Reactance to Recommendations: When Unsolicited Advice Yields Contrary Responses

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Recommendations often play a positive role in the decision process by reducing the difficulty associated with choosing between options. However, in certain circumstances recommendations play a less positive and more undesirable role from the perspectives of both the recommending agent or agency and the person receiving the recommendation. Across a series of four studies, we explore consumer response when recommendations by experts and intelligent agents contradict the consumer's initial impressions of choice options. We find that unsolicited advice that contradicts initial impressions leads to the activation of a reactant state on the part of the decision maker. This reactance, in turn, leads to a behavioral backlash that results not only in consumers ignoring the agents' recommendations but in intentionally contradicting them.

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Expert advice has always played an important role in human interaction and decision making. With the development of the Internet, the potential benefits and harm of such advice has the potential for much broader and faster impact. In an online environment, one of the most utilized, and perhaps least understood, tools is the intelligent agent. Some agents both identify a range of alternatives and provide a recommendation as to which alternative best meets the customer's needs, while others similarly offer advice on options and choices without customer solicitation. Both types of agents ostensibly have the same goal: to provide an enhanced customer experience through recommending options to their customers, and through this enhanced experience to increase satisfaction and ultimately firm profitability.

Conventional wisdom suggests that recommendations are, in general, viewed positively by customers. In situations in which customers are faced with multiple choice options, considerable difficulty is often encountered in making a choice. Recommendations serve to potentially reduce the effort required (i.e., the cost of thinking, Shugan 1980) as well as the uncertainty surrounding a decision, and thus both reduce the difficulty of making a choice and increase the confidence associated with it. When the source of the recommendations is perceived to be highly credible or to have particular expertise in the decision context, this "positive" impact is expected to intensify.

This general presumption has served as the driver for the development of the deluge of intelligent agents now found on the Internet, as well as various customer management systems.

In the current research we show that under many conditions recommendations serve as the uncertainty-reducing, decision-simplifying aids we typically think of them as being. In these situations it makes sense to offer some form of intelligent agent recommendations to consumers. More interestingly, however, we show that under certain circumstances recommendations can be perceived negatively by the decision maker and can result in unexpected results in terms of ultimate choice, as well as a backlash toward the source of the recommendation (the intelligent agent's firm). Across four experiments, we demonstrate that recommendations by experts have a substantial impact on satisfaction and choice. We restrict our attention to situations in which decision makers have been exposed to information about the potential options and have formed preliminary opinions of and preferences toward the options prior to exposure to the expert recommendation—e.g., a consumer plans to purchase a new car, and has some information on each of the relevant options before receiving a recommendation from an expert agent.

We find that if experts recommend an option that is a dominant option (i.e., a clearly attractive option) or recommend against an option that is dominated

(i.e., a clearly unattractive option), the decision maker finds this eases the decision process and is more satisfied. The decision maker also chooses the recommended option in greater proportions than a control group. However, when experts recommend a dominated option or recommend against a dominant option, decision makers demonstrate reduced satisfaction levels. In this situation, the difference between the decision maker's evaluation of the option and that of the expert sets up a high-conflict decision environment. Most interestingly, we find that when experts recommend against a dominant option, a "reactance-style" response occurs. Decision makers become quite dissatisfied and, rather than adjusting their decisions according to the expert recommendations or simply ignoring them, a backlash occurs such that we observe an increase in choice of the option that was recommended against.

In the following sections we review research on recommendations and reactance, and discuss predictions for the intersection of the two. We then describe the results of four laboratory experiments designed to examine the impact of recommendations and discuss the implications.

Recommendations

The advent of the Internet has led to a considerable amount of research on what strategies consumers employ while shopping in computer-mediated environments (see Hoffman and Novak 1996 and Winer et al. 1997 for reviews). The motivation for the bulk of this research is that computer-mediated environments provide a simple way for a firm to help influence and shape the decision process of the consumer. Payne et al. (1993, p. 234), for example, suggest that one might take advantage of a decision support system (facilitated by a computer-mediated environment) to derive knowledge of a consumer's attribute importance weights and use this information to alert or recommend to the consumer (or similar consumers) other possibly attractive options. Alba et al. (1997) suggest that interactive home shopping might provide several recommendation-like functions through providing alternatives for consideration, screening alternatives to form a consideration set, or assisting in selecting from a consideration set. Lynch and Ariely (2000), Diehl et al. (2003), and Iyer and Pazgal (2003) find that the reduced costs provided by computer-mediated environments have largely beneficial effects on consumer welfare. Similarly, Haubl and Trifts (2000) and Chen et al. (2002) demonstrate beneficial effects of computer-mediated environments, both in terms of efficiently screening the potentially large set of options available and enabling efficient price and attribute comparison between considered options.

Given that a decision support system generates a recommendation, the obvious question is how consumers utilize it. Consumers' responses have been shown to be affected by the characteristics of the person or agent making the recommendation as well as what that agent recommends. Eliashberg and Shugan (1997) find that the reviews offered by movie critics are significantly related to late and cumulative box-office receipts, but not to early box-office receipts. They suggest that movie critic reviews, while acting usefully as leading indicators, do not serve as consumer opinion leaders. By contrast, a series of papers (Gershoff and West 1998, Gershoff et al. 2001, West and Broniarczyk 1998) that employ laboratory experiments provide strong evidence that others' opinions provide substantial increases in explanatory power over models that include, for example, only attribute information (cf., Gershoff and West 1998). Duhan et al. (1997) similarly argue that recommendations play a large role in decision making and that consumers will be more likely to use recommendation sources that have close relationships to them versus sources that are more distant. Further evidence of the positive role of recommendations in the decision process is provided by a study of primary-care physician recommendations in a breast cancer prevention trial (Kinney et al. 1998). Patients that reported that their physicians had advised them to enroll were 13 times more likely to subsequently participate than those whose physicians had not.

Reactance

In his theory of reactance, Brehm (1966) posited that when an individual's freedom is restricted through the elimination of (or threat of elimination of) a behavior, that individual will experience a state of psychological reactance. Psychological reactance is a motivational state directed toward reattaining the restricted freedom. The result of this reactance is, in many circumstances, an increase in the attractiveness of the constrained behavior and a decrease in the evaluation of the source of the restriction, as well as an increased sense of confidence in the ultimate decision made.

Brehm demonstrated that reactance increases as the proportion of behavioral freedom restricted increases, and with the attractiveness of the constrained behavior. Reactance was also greater when the restricted freedom was perceived by the subject as directed personally toward him or her (e.g., a superior giving an order) than when the elimination of freedom was impersonal (e.g., a store running out of a flavor of ice cream).

While Brehm attempted to either control for or eliminate frustration in his experiments, Wicklund (1974) described work that tied frustration to

restricted freedom and reactance. Aggression is often expected to follow from frustration (Dollard et al. 1939) and is more likely in cases when the frustration is unexpected. Wicklund pointed out that when the frustration is perceived as a threat to freedom, the ensuing reactance will contribute to aggression.

This aggression may be manifested in a number of ways. The first, discussed above, is a motivation to reestablish the constrained freedom. A second and potentially more serious manifestation is a hostile attitude or behavior toward the source of the restriction on the subject's freedom. Clee and Wicklund (1980) discuss numerous practical examples of consumer behavior settings where reactance may occur and where aggression may be manifested as hostility toward the marketer. The consumer does need to know for certain that a freedom has been restricted; the suspicion of a constraint may cause reactance to be elicited.

A practical example of the manifestation of constraining consumers is provided by Fitzsimons (2000). This research demonstrates that when consumers are exposed to a stockout (a choice option that is not available)—in particular one of a highly considered or preferred alternative—consumers are both less satisfied and significantly less likely to return to that store on a subsequent visit. For example, when the stockout was of their most preferred alternative, a 53% increase in the consumers' likelihood to switch stores on a subsequent visit was observed. Even when the item that was out of stock was the last alternative they would consider (and thus a less-preferred option), the increase in store switching due to a stockout was still 24%.

Interestingly, Brehm (1966) argued that reactance could be elicited even in situations in which the instruction or direction to the individual was in direct correspondence with the individual's underlying preferences. For example, he discusses the example of Mr. Smith, a gentleman who often plays golf on a Sunday afternoon but occasionally putters in his workshop instead. On a particular Sunday, Mrs. Smith announces that he will have to play golf that afternoon, because she needs him out of the house. As a result, Mr. Smith experiences reactance and is in turn much less motivated to play golf than he would otherwise be. Puttering in his workshop becomes his most desirable activity.

When Recommendations Are Unwanted

While many recommendations will be viewed as simplifying the decision process, we speculate that under certain conditions they may be viewed negatively. Specifically, if the decision maker has a prior attitude toward a particular option in a set that is either positive or negative, and the recommendation runs counter to that prior attitude, we suggest that this recommendation will be unwelcome. The unsolicited advice will be viewed as more of a threat or intrusion if the source of the recommendation is a credible source (e.g., an expert in the area or a person with whom the decision maker identifies or respects). This increased threat arises because the decision maker is likely to increase the attention to and weight on recommendations provided by credible sources. It is worth noting that the source of a recommendation that runs counter to a previously held attitude may still be accurately described as an "intelligent" agent. The agent may be suggesting an option that is normatively best for the decision maker, or alternatively may be intentionally offering a "bad" recommendation to learn more rapidly about the decision maker's preferences (see Ariely et al. 2004).

Previous research (e.g., Brehm 1966, Fitzsimons 2000, Zhang and Fitzsimons 1999) has shown that reactance-style responses involve a variety of affective, cognitive, and behavioral dimensions. In the current domain, we expect particular forms of recommendations to elicit reactance within the decision maker and lead to reduced satisfaction with the decision process and increased difficulty in making a decision. Specifically, if the decision maker has a priori attitudes or judgments that are inconsistent with the provided recommendation, he or she will experience reactance (as the recommendation is suggesting he or she do something other than he or she would have done had the recommendation not been provided) and be resistant to the persuasion attempted by the recommending agent. Additionally, there will be an increase in the difficulty of the decision being made—rather than follow their attitudes they must now resolve the conflict between their attitudes and the recommendation. Partially as a result of the increase in difficulty and partially as a result of the reactive state, the decision makers will also be less satisfied with their decision process. Further, the decision maker will resist the recommendation and be even more likely to select their preferred alternative.

A number of alternative psychological responses to a counterattitudinal recommendation might also be anticipated. For example, the decision maker may simply discount the recommendation and choose based on their initial attitudes. Or, perhaps the recommendation may lead to an increase in involvement as the consumer now faces a high-conflict choice scenario. The four experiments described below are designed both to provide supportive evidence that decision makers that receive counterattitudinal recommendations often experience reactance in response to the recommendation, and to explore conditions where this response will be elicited.

Experiment 1

Experiment 1 was designed to establish the existence of behavior consistent with a reactance-style response when a recommendation is received that runs counter to a previously formed attitude. We examine both positive recommendations, for unattractive options, and negative recommendations, about attractive options. Further, as stated above, we anticipate these effects will be greatest when the source of the recommendation is credible. We vary the degree of source credibility by manipulating the perceived expertise of the source.

Participants

One hundred and thirty undergraduate students from the University of Pennsylvania participated in the experiment in partial fulfillment of a course requirement. Participants signed up for the experiment in class, reported to the assigned room, and completed the paper-and-pencil booklet.

Design

Three factors were manipulated in Experiment 1: whether the recommendation given was positive or negative, whether the source of the recommendation was perceived by the participant to have relevant expertise, and whether the option about which a recommendation was made was attractive (highly attractive targets were constructed to lie on the efficient frontier of a two-attribute space while low-attractive targets were asymmetrically dominated by another alternative). The design was a 2 (source of recommendation: expert/nonexpert) × 2 (recommendation valence: supportive/nonsupportive) × 2 (attractiveness of recommended option: dominant/dominated) full-factorial between-subjects design.

Procedure

The first page of the experimental booklet contained basic instructions as well as a cover story that explained that the researchers were designing a new granola bar and were interested in the impressions of the participants. Granola bars were selected as a product category that was relevant to the participants, but not so involving that reactance would be expected to be especially strong. Thus, this product category provides a reasonably conservative test of our hypotheses. The next page presented participants with descriptions of four potential granola bar formulations on three different attributes and asked them to examine the formulations and imagine which of the four they would consider choosing. Two of the three attributes had been pretested to be important in making a decision about a granola bar choice (taste, calories), while the third attribute was of low importance (number of days before the product expired) and served as a filler attribute. Attribute

values for each of the four formulations on taste (1 = poor taste, 10 = excellent taste) and number of calories were, respectively: Formulation A: 7.5, 125; Formulation B: 8, 365; Formulation C: 9, 220; Formulation D: 6, 150. Formulations A and C were each designed and pretested to be relatively attractive, while Formulations B and D are relatively less attractive. Formulation C strictly dominates Formulation B (i.e., it is higher on taste and lower in calories), while Formulation A strictly dominates Formulation D. See Figure 1 for a visual representation of the stimuli.

On the subsequent page, participants received one of the eight possible recommendations and were asked, if they were to make a choice, which of the four formulations they would select and to indicate which and how many of each of the four formulations they would choose if they were allowed to have three bars. Finally, participants responded to a series of questions designed to measure their affective response to the decision experience (three decision-satisfaction items taken from Fitzsimons 2000, and a difficulty measure) as well as questions about their granola bar knowledge and frequency of consumption (see Appendix 1 for a list of items).

The recommendation received by the participants varied in three ways: It was either about Formulation C (attractive alternative) or Formulation B (unattractive alternative), was either a positive recommendation (i.e., strongly recommend) or a negative recommendation (i.e., strongly recommend against), and was given by either an expert in granola bars (i.e., *Health and Fitness* magazine) or a nonexpert (i.e., a participant in a mall taste test). The nonexpert recommender was stated to be from a suburban mall that was not a shopping location the participant would frequent. In this way, we attempted to ensure the participant did not attribute some expertise to the taste-test participant by virtue of being similar to him or herself. A sample recommendation was as follows: "*Health and Fitness* magazine examined the ratings, and tried the formulations, and strongly recommends Formulation B."

Figure 1   Experiments 1–3: Granola Bar Stimuli
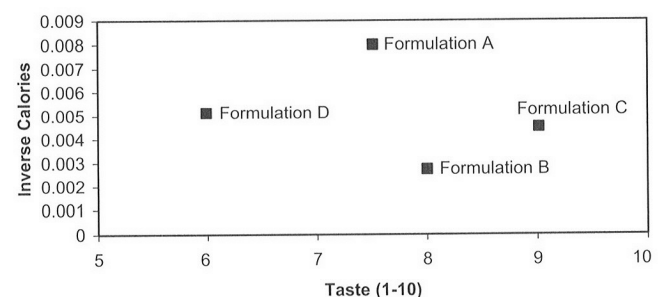
Results

As anticipated, virtually all of the participants chose either Formulation A or Formulation C, each of which was an efficient frontier alternative (i.e., 124 of the 130 participants chose either A or C). To simplify presentation, we use choice of C as the key dependent variables, as (i) participants either received a recommendation about Formulation C or its dominated neighbor, Formulation B, and (ii) performing a multinomial analysis would add little, as participants essentially made a binary choice between Formulation A and Formulation C.

An analysis of variance was performed with the number of Formulation C bars chosen in the allocation task as the dependent variable. Independent variables were the source of the recommendation, recommendation valence, and attractiveness of the recommended option. Results are presented in Table 1. As anticipated, the three-way interaction was significant ($F(1, 122) = 8.02$, $p < 0.01$). No other main or interactive effects were significant. When the source of the recommendation is a nonexpert, no significant differences are observed across conditions (all $ps > 0.10$). By contrast, when the source of the recommendation is an expert, the hypothesized pattern is observed. Conditions in which no reactance-style response is anticipated (i.e., recommending the attractive option or recommending against the unattractive option) lead to substantially lower choice of the target than do conditions in which we anticipated reactance being elicited (i.e., recommendations against the attractive option and recommendations for the unattractive option). When the recommendation was about the unattractive option, a positive recommendation actually led to greater choice of the attractive option (mean = 2.31 of 3) than a negative recommendation for the unattractive option (mean = 1.71, $F(1, 122) = 4.49$, $p < 0.05$). The opposite pattern was observed when the recommendation was about the attractive option: A positive recommendation for the attractive option led to a lower number chosen (mean number = 2.12) than a negative recommendation for the attractive option (mean number = 2.71,

$F(1, 122) = 4.05$, $p < 0.05$). This two-way interaction is significant ($F(1, 60) = 9.70$, $p < 0.001$).

The data on choice of a single granola bar yield parallel results. In addition, a significant simple two-way interaction exists when the source of the recommendation is perceived to be an expert ($\chi^2(1, n = 64) = 4.26$, $p < 0.05$), but not when the source is not perceived to be an expert.

An examination of reported decision satisfaction shows a similar pattern. As with the choice data, the anticipated three-way interaction is significant ($F(1, 122) = 89.9$, $p < 0.001$), with no significant differences among the conditions in which the source of the recommendations was perceived to be a nonexpert (all $ps > 0.10$). Participants reported significantly higher levels of satisfaction with their decision experience in our hypothesized low-reactance conditions than in our hypothesized high-reactance conditions. When the recommendation was about the unattractive option, a positive recommendation led to lower levels of decision satisfaction (mean = 6.19) than a negative recommendation (mean = 8.10, $F(1, 122) = 28.2$, $p < 0.001$). When the recommendation was about the attractive option, a positive recommendation led to higher decision satisfaction (mean = 8.78) than did a negative recommendation for the attractive option (mean = 4.74, $F(1, 122) = 117.7$, $p < 0.001$). Similarly, respondents found it more difficult to make a decision when a positive recommendation was given by an expert for the unattractive option (mean = 6.50, where 1 = least difficult and 10 = most difficult) than when a negative recommendation was given (mean = 3.00, $F(1, 122) = 32.0$, $p < 0.001$). They also found it substantially more difficult when a negative recommendation was made by an expert for the attractive option (mean = 7.79) than when a positive recommendation was made (mean = 3.41, $F(1, 122) = 46.6$, $p < 0.001$).

Discussion

Experiment 1 demonstrated that expert recommendations are a two-edged sword. When they support

Table 1 Experiment 1 Results by Condition

Source of Recommendation	Valence of Recommendation	Attractiveness of Recommended Option	No. of Target Attractive Option Chosen (Max = 3)	Choice Percentage of Target Attractive Option	Decision Satisfaction (Min = 1, Max = 10)	Difficulty in Making Decision (Min = 1, Max = 10)
Nonexpert	Positive	Dominated	1.50	61.1	7.41	3.67
Nonexpert	Positive	Dominant	1.81	60.0	7.08	2.69
Nonexpert	Negative	Dominated	1.53	68.8	7.13	3.00
Nonexpert	Negative	Dominant	1.41	58.8	7.75	2.94
Expert	Positive	Dominated	2.31	86.7	6.19	6.50
Expert	Positive	Dominant	2.12	70.6	8.78	3.41
Expert	Negative	Dominated	1.71	70.6	8.10	3.00
Expert	Negative	Dominant	2.71	92.9	4.74	7.79

a strong alternative or criticize a weak one, they increase choice of the recommended option, as well as satisfaction. However, when recommendations are in an unexpected direction, they reduce choice of the explicitly or implicitly recommended choice (as well as satisfaction). The experiment also provides preliminary data that the decision makers were able to disregard the recommendation provided in some circumstances. Specifically, if the source was not an expert, they treated it as providing no information and chose based on their initial preferences.

However, if the source was perceived as an expert, participants did not disregard the recommendation despite the fact that it had only limited information value (it was based largely on the same information on which the decision maker formed an initial preference). Interestingly, decision makers did not simply classify contradictory recommendations as lacking in credibility. Had this been the case, they would have treated the contradictory expert recommendation in much the same way they treated nonexpert contradictory recommendations, and not shifted their choices. It is worth noting that receipt of a recommendation did not lead participants to abandon rational choice behavior—the vast majority of respondents chose one of the two efficient frontier alternatives. It was their choice of attractive alternative that was impacted by the recommendation—in several interesting cases, choosing more of the option recommended against.

In the next experiment we seek to accomplish three goals. First, we examine whether the results of Experiment 1 replicate and generalize. Second, while the results are encouraging and consistent with a reactance explanation, we have no explicit evidence that reactance is the underlying mechanism driving the results. For example, it might be that the unexpected recommendation increased attention or involvement or generated counterarguing, and one of these mechanisms led to the results. To isolate its impact, we use a manipulation designed to enhance reactance. Previous reactance effects have been found to be much stronger if the decision maker perceives that he or she has the ability to make a choice (Brehm 1966, Fitzsimons 2000). Thus, we anticipate observing much greater reactance to recommendations when decision makers have the ability to choose themselves, and much less if their ability to freely choose is constrained.

Finally, we also assess confidence in the decision maker's choice in order to examine if choosing against the recommendation reduces confidence (as would be the normative implication of Bayesian analysis) or increases it. A reactance-style response would be likely to lead to an increase in confidence, because one of the byproducts of experiencing reactance is

often an increase in the ultimate attractiveness of the restricted option (Brehm 1966). As a result, decision makers will often end up selecting an option that they evaluate more highly than would be expected and therefore experience higher decision confidence.

Experiment 2

Participants

Ninety undergraduate students from the University of Pennsylvania participated in the experiment in partial fulfillment of a course requirement. Participants signed up for the experiment in class, reported to the assigned room, and completed the paper-and-pencil booklet.

Design

The design employed in Experiment 2 was a 2 (recommendation valence: supportive/nonsupportive) × 2 (expectation of ability to choose: expected/not expected) full-factorial between-subjects design. The first factor was manipulated as in Experiment 1. Because Experiment 1 demonstrated that the effect was similar for recommendations about both attractive and unattractive alternatives and occurred only for expert recommendations, all recommendations were made by experts for or against the attractive target option.

Procedure

The procedure employed in Experiment 2 was similar to that used in Experiment 1. Participants examined descriptions of the same four granola bar formulations as in the first experiment, were exposed to a recommendation either for or against the attractive (dominating) Formulation C, made a choice, and finally answered several other questions. In addition to the questions asked in Experiment 1, we also measured the decision makers' confidence that he or she had made the "right" choices (see Appendix 1). Prior to exposure to the granola bar formulations, all participants were exposed to one of two choice-expectation manipulations. If they were assigned to the condition in which they expected to have the ability to choose which granola bar they might receive, they read the following:

> At a later time, the company making the new bar will supply us with samples for some of the participants. *If you are randomly chosen you will receive samples of the granola bar you choose in this survey.*

If, however, the participants were assigned to the condition that had no expectation of choice ability, the participants read the following:

> At a later time, the company making the new bar will supply us with samples for some of the participants.

If you are randomly chosen you will receive a sample of a granola bar that is randomly selected from the set of four options described on the next page.

This manipulation is similar to that employed by Brehm (1966). In the choice-ability expected condition, participants fully expect that they will be free to choose and receive any option they would like. By contrast, while participants in the low-choice-ability expected condition are free to express their preferences, they believe that the outcome of the procedure is independent of their expressed preferences. Thus, there is no opportunity to choose and receive their preferred option.

Results

As in the first experiment, an analysis of variance was performed with the number of Formulation C bars chosen in the allocation task as the dependent variable, and recommendation valence and whether stated choice was related to the product received as the independent variables. Results are presented in Table 2. While the main effect of valence was not significant ($F(1, 86) = 1.53$, $p > 0.10$), the main effect of choice ability was ($F(1, 86) = 13.26$, $p < 0.001$): Participants expecting their selections to be related to the option they might receive chose more of the target formulation (mean number = 2.23) than did those assigned to the low-choice-ability condition (mean number = 1.63). This main effect was qualified by the predicted two-way interaction ($F(1, 86) = 7.01$, $p < 0.01$). When participants received a negative recommendation for the target option and expected choice, they demonstrated a reactance-style response and had significantly greater choice of Formulation C (mean number = 2.55) than did the group not expecting their stated preferences to be linked to the option they might receive (mean number = 1.52; $F(1, 86) = 20.51$, $p < 0.001$). By contrast, when participants received positive recommendations not expected to elicit a reactance-style response, there was no significant difference between those who expected their choice to be linked to the product they might receive (mean number = 1.91) and those who did not (mean number = 1.75; $F(1, 86) = 0.49$, $p > 0.10$). In other words, reactance occurred only when participants

expected their stated preferences to be linked to the product they might receive.

Parallel results are obtained when the simple choice of the target formulation (Formulation C) is used as a dependent measure. A categorical analysis of variance (using the SAS Catmod procedure) found a significant two-way interaction between recommendation valence and whether stated choice was related to the product received ($\chi^2(1, n = 90) = 11.84$, $p < 0.001$). As above, a main effect of whether stated choice was related to the product received was also observed ($\chi^2(1, n = 90) = 5.40$, $p < 0.001$). Planned contrasts demonstrated that for participants receiving negative recommendations, those with an expectation of a link between stated choice and product received were significantly more likely to choose the target option (choice frequency = 95.0%) than were those who did not expect stated choice to be linked to product received (44.4%; $\chi^2(1, n = 90) = 22.19$, $p < 0.001$). By contrast, when participants received positive recommendations (and hence were not expected to demonstrate a reactance-style response), there was no significant difference between those who expected their stated choice to be the product they receive (choice = 65.2%) and those who did not (choice percentage = 75.0%; $\chi^2(1, n = 90) = 0.50$, $p > 0.10$).

An examination of participants' reported decision satisfaction and decision difficulty ratings showed that the expected high-reactance condition (i.e., expected stated choice would be product received, negative recommendation received) resulted in significantly lower satisfaction (mean = 5.45 versus 7.37; $F(1, 86) = 47.3$, $p < 0.001$) and significantly higher decision difficulty (mean difficulty = 8.20 versus 3.90; $F(1, 86) = 56.7$, $p < 0.001$) than each of the other three nonreactance-inducing conditions. Interestingly, and consistent with a reactance-style mechanism, participants were *more* confident that they had made the right choice in the more difficult, high-reactance condition in which they expected that their choice was related to the product received and a negative recommendation was received (mean confidence = 9.50, where 10 = most confident) than in the other three conditions (mean confidence = 7.27; $F(1, 86) = 16.8$, $p < 0.001$).

Table 2 Experiment 2 Results by Condition

Valence of Recommendation	Perception of Decision Freedom	No. of Target Attractive Option Chosen (Max = 3)	Choice Percentage of Target Attractive Option	Decision Satisfaction (Min = 1, Max = 10)	Difficulty in Making Decision (Min = 1, Max = 10)	Confidence Correct Decision Made (Min = 1, Max = 10)
Positive	Expected	1.91	65.2	7.41	3.67	8.39
Positive	Not expected	1.75	75.0	6.75	3.40	6.90
Negative	Expected	2.55	95.0	5.45	8.20	9.50
Negative	Not expected	1.52	44.4	6.89	4.41	6.59

Discussion

Experiment 2 generalizes the results of Experiment 1. More importantly, it shows that respondents acted contrary to recommendations only when they perceived that the choice they were making was a real choice (and would drive which option they might later receive). When participants believed that their choice would be linked to actual outcomes, they responded to "unexpected" recommendations by choosing contrary to the recommendation and doing so with increased confidence, albeit with less satisfaction and greater decision difficulty.

One alternative explanation for the observed pattern of results is that the "reactance" manipulation also changed the degree to which participants were involved in the experiment. If participants believed that the choice they made in the experiment would effect the granola bar they might later receive (i.e., our manipulation of reactance), the decision would be more personally relevant and involving. As a result, the participants would be more likely to critically examine both the initial product information and the recommendation. More scrutinization of the product information and recommendation should lead to a decrease in the choice of suboptimal alternatives and most likely a rejection of the counterattitudinal recommendation. However, the data suggest that respondents did not simply reject the recommendation in high-reactance/involvement situations—it was an important determinant of choice that operated in the opposite direction of the recommendation. While these results suggest that reactance explains the results more parsimoniously than involvement, they do not refute involvement as a counterexplanation. Rather, we believe involvement is likely to be a moderating factor that can heighten the reactance induced by an unwanted recommendation. When involvement is high with a particular decision, reactance experienced as a result of a recommendation is likely to be more extreme than if involvement with the decision is low.

In the first two experiments, we manipulated whether or not we expected participants to experience reactance in response to a recommendation. While the results observed were consistent with a process in which recommendations triggered reactance in the decision makers, they were nonetheless indirect evidence of this process explanation. In the next experiment we rely on research that suggests that experienced reactance not only varies across situations but also varies across individuals (Hong 1992). That is, some individuals are more likely to experience reactance in response to a particular environmental cue (e.g., a recommendation) than are other individuals. If, as we have hypothesized, recommendations can lead to reactance being elicited, we should expect to see highly reactant individuals behaving similarly in response to recommendations, as did participants assigned to our high-reactance manipulations in previous experiments. In addition, to further explore the plausibility of involvement as an alternative explanation, we measured respondents' involvement with the product category.

Experiment 3

Participants

One hundred nineteen undergraduate students from the University of Pennsylvania participated in the experiment in partial fulfillment of a course requirement. Participants signed up for the experiment in class, reported to the assigned room, and completed the paper-and-pencil booklet.

Design

The design employed in Experiment 3 utilized a single manipulated factor (recommendation valence: supportive/nonsupportive) that was manipulated as in Experiment 2. In addition, a second factor was measured (individual reactance).

Procedure

The procedure employed in Experiment 3 was similar to that used in Experiment 2. Participants examined descriptions of the same four granola bar formulations as in that experiment, were exposed to a recommendation either for or against the attractive (dominating) Formulation C, made a choice, and finally answered several other questions. To make certain that respondents understood that the expert recommenders had actually tried the granola bar formulations and experienced aspects of the granola bar beyond the simple taste and calorie-attribute information that the respondent also was provided with (e.g., texture, etc.), we changed the wording of the recommendation:

> *Health and Fitness* magazine examined the ratings by the company's own R&D department, actually tried each of the formulations, and strongly recommends against Formulation C.

In addition to the questions asked in previous experiments, we also measured each respondent's involvement with the product category (using an adapted 10-item version of Zaichkowsky's 1985 personal involvement inventory). Finally, we measured reactance at an individual level. To measure individual proclivity toward experiencing reactance, we used the refined version of the Hong psychological reactance scale (Hong 1992, Hong and Faedda 1996), an 11-item scale designed to measure the degree to which individuals are likely to experience reactance.

While reactance was initially viewed to be situationally driven, later refinements suggested that it not only varies by situation, but also by individuals (Hunsley 1997). The 11-item scale asked respondents to indicate on a five-point Likert-type scale their agreement with each of the items (e.g., "Regulations trigger a sense of resistance in me;" "I become angry when my freedom of choice is restricted"). Scale endpoints were 1 = "Strongly Agree" and 5 = "Strongly Disagree."

Results

The reactance measure we collected proved to be reliable across the 11 items (Cronbach alpha = 0.79); thus, an average reactance score was created for each respondent. The individual-level reactance score had a mean of 2.97 and ranged from 1.1 to 4.3. A median split was performed on average reactance scores, with those reporting scores of 2.9 and lower being categorized as "high-reactance" individuals, and those 3.0 and greater being categorized as "low-reactance" individuals. The involvement measure collected also had high reliability (Cronbach alpha = 0.95), and as a result we used a mean involvement score for each individual (mean involvement across all respondents was 3.1 on a 1–6 scale, with 1 being most involving).

As in an earlier experiment, an analysis of variance was performed with number of Formulation C bars chosen in the allocation task as the dependent variable and recommendation valence as a class variable. Instead of a manipulated reactance variable, we included a class variable representing high- and low-reactance individuals. In addition, we included involvement as a third factor in this analysis. Results are presented in Table 3. While the main effect of valence of the recommendation (either for or against Formulation C) was not significant ($F(1, 114) = 1.66$, $p > 0.10$), the main effect of individual reactance ($F(1, 114) = 14.57$, $p < 0.001$) showed that high-reactance individuals chose more of the target formulation (mean number = 2.02) than low-reactance individuals (mean number = 1.45). This main effect was qualified by the anticipated two-way interaction ($F(1, 114) = 13.41$, $p < 0.001$). When high-reactance participants received a negative recommendation for the target option, they chose more of Formulation C (mean number = 2.21) than low-reactance participants (mean number = 1.03; $F(1, 114) = 26.90$, $p < 0.001$). By contrast, when participants received a positive recommendation, there was no significant difference between high- and low-reactance individuals (mean = 1.83 versus 1.81; $F(1, 114) = 0.01$, $p > 0.10$).[1] Involvement was not significantly related to the number

[1] While the analyses reported here use a categorical version of the individual reactance data for ease of explication, none of the results changed meaningfully if a continuous version of the data was used.

of Formulation C bars selected ($F(1, 114) = 0.04$, $p > 0.10$), nor did it significantly interact with either valence of the recommendation, individual reactance, or their interaction (all $ps > 0.10$).

As in previous studies, parallel results are obtained when binary choice of the target formulation (Formulation C) is used as a dependent measure. A categorical analysis of variance (using the SAS Catmod procedure) found a significant two-way interaction between recommendation valence and individual reactance ($\chi^2(1, n = 119) = 8.42$, $p < 0.001$). As above, a main effect of individual reactance was also observed ($\chi^2(1, n = 119) = 3.82$, $p = 0.05$). For participants receiving negative recommendations, high-reactance individuals were significantly more likely to choose the target option (choice frequency = 79.3%) than were low-reactance individuals (35.7%; $\chi^2(1, n = 119) = 10.20$, $p < 0.01$). By contrast, when participants received positive recommendations (and hence were not expected to demonstrate a reactance-style response), there was no significant difference between high-reactance (choice = 53.3%) and low-reactance individuals (choice = 62.5%; $\chi^2(1, n = 119) = 0.53$, $p > 0.10$).

As in prior experiments, an examination of both participants' reported decision satisfaction and decision difficulty ratings showed that conditions expected to lead to a reactance response (i.e., high-reactance individuals, negative recommendation received) resulted in significantly lower satisfaction (mean = 5.17 versus 6.73; $F(1, 114) = 18.53$, $p < 0.001$) and significantly higher decision difficulty (mean difficulty = 5.28 versus 3.17; $F(1, 114) = 21.0$, $p < 0.001$) than the other combinations of individual reactance and valence of the recommendation. Unlike in previous experiments, those in the high-reactance scenario (i.e., high-reactance individuals, negative recommendation received) were not more confident than those in each of the other three conditions ($F(1, 114) = 0.99$, $p > 0.10$). They were, however, more confident (mean = 7.52) than their low-reactance counterparts when a negative recommendation was received (mean = 5.79, $F(1, 114) = 9.32$, $p < 0.001$). Once again, there were no significant main or interactive effects of involvement (all $ps > 0.10$).

Discussion

Experiment 3 provides strong support for our argument that recommendations can lead to a backlash on the part of the respondent, primarily through initiating a reactance-style response. In the current experiment, instead of manipulating reactance, we measured it and examined differential response to recommendations based on individual reactance tendencies. We found strong support for our proposed underlying process—namely, that when recommendations conflict with initial impressions, if

Table 3   Experiment 3 Results by Condition

Valence of Recommendation	Individual Reactance (Median Split of Measured Responses)	No. of Target Attractive Option Chosen (Max = 3)	Choice Percentage of Target Attractive Option	Decision Satisfaction (Min = 1, Max = 10)	Difficulty in Making Decision (Min = 1, Max = 10)	Confidence Correct Decision Made (Min = 1, Max = 10)
Positive	High	1.83	53.3	6.69	2.83	7.97
Positive	Low	1.81	62.5	7.09	2.78	7.44
Negative	High	2.21	79.3	5.17	5.28	7.52
Negative	Low	1.03	35.7	6.35	3.96	5.79

reactance is elicited, consumers will not only ignore the recommendation but will go against it. This reactance can be elicited either through the situation (e.g., the respondent felt that the recommendation was unwanted and/or an intrusion) or through personal differences (e.g., some consumers will be more likely in general to have a reactance response to any perceived constraint). The net result is largely the same—choice is affected and the consumer finds the choice more difficult, is less satisfied, and more confident. Involvement did not play a significant role in this decision, either as a covariate (i.e., more-involved participants were neither more nor less likely to choose the target option) or by interacting with the recommendation provided.

One criticism of each of the studies we have run so far could be that they lack face validity because it is not typical to receive an intelligent agent or expert recommendation on which granola bar to select. In addition, this is by and large a low-effort or low-involvement product decision for most consumers. While this would suggest that any results that we observe in this relatively low-cost environment might be viewed as conservative, it is desirable to perform a replication of Experiment 3 in a context in which consumers are used to receiving recommendations, namely automobile purchasing. Another criticism of the granola bar recommendations in the studies thus far might be that it was not clear that the recommendation provided a substantial amount of information beyond what the decision maker had seen already. In the next experiment, we extend our findings to a situation in which a recommendation might reasonably be assumed to contain substantial additional information.

Experiment 4

Participants

Ninety-nine undergraduate students from the University of Pennsylvania participated in the experiment in partial fulfillment of a course requirement. Participants signed up for the experiment in class, reported to the assigned room, and completed the paper-and-pencil booklet.

Design

The design employed in Experiment 4 was identical to that in Experiment 3 and utilized a single manipulated factor (recommendation valence: supportive/nonsupportive) as well as a second factor that was measured (individual reactance).

Procedure

The procedure employed in Experiment 4 was similar to that used in Experiment 3, set in a different product category. All participants first read the following cover story:

> This research examines factors that influence the purchase of an automobile through the Internet rather than through traditional dealerships. It should take five minutes to complete. A web site is considering adding automobile purchasing to its current menu of product offerings and is interested in how people might choose a car through the Web. Below are ratings of three cars in the subcompact category (e.g., cars such as the Toyota Tercel, Ford Escort, etc.). Please examine the ratings for each of the three cars, and turn to the next page.

Participants then examined descriptions of the three subcompact automobiles (see Appendix 2, and Figure 2 for a visual representation), were exposed to a recommendation either for or against the most attractive option (determined through pretesting): Brand A, made a choice, and answered several questions. The recommendation was identical to that given in earlier experiments, except that the expert giving the recommendation was *Car and Driver* magazine. As in Experiment 3, individual-level measures of both reactance and involvement were collected. Because

Figure 2   Experiment 4: Automobile Stimuli
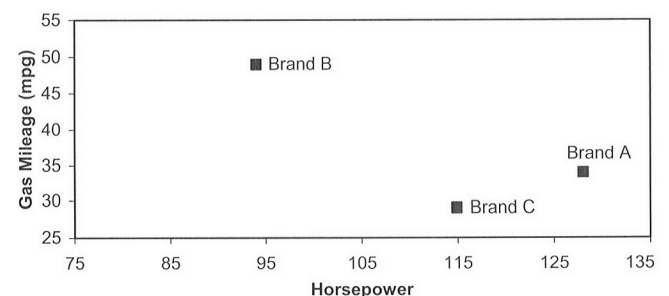
previous experiments had found analogous results for both simple choice and allocation across options dependent variables, and choice had much greater face validity in the automobile category, we collected only choice for Experiment 4.

Results

The reactance measure was once again reliable (Cronbach alpha = 0.76), with a mean reactance score at the individual level of 2.98, and ranged from 1.0 to 4.4. The involvement measure collected also had high reliability (Cronbach alpha = 0.96).

A categorical analysis of variance (using the SAS Catmod procedure) was performed using binary choice of the target automobile (Brand A) as a dependent measure. Results (see Table 4) revealed a marginally significant main effect of individual reactance ($\chi^2(1, n = 99) = 2.76$, $p = 0.097$) that was qualified by a significant two-way interaction between recommendation valence and individual reactance ($\chi^2(1, n = 99) = 7.13$, $p < 0.001$). For participants receiving negative recommendations, high-reactance individuals were significantly more likely to choose the target option (choice frequency = 92.0%) than were low-reactance individuals (51.85%; $\chi^2(1, n = 99) = 8.11$, $p < 0.01$). By contrast, when participants received positive recommendations (and hence were not expected to demonstrate a reactance-style response), there was no significant difference between high-reactance (choice = 47.1%) and low-reactance individuals (choice = 52.9%; $\chi^2(1, n = 99) = 0.78$, $p > 0.10$). Involvement did not significantly affect choice of the target option ($\chi^2(1, n = 99) = 0.41$, $p > 0.10$), nor were there any significant higher-order interactions.

Conditions expected to lead to a reactance response (i.e., high-reactance individuals, negative recommendation) resulted in significantly lower satisfaction (mean = 4.91 versus 6.65; $F(1, 94) = 17.72$, $p < 0.001$) and significantly higher decision difficulty (mean difficulty = 5.60 versus 3.97; $F(1, 94) = 9.95$, $p < 0.01$) than each of the other combinations of individual reactance and valence of the recommendation. Those in the high-reactance scenario (i.e., high-reactance individuals, negative recommendation) were also more confident (mean = 8.12) than each of the

other three conditions (mean = 6.99; $F(1, 94) = 28.04$, $p < 0.001$). There were no significant main or interactive effects of involvement (all $ps > 0.10$).

Discussion

Experiment 4 largely replicates the findings of Experiment 3 in a different context. Consumers are often exposed to recommendations when shopping for large-ticket items such as the automobile category, as used in this experiment. In addition, the recommendation in this experiment was clearly based on additional information on which decision maker had not based his or her initial preferences. No meaningful differences between the automobile and granola bar categories were observed, suggesting that recommendations can have negative reactive effects even in high-importance product categories.

Conclusions

Much of the literature on choice and decision making suggests that information in general and expert opinions/advice in particular is desirable. To the extent that expert advice is consistent with the choice tendency of individuals, this is indeed the case: Choice moves in the recommended direction, decision difficulty decreases, and confidence and satisfaction increase. When expert advice goes contrary to individual choice tendencies, however, some unusual patterns emerge even when there is a close substitute available. While decision difficulty increases, as would be expected given conflicting information, both choice and confidence in the "rejected" alternative also increase significantly. Drawing support from four experiments, we argue that this results from reactance to the recommendation (Brehm 1966, Fitzsimons 2000).

These results have interesting implications, both practically and theoretically. Perhaps the most significant is that making unpopular recommendations, while normatively desirable, may be counterproductive: It simultaneously makes life more difficult for the decision maker and produces behavior opposite to the recommended course of action. If the same holds true, for example, for political causes, the implications are not encouraging—politicians are likely to avoid recommending the normatively correct course of action, and instead will recommend the path of

Table 4   Experiment 4 Results by Condition

Valence of Recommendation	Individual Reactance (Median Split of Measured Responses)	Choice Percentage of Target Attractive Option	Decision Satisfaction (Min = 1, Max = 10)	Difficulty in Making Decision (Min = 1, Max = 10)	Confidence Correct Decision Made (Min = 1, Max = 10)
Positive	High	47.1	6.96	3.92	7.21
Positive	Low	52.9	6.43	3.91	6.48
Negative	High	92.0	4.91	5.60	8.12
Negative	Low	51.2	6.58	4.04	7.22

least resistance. Moreover, the impact on the source of the recommendation as well as the medium carrying it may be negative and is certainly worthy of further investigation.

Of course, the present data can speak clearly to the particular case in which recommendations conflict with other information or preferences—that in which the recommendations are received *after* preferences have been formed. It is not clear that our results will generalize to situations in which the decision maker receives a recommendation either before or at the same time he or she form attitudes toward choice options. In these situations, the recommendation may be perceived as less of an intrusion and simply as another input into the preferences that are formed—future research in this area would seem warranted. Another interesting extension of the current research might be to explore response to recommendations when the decision makers know they "should" choose the normatively best option, but want to choose an alternative—e.g., most people realize that salad or fresh fruit are superior snacks to a candy bar on many important dimensions, yet often choose not to select them. How will such an individual respond to a recommendation for the healthy snack? How will they respond to a recommendation for an option they want, but know they shouldn't have?

What are the implications for e-retailers currently employing recommendation agents of one form or another? This research suggests that when the recommendations the agent offers run counter to the decision maker's predisposition, the recommending firm needs to tread gingerly. Simply recommending against the decision maker's a priori champion may not yield the desired result. In fact, the decision maker may choose his or her a priori preferred option and become irritated with the retailer. In such situations the retailer may be better off simply offering no recommendation, even though it knows that the decision maker's choice is nonoptimal. Perhaps an alternative strategy, such as focusing on some of the specific elements that drive the recommendation, may reduce reactance-style responses. However, even this may not yield the desired results as it may lead the decision maker to shift attribute importance weights, etc. Further, because we observe similar reactance-style responses both when favored options are recommended against and unfavored options are recommended, simply reframing the recommendation is unlikely to eliminate the response to contrary recommendations. Perhaps e-retailers might track customers to detect which customers have previously manifested reactance-style responses to recommendations and tailor future recommendation strategies accordingly (potentially eliminating their use altogether).

There are, of course, limits to the present research. In each of our experiments, we did not have direct measures of the participants' actual preferences, but rather inferred them from the construction of the choice set and pretesting. As a result, it is possible that the recommendations received did not actually contradict their initial impressions. Although this likely makes our tests more conservative, future research might consider directly measuring initial preferences and examining how positively a decision maker must hold an option before reactance will be experienced to a negative recommendation. Consistent with Brehm's (1966) speculation, we believe that there may be situations in which an unwanted recommendation that is entirely consistent with one's initial preferences may still lead to reactance. Research in this area could be extremely interesting. Further, in our experiments, choice preference was constructed contiguously in time and was based on verbal attribute descriptions. It would be interesting to see how reactions varied when opinions were either well established and supported by previous satisfactory use, or more subjectively based. We would expect greater rather than lesser reactance in these situations.

The results of Experiments 3 and 4 suggest that involvement did not play a major role in explaining varying response to recommendations that were in favor of or against preferred options. Despite these results, and because we cannot rule out a contributing role of involvement in Experiments 1 and 2, we believe future research into the role of involvement is warranted. Reactance theory suggests that as options are more important to the decision maker, reactance responses will increase. It may be the case that involvement in the laboratory setting did not vary sufficiently for us to identify this moderating effect in Experiments 3 and 4. An examination of reactance in response to recommendations across a wide range of involving scenarios might yet demonstrate the intuitively appealing hypothesis that reactance is much stronger in higher-involvement settings.

In our current research, we restricted our exploration of expertise to that of the recommending agent and did not examine the interaction of perceived restrictions due to recommendations and the expertise of the decision makers themselves. Further, it would be interesting to see how the results varied across high versus low involvement, hedonic versus utilitarian, and search versus experience categories. We hope the current results are sufficiently intriguing to motivate further work in these directions.

Appendix 1

1. I found the process of deciding which "insert product name" to select frustrating. (1 = Strongly Agree; 10 = Strongly Disagree)

2. How satisfied or dissatisfied are you with your experience of deciding which "insert product name" to choose? (1 = Extremely Satisfied; 10 = Extremely Dissatisfied)

3. I found the process of deciding which "insert product name" to select interesting. (1 = Strongly Agree; 10 = Strongly Disagree)

4. I found choosing a "insert product name" to be very difficult. (1 = Strongly Agree; 10 = Strongly Disagree)

5. I'm confident that I made the right choice. (1 = Strongly Agree; 10 = Strongly Disagree) (item used only in Experiments 2–4)

6. How knowledgeable do you rate yourself regarding granola bars? (1 = Not at All Knowledgeable; 10 = Extremely Knowledgeable)

7. How often do you buy granola bars? (1 = Rarely; 10 = Often)

Appendix 2

Experiment 5 Stimuli Descriptions

Attribute	Brand A	Brand B	Brand C
Horsepower	128	94	115
Number of colors available	12	14	8
Gas mileage (in miles/gallon)	34	49	29
Wheelbase (in inches)	68	66	68

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