

Marketing the Unfamiliar:

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

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Abstract

Electronic agents help consumers locate new products and generate demand by recommending products with which consumers may be unfamiliar. We explore the effects of these unfamiliar recommendations by addressing the following questions: (1) How do unfamiliar recommendations affect consumers' attitudes towards the agent? (2) How does information about familiar recommendations alter consumers' attitudes toward unfamiliar alternatives and toward the agent? (3) How does item-specific information about unfamiliar alternatives moderate the effect of familiar recommendations? Through three studies using simulated music CD shopping agents, we show that: (1) unfamiliar recommendations lower agent evaluations, (2) familiar recommendations create a context that can raise the attractiveness of unfamiliar recommendations and the agent, and (3) the effects of contextual recommendations can be reversed by item-specific information. Furthermore, we show a dissociation between recommendation and agent evaluations under some conditions. These results suggest ways to ameliorate the effects of unfamiliarity in Internet product search through the use of appropriate contextual cues.

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 the composition and presentation of the recommended products influence the agent's ability to sell products. Our research suggests how agent recommendation sets should be constructed to build 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, possibly in conjunction with other individuating information, to provide a more attractive set of recommendations. Thus, unlike traditional commercial sites which function primarily as electronic catalogs, sites using electronic agents have many characteristics often attributed to salespeople (Sujan, Sujan and Bettman 1988). (For a review and assessment of agent technology, see Ariely and Lynch 1999 and Gershoff and West 1998.)

Electronic agents supply consumers with a list of recommendations along with additional information about the recommendations. Some of the recommended items may already be familiar to the consumer. However, in many cases the consumer may be completely unfamiliar with some or all of the recommended products. In this paper, we explore how consumers react to unfamiliar recommendations.

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 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, by their very nature, may be more difficult to sell and may have negative consequences for the retailer. Third, because consumers do not possess strong pre-existing beliefs about the 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

Suppose 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.

However, suppose that the agent recommended 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 the consumer will purchase the contextual recommendations (because he or she already owns these CDs). Nonetheless, providing those contextual recommendations may affect the consumer's likelihood of buying the unfamiliar recommendation.

Context has been shown to affect preference (e.g., 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 agents primarily on the results of the process – the recommended alternatives. If an agent recommends books 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 on judgments (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. It is also easy to provide or conceal specific information about the alternatives. Finally, 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.

We examine how providing the consumer with different contextual recommendations alters his or her evaluation of unfamiliar recommendations and of the site itself. We consider the effects of the number of contextual recommendations provided, the consumer's preference for the contextual alternatives, and the information provided about those alternatives.

The Role of Item-Specific Information

A second technique that electronic agents use to increase the attractiveness of unfamiliar recommendations is to provide users with additional information about the product (Alba et al. 1999). In some cases, this information may be informational. 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 be specific to the product in question, and may allow the consumer to 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 and information of a more diagnostic nature than other retail sites, that retailer should be preferred. But what is the impact of this additional information on the consumer's

evaluation of the unfamiliar recommendation? On the one hand, providing additional information may make the unfamiliar recommendation 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 may serve to distinguish the unfamiliar recommendation from the more familiar recommendations, thereby decreasing its attractiveness. Clearly, it is important to understand how item-specific information and recommendation context jointly contribute to the attractiveness of unfamiliar recommendations.

In this paper, we report the results of three studies designed to investigate the effects of recommendation context and item-specific information in agent recommendations. In each case, we examine the effects of recommendation context 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. Our research affords new opportunities for the study of consumer – computer interaction.

In Study 1, we conduct a preliminary investigation of how characteristics of the recommendation set – the number, quality, and familiarity of the recommendations – affect agent evaluations. We show that unfamiliar recommendations have a strong negative impact on attitudes toward the agent. Our results also suggest that in the absence of elucidating information about the unfamiliar alternatives, subjects assimilate unfamiliar recommendations to the context, albeit weakly. Study 2 examines this result more directly in situations in which the recommendation context is made more or less salient and individuating information about the unfamiliar recommendations is provided. Unfamiliar recommendations show assimilation to a salient recommendation context in the absence of individuating information and contrast in its presence. Agent evaluations, on the other hand, are always more favorable in the presence of a

positive recommendation context. Finally, Study 3 examines the effects of information congruence across familiar and unfamiliar recommendations. These data also support the position that a positive recommendation context can have either positive or negative effects on unfamiliar recommendations, depending on the information provided. Together, these 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.

Study 1: The Effects of Unfamiliar Recommendations

The primary purpose of Study 1 was to examine the effect of recommending new, unfamiliar alternatives on agent evaluations. The value of electronic agents and commercial web sites in general depends to a large degree on their ability to generate demand for new products and brands. However, consumers are likely to react negatively towards recommendations that are unfamiliar to them.

Suppose that you were searching for music on the Internet. You visit Retailer A, whose agent recommends two CDs that are completely unfamiliar to you. Absent other information about these CDs, you are unlikely to find them particularly attractive. Furthermore, you are likely to question the abilities of this agent to understand your preferences and will shop elsewhere in the future. Retailer B, on the other hand, recommends these same two unfamiliar CDs along with a set of other CDs that you like. Your evaluation of this retailer is likely to be higher than that of Retailer A, because you have some evidence (the familiar recommendations) that suggest that the agent is calibrated to your preferences.

Now, consider your reaction to Retailer C, who recommends only the familiar CDs that Retailer B recommended. How will your attitudes towards Retailers B and C compare? This

depends on your reaction to the unfamiliar recommendations. If you find that the unfamiliar recommendations provide you with additional value, or if the provision of familiar recommendations allows you to infer that the unfamiliar recommendations are of similar value, then your attitude towards Retailer B should be greater than your attitude towards Retailer C. If, on the other hand, the unfamiliar recommendations are used as a negative cue to the abilities of the agent, you should prefer Retailer C over Retailer B.

The preceding example suggests two phenomena. First, our example suggests that consumers will typically react negatively to unfamiliar recommendations. This may occur for a variety of reasons, consumers tend to react negatively to products that are unfamiliar to them. First, consumers are uncertain about the quality of the alternative and are generally averse to uncertainty (cf., Kahn and Sarin 1988; March 1996). Second, researchers have demonstrated that people tend to report higher attitudes toward alternatives that have been presented repeatedly, even when no specific information about the alternatives was provided (Bornstein 1989; Zajonc 1968). Finally, much evidence suggests that consumers use familiarity as a cue to the overall quality of the brand or product (e.g. Monroe 1976; Park and Lessig 1981). This research suggests that products or brands that are more familiar are judged to be of higher quality than those that are less familiar. This effect may be especially damaging for products that are completely unfamiliar to consumers, because consumers may reason that if the product had superior quality, they would already be familiar with it. Each of these three mechanisms predicts that if agents include unfamiliar alternatives in the recommendation set, consumers will tend to like the agent less.

Furthermore, our example suggests that it may be possible to make unfamiliar recommendations appear more attractive by altering the framing of the consumer's task.

Research has demonstrated that the use of contextual information depends on the processing goals of the consumer (Martin and Achee 1992). Other work shows that information acquisition and use on the Internet may depend on the nature of the individual's consumption goals (Alba et al. 1997; Hoffman and Novak 1996; West et al. 1999). If consumers are engaged in a task that focuses on evaluating the performance of the electronic agent, for example, they are predicted to perceive unfamiliar recommendations as negative cues, and penalize the agent accordingly. If, on the other hand, the task focuses on finding new information (information that was not available to the consumer prior to the search), unfamiliar recommendations are predicted to serve as positive cues and raise evaluations of the agents that recommend them. In summary, we propose and test the following two hypotheses:

- H1: Agents that recommend unfamiliar alternatives will receive lower evaluations than agents that recommend only familiar alternatives.
- H2: Agents that recommend unfamiliar alternatives will be judged less negatively when consumers evaluate the usefulness of the recommendations than when they evaluate the competence of the agent.

If it is true that unfamiliar alternatives lower agent evaluations, it is important to assess ways in which electronic agents can recommend unfamiliar alternatives such that consumers are less prone to judge them negatively. Thus, a secondary purpose of Study 1 was to explore how contextual factors affect the evaluation of unfamiliar recommendations and the recommending agents. We suggest two ways that contextual recommendations can affect the interpretation of unfamiliar recommendations (Stapel and Winkielman 1998; Meyers-Levy and Tybout 1997). Consumers could assimilate the unfamiliar recommendations and give them a rating closer to that of the familiar recommendations. This implies that providing a positive recommendation context (a set of familiar, well-liked alternatives) will result in more favorable attitudes toward the unfamiliar alternatives. Alternatively, consumers could use the familiar alternatives as the

standard of comparison and contrast the ratings of familiar and unfamiliar alternatives. This implies that providing a positive recommendation context will result in less favorable attitudes towards the unfamiliar alternatives.

It is not obvious whether we should expect assimilation or contrast when familiar and unfamiliar alternatives are presented, and no additional information is provided. If consumers naturally use the attractiveness of the familiar alternatives as a cue to predicting the attractiveness of the unfamiliar alternatives, we would expect assimilation to occur. However, if enough familiar alternatives are presented, we might expect the unfamiliar alternatives to appear more different, resulting in contrast.

Method

Study 1 served primarily to examine the effects of unfamiliar recommendations on agent evaluations and as a preliminary exploration into the ways that recommendation context affects the interpretation of unfamiliar suggestions. We examine these issues in a more detailed way in Studies 2 and 3. The study consisted of two sessions conducted about two weeks apart. In the first session, we told subjects that we were interested in the music preferences of college students. Subjects judged their preference for a series of audio CDs. Unbeknownst to the participants, these judgments were used to construct the idiosyncratic suggestion sets used in the second session.

In the second session, we told subjects that we were interested in their reactions to electronic agents. Subjects were asked questions about their music preferences and were given suggestion sets, purportedly from different agents. Suggestion sets varied in terms of the number of items presented, how much the subject liked the items (based on their responses in the first session) and whether unfamiliar items were included. We asked subjects to rate the overall

performance of the agent according to one of the two processing goals, agent competence or usefulness.

Through pre-testing, we identified a set of 100 CDs that were relatively familiar to most students (shown in the Appendix). These CDs varied in popularity and musical genre. In the first session, subjects rated their preference for these CDs. Specifically, they were asked to select a subset of ten CDs that they liked very much and another subset of ten CDs that they liked only moderately. For each of these 20 CDs, they rated their preference using a 1 (*Dislike Very Much*) to 10 (*Like Very Much*) scale. Subjects provided their social security number, sex, and some demographic information about the types of music they listen to and their frequency of listening. We used their social security numbers to provide them with individualized recommendations in the second session.

In the second session, subjects were given one of two goals by which to assess their interactions with simulated electronic agents on a computer. Subjects were asked to either think about how well each agent captured their music preferences or how useful each agent's suggestions were. First, subjects answered general questions regarding their music preferences. Then, subjects were told that each electronic agent they would interact with would construct a suggestion set of CDs specifically for them using their responses in different ways. Subjects received twelve suggestion sets in random order, each purported to come from a different electronic agent. The design of these sets is described subsequently. Subjects rated agent competence or recommendation usefulness. Subjects then wrote a paragraph describing how they thought the agents devised the recommendations. These protocols suggested that none of the subjects perceived a relationship between Sessions 1 and 2. Rather, subjects appeared to believe

that they were interacting with actual electronic agents of varying ability. The procedure took about 25 minutes.

The 12 suggestion sets each subject received were based on a 3 (number of items) \times 2 (familiarity) \times 2 (preference) within-subjects factorial design. The number of items comprising the suggestion set was 3, 6 or 9. In the high familiarity conditions, subjects were familiar with all the suggested items. In the low familiarity conditions, one third of the suggested items were unfamiliar to the subjects. To insure that these titles and artists were completely unfamiliar, we created them ourselves. The unfamiliar CDs used were (Artist: *Title*): Tula: *Tonight and Forever*; Age of Ochre: *Openings*; and Saylis: *Ruby Days*. In the high-preference conditions, all familiar recommendations were drawn from the first set of CDs selected by that subject (well-liked CDs). In the moderate-preference conditions, one-third of the familiar items were drawn from that subject's first set of CDs and the other two-thirds were drawn from that subject's second set (liked only moderately). The computer program read the subjects' social security numbers and used them to retrieve their selections from Session 1 and construct agent recommendations based on these selections. An example suggestion set is shown in Figure 1.

Insert Figure 1 about here.

We also manipulated the nature of the subjects' task. Half the subjects judged the agents' competence in predicting their preferences ("How well did this agent capture your preferences?") and the other half judged the usefulness of the recommendation ("How useful were this agent's recommendations?"). Each rating was made on a 1 (*Not at All*) to 9 (*Very*) scale.

Thus, we used a 2 (Goal: Competence or Usefulness) \times 3 (Set Size: 3, 6, or 9) \times 2 (Preference: High or Moderate) \times 2 (Familiarity: High or Low) design, with the first factor manipulated between-subjects and the other three factors manipulated within-subjects.

A total of 179 subjects at a large Southern university were run in Session 2. Only 40 of these subjects had also completed Session 1; 20 subjects served in each of the processing goal conditions. Since we could not control the attractiveness of the recommendations for the remaining subjects, we only analyzed data for these 40 subjects. All subjects received extra credit in an introductory marketing or business statistics class.

Results

How Do Unfamiliar Recommendations Affect Agent Evaluations? Table 1 shows mean competence and usefulness evaluations for each cell of our design. Hypothesis 1 stated that electronic agents that make unfamiliar recommendations are judged negatively. Consistent with Hypothesis 1, subjects reported higher agent evaluations in the familiar ($M=6.33$) than in the unfamiliar ($M=4.98$) conditions ($F_{1,38}=83.3, p<.01$). This result is underscored by comparing mean evaluations for the six recommendations, high preference, familiar cell, in which subjects received six highly preferred recommendations, with the nine recommendation, high preference, unfamiliar cell, in which subjects received six highly preferred recommendations along with three unfamiliar recommendations. The mean rating for the first cell ($M=7.45$) was higher than for the second cell ($M=6.75, t_{39}=2.38, p<.01$), indicating that including unfamiliar recommendations made the set less attractive. This result poses an paradox for designers of electronic agents: By recommending unfamiliar items, agents impair their ability to sell those items.

Insert Table 1 about here.

We also observed significant main effects of recommendation preference ($F_{1,38}=105.6$, $p<.01$), number ($F_{2,38}=43.3$) and their interaction ($F_{2,37}=9.7$, $p<.01$) on agent evaluations. The same pattern of results held for agents that provided unfamiliar recommendations. Across these unfamiliar conditions, agent evaluations were highest ($M=6.75$) when the unfamiliar recommendations were embedded in the context having the most high-preference items (6), and this was significantly different from all other conditions (smallest $t_{39}=5.4$, $p<.01$). This pattern of results is consistent with an assimilation effect for agent evaluations; evaluations are highest when the recommendation context includes the largest number of high-preference recommendations.

Contrary to Hypothesis 2, the effect of unfamiliar recommendations did not depend on subjects' processing goals. The different processing goals had no effect on consumers' evaluations of the agents ($F_{1,38}<1$, ns). Processing goal also did not interact significantly with any of the within-subjects factors. Apparently, subjects did not perceive the goal of assessing the usefulness of the information sufficiently important as to outweigh the inherent negative implications of unfamiliarity.

Does the Attractiveness of an Unfamiliar Alternative Vary with Recommendation Context? Because only half our recommendation sets contained unfamiliar items, we did not directly measure subjects' evaluations of these items. Thus, it was not possible to directly assess the attractiveness of unfamiliar recommendations in different contexts. Nonetheless, it was possible to examine the evaluation of unfamiliar recommendations in different contexts by decomposing agent evaluations. We fitted a model to the agent ratings that allows us to estimate

the value of unfamiliar recommendations when they are presented along with only high-preference recommendations or with a mixture of high- and moderate-preference recommendations. We assumed that the overall utility of a set of recommendations was equal to the sum of the utility of each of the individual recommendations. (We also examined other aggregation functions; the choice of aggregation function did not substantively affect our results.) Furthermore, we assumed that all high-preference recommendations had one utility, H , and all moderate-preference recommendations had another utility, M . Last, we assumed that unfamiliar recommendations had a third utility that depends on context: U_H when paired with only high-preference recommendations, and U_M when paired with high- and moderate-preference recommendations.

We estimated this model for each individual by coding the number of each type of recommendation (H , M , U_H and U_M) for each observation. For example, an agent providing 1 high-preference recommendation and two moderate-preference recommendations is coded [1,2,0,0]. An agent providing two high-preference recommendations and one unfamiliar recommendation is coded [2,0,1,0]. Then we estimated the value of each parameter using least-squares regression through the intercept.

The resulting model explained 86% of the variance in agent evaluations. The estimated utilities for high- and moderate-preference recommendations were 1.08 and .73, respectively. The estimate for unfamiliar recommendations in a high-preference context was .30, whereas it was .17 in the moderate-preference context. The utility estimate for the high-preference recommendations was significantly greater than that for the moderate-preference recommendations ($F_{1,476}=27.7, p<.01$), indicating that our preference manipulation had the desired effect. Both the utility estimates for unfamiliar recommendations differed significantly

from the utility of the moderate-preference recommendations ($F_{1,476}=15.3, p<.01$ for M vs. U_H and $F_{1,476}=16.3, p<.01$ for M vs. U_M). This indicates that subjects do view unfamiliar recommendations as significantly less favorable than even those recommendations that they themselves indicated they liked only moderately. The utility estimate for unfamiliar recommendations was slightly higher when they were presented in the high-preference context than when they were presented in the moderate-preference context, suggesting assimilation. The difference between the two, however, did not reach statistical significance ($F_{1,476}<1, ns$).

Discussion

The preceding results indicate that recommendation familiarity plays an important role in how consumers respond to the suggestions of electronic agents. We demonstrated that consumers judge agents that recommend unfamiliar CDs less favorably than they do agents that recommend CDs that are only moderately well liked. Although not particularly surprising, this result may have profound practical significance. It implies that, in the absence of additional information, recommending unfamiliar alternatives may have a negative effect on attitude toward the agent. This effect does not depend on the criteria by which the agent was evaluated. Consumers reacted just as negatively toward unfamiliar recommendations when asked to evaluate the usefulness of the agents' recommendations than when asked to evaluate the quality of the recommendations.

Although our data showed that agents that recommend unfamiliar alternatives are evaluated more favorably when they also recommend many familiar and well-liked items (i.e., consumers assimilate unfamiliar recommendations), the effect on the evaluation of unfamiliar recommendations themselves was relatively small. We estimated the utility of unfamiliar recommendations in high- and moderate-preference contexts. The utility of unfamiliar

recommendations was greater in the high-preference than in the moderate-preference context, consistent with assimilation, but this difference did not reach statistical significance.

The procedure we used to explore the effects of context on judgments of unfamiliar alternatives was weak for a number of reasons. First, we examined how context affects unfamiliar recommendations by estimating values in each context based on a mathematical model rather than directly measuring those effects. Second, our design in Study 1 was inefficient in that it allowed only one comparison that was directly diagnostic of the value of unfamiliar recommendations. Third, although we believe that there are a variety of factors that influence whether people assimilate or contrast judgments of unfamiliar alternatives to contextual recommendations, we did not examine any of these factors in Study 1.

In Study 2, we remedied these problems. First, in addition to agent evaluations, we asked subjects to rate their likelihood of buying the unfamiliar CDs, allowing us to directly assess the effects of context on unfamiliar recommendations. Second, we included conditions in which consumers received only unfamiliar recommendations, allowing comparisons between different contexts and this baseline condition. Third, we manipulated both the salience of the recommendation context and the availability of positive individuating information about the recommendations. We expected both of these factors to affect whether people assimilate or contrast the contextual recommendations. Finally, we manipulated context between-subjects, thereby providing a more robust demonstration of contextual effects.

Study 2: Item-Specific Information and Recommendation Context

Study 2 examined the role of recommendation context and item-specific information in the interpretation of unfamiliar recommendations. In Study 2, we collected judgments about the agent and unfamiliar recommendations. Furthermore, we explored some of the factors expected

to influence whether and how context affects unfamiliar recommendations. In particular, we explored ways to make the recommendation context more or less salient, and how item-specific experience affects the processing of contextual information.

How does context affect the attractiveness of unfamiliar recommendations? We believe that the answer to this question depends on what information the agent provides. Consider the case when the recommendation set includes unfamiliar recommendations but has little additional information about those alternatives. In this case, the reasoning and results of Study 1 predict assimilation: unfamiliar recommendations are viewed negatively when they are the only recommendations, but are viewed more positively when presented in the context of other attractive recommendations.

How will including item-specific information affect the processing of contextual information? Suppose agents in the above scenario also allowed users to listen to samples of the unfamiliar CDs. As long as the music samples are reasonably pleasant, consumers will find the unfamiliar CDs more attractive, than when they were provided without music. However, including music clips may also cause contextual information to be processed in a different manner. In particular, because music samples by definition provide vivid individuating information, they may induce customers to distinguish and 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 nonetheless lower evaluations of the unfamiliar recommendations because the item-specific

information induces consumers to contrast the unfamiliar recommendations with the more familiar and well-liked recommendations. Thus, we predict that when item-specific information is provided, consumers will tend to contrast unfamiliar alternatives with contextual recommendations, lowering their attractiveness.

Finally, we note that agents can provide information about the alternatives using a variety of formats. 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, electronic agents could present recommendations sequentially, with different recommendations appearing on different pages. This organization reduces the ease with which alternatives that appear on different pages can be compared.

How might the temporal organization of the recommendations affect the use of context? Some research suggests that context has a greater effect as its salience increases (cf. Taylor 1979). This 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 page and individuating information is absent, assimilation should result. Assimilation should be less when context and target recommendations are presented on separate pages. Similarly, when item-specific information is provided, contrast effects should be strongest in the simultaneous presentation format, and weaker in the sequential presentation format.

However, perceptual research suggests a different result. 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. This work has not examined the effects of individuating information, so it is not possible to predict the effects of item-specific information or how it will interact with presentation format. We will therefore focus on the prior set of predictions.

In summary, we predict that the effect of contextual recommendations on the evaluation of unfamiliar recommendations will depend on whether or not item-specific information about the alternatives is provided and on the organization of the recommendations. We propose the following hypotheses:

- H3: In the absence of item-specific experience, consumers assimilate unfamiliar and familiar recommendations. Unfamiliar recommendations are more attractive when presented with attractive contextual recommendations when music clips are not available.
- H4: In the presence of item-specific experience, consumers contrast unfamiliar and familiar recommendations. Unfamiliar recommendations are less attractive when presented with attractive contextual recommendations when music clips are available.
- H5: Making contextual comparisons easier tends to magnify the effects of context (H3 and H4) on evaluations of unfamiliar alternatives. The magnitudes of assimilation and contrast are greater in the simultaneous presentation format.

Method

Study 2 differed from Study 1 in some key respects. First, we manipulated the availability of item-specific experience about the alternatives. In some conditions, we provided short clips of music purported to come from the unfamiliar CDs. In other conditions, this information was not available. We also manipulated the timing with which we presented contextual information. In the Control condition, no contextual recommendations were given. In the Simultaneous

condition, we presented high-preference recommendations on the same page as the unfamiliar recommendations. In the Sequential condition, we presented high-preference recommendations on one page, followed by unfamiliar recommendations on a separate page. We manipulated both experience and context between subjects and had subjects rate their likelihood of buying each of the unfamiliar CDs and evaluate the agent. This design enables us to directly assess assimilation and contrast effects due to recommendation context. Subjects' reactions to the unfamiliar CDs in these conditions could be based on the item-specific experience provided, the recommendation context provided, or both.

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 page. They clicked a "Continue" button, and then saw the two unfamiliar recommendations on a different page. In the Simultaneous condition, subjects saw six high-preference familiar CDs and two unfamiliar CDs on the same page. In the Information Present condition, subjects heard a short music clip (about 10 seconds in duration) prior to evaluating each of the unfamiliar CD. Clips were not provided in the Information Absent condition.

Like Study 1, Study 2 also involved two sessions. The collection of Session 2 data began on average, three weeks after the end of Session 1. In Session 2, subjects first answered a series of questions regarding their music preferences. After viewing the recommendations, subjects rated their likelihood of purchasing each unfamiliar CD. The order of presentation of these CDs was randomized. Purchase likelihood was rated on a scale of 1 (*Not Very Likely*) to 9 (*Very Likely*). Purchase probabilities were averaged across the two unfamiliar CDs to produce a single index (coefficient alpha=0.72).

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 Dutch recordings) were randomly assigned to each of the unfamiliar CD titles. All subjects in the Experience conditions heard the same clips. The procedure in Study 2 was essentially the same as in Study 1.

A total of 118 subjects from a large northeastern university participated in Session 2. Eighty-four of these had also completed the Session 1 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 experience ($F_{2,79}=68.8, p<.01$). We will explore the nature of this interaction in the following sections by examining simple effects of context for each level of experience.

Context Effects in the Absence of Item-Specific Information. Hypothesis 3 predicts that, when no item-specific information is provided, consumers will tend to assimilate unfamiliar recommendations in the direction of the contextual recommendations. However, Hypothesis 5 predicts that this effect will be stronger when context is more salient, and decline as context becomes less salient. Thus, we predict that when no experiential information is available, unfamiliar recommendations will be judged more positively when recommendation context is present and salient (Simultaneous condition) than when context is weak (Sequential condition) or

absent (Control condition). Mean ratings of the unfamiliar CDs are shown in Figure 2. Error bars represent one standard error of the mean.

Insert Figure 2 about here.

Across unfamiliar CDs in the Information Absent condition, mean ratings were 3.38, 2.00, and 2.46 in the Simultaneous, Control, and Sequential 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 3. 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. This result appears generally consistent with the hypothesis that context effects are reduced as context becomes less salient (Hypothesis 5).

Context Effects in the Presence of Item-Specific Information. Hypothesis 4 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. Hypothesis 5 again predicts 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 experience 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 Experience condition, mean ratings were 3.75, 4.70, and 5.07 in the Simultaneous, Control, and Sequential conditions, respectively. The difference between the Simultaneous condition and the other two conditions were each 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 Hypotheses 4 and 5; 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, consistent with Hypothesis 5.

Context versus Item-Specific Experience. Another way to view these data is to ask whether item-specific information overshadows the effects of recommendation context. Subjects tended to view unfamiliar CDs as more attractive when they had the opportunity to experience them, even for short periods. The main effect of experience was significant ($F_{1,78}=25.2$, $p<.001$). However, this was not true for all context conditions. When recommendation context was absent (Control condition) or less salient (Sequential condition), the effects of experience 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.

How Do Context and Experience 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 3. 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, 1.7, and 7.2 in the Simultaneous, Control and Sequential 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, the mean agent evaluations were 7.5, 5.3, and 7.0, in the Simultaneous, Control and Sequential 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 ($t_{28}=0.68, ns$). Mean evaluations differed as a function of experience for subjects in the Control context ($t_{27}=4.65, p<.001$) 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 3 about here.

These results indicate three effects of note. First, there is a large effect of providing music on agent evaluations when only unfamiliar CDs are recommended (Control condition). Thus, if an agent knows that the user will be unfamiliar with all of the recommended items, providing

experience with the items will raise users' attitudes toward the site. Second, results show that subjects like agents more who provide a positive recommendation context. While this result is not particularly surprising, it has important implications for the design of electronic agents. Finally, the results also indicate that providing music will have little impact on attitudes toward the agent when a positive recommendation context is available. This result is consistent with the view that positive contextual information tends to dominate item-specific experience.

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 standardized, it is becoming increasingly easy to provide consumers with this sort of experience via their web browser (at least for particular product categories). But it is not known how item-specific experience and recommendation context will interact to determine the attractiveness of an unfamiliar suggestion.

Study 2 shows that recommendation context tends to increase evaluations of unfamiliar recommendations when experiential information is absent, but tends to decrease them when experiential information is present. Results are consistent with the theory that consumers are sensitive to recommendation context, but context can either raise or lower the attractiveness of unfamiliar alternatives depending on the information provided. When no experiential information is provided, subjects assimilate the unfamiliar recommendations in the direction of the contextual recommendations. However, when item-specific information is provided, subjects tend to contrast familiar and unfamiliar recommendations. Under these circumstances, a salient and attractive context can make unfamiliar alternatives appear less attractive.

This result does not extend to ratings of agent competence, which appear largely driven by the presence or absence of high-quality recommendations and are also aided by the inclusion of positive experiential information when context is absent. The results of Study 2 suggest a potential rule of thumb for presenting information by an electronic agent. If the agent has access to experiential information about the product that is thought to be attractive, it may be wise to minimize the effects of recommendation context. This can be achieved by presenting few familiar alternatives, or by separating the familiar and unfamiliar alternatives spatially or temporally. Doing so will raise the attractiveness of the agent without negatively affecting the consumers' likelihood of purchasing an unfamiliar recommendation. Conversely, if the agent cannot provide users with item specific experience, it may be wise to provide a positive and salient recommendation context.

In sum, consistent with basic research on contextual processes, Study 2 suggests that marketers can reverse the effects of recommendation context using item-specific information. In this study, we found that positive information about the unfamiliar recommendations may decrease the attractiveness of those recommendations, depending on the availability of contextual comparisons. However, in Study 2 we only provided information that served to distinguish familiar and unfamiliar alternatives. To further examine the role of item-specific information, in Study 3 we provided information that either increases or decreases the similarity of familiar and unfamiliar recommendations. We **show** that when item-specific information makes the recommendations more similar, consumers tend to assimilate unfamiliar recommendations, whereas when information distinguishes the recommendations, as in study 2, contrast results.

Study 3: Recommendation Similarity and Contextual Effects

The music clips in Study 2 provided information that was, by definition, specific to the unfamiliar recommendations, and therefore served to distinguish them from the contextual recommendations. However, electronic agents can also present information that is not specific to that particular recommendation. In these cases, it is the degree to which the information itself is shared by the other recommendations that determines its ability to distinguish the unfamiliar recommendations.

This provides an alternative technique for altering the processing of contextual information. Suppose that 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 makes all the CDs appear more similar to one another. A substantial body of research shows that when information causes people to view items (e.g., people) as part of a group, they tend to assimilate the ratings of particular individuals within the group towards the other members of the group (e.g., Stapel and Koomen 1998; Stapel, Koomen, and Velthuijsen 1998; Stapel and Winkielman 1998; Bless and Schwarz 1998). This research implies that providing reviewer information in the example above should result in greater assimilation, making the unfamiliar recommendations appear more attractive.

Alternatively, suppose that the agent had returned the same list of recommendations, except that different (but equally informative) reviewers had recommended the familiar and unfamiliar CDs. In this case, providing the reviewer information serves to distinguish the familiar and unfamiliar recommendations. Based on the results of Study 2 and the research previously cited, we predicted that information that decreases the similarity between familiar and

unfamiliar recommendations should result in contrast, making the unfamiliar recommendations appear less attractive.

In summary, we predict that information that makes familiar and unfamiliar recommendations more similar will result in assimilation, whereas information that makes the recommendations less similar will result in contrast. Note that these hypotheses are similar to Hypotheses 3 and 4 in the previous study and are based on similar reasoning.

H6: Presenting information that is the same across familiar and unfamiliar recommendations results in assimilation. Unfamiliar recommendations are more attractive when information serves to unite familiar and unfamiliar recommendations.

H7: Presenting information that differs across familiar and unfamiliar recommendations results in contrast with contextual recommendations. Unfamiliar recommendations are less attractive when information serves to distinguish familiar and unfamiliar recommendations.

Method

In this study, we manipulated the similarity of the information provided for the familiar and unfamiliar recommendations by providing additional information about each CD in the form of a reviewer endorsement. Reviewer endorsements are commonly associated with CDs, and they can be applied to familiar CDs without incongruity.

Subjects participated in one of three conditions, each involving recommendations from a single agent. In the Control condition, the agent recommended two unfamiliar recommendations with the same reviewer's endorsement. In the Similar condition, the agent recommended six high-preference CDs and two unfamiliar CDs. All eight CDs were endorsed by the same reviewer. In the Dissimilar condition, subjects also saw six high-preference and two unfamiliar CDs. However, in this case the six familiar CDs had received an endorsement from a different reviewer than the reviewer endorsing the two unfamiliar CDs. To avoid the effects of pre-

existing reviewer preferences, we used fictitious reviewers' endorsements. 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, as in the Simultaneous condition of Study 2.

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.

Results

Do Context Effects Depend on Information Alignment? Hypothesis 6 predicted that when reviewer 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 6.

Hypothesis 7 predicted 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 7.

How Does Similarity Affect Agent Evaluations? In Study 2, we found dissociation between the evaluations of unfamiliar recommendations and evaluations of the recommending agent. We observed the same dissociation in Study 3. The mean agent evaluations were 2.2, 7.2, and 7.4 in the Control, Similar, and Dissimilar conditions, respectively. Subjects evaluated the Control agent significantly lower than both the Similar ($t_{72}=14.1, p<.001$) and the Dissimilar ($t_{74}=16.4, p<.001$) agent. Furthermore, the evaluations of the Similar and Dissimilar agents did not differ significantly ($t_{68}=0.8, ns$). Thus, as in Study 2, we find that although the configuration of informational context had a substantial impact on how context alters 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 familiar recommendation context, with little regard for how familiar and unfamiliar recommendations related to one another.

Discussion

Study 3 extends our understanding of the role of context in electronic agent recommendations. Our results provide unambiguous evidence that recommendation context and item information affects how consumers interpret particular unfamiliar recommendations using a very different type of information than was used in Study 2. Perhaps of greater relevance, Study 3 demonstrates that the information one provides about the recommendations determines the mechanism by which recommendation context is processed. When information distinguishes familiar and unfamiliar recommendations, subjects contrast the familiar and unfamiliar recommendations, resulting in lower evaluations of the unfamiliar recommendations. However, when information matches, evidence suggests that unfamiliar recommendations are assimilated towards the context, making the unfamiliar recommendations appear more attractive.

These results offer designers of electronic agents both an opportunity and a caution. They are encouraging because they suggest that it may be possible to overcome consumers' general negativity towards unfamiliar recommendations by recommending alternatives that the consumer is known to like. However, these results suggest that applying this method unconditionally may hurt rather than help sales. Information about the unfamiliar items must be similar to that provided for the familiar items, or consumers may contrast the two sets resulting in lower evaluations for the unfamiliar recommendations. We elaborate on the managerial implications of these results in the next section.

General Discussion

Recommendation Evaluations. This research explores the role of familiarity, context, and item-specific information in electronic agent recommendations. It is abundantly evident that unfamiliar recommendations tend to be viewed negatively, and that they lower agent evaluations. 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 in a large 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 alternatives), 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, in keeping with this idea.

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, providing context can produce contrast and have negative effects on evaluation of unfamiliar alternatives, depending on the other information available. Negative effects of context occurred in both Studies 2 and 3. These results are consistent with the theory that distinguishing information leads consumers to contrast familiar and unfamiliar alternatives, whereas information that associates the two sets of recommendations produces assimilation. In Study 2, we show assimilation to the context when no additional information is provided. When positive item-specific experience is provided, however, subjects contrast familiar and unfamiliar recommendations. Likewise, our results in Study 3 show that information about the unfamiliar recommendations appears to produce assimilation when it is the same for familiar recommendations. However, the same contextual recommendations produce contrast when the information differs for familiar and unfamiliar recommendations. Thus, evidence indicates that information about the unfamiliar (and familiar) recommendations can alter how contextual information is processed.

Agent Evaluations. Our research also examines the effects of recommendation context and item information on consumers' evaluations of the agent. Interestingly, we show that the same information can have dramatically different implications for evaluations of agents and unfamiliar items. Item-specific information provided to the consumer moderates the impact of context on the evaluation of unfamiliar recommendations but has little impact on how context affects the evaluation of the agent. In both Studies 2 and 3, we demonstrate that agent evaluations are sensitive to the presence of a positive recommendation context. However, agent evaluations appear insensitive to the effects of item-specific information that produces assimilation or contrast on the unfamiliar alternatives.

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, information about the recommendation itself and the agent's ability to provide other high-quality recommendations are paramount. Consumers consider not only the evaluative implications of this information but also the descriptive implications that link or separate unfamiliar items from familiar 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.

This is not to say that unfamiliar recommendations have no impact. Study 1 demonstrates that unfamiliar recommendations have a substantial negative impact on the agent. However, Studies 2 and 3 suggest that the negative effects of the unfamiliar recommendations are less than the positive effects of familiar, high-preference recommendations. Additional research into the nature and cause of this dissociation is warranted. Nevertheless, our results 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, as 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, depends on the recommendation set. However, our research also demonstrates that attractive contextual recommendations do not always produce positive effects for the judgments of unfamiliar, 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.
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 buyer, 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.
3. When distinguishing information is available about the target item.
4. When strongly positive information is available about the target item.

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. Another potential line of inquiry is to examine the effects of the inputs to the recommendation process. How should electronic agents assess consumer preference? Conventional wisdom holds that it should be done in as effortless and surreptitious a manner as possible. However, research in salesforce effectiveness has shown that salesperson evaluations depend on the perceived amount of effort expended to learn about the consumer (Weitz, Sujan and Sujan 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 a direct fashion, asking a moderate 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.

A third interesting line of inquiry relates to the way consumers categorize products. Our research suggests that the format used to present recommendations and the particular recommendations provided affect the way the consumer evaluates unfamiliar alternatives. Do these factors also affect how consumers classify new products? If agents recommend a diverse set of products (recommending both books and CDs, for example), do those recommendations have a greater or lesser impact on evaluations of unfamiliar recommendations and the agent? Collaborative filtering algorithms base their recommendations on what consumers having 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 demonstrates 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 consumers' preferences.

Appendix: CDs used to assess music preferences.

Artist	Title
10000 Maniacs	In My Tribe
311	Grassroots
ACDC	Back in Black
Aerosmith	Big Ones
Alabama	Dancing on the Boulevard
Alanis Morissette	Jagged Little Pill
Back Street Boys	Back Street Boys
Barbara Striesand	Guilty
Bare Naked Ladies	Gordon
The Beastie Boys	Paul's Boutique
The Beatles	Sgt. Pepper's Lonely Heart Club Band
The Bee Gees	Saturday Night Fever
Billy Joel	Piano Man
Blues Traveler	Traveler
Bob Dylan	Highway 61 Revisited
Bob Marley	Babylon by Bus
Boy George	Sold
Brandy	Brandy
Britney Spears	Baby One More Time
Bruce Springsteen	Born in the USA
Bush	Sixteen Stone
The Cars	Heartbeat City
Celine Dion	Falling Into You
Cheryl Crow	Cheryl Crow
Chuck Berry	St. Louis to Liverpool
Counting Crows	Recovering the Satellites
The Cranberries	To the Faithful Departed
Crosby Stills Nash and Young	So Far
The Cure	Disintegration
The Dave Matthews Band	Crash
Deanna Carter	Did I Shave My Legs for This?
Dixie Chicks	Wide Open Spaces
DMX	It's Dark and Hell is Hot
The Doors	LA Woman
Duran Duran	Rio
The Eagles	Hotel California
Elton John	Goodbye Yellow Brick Road
Elvis Costello	Imperial Bedroom
Elvis Presley	Elvis Presley
Eminem	Slim Shady
Enya	Watermark
Eric Clapton	Unplugged
Fleetwood Mac	Rumors
Garth Brooks	Sevens
Goo Goo Dolls	Dizzy Up the Girl
The Grateful Dead	American Beauty

Artist	Title
Green Day	Dookie
Guns 'N Roses	Appetite for Destruction
Hole	Celebrity Skin
Janet Jackson	Janet Jackson
Janis Joplin	Pearl
Jay-Z	Reasonable Doubt
Jewel	Pieces of You
Jimmy Buffet	Don't Stop the Carnival
Joni Mitchell	Court and Spark
Korn	Korn
Lauryn Hill	Miseducation of Lauryn Hill
Less Than Jake	Hello Rockview
Madonna	You Can Dance
Mariah Carey	Day Dreamer
Mase	Harlem World
Metallica	Mama Said
Michael Jackson	Thriller
NAS	It Was Written
Natalie Merchant	Ophelia
Nine Inch Nails	The Downward Spiral
N-Sync	N-Sync
Outkast	Southern Playalisticadillacmusic
Ozzy Osborne	Tribute
Paul Simon	Graceland
Pearl Jam	Vs.
Phish	Billy Breathes
Pink Floyd	Dark Side of the Moon
Prince	Dirty Mind
Public Enemy	It Takes A Nation
Puff Daddy	No Way Out
REM	Automatic for the People
The Replacements	Tim
The Rolling Stones	Bridges to Babylon
Sarah McLachlan	Surfacing
Shania Twain	The Woman in Me
Sister Hazel	Sister Hazel
Smashing Pumpkins	Siamese Dream
Stevie Ray Vaughn	Live Again
Sting	Bring on the Night
Suzanne Vega	Solitude Standing
The Talking Heads	Remain in Light
Tears for Fears	The Hurting
They Might Be Giants	Lincoln
Third Eye Blind	Third Eye Blind
Tim McGraw	Not a Moment Too Soon
Tina Turner	Private Dancer
Tori Amos	Little Earthquakes
Trisha Yearwood	Everybody Knows

Artist	Title
Tupac	Me Against the World
U2	The Joshua Tree
Usher	My Way
Whitney Houston	Whitney Houston
The Who	Who's Next
Will Smith	Big Willie Style

Tables

Table 1: Mean agent evaluations for Study 1.

Task	Preference	Number of Recommendations					
		Three		Six		Nine	
		Familiar	Unfam.	Familiar	Unfam.	Familiar	Unfam.
Competence	High	6.70	4.65	7.65	5.45	8.80	6.70
	Moderate	4.65	4.10	5.35	4.35	5.95	4.70
Usefulness	High	5.55	4.05	7.25	5.50	8.35	6.80
	Moderate	4.35	3.60	5.15	4.30	6.20	5.50

Figure Captions

Figure 1: An example recommendation set.

Figure 2: Mean unfamiliar CD ratings as a function of context and item-specific experience. Error bars represent one standard error of the mean.

Figure 3: Mean agent ratings as a function of context and item-specific experience. Error bars represent one standard error of the mean.

Figure 1



FIGURE 2

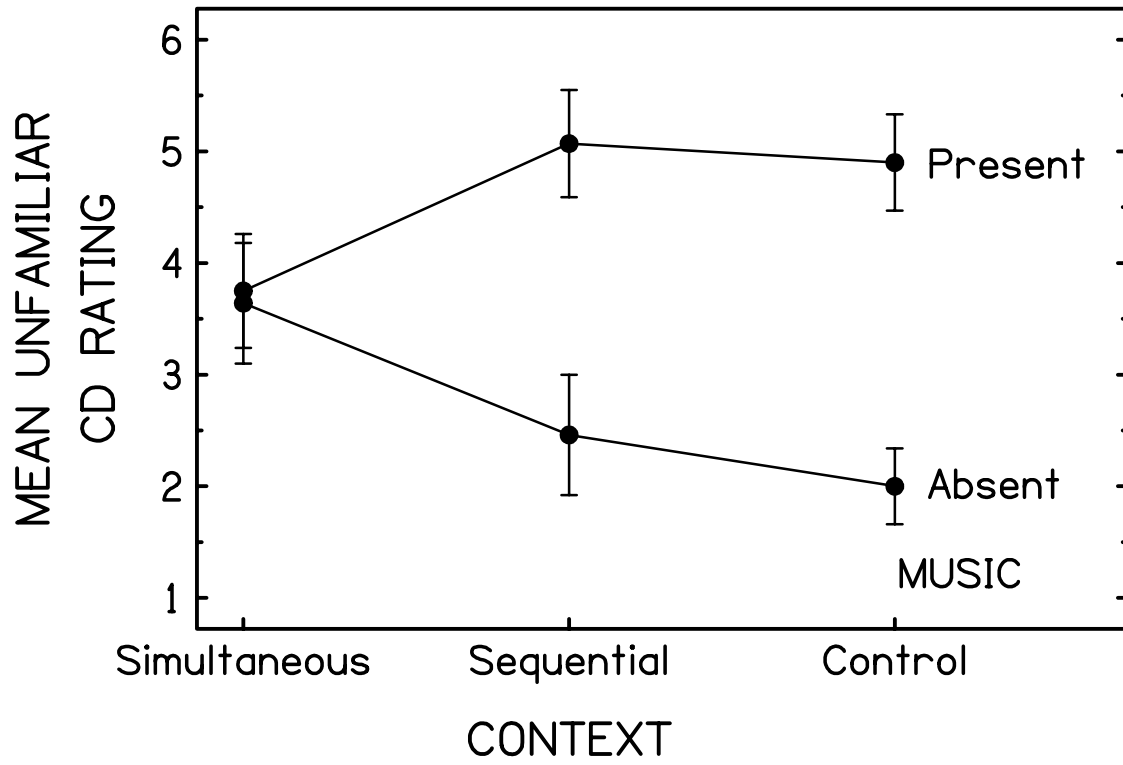
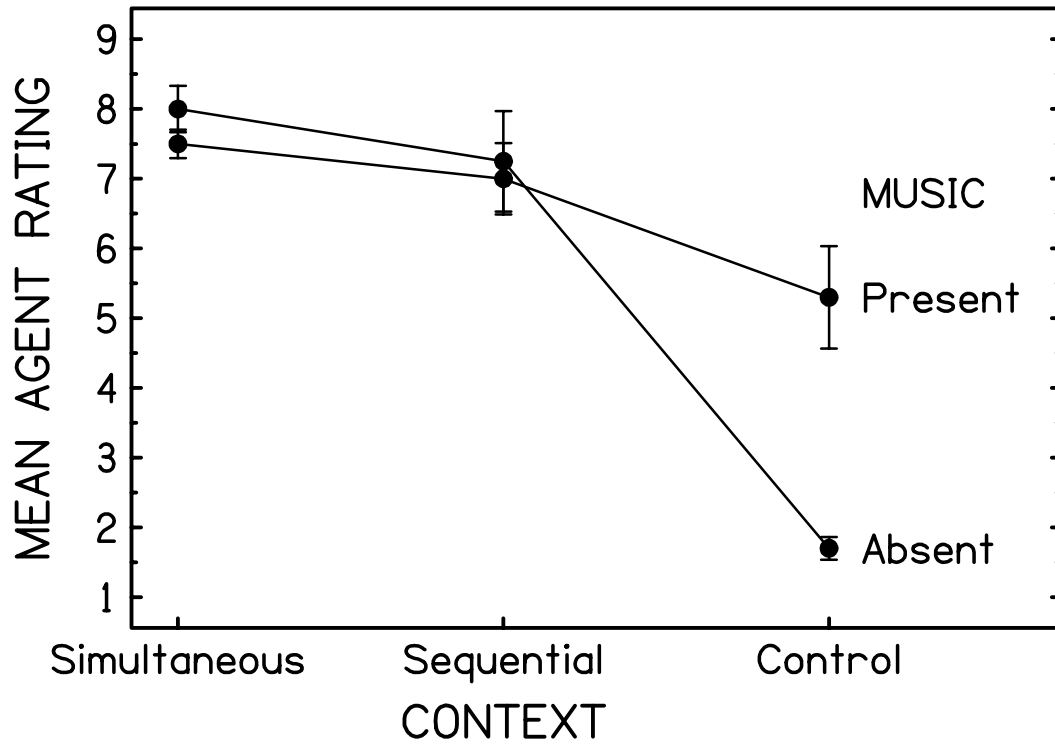


FIGURE 3



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