9.00 and \$8.68 for the unfamiliar CDs in the related and unrelated conditions, respectively, but were only willing to pay a mean of \$4.18 for the same unfamiliar CDs in the information absent control condition. Thus, subjects were willing to pay nearly double the amount for the same unfamiliar CDs when contextual recommendations indicated that the agent understood their personal preferences. Reservation prices for the information absent

related and unrelated conditions each differ from the control condition ($t_{19} = 2.66, p < .01$ and $t_{19} = 2.53, p < .05$, respectively). Reservation prices did not differ significantly between the related and unrelated conditions ($t_{20} = 0.23, ns$).

Insert Figure 4 about here.

Context Effects in the Presence of Item-Specific Information. Hypothesis 2 predicts that item-specific information about the unfamiliar recommendations will cause subjects to contrast them with the familiar recommendations, resulting in lower evaluations in the related and unrelated conditions. This effect should be significant for both the unrelated and the related conditions, although it may be stronger for the related condition. As predicted, unfamiliar CD evaluations in the related and unrelated information present conditions were lower than in the information present control condition. These differences did not reach statistical significance for the purchase likelihood measure ($t_{20} = 0.68$ and $t_{20} = 0.61$, respectively), but were significant for the reservation price measure ($t_{20} = 2.24, p < .05$ and $t_{20} = 1.89, p < .05$, respectively). The related and unrelated conditions did not differ significantly on either measure ($t_{20} = 0.13$ for purchase likelihood and $t_{20} = 0.76$, for reservation prices, both *ns*).

Again, the effects of context and item-specific information on reservation prices are striking. Subjects were willing to pay a mean of \$7.48 for the unfamiliar CDs when information about the CD but no other contextual recommendations was given. However, subjects were only willing to pay \$4.11 and \$5.14 for the same CDs in the related and unrelated conditions, respectively. This result indicates that although providing item-specific information can cause consumers to perceive unfamiliar products as more attractive in the absence of recommendation context, providing both item-specific information and a positive recommendation context can

invoke a different evaluative process, causing consumers to perceive the unfamiliar products as less attractive.

Item-Specific Information and Similarity. We believe that item-specific information causes people to distinguish recommendations from one another that they otherwise would have perceived as similar or belonging to the same category. Studies 1 and 2 do not provide direct evidence of this process. In Study 3, on the other hand, we also collected direct similarity ratings between familiar and unfamiliar CDs in the conditions where both were presented, allowing us to directly test whether similarity mediates the relationship between item-specific information and product perceptions. To test for this relationship, we effects-coded the information conditions (-1 = information present, +1 = information absent) and the two context conditions (-1 = related, +1 = unrelated). We then performed a linear regression in which we predicted mean purchase likelihood ratings for the two unfamiliar CDs from the information condition, the context condition, and the cross-product of the two factors. We found a significant positive effect of information ($\beta = 1.57, t_1 = 3.00, p < .001$). The coefficients for context and the cross-product were both negative and nonsignificant ($\beta = -0.02, t_1 = 0.04$ and $\beta = -0.57, t_1 = 0.22$, respectively).

Next, we predicted mean purchase likelihood from the average similarity rating between familiar and unfamiliar CDs. The effect of similarity on purchase likelihood was positive and significant ($\beta = 0.86, t_1 = 4.62, p < .001$). Finally, we estimated the full regression in which we predicted mean purchase likelihood from the information condition, the context condition, the cross-product, and the mean similarity rating. We found that the coefficient for similarity was positive and significant ($\beta = 0.74, t_1 = 3.46, p < .001$), whereas the coefficient for information was no longer significant ($\beta = 0.76, t_1 = 1.46, p = .15$). Thus, our results indicate that the

similarity of familiar and unfamiliar recommendations mediates the relationship between item-specific information and purchase likelihood, consistent with our thesis.

Context, Information and Agent Evaluations. The results of Studies 1 and 2 indicated that contextual recommendations affected the evaluations of unfamiliar recommendations and of the recommendation agent in different ways. We again found that agent evaluations depended primarily on the presence or absence of a positive recommendation context, supporting Hypothesis 3. In this study, agent evaluations were relatively unaffected by item-specific information, even when context was absent; thus, Hypothesis 4 was not supported. Figure 5 shows mean ratings of the agent as a function of context and item-specific information. Mean agent ratings when contextual recommendations were absent were 2.6 (information absent) and 3.2 (information present). When contextual recommendations were present, mean agent ratings ranged from 5.8 to 8.6. Each of the control conditions differed significantly from each of the four context conditions (all $t_s > 2.3$, all $p_s < .05$), whereas the two control conditions did not differ significantly from one another ($t_{19} = 0.84$, ns).

Insert Figure 5 about here.

We also found that agent evaluations were lower on average when item-specific information was presented in the related context than in the other context conditions. Mean agent evaluations did not differ significantly between the information present related condition and the information present unrelated condition ($t_{20} = 1.47$, $p < .16$), but did differ significantly between the information present related and the two information absent context conditions ($t_{10.4} = 2.72$, $p < .05$ for the information absent related condition and $t_{11} = 2.07$, $p < .06$ for the information absent unrelated condition, using a Satterthwaite correction for unequal variances). These results

suggest that the contrast effects produced by providing item-specific information and a strong context may in fact adversely affect agent evaluations, but that this effect is considerably smaller than the positive effect of providing the recommendation context.

General Discussion

Theoretical Contributions. Through a set of three studies that increasingly parallel the design of online retailers, this research explores the role of familiarity, context, and item-specific information in electronic agent recommendations. Consumers tend to react negatively toward unfamiliar recommendations, but electronic agents must provide consumers with information about new, unfamiliar alternatives in order to sell those products. How are agents to overcome consumers' negative reactions to unfamiliar recommendations?

One solution might be to embed unfamiliar recommendations among a set of recommendations that the consumer is known to like. Although consumers may be unlikely to purchase these contextual alternatives (perhaps because they already own these products), the presence of the familiar alternatives may increase the attractiveness of the unfamiliar alternatives. We show that judgments of unfamiliar recommendations are indeed sensitive to recommendation context, consistent with this notion.

However, we suggest that it is unwise to provide users with contextual recommendations without carefully considering how they are likely to be processed. Our research demonstrates that even when the contextual recommendations are all positive, negative effects of context can occur. Our results across all three studies show that that distinguishing information about new options, when combined with attractive familiar contextual recommendations, leads consumers to contrast familiar and unfamiliar alternatives, and to evaluate the new options less favorably. This occurs even when the distinguishing information is evaluated as positive. Existing research

on context effects has primarily focused on descriptive matches between context and stimulus and the role of evaluatively neutral information in producing this match or mismatch (Fiske 1998). By examining the effects of positive distinguishing information, we extend research in this domain in a meaningful way.

Our research also examines the effects of recommendation context and item information on consumers' evaluations of the agent. Interestingly, we show that the same factors can have dramatically different implications for evaluations of agents and unfamiliar items. The impact of context on the evaluation of unfamiliar recommendations depends on the information provided about the unfamiliar recommendations. However, item-specific information appears to have relatively little impact on how context affects the evaluation of the agent. All three studies demonstrate that agent evaluations are most sensitive to the presence of a positive recommendation context.

Why might this dissociation occur? We suspect that the explanation lies in the different nature of the two tasks. When assessing the value of an unfamiliar alternative, both information about the recommendation itself and the agent's ability to provide other high-quality recommendations **are** paramount. Furthermore, while engaging in a process of comparing familiar and unfamiliar items, consumers consider not only the evaluative implications of this information but also the descriptive implications that relate familiar and unfamiliar items. When evaluating the agent, on the other hand, the consumer's focus is on those recommendations that are diagnostic of the abilities of the agent. Unfamiliar recommendations are, by definition, less diagnostic than familiar ones, and are correspondingly given less weight in evaluating the agent. Contrastingly, the dominant research on person perception assumes that, inevitably, evaluations of a source mediate the evaluation of its recommendations (see Gilbert 1998 for a review). The

dissociation between agent and item evaluation found in our research raises questions about the boundary conditions for when source evaluations do not mediate item evaluations. Thus, our research provides some important first steps in developing a theory of contextual factors in item and agent evaluations. Our results further suggest that agent designers may be able to offset negative attitudes toward unfamiliar alternatives with careful design of item-specific information, and at the same time run little risk of damaging consumers' attitudes toward the agent or retail site. These implications are detailed below.

Agent Design Implications. Our research has a variety of implications for the design of electronic agents. Foremost is that context matters; the attractiveness of an unfamiliar recommendation and of the recommending agent, depend on the recommendation set. However, our research also demonstrates that positive contextual recommendations do not always produce positive effects for the judgments of new products. It is important that designers of electronic agents create contexts judiciously. We offer the following tentative guidelines for designers of electronic agents:

Providing contextual recommendations may be beneficial when:

1. The contextual recommendations are known to be attractive to the consumer. This condition is most easily met when the agent has access to individual consumers' purchase histories or post-sales satisfaction data.
2. The contextual recommendations are likely to be perceived as similar to the target item. Because the agent is presenting the information, the agent has control over what information is presented and thus can present information only when it tends to be similar across recommendations.
3. The context can be provided in a manner that makes it salient when consumers first encounter the unfamiliar recommendations. Small spatial or temporal distinctions may render context ineffective (as in the sequential conditions of Study 2).
4. Little additional information, especially distinguishing experiential information, is available about the target recommendation.

Conversely, new recommendations should be presented in isolation when:

1. Little is known about the shopper, and therefore it is not possible to construct a set of highly attractive contextual recommendations.
2. The familiar recommendations are likely to be perceived as different from the unfamiliar recommendations. This may depend on both the information available about the alternatives and on the manner in which the information is presented.
3. When distinguishing information about the target item is made available.
4. When strongly positive information about the target item is made available.

Directions for Future Research. The study of consumer reactions to electronic agents' recommendations is interesting, in part, because consumers typically have little insight into the processes by which the agents make recommendations. In this paper, we examined how the results of this process (the recommended items and the information about them) determine reactions to specific recommendations and to the agent. How would consumers react to visible differences in the level of effort agents input into the recommendation process? Conventional wisdom on Internet agents holds that electronic agents should assess consumer preferences as surreptitiously as possible. However, research in salesforce effectiveness has shown that salesperson evaluations increase with the perceived amount of effort expended to learn about the consumer (Weitz 1978; Weitz, Sujana and Sujana 1986; Weiner and Kukla 1970; Friestad and Wright 1994). This work suggests that, rather than obscuring the details of the recommendation process, as is typically done, agents may be viewed as more capable if they assess consumer preferences in an effortful and obvious fashion, asking a number of very targeted questions.

This paper focuses on consumer reactions to unknown electronic agents. Because of the large number of web sites and electronic agents available, consumers interact with unknown agents frequently. However, as use of the Internet for commerce increases, consumers will likely visit specific agents multiple times and begin to form stable evaluations of agent performance. Consequently, another interesting direction for future research is to examine the impact and recommendation set context and agent evaluation in a dynamic setting. It is possible, for instance, that consumers are especially sensitive to recommendation context at an early stage of

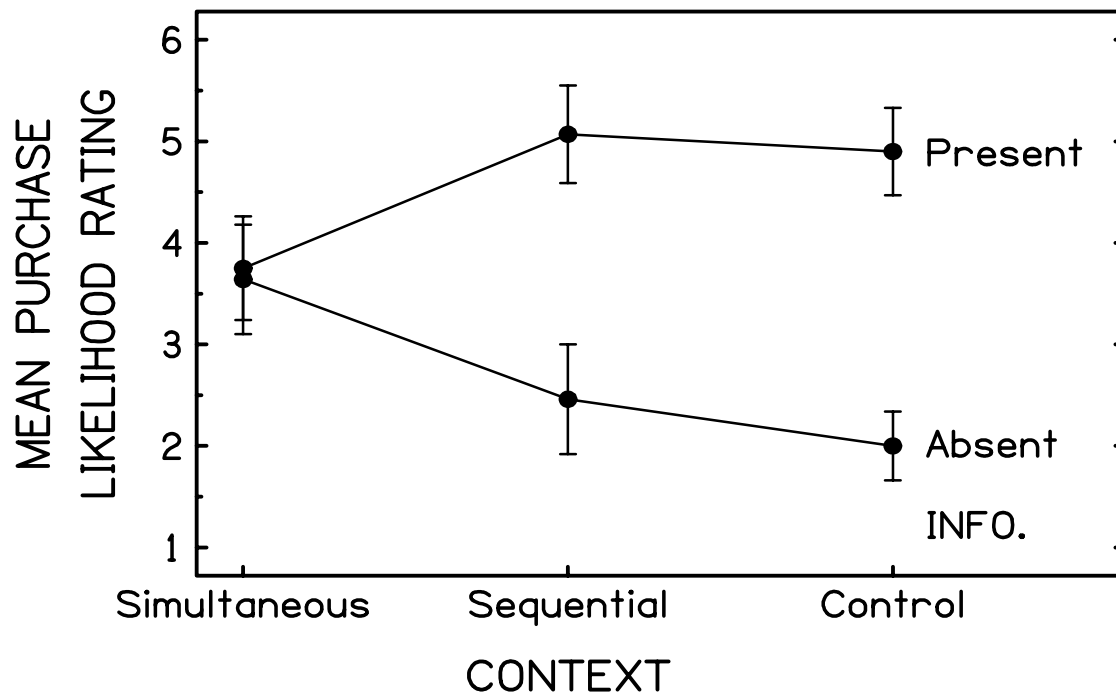
the relationship, but as experience with the agent grows, so does the level of “trust” that the consumer places in the agent’s recommendations. That is, the dissociation between agent evaluation and item evaluation disappears with repeated visits to a site.

A third interesting line of inquiry relates to the way consumers categorize products. Our research suggests several ways in which unfamiliar products within a product category can be made more attractive. Do these factors also affect cross-category recommendations? When agents recommend a diverse set of products (both books and CDs, for example), can knowledge of the consumer’s preferences for one category be employed to increase purchases in other categories? Collaborative filtering algorithms base their recommendations on what consumers with similar preferences have bought. Because they do not explicitly represent product categories, they are easily applied to cross-category selling. However, the effectiveness of cross-category recommendations remains unexplored.

In conclusion, this paper uses and extends theories of assimilation and contrast to demonstrate that context plays an important role in consumers’ and retailers’ use of electronic agents. In addition to developing more sophisticated agent technology, firms need to develop a better understanding of how consumers respond to different forms of agent recommendations. As our studies show, different types of information available through electronic agents – new product information, experiential information (e.g., product samples) and contextual information that is made more or less salient – can combine in ways that that need to be carefully assessed and managed. As the use of electronic agents increases, we may find that the greatest impediment to progress lies not in technological hurdles, but in our limited understanding of the determinants of consumer preferences.

Figure 1

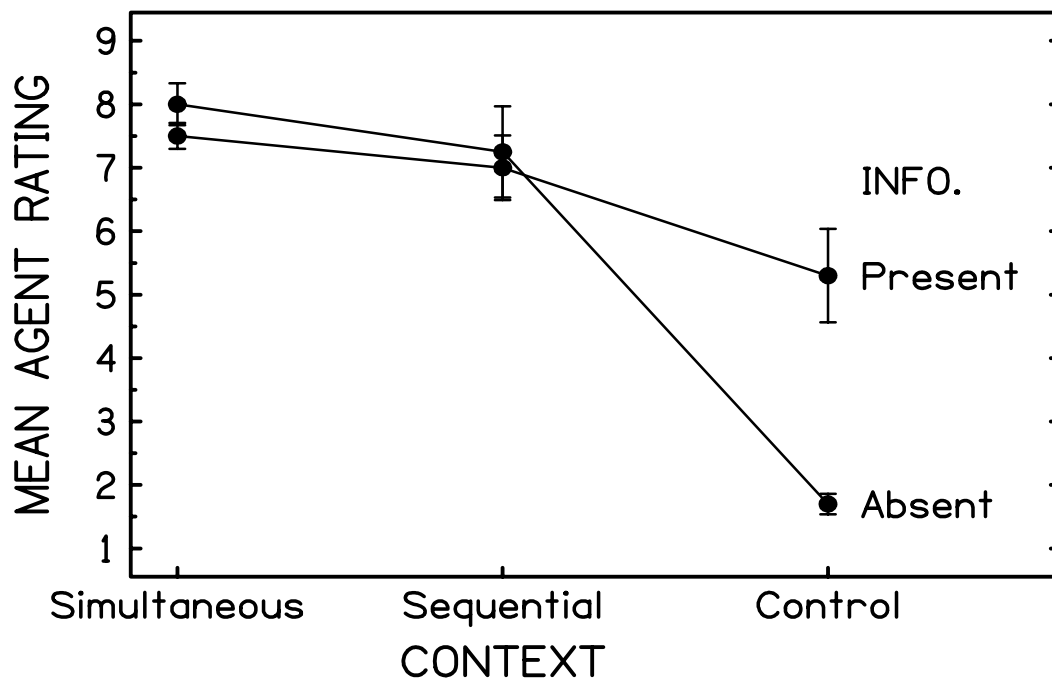
**Mean Purchase Likelihood Ratings For Unfamiliar CDs
As A Function Of Context And Item-Specific Information**



Note: Error bars represent one standard error of the mean

Figure 2

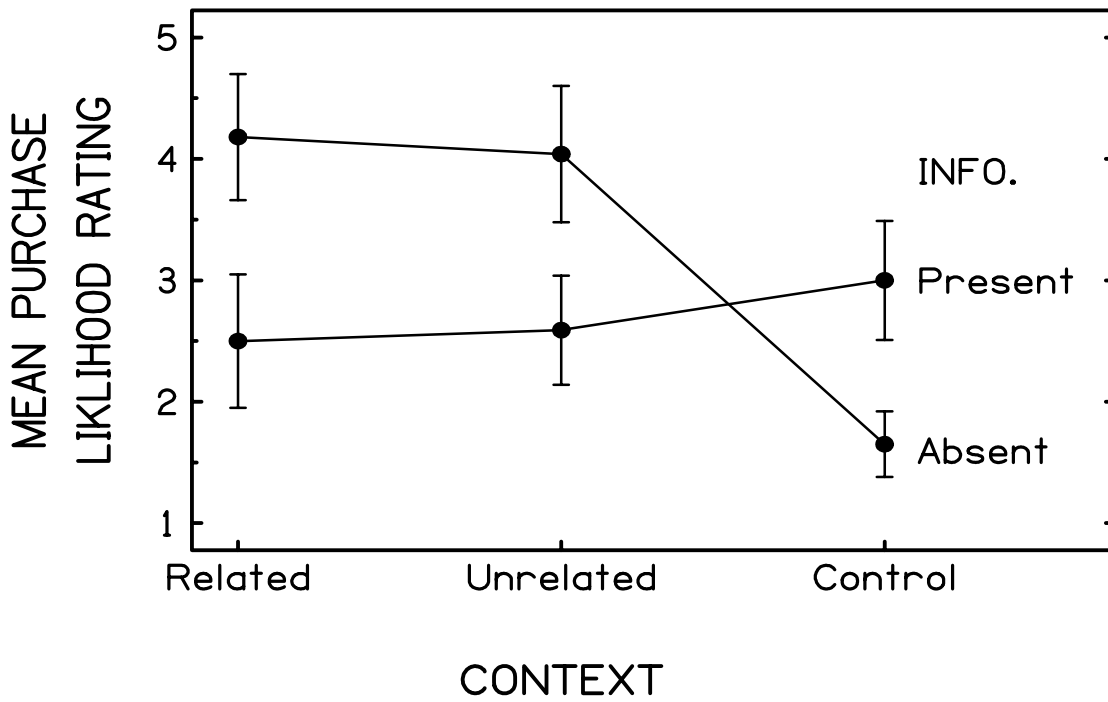
Mean Agent Ratings As A Function Of Context And Item-Specific Information



Note: Error bars represent one standard error of the mean

Figure 3

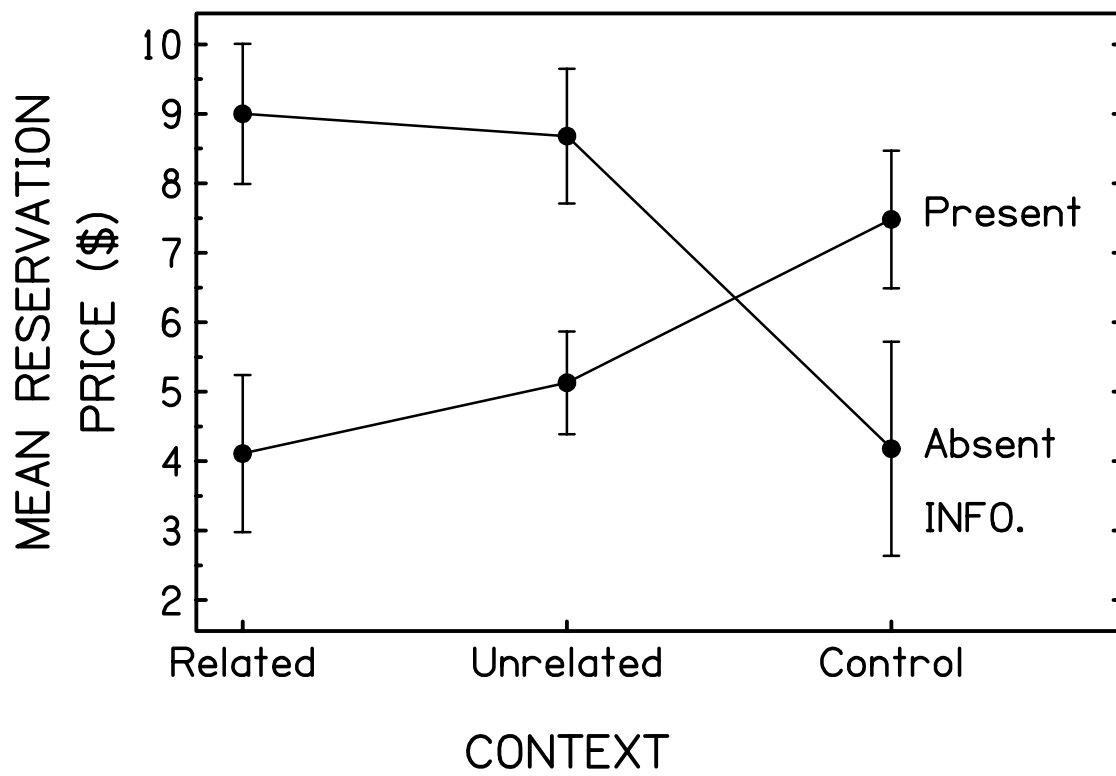
**Mean Purchase Likelihood Ratings For Unfamiliar CDs
As A Function Of Context And Item-Specific Information**



Note: Error bars represent one standard error of the mean

Figure 4

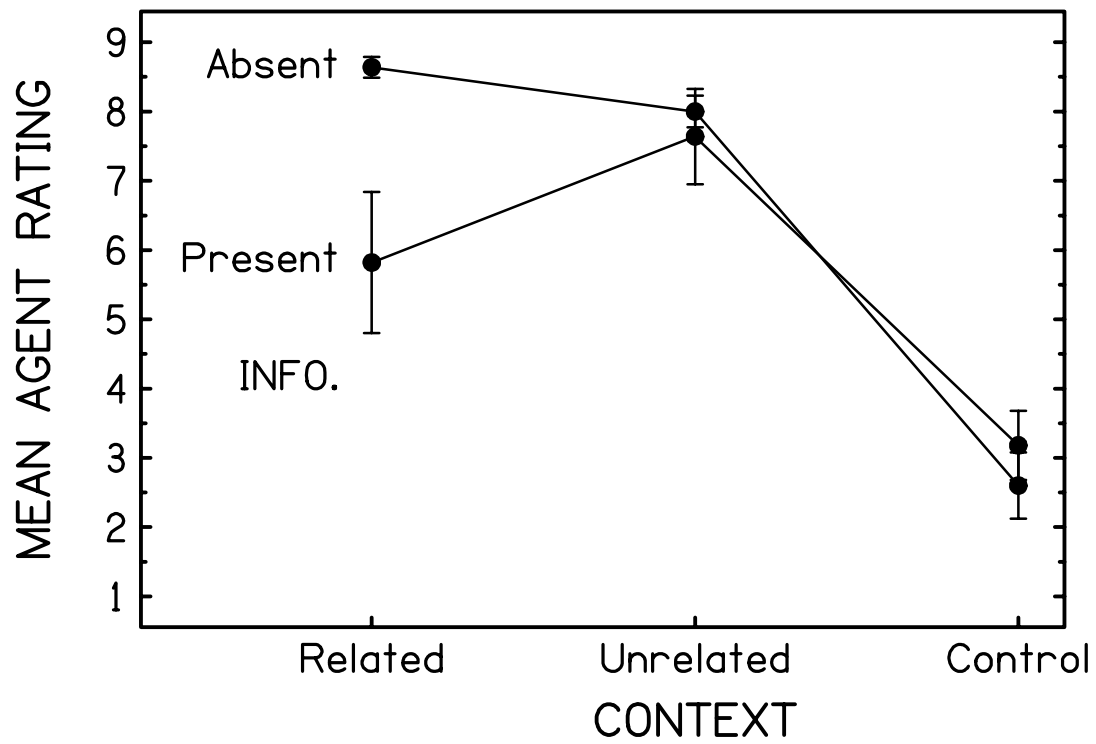
Mean Reservation Prices For Unfamiliar CDs As A Function Of Context And Item-Specific Information



Note: Error bars represent one standard error of the mean

Figure 5

Mean Agent Ratings As A Function Of Context And Item-Specific Information



Note: Error bars represent one standard error of the mean

References

- Abele, Andrea E. and Peter Petzold (1998), "Pragmatic Use of Categorical Information in Impression Formation," *Journal of Personality and Social Psychology*, 75 (2), 347-358.
- Alba, Joseph, John Lynch, Barton Weitz, Chris Janiszewski, Rich Lutz, Alan Sawyer, and Stacey Wood (1997), "Interactive Home Shopping: Consumer, Retailer, and Manufacturer Incentives to Participate in Electronic Marketplaces," *Journal of Marketing*, 61 (3), 38-53.
- Ariely, Dan, John G. Lynch, and Manuel Aparico (2000), "Which Intelligent Agents Are Smarter? An Analysis of Relative Performance of Collaborative and Individual Based Recommendation Agents," unpublished manuscript, Massachusetts Institute of Technology.
- Biernat, Monica, Melvin Manis, and Diane Kobrynowicz (1997), "Simultaneous Assimilation and Contrast Effects in Judgments of Self and Others," *Journal of Personality and Social Psychology*, 73 (2), 254-269.
- Bless, Herbert and Norbert Schwarz (1998), "Context Effects in Political Judgement: Assimilation and Contrast as a Function of Categorization Processes," *European Journal of Social Psychology*, 28 (2), 159-172.
- and Michaela Waenke (2000), "Can the Same Information Be Typical and Atypical? How Perceived Typicality Moderates Assimilation and Contrast in Evaluative Judgments," *Personality and Social Psychology Bulletin*, 26 (3), 306-315.
- Cooke, Alan D. J. and Barbara A. Mellers (1998), "Multiattribute Judgment: Attribute Spacing Influences Single Attributes," *Journal of Experimental Psychology: Human Perception and Performance*, 24 (2), 496-504.

- Fiske, Susan T. (1998), "Stereotyping, Prejudice, and Discrimination, " in *The Handbook of Social Psychology*, Vol. 2 (4th edition), Daniel T. Gilbert, Susan T. Fiske, and Gardner Lindzey, eds., New York, NY: McGraw Hill, 357-411.
- Friestad, Marian and Peter Wright (1994), " The Persuasion Knowledge Model: How People Cope with Persuasion Attempts," *Journal of Consumer Research*, 21 (2), 1-31.
- Gershoff, Andrew D. and Patricia M. West (1998), "Using a Community of Knowledge to Build Intelligent Agents," *Marketing Letters*, 9 (1), 79-91.
- Gilbert, Daniel T. (1998), "Ordinary Personology," in *The Handbook of Social Psychology*, Vol. 2 (4th edition), Daniel T. Gilbert, Susan T. Fiske, and Gardner Lindzey, eds., New York, NY: McGraw Hill, 89-150.
- Jordan, Kevin and Peter W. English (1989), "Simultaneous Sampling and Length Contrast," *Perception & Psychophysics*, 46 (6), 546-554.
- and John Uhlarik (1985), "Assimilation and Contrast of Perceived Length Depend on Temporal Factors," *Perception & Psychophysics*, 37 (5), 447-454.
- Maes, Pattie (1999), "Agents that Buy and Sell," *Communication of the ACM*, 42 (March), 81-87.
- Martin, Leonard L. and John W. Achee (1992), "Beyond Accessibility: The Role of Processing Objectives in Judgment," in *The Construction of Social Judgments*, Leonard L. Martin, Abraham Tesser, et al. (eds.), Hillsdale, NJ: Erlbaum, 195-216.
- Mellers, Barbara A. and Alan D. J. Cooke (1996), "The Role of Task and Context in Preference Measurement," *Psychological Science*, 7 (2), 76-82.

- Meyers-Levy, Joan and Alice M. Tybout (1997), "Context Effects at Encoding and Judgment in Consumption Settings: The Role of Cognitive Resources," *Journal of Consumer Research*, 24 (1), 1-14.
- Park, C. Whan and Parker V. Lessig (1981), "Familiarity and Its Impact on Consumer Decision Biases and Heuristics," *Journal of Consumer Research*, 8 (2), 223-230.
- Peterson, Robert A., Sridhar Balasubramanian and Bart J. Bronnenberg (1997), "Exploring the Implications of Internet for Consumer Marketing," *Journal of Academy of Marketing Science*, 25 (4), 329-346.
- Sen, Sankar (1998), "Knowledge, Information Mode, and the Attraction Effect," *Journal of Consumer Research*, 25 (1), 64-77.
- Seta, John J., Lenny Martin, and George Capehart (1979), "Effects of Contrast and Generalization on the Attitude Similarity-Attraction Relationship," *Journal of Personality and Social Psychology*, 37 (3), 462-467.
- Simonson, Itamar and Amos Tversky (1992), "Choice in Context: Tradeoff Contrast and Extremeness Aversion," *Journal of Marketing Research*, 29 (3), 281-295.
- Shafir, Eldar (1993), "Choosing Versus Rejecting: Why Some Options Are Both Better and Worse than Others," *Memory & Cognition*, 21 (4), 546-556.
- Stapel, Diederik A. and Willem Koomen (1998), "Interpretation Versus Reference Framing: Assimilation and Contrast Effects in the Organizational Domain," *Organizational Behavior and Human Decision Processes*, 76 (2), 132-148.
- , ----, and Aart S. Velthuijsen (1998), "Assimilation or Contrast? Comparison Relevance, Distinctness, and the Impact of Accessible Information on Consumer Judgments," *Journal of Consumer Psychology*, 7 (1), 1-24.

- and Russell Spears (1996), "Event Accessibility and Context Effects in Causal Inference: Judgment of a Different Order," *Personality & Social Psychology Bulletin*, 22 (10), 979-992.
- and Piotr Winkielman (1998), "Assimilation and Contrast as a Function of Context-Target Similarity, Distinctness, and Dimensional Relevance," *Personality & Social Psychology Bulletin*, 24 (6), 634-646.
- Sujan, Harish, Mita Sujan, and James R. Bettman (1988), "Knowledge Structure Differences Between More Effective and Less Effective Salespeople," *Journal of Marketing Research*, 25 (1), 81-86.
- Taylor, Shelley E. (1979), "The Generalizability of Salience Effects," *Journal of Personality and Social Psychology*, 37 (3), 357-368.
- Tversky, Amos (1977), "Features of Similarity," *Psychological Review*, 84 (4), 327-352.
- and Itamar Gati (1978), "Studies of Similarity," in *Cognition and Categorization*, Eleanor Rosch and Barbara Lloyd, eds. Hillsdale, NJ: Erlbaum.
- and Daniel Kahneman (1991), "Loss Aversion in Riskless Choice: A Reference-Dependent Model," *Quarterly Journal of Economics*, 106 (4), 1039-1061.
- Wedell, Douglas H., Allen Parducci, and Edward R. Geiselman (1987), "A Formal Analysis of Ratings of Physical Attractiveness: Successive Contrast and Simultaneous Assimilation," *Journal of Experimental Social Psychology*, 23 (3), 230-249.
- Weiner, Bernard and Andy Kukla (1970), "An Attributional Analysis of Achievement Motivation," *Journal of Personality and Social Psychology*, 15 (1), 1-20.
- Weitz, Barton A. (1978), "Relationship Between Salesperson Performance and Understanding of Customer Decision Making," *Journal of Marketing Research*, 15 (4), 501-516.

- , Harish Sujan, and Mita Sujan (1986), "Knowledge, Motivation, and Adaptive Behavior: A Framework for Improving Selling Effectiveness," *Journal of Marketing*, 50 (4), 174-191.
- West, Patricia M, Dan Ariely, Steve Bellman, Eric Bradlow, Joel Huber, Eric Johnson, Barbara Kahn, John Little, and David Schkade (1999), "Agents to the Rescue?" *Marketing Letters*, 10 (3), 285-301.
- Wright, Peter and Peter D. Rip (1980), "Product Class Advertising Effects on First-Time Buyers' Decision Strategies," *Journal of Consumer Research*, 7 (2), 176-188.
- Zajonc, Robert B. (1968), "Attitudinal Effects of Mere Exposure," *Journal of Personality & Social Psychology*, 9 (2), 1-27.