

Bolstering: How Does Choice Distort Product Evaluations?

Christina L. Brown
Assistant Professor of Marketing
The University of Michigan
clbrown@umich.edu
(734) 764-4717

Fred Feinberg
Associate Professor of Marketing
The University of Michigan
feinf@umich.edu
(734) 764-4711

Fax: (734) 764-3240

*The authors would like to thank Michel Wedel, Carolyn Yoon, and the faculty and students of the University of Michigan Marketing Seminar for their expertise.

Bolstering: How Does Choice Distort Product Evaluations?

Abstract

We resolve competing explanations for bolstering (dissonance, endowment, pre-choice distortion) in an experiment directly manipulating whether or not a subject freely chooses the evaluated item. We then separately model the effects of pre-choice distortions on selection and on bolstering of an item given that it is chosen, while accounting for endogeneity present in the data. Our results generally support the notion that bolstering is rooted in pre-choice distortion processes.

Bolstering: How Does Choice Distort Product Evaluations?

Bolstering is the “propping up of what cannot stand of itself” (Oxford English Dictionary, 1989). Decision makers are said to engage in bolstering when they magnify the perceived value of something to which they have made some commitment (Tetlock, Stitka, and Boettger 1989). Because consumers have frequently been shown to ‘bolster’ their choices by raising their evaluations of them (Chernev 2001, Zhang and Fitzsimons 1999), the issue of how bolstering is created is an important one to marketers who wish to maximize post-choice satisfaction. In extreme cases, the distortion created by bolstering may be so severe that preferences are actually reversed (Hsee, Loewenstein, Blunt, and Bazerman 1999): products that are less preferred prior to choice are bolstered so powerfully that they receive extremely high post-choice evaluations, while products that are more highly rated *a priori* do not fare as well. Marketers who wish to maximize customer satisfaction need to know when, how, and why some items are bolstered more than others.

Several important streams of research have documented bolstering as a pervasive consequence of choice, a form of justification for a decision already taken. For example, in marketing, Chernev (2001) has shown that consumers bolster their preferences for items they have chosen by enhancing the importance of these items’ attractive features. Morwitz and Pluzinski (1996) have suggested that supporting a candidate in a poll increases the likelihood that a consumer will vote for that candidate because not to do so would create cognitive dissonance. In political psychology, Tetlock and colleagues (Tetlock et al. 1989; Tetlock 1991) have shown that people committed to a political position will devote the majority of their mental effort to justifying those positions (i.e., defensive bolstering). In economic psychology, the well-known endowment effect (Carmon and Ariely 2000; Kahneman, Knetsch, and Thaler 1990, 1991; Sen

and Johnson 1997; Thaler 1980), the finding that consumers are willing to pay less to acquire an item than they require to part with it, can also be seen as a form of bolstering. Although these researchers invoke different mechanisms, they all suggest a positive effect and a retrospective orientation: evaluations of a choice alternative are higher looking back on a choice relative to before it. However, there is also considerable evidence that consumers distort their evaluations *in anticipation of* choice. The comparative evaluation that precedes choice sometimes appears to bolster one item before a choice is actually made (Brownstein 2003; Hsee et al. 1999, Russo, Medvec, and Meloy 1996; Russo, Meloy, and Medvec 1998)

Generally, these competing explanations are confounded. If we observe bolstering ‘after the fact’ – i.e., when consumers make a choice then assess their satisfaction with it – we cannot determine whether this bolstering has occurred retrospectively (as a reaction to choice, or even as a reaction to the evaluative question itself) or prospectively (in anticipation of it). If, instead, we examine bolstering prospectively – by allowing consumers to compare alternatives, bolstering as they may, then choosing and evaluating their choice – we have created a ‘selection’ bias (i.e., items that are significantly bolstered prior to choice stand a much better chance of being selected).

This research resolves the difficulty in investigating these competing explanations for the effects of choice on bolstering by directly manipulating whether or not a subject freely chooses the alternative he/she evaluates, then separately modeling the effects of anticipatory processing on selection and on bolstering of an item *given that it is chosen*. An excellent example of the distinction between selection biases and bolstering is evident in Ratner, Kahn, and Kahneman (1999, Experiment 5). In their experiment, subjects choosing songs to listen to from among a set of six alternatives show lower mean post-choice ratings than do subjects choosing from a subset of only the three highest-rated alternatives. However, this reduction occurred because subjects in

the six-alternative case chose items with lower *a priori* ratings (i.e., a selection effect), not because the choice set size negatively affected the bolstering of particular songs (i.e., a bolstering effect).

Since the equations estimating the bolstering and selection effects may have correlated error terms, our estimation must correct for endogeneity present in the data. To do so, we have developed a model similar in spirit to selection-bias models (Heckman 1978, 1979), adapting the model to accommodate the multinomial selection process and ordinal properties of the post-choice rating scale (see Current Authors, 2003, for a complete description of this class of adapted models.)

We find considerable evidence that bolstering occurs *in anticipation of* choice, but our results are not generally compatible with either dissonance or endowment. We identify two key moderators of bolstering following choice: whether or not a consumer has chosen an *a priori* favorite, and whether or not the post-choice evaluation is made in the same comparative (“joint”) evaluation mode as it was chosen (Hsee et al. 1999). Bolstering effects for less-preferred items are considerably stronger than for *a priori* favorites. In fact, our results suggest that in some circumstances implicit ‘preference reversals’ are possible – items that received lower *a priori* ratings than their competitors “out-rated” them *after* being chosen.

This research thus aspires to make contributions in several key areas: both our experiment and our model distinguish between anticipatory (pre-choice) and retrospective (post-choice) mechanisms for bolstering. By manipulating whether a bolstered item is acquired through choice or by some other process, we provide a direct test of the effects of choice itself on bolstering. The lack of an appropriate analytical model – one that accounts for selection bias and the resulting endogeneity when each individual chooses a single item from a distinct set of

alternatives – has previously made it difficult, if not impossible, to test fully the effects of choice on post-choice bolstering. The development and application of such a model is thus another key contribution of the paper.

In the next section, we propose a framework to identify under what conditions bolstering will thrive and when it will be limited. We compare and contrast explanations based on bolstering in anticipation of choice to more traditional “retrospective” explanations such as dissonance reduction and endowment. We briefly present the analytical model that allows an appropriate test. We develop and report the experiment. Finally, we discuss the implications of our research and suggest future research on related topics.

WHEN AND HOW DOES CHOICE AFFECT BOLSTERING?

A choice alternative goes through two distinct evaluative stages before we as researchers can make an assessment of how and when it has been bolstered: first, a consideration phase in which it is compared to other available alternatives. Only a single item will survive this choice process. Secondly, the chosen item is evaluated. Thus, a bolstered rating following choice is the result of *two* evaluations: one implicit (during consideration), and one explicit (during post-choice evaluation). However, we do not observe the consideration stage directly; we observe only which item was chosen, and its posterior rating.

Many existing theories related to bolstering are ‘retrospective’ in nature; i.e., they assume that bolstering occurs *in reaction to* the commitment implied by choice. In other words, they do not take this consideration stage into account. We consider whether bolstering can also occur during the pre-choice consideration stage, and now describe how these two classes of theories make different predictions about when bolstering will be strongest.

Retrospective Theories of Bolstering. Choice is commonly thought to have a motivational effect; people bolster consistent with their choices because it is emotionally stressful not to do so (Bettman, Luce, and Payne 2001). The most commonly presumed causal mechanism for motivated bolstering following choice is dissonance reduction (Boiney, Kennedy, and Nye 1997; Brehm 1956; Carlson and Klein 2001; Chernev 2001; Russo et al. 1996, 1998). Dissonance is generated by a state of emotional arousal, created by a conflict between one's beliefs and one's actions (Festinger 1957). If one's actions are consistent with one's beliefs, no conflict is created (Cooper and Fazio 1984). Thus, imagine I have been asked to rank-order a set of alternatives and am then asked to choose among them. There should be no dissonance created if I choose the highest-ranked alternative. However, if I choose an item – even a highly-rated item – over one which I have previously ranked higher, dissonance should operate.¹ Similarly, if an external attribution for the dissonant behavior is available, there should be no dissonance (for example, if a low-ranked alternative is assigned by someone else, rather than freely chosen). In other words, dissonance will not create a main effect of choice on evaluation, but should occur only when freely choosing a less-preferred alternative.²

Alternatively, choice may be seen as generating an endowment which makes pro-choice reasons more cognitively accessible (Carmon and Ariely 2000; Carlson and Klein 2001; Russo et al., 1996, 1998). If compared to forgone alternatives following choice, the chosen item naturally

¹ For clarity of exposition, we will refer to the highest-ranked available item as the “favored” item, and the other, lower-ranked, items as “less-preferred” items. By adopting this terminology we do not mean to imply that the ordering of alternatives is definitive, permanent, or invariant over time, merely that it reflects a subject's most recent explicitly stated preference. It is a subject's own statement, rather than the absence of uncertainty in the rankings, that potentially creates the dissonance required by the theory.

² Iyengar and Lepper (2000) use a paradigm that shows the effect of choice on valuation. They assume that the underlying mechanism is essentially motivational but do not specify how it operates. In their paper, subjects who were assigned to consume a particular item were “yoked” to subjects who had freely chosen the same item. This allowed the authors to equate outcomes across subjects but not the perceived values of those outcomes. The chooser of Item X received his/her favored item, whereas the assignee to Item X most likely received an item less preferred –

becomes the “focus of comparison;” thus a decision maker processes more, and more positive, information about it (Dhar, Nowlis, and Sherman. 1999, Dhar and Simonson 1992). Such an effect is similar in nature to an endowment effect. This accessibility bias may be affected by the fact that forgone alternatives are generally not physically present at the moment of evaluation (Hsee et al. 1999). In the drugstore, we choose from a host of toothpastes, but only our chosen brand is usually present when we finally brush our teeth. The endowment or ‘focus-of-comparison’ argument also views bolstering as a retrospective, post-choice effect. However, it is not clear whether it is the endowment or choice *per se* that would create this retrospective bias. A consumer could be endowed with an item by some other means (random assignment, for example). Thus, if bolstering is rooted in anticipation of choice, rather than simply by endowment, there should be important differences in bolstering depending on whether an item is required by choice or by some other means.

Anticipatory Theories of Bolstering. An alternative explanation for post-choice bolstering lies not in the retrospective justification of a decision already taken but in the way in which the anticipation of an impending choice changes the elaborative processing of choice alternatives. For example, Russo and colleagues (Russo et al. 1996; Russo et al. 1998) have shown that consumers choosing between a pair of alternatives develop a preliminary preference for one or the other, then distort the favorability of attribute information towards the ‘leading’ alternative. Choosers will continue to reframe and reconsider the decision until it provides a sufficient distinction between the leading alternative and its rivals to make a choice with adequate confidence (Busemeyer and Townsend 1993; Russo et al. 1996, 1998). Shiv and Huber (2000) have shown that anticipating the satisfaction of a choice can change which of two items is

even though it is the same item. Since dissonance should depend on whether a subject freely chose a favored or less preferred item, their paradigm cannot test for it.

chosen. Although there is a long-standing debate in psychology about whether distortion is created prior to choice, a recent review by Brownstein (2003) suggests that private, rapid evaluation of similarly attractive alternatives are particularly prone to biased pre-decision processing, particularly when there is no need to justify one's decision to others. Since many consumer choices share those characteristics (a choice between two candy bars, two songs, two restaurants, two apartments, etc. that is no one's business but one's own), the possibility of pre-choice bolstering should be taken into account.

Recently, Hsee and colleagues (Hsee et al. 1999) have suggested a particular mechanism through which pre-choice bolstering may be created. They point out that choice among alternatives is inherently comparative; alternatives are evaluated jointly, relative to one another ("joint evaluation mode"). This comparative pre-choice consideration process highlights attributes that are less easy to evaluate, as well as making physically salient positive attributes of the forgone alternative(s) (Carmon & Ariely 2000). Post-choice evaluation, in contrast, is more commonly done in isolation from such forgone alternatives. Thus, post-choice processing is typically not comparative in nature nor is it subject to the biases of comparative processing. In effect, the prospect of choice *encourages* a certain amount of distortion. Thus, pre-choice evaluation of alternatives differs in direction and depth from processing of alternatives in isolation and in the absence of choice.

Predictions Distinguishing Between Bolstering Mechanisms

Post-choice retrospective mechanisms (i.e. dissonance, endowment) and pre-choice anticipatory mechanisms lead to different predictions about the amount of bolstering dependent on choice outcome (whether a less-preferred or a favored item is evaluated), choice mode (choice vs. random assignment) and evaluation mode (joint vs. separate). Dissonance-based

bolstering should be restricted to less-preferred items that have been freely chosen (in other words, there should be a choice outcome – x – choice mode interaction). Dissonance does not predict a main effect of choice mode (choice vs. random assignment) nor does it predict significant bolstering of a favored item when it is freely chosen. Bolstering generated by endowment or focus-of-comparison should not depend on whether an item was received via free choice or random assignment; in other words, there should be not be any effects of choice mode.

Bolstering created in anticipation of choice makes different predictions. First, because choice encourages additional processing (Busemeyer and Townsend 1993), in particular processing that maximizes the distinctions between alternatives, we expect that choice will have a positive effect on bolstering regardless of what is chosen (i.e., a main effect of choice on bolstering). Other forms of acquisition (e.g., random assignment) do not facilitate the same degree of additional processing nor processing biased towards positive attributes.

Secondly, because pre-choice bolstering is inherently comparative, the continued presence of forgone alternatives will affect bolstering following choice. If forgone alternatives remain present after the choice is made (“joint evaluation mode”), they represent a challenge to whatever bolstering occurred in anticipation of choice. Therefore, for less-preferred items, bolstering will be high following choice in separate evaluation mode: a simple reflection of the high levels of pre-choice bias required for the choice to have occurred in the first place. However, bolstering of less-preferred items will be low in joint evaluation mode, as the continued presence of the forgone favored alternative will have a debiasing effect. For favored items, in contrast, bolstering will be modest in solo evaluation mode and *higher* in joint evaluation mode. In short, joint evaluation following choice enhances perceptions of an *a priori favored* choice (because there are continued opportunities to contrast the favored item to its less-

preferred alternative) but reduces perceptions of a less -preferred item (because a second comparison of the less-preferred item will have a debiasing effect).

In summary, dissonance reduction suggests a two-way interaction between acquisition mode and choice outcome, but is silent on the effects of evaluation mode. Endowment suggests a two-way interaction between choice outcome and evaluation mode, but does not suggest an effect of acquisition mode. Bolstering created by comparative processing *in anticipation of choice* suggests a positive main effect of acquisition mode on bolstering, and a three-way interaction such that: 1) joint evaluation of a freely-chosen less-preferred item will reduce its bolstering relative to its solo evaluation; 2) joint evaluation of a freely-chosen favored item will increase its bolstering relative to its solo evaluation; 3) effects of evaluation mode and choice outcome on bolstering should be reduced under random assignment.

ANALYZING BOLSTERING WHEN CONSUMERS CAN CHOOSE AMONG OUTCOMES

We now motivate and present an analytical model that will allow us to control for variability in choice outcomes created when subjects choose freely among alternatives. As the focus of the present paper is on the substantive issues of when and how bolstering is created, the presentation is as terse as we can make it. A detailed specification of this model, a description of how it is estimated, and various generalizations, are available in Current Authors, 2003.

Consistent with the standard view of expected utility theory (e.g., Manski 1979), we presume a decision maker considers the likely utility of each alternative in an available set and chooses something that she predicts she will enjoy. These predictions are noisy and imperfect, and she never gets a chance to fully test her predictions, because she actually *consumes* only the

item that she has chosen.³ Thus, the value of the product she chooses to consume is taken from a distribution that is “truncated” – i.e., there will be few (if any) observations below some point in the distribution, because the consumer will not choose a product that she believes (at that point) to be *much* worse than the rest. This truncation is not absolute but probabilistic; for each level of anticipated value there is a probability that the item will be chosen, highest for the predicted favorite, and decreasing to the extent the item in question trails behind the alternative in terms of its predicted value.

The statistical effects of including such truncated variables in a general linear model are well known (Heckman 1979, Maddala 1983); estimates can be both biased and inefficient. Thus, simply modeling the relationship between independent variables “x” and product evaluation “y” poses a problem. Unless we assume that a consumer’s choices are random (in the sense of not being systematically related to consumption utility), standard regression-based methods for relating “x” to “y” can be misspecified, and offer potentially misleading conclusions (Heckman 1979; Shaver 1998). If we assume that a consumer’s predictions about what products will be more enjoyable are in some way systematic (and genuinely related to actual enjoyment), we must treat choice as *endogenous*; in other words, we must account for the fact that factors affecting choice are related to the factors affecting consumption ratings (Heckman 1978, 1979; Maddala 1983). (If people were randomly exposed to products for consumption (as often happens in product rating- or taste-tests), choice would, by contrast, be *exogenous* – i.e., driven by something outside the consumer’s control.) Recently, the issue of endogeneity has taken a central

³ This probabilistic model is similar in spirit to both Decision Field Theory (Busemeyer and Townsend 1993) and the lexicographic semi-order model of decision-making (Tversky, Sattath, and Slovic 1988), in that alternatives are compared until the differences between them reach some critical value, and each comparison is taken up probabilistically (for example, in the lexicographic semi-order model the likelihood of an attribute being evaluated is proportional to its importance). Thus, choice of a less-preferred alternative can occur when a comparison that favors it (such as a minor attribute on which it is superior) by chance comes up early in the process.

role in studies in marketing involving field data, but have not received similar attention among behavioral researchers, who can rely on random assignment and various other experimental controls. The interested reader is directed to the classic article of Villas-Boas and Winer (1999) and to the econometric survey by Draganska and Jain (2002).

The classic Heckman model combines a binary probit-based selection model (to account for choice) with an OLS regression prediction model to account for the covariate effects relative to some continuous, presumably interval-scaled, outcome measure (such as income). (An excellent introduction to the use of such models in the social sciences appears in Winship and Mare 1992.) Neither the binary probit selection nor the OLS prediction sub-models are appropriate to our case, so we adapt both, as follows.

Our model replaces the binary probit selection equation of the classic Heckman model with a polychotomous probit (i.e., multinomial) discrete choice model (similar to McFadden's (1974) conditional logit, but with normal errors). Note that this is not *binary* selection; the binary probit specification assumes that each item presented to the chooser is either accepted or not, independently of every other. Consumer choice differs markedly from this situation, because in the prototypical case each consumer chooses *exactly one* alternative. Thus, the likelihood of a particular consumer choosing alternative *X* is not independent of her likelihood of choosing alternative *Y*; they are, in fact, perfectly dependent, in that they cannot both occur. The traditional binary probit does not account for this, instead merely estimating whether an alternative surpasses a minimum cutoff and is thus chosen, or not, irrespective of other options. Therefore, it might not predict one choice per consumer, but zero or two or even more, so long as each surpasses the cutoff. The multinomial probit specification allows one and only one choice

per subject, and can simultaneously account for different choice sets being encountered by different subjects.

Our adaptation also replaces the (OLS) linear prediction model with an ordered probit specification. Using OLS to predict the bolstering effect would require us to assume that the independent variables have a constant effect throughout the range of the dependent variable. Consider a case in which our measurement of bolstering is the *difference between posterior and prior ratings*, with ratings measured on the typical 1-7 scale. If the coefficient of the independent variable is +1.00, OLS assumes that increasing its value by one unit will bolster a prior rating that would “otherwise” be 4 to a posterior rating of 5, or 6 to a 7. Subjects are unlikely to use the rating scale in this way – for example, an increase from 6 to the top point on the scale (7) may represent a greater improvement in valuation than an increase from 4 to 5, violating the OLS assumption of an interval-scaled dependent variable. It is also possible for an OLS model to predict out of range: in our prior example, given a prior rating of “7”, the model might nevertheless predict bolstering equal to 1 point, giving a posterior rating of “8,” an impossible value for a 1-to-7 scale. Finally, the dependent variable is discrete, and should be treated as such, making use only of its ordinal nature. An ordered-probit prediction model eliminates the problems created by the assumption of interval scaling, as well as the possibility of predicting out of range.⁴

Formally, the first-stage choice model and second-stage evaluation model (for product ratings) are jointly specified as follows. Each subject, r , makes a choice from a subject-specific set of size k_r , which without loss of generality we denote as item $i=1$. Underlying both choice and prediction are (latent) utilities, which are modeled linearly, but not directly observed:

$$Anticipated_Value_{r,[i:k_r]} = \mathbf{Z}_{r,[i:k_r]} \gamma + \varepsilon_i \quad (1)$$

$$Bolstering_{r,[1:k_r]} = \mathbf{X}_{r,[1:k_r]} \beta + u_i \quad (2)$$

\mathbf{X} and \mathbf{Z} are vectors of explanatory variables, and $(u_i, \varepsilon_i) \sim N[0, 0, 1, \sigma^2, \rho]$.⁵ Note that we observe *neither* anticipated value nor bolstering directly, but something (deterministically) related to them, respectively, *Choice*, *Posterior Ratings*, and *Prior Ratings*. For example, which item is chosen (denoted always as $i = I$) is contingent on the *set* of anticipated values (Equation 1), but we do not observe the values themselves, only the “fact” of which item was chosen (Equation 3 below). Similarly, we do not observe bolstering directly (Equation 2), only the posterior and prior ratings for items which ‘survive’ the choice stage (Equation 4 below). *Moreover*, in the case of posterior ratings we observe not a continuous value (as the Equation 2 would imply) but only discrete, ordinal values on, for example, a 1-7 scale. Specifically, actual experimental observations in this study are given as:

$$\begin{aligned} CHOICE_i &= 1, \text{ if } Anticipated_Value_i = \max\{Anticipated_Value_{1:k}\} \\ &0, \text{ otherwise} \end{aligned} \quad (3)$$

$$\begin{aligned} POST_i - PRIOR_i &= 0 \text{ if } Bolstering_i \leq 0 \\ POST_i - PRIOR_i &= 1 \text{ if } 0 < Bolstering_i \leq \mu_1 \\ POST_i - PRIOR_i &= 2 \text{ if } \mu_1 < Bolstering_i \leq \mu_2 \dots \\ POST_i - PRIOR_i &= 3 \text{ if } \mu_2 < Bolstering_i \leq \mu_3 \dots \\ POST_i - PRIOR_i &= 4 \text{ if } Bolstering_i > \mu_3 \end{aligned} \quad (4)$$

⁴ While it is possible to use the parsimonious rank-order binomial specification of Rost (1985) for the ordinal data sub-model, we have found this to work less well empirically, and that models’ reliance of a single parameter entails a simplification as least as limiting as the linearity of OLS.

⁵ It is convenient for identification and estimation purposes to have $\varepsilon_i \sim N[0, 1]$ iid. An unrestricted covariance matrix and Bayesian (MCMC) estimation failed to appreciably affect our predictive results; this is unsurprising, given that error correlations for latent utilities are notoriously weakly identified. Further details of model set-up and estimation are available from the authors.

Note that ρ is critical to the model; if ρ is non-significant (i.e., if the error terms of equations 1 and 2 are *not* correlated), then a much simpler model (a standard ordered probit) would provide unbiased estimates of the effects of explanatory variables on evaluations. Thus, the significance of ρ will be the crucial test of the model's necessity, as well as the substantive claim of choice endogeneity. Also, in our data there are only actual five values taken by the variable $POST_i - PRIOR_i$ (although more are theoretically possible), thus only five equations for bolstering in (4) above.

We now present and review an empirical study that tests the framework developed above by applying this analytical model.⁶

STUDY

Expectations

The objectives of this study are (1) to provide a direct test of the effect of choice on bolstering by manipulating the presence or absence of free choice, and (2) to determine the relative impact of bolstering in anticipation of choice vs. bolstering driven by retrospective, post-choice mechanisms. We investigate the effects of choice on bolstering by experimentally manipulating whether a subject is allowed to freely choose among the available alternatives or is directly assigned (unbeknownst to him) to eat either a favored or a less-preferred candy. We investigate the role of pre-choice comparative processing by manipulating whether posterior ratings were made in the presence or absence of a forgone alternative (i.e., in joint vs. in separate evaluation mode; Hsee and LeClerc 1998; Hsee et al. 1999). Finally, we investigate whether bolstering depends on whether an *a priori* favorite or a less-preferred item is chosen by varying which of a pair of items is received.

⁶ Our Appendix contrasts results from the proposed model to one which does not account for endogeneity.

Thus, the design of the experiment was $2 \times 2 \times 2$: whether or not the subject was allowed to freely choose or was assigned to eat a particular candy (“assignment mode”), whether or not that candy was the favorite or the less-preferred candy (“choice outcome”), and whether or not the posterior rating was comparative in nature (joint evaluation mode) or not (separate evaluation mode). Anticipatory effects of choice on bolstering would be evident in a positive main effect of assignment mode (choice) on bolstering, as well as a three-way interaction between the factors such that bolstering of a less-preferred item following choice will be higher in separate evaluation than in joint evaluation, but bolstering of a favored item following choice will be higher in joint evaluation than in separate evaluation. However, anticipatory bolstering suggests weaker effects of evaluation mode or choice outcome when subjects believe they are randomly assigned to eat a candy bar. Dissonance reduction will be supported if there is a significant two-way interaction between assignment mode and choice status such that bolstering is strong only when rating a less-preferred item that has been freely chosen (regardless of evaluation mode). An endowment or focus-of-comparison mechanism will be supported if there is a significant two-way interaction between choice outcome and evaluation mode such that bolstering is strong only when rating a less-preferred item in joint evaluation mode (regardless of assignment mode).

The design of the study will also allow us to confirm and control for several alternative explanations for bolstering: a main effect of choice outcome (less-preferred vs. favored) would be consistent with the possibility that less-preferred items have less well-formed preference (West, Brown, and Hoch 1996). A main effect of choice status (free choice vs. assigned) would be consistent with the idea that choice can be internally motivating (Lepper, Greene, and Nisbett 1973) or improve one’s mood (Meloy 2000). A main effect of evaluation mode would be

interpretable as a dilution effect (a general reduction in bolstering following exposure to a full range of attributes; Tetlock 1991).

Methodology

One hundred fourteen undergraduates participated for course credit, in groups of up to ten, each subject isolated in a separate carrel. The experimental session consisted of a pre-test, a 30-40 minute set of unrelated filler experiments, and the taste test. The pre-test (and the filler experiments) were administered via computer. The pre-test was described as a “candy preferences study,” in which the researchers were interested in what types of candy were preferred by the university’s students. Subjects were asked to rate each of the ten candies on a 1-11 scale with a hedonically neutral mid-point (Kahneman, Wakker and Sarin 1994) (“dislike very much... like very much”). These ratings formed our measure of a subject’s prior preference for each item. They were next asked to rank the candies in order of preference. Then, they were asked to rank them in terms of the frequency with which the subject consumed them, leaving off any items that they had not tried. Finally, they were asked to list any which they would never eat due to dietary restrictions (no subjects were offered items counter to their restrictions).

An unrelated 30-40 minute filler task followed. While subjects were completing this task, an experimenter reviewed each subject’s pre-test response to create a customized choice set based on the subject’s rankings, using actual candy bars. A confederate in a separate room observed each subject’s data file on a monitor, to construct his/her choice set. All subjects were presented with two candies: the third and fifth-best candies according to their *a priori* rankings.⁷

⁷We used the third and fifth-ranked candies to avoid the possibility of ceiling effects, and to assure that there was a significant *a priori* difference between the favored and less-preferred items. We also used an 11-point scale rather than a 7-point scale to reduce the possibility of ceiling effects. The 11-point scale was successful in limiting subjects’ use of the high point of the scale in marking their prior ratings. Few subjects (9 of 115, of 7.8%) tasted an item with an *a priori* rating of 11. Furthermore, only 11.3% of subjects reported a posterior rating of 11, regardless

When the filler tasks were completed, the subject notified the first experimenter, who brought him/her the (covertly) customized box, which for all subjects contained two candies and the prepared response form. The subject read the first page of the response form, wrote the name of the candy he or she was going to eat on the bottom of the first page, and proceeded. The experimenter then left the area. The subject completed one final five-minute filler task, and then finally the taste test itself, providing a rating for the candy once eaten.

Two manipulations appeared on the taste-test response form. First, we manipulated whether subjects were assigned to eat a particular candy or whether they were allowed to freely choose among the two (“assignment mode”). Subjects in the free-choice condition read that ‘To give you an opportunity to choose a candy you prefer, we are offering you a choice of alternatives,’ and asked to fill in the statement “the name of the candy you will be eating is _____.” “For subjects in the assigned condition, the form stated “in order to have enough observations on all the candies we are considering, you have been randomly assigned to eat the candy listed below,” followed by “the name of the candy you will be eating is _____.” (i.e., the same phrase appeared in both conditions.) In the assigned case, however, the blank had been previously filled in by the experimenter, with the name of either the favorite (third-best) or less-preferred (fifth-best) candy (determined by random assignment).

The other manipulation involved whether the taste-test judgment was made under joint or separate evaluation mode. In the separate-evaluation condition, once the subject indicated on his form which candy he/she would taste, the experimenter removed the other candy without comment. Under joint-evaluation, the experimenter left both candies, also without comment.

of condition. Thus, very few subjects showed signs of being constrained by a ceiling effect. An analysis of these data with these observations omitted does not significantly alter the forthcoming results.

Thus, in the joint-evaluation condition only, the forgone alternative candy was present during the taste test itself.

Results

Selection Effects. As one might expect, the favored item (the third-ranked item for all subjects) had a higher prior rating than for items at the lower rank ($x(3^{\text{rd}}\text{-ranked}) = 8.342$, $x(5^{\text{th}}\text{-ranked}) = 7.333$, $t(114) = 4.035$, $p \leq .001$). Secondly, the highly significant correlation between the error terms of the sub-models ($\rho = -.913$, $t(1) = -2.194$, $p \leq .005$) reconfirms the importance of using a model that accounts for choice endogeneity. Status as the favored alternative (FAVORED) significantly increased the likelihood of being chosen ($t(1) = 3.532$, $p \leq .001$; the greater a 3^{rd} -rated item's prior rating was from the 5^{th} -rated item, the more likely it was to be chosen (DISTANCE; $t(1) = 2.911$, $p \leq .005$). Unsurprisingly, subjects offered free choice were more likely to choose the favored item than subjects who were randomly assigned (FREE CHOICE \times FAVORED, $t(1) = 2.349$, $p \leq .02$). (See Table 1 for model results.)

Table 1 about here.

Evaluation Effects. The main effects of the three primary manipulations were all significant (choice status – assignment mode [FREE CHOICE]; choice outcome – favored item vs. less preferred [FAVORED ITEM]; and evaluation mode – separate vs. joint [EVALMODE]). Although the main effect of FREE CHOICE was important to our theory test, the other effects have intuitively appealing interpretations. People who were allowed to freely choose an item bolstered it more than people who were assigned to an item of the same quality (FREE CHOICE; $t(1) = 1.971$, $p \leq .05$). This positive effect is consistent with our suggestion that comparative

processing in anticipation of choice results in the bolstering of the chosen item. Secondly, people who chose a less-preferred item bolstered their ratings significantly more than people choosing favored items (FAVORED, $t(1) = -2.372$, $p \leq .02$). This is consistent with West, Brown, and Hoch's (1996) observation that preferences are well-defined for favored items but more malleable for less familiar ones. Finally, people who evaluated their target item in joint evaluation mode showed less bolstering than people who evaluated their target in isolation (a kind of dilution effect, Tetlock and Boettger 1989; EVALMODE; $t(1) = -2.071$, $p \leq .05$).

The critical tests of anticipatory and retrospective explanations lie in the two- and three-way interactions. Dissonance in particular would suggest an interaction between assignment mode (free choice vs. assigned; FREE CHOICE) and choice outcome (favored item vs. less-preferred; FAVORED); however, this interaction was not significant ($t(1) = -.530$, n.s.). Neither can endowment or focus-of-comparison (as distinct from choice) explain our results, because the interaction between choice outcome and evaluation mode implied by this theory was also not significant ($t(1) = -.933$, n.s.). (In fact, none of the two-way interactions was significant.) This three-way interaction is, however, highly significant, $t(1) = 3.804$, $p \leq .0001$, as predicted.

We clarify the three-way interaction by looking first at the data for assigned subjects then the data for subjects who freely chose a candy. (Figure 1 illustrates the interactions.) For assigned subjects, we hypothesized limited effects of either choice outcome or comparison mode on bolstering. As anticipated, for assigned subjects, there was no main effect of either choice outcome or comparison. There was, however, a significant interaction between choice outcome and evaluation mode ($t(1) = -2.053$, $p \leq .05$), such that the bolstering of less-preferred items is higher than that of favored items under joint evaluation only ($x = 1.444$ for assigned/joint/less-preferred but $x = .2$ for assigned/joint/favored).

For choice subjects, we anticipated a two-way interaction between choice outcome and comparison mode on bolstering. This interaction was significant ($t(1) = 3.437, p \leq .001$). More specifically, we hypothesized that bolstering of a less-preferred item would be higher in separate evaluation than in joint evaluation. As predicted, there was a significant decline in bolstering from the choice/less-preferred/separate condition [$x = 2.667$] to the choice/less-preferred/joint condition [$x = .286$], $t(1) = 3.258, p \leq .01$). In contrast, pre-choice distortion suggested bolstering of a favored item following choice would be higher in joint evaluation than in separate evaluation. Mean bolstering of a favored item in joint evaluation was 1.444, while mean bolstering of favored items in separate evaluation was .958; however, this difference by itself did not reach significance.

Greater bolstering for less-preferred items (relative to favored items) raises the possibility of preference reversals (i.e., bolstering is so much higher that the item less preferred *a priori* is more preferred after choice). Hsee et al. (1999) proposed that such preference reversals were more likely when “switching” evaluation modes between choice and satisfaction ratings. For example, this might occur when subjects choose in “joint evaluation” mode but evaluate items separately post-choice – which is, of course, common in daily consumer life. In fact, our final posterior ratings are consistent with this expectation: bolstered less-preferred items show higher mean ratings than favored when freely chosen but separately evaluated (9.22 for less preferred items vs. 8.87 for favored items), and when assigned (separate evaluation) but jointly evaluated (9.56 less preferred vs. 9.13 preferred; see Figure 2). Although these differences are not highly significant, they are consistent with Hsee’s proposal.

 Figures 1 and 2 about here.

It is worth noting that our model allowed us to draw different conclusions than a model that does not account for endogeneity. In the exogenous model (see Appendix), none of the main effects of choice mode, evaluation mode, or choice outcome are significant, but they all reach significance with the endogenous model. Furthermore, the highly significant negative value for ρ (confirming the presence of endogeneity) has an appealing interpretation: it suggests that there are some unobserved features of choice alternatives that reduce their chances of being chosen yet increase their post-choice evaluations. This result is consistent with the preference reversals we observe in our experiment.

DISCUSSION AND CONCLUSIONS

We have identified several critical ways in which the anticipation of choice affects bolstering: first, choice of a less-preferred item (relative to random assignment) shows bolstering effects consistent with the observation that less-preferred items will *only* be chosen if they have benefited from strong positive distortion prior to choice. Furthermore, bolstering is powerfully affected by the fact that the chosen item typically dominates the *physical* environment after it is chosen. “De-biasing” by allowing the foregone item to remain physically present during consumption reversed the bolstering effects following choice. Finally, prior preferences for the consumed item acted as a powerful moderator of bolstering: Because consideration seems to impact less-preferred items more than favored items, bolstering for less-preferred items can sometimes be so powerful that it creates implied preference reversals.

Our results are more generally consistent with anticipatory than retrospective theories, for several reasons: counter to dissonance, there is bolstering for favored items as well as for less-preferred items, and there is bolstering for less-preferred items despite the availability of an

external attribution for one's behavior (i.e., random assignment). In fact, in our study sometimes bolstering following assignment was actually *greater* than bolstering following choice. Likewise, our results are not generally consistent with an endowment or focus-of-comparison-generated retrospective effect, because subjects endowed with an item via choice bolstered differently than subjects receiving the same endowment via random assignment.

However, for subjects randomly assigned to a candy, there was an interaction that we had not predicted; in "joint evaluation" mode, subjects assigned to a less-preferred item bolstered its evaluation more than subjects assigned to a favored item. In other words, joint evaluation mode following random assignment gave the same results as the implicit joint evaluation preceding choice: consistent with Hsee et al. (1999), joint evaluation mode distorted results in favor of the item less preferred when evaluated alone. In the joint evaluation implicit in free choice mode, this resulted in a greater likelihood of consuming the less-preferred item (relative to random assignment); in joint evaluation mode following random assignment, this resulted in a more positive final evaluation.

To demonstrate the effects of choice on bolstering, we have shown how a consumer's experience of an item, once chosen, is different than that of this same item had it been consumed *but not chosen*. Our ability to make such a causal claim (Raudenbush 2001), and to delineate the mechanisms that underlie the phenomenon, rests on two features of our work. First, our experimental manipulation of choice allows us to make a causal claim otherwise unavailable. Using this methodology, we are able to demonstrate how and why bolstering depends on choice outcome (the extent to which prior preferences favor an item). Because prior preferences have a powerful effect on which attributes are most likely to be considered early in the consideration process, this distinction proves to be critical in establishing how bolstering is generated.

Second, our analytical model, which treats choice as endogenous, allows us to distinguish accurately between the effects of the choice set on what is chosen and on how that choice is evaluated. Commonly, researchers interested in the effects of choice antecedents on post-choice satisfaction have not controlled for choice outcomes, but measured the effects directly (i.e., Dhar et al. 1999), leading to possibly biased estimates. Moreover, important adaptations from the traditional form of selection models (Heckman 1979) were necessary to render them suitable for consumer choice. The significance of the measure ρ in our model testifies to the importance of an endogenous model in providing debiased estimates of the key effects in our study. Importantly, the model draws different substantive conclusions than a comparable exogenous model; the three main effects are significant in our model but not in the conventional one. Although we have not emphasized the model itself here, our conclusions could not have been drawn without it. Phased decision strategies (i.e., evaluation following selection, or a series of nested selections) are common in consumer decision making, suggesting that the class of models applied here can, and perhaps should, be applied to a broader class of marketing problems.

We might debate whether our distinctions between “favored” and “less preferred” items are definitive; is it possible that our pre-consumption measurement of product preferences is simply too noisy to be meaningful? Our analysis suggests otherwise; pre-consumption ratings for each rank were significantly higher than at the next rank. Even with imprecise priors, the explicit ranking of all candies should generate the conflict (between stated ranked preference and actual choice of an item the subject has admitted to liking less) necessary to create dissonance.

Areas for Future Research

The robustness of the basic bolstering effect – an *improvement* in affective response following choice – suggests that having to make a trade-off in choice (say, chocolate for nuts)

does not necessarily result in a negative emotional response (Bettman et al. 2001). Even subjects who ate a clearly inferior candy increased their posterior ratings. In our experiments, all alternatives were at least minimally acceptable to the consumer. A choice among candy bars is a “win-win” situation, since most people like most candy. It would be valuable to replicate the experiment in a product category in which some alternatives are below some aspiration level (Dhar et al. 1999, Hsee and LeClerc 1998, Busemeyer and Townsend 1993).

Our positive main effect of choice on bolstering is consistent with a long stream of American research emphasizing that decision makers *like* to choose. Recently, some researchers have suggested that this main effect may be an artifact of Western culture, which values individual choice (Iyengar and Lepper 1999, 2001). For example, Iyengar and Lepper (1999) demonstrated that Asian-American subjects showed greater internal motivation when they believed that high-status others (mothers or student peers) had chosen for them than when subjects chose for themselves (while European-Americans showed the opposite result). It would be useful to learn whether our results would hold up in cultures in which choice does not have the same motivational effect. In some cultures we might see negative, rather than positive, main effects of choice on evaluation.

Despite a clear inferiority in the *a priori* ratings of the less-preferred items, our results showed so much bolstering for these items that preferences were actually *reversed* – the posterior rating of the less-preferred item was actually higher than the predicted posterior rating for the (superior) forgone alternative. We should be careful here to point out that we are not suggesting that consumers are choosing “non-normatively;” in our theory they are always choosing the item they believe will provide the greatest experienced utility. However, these predictions are distorted in predictable ways (see also Hsee, Zhang, Yu, and Xi 2003). If the consumer could not

predict when such reversals will occur, the *a priori* favorite is surely still the best choice.

However, our reversals predictably depended on the match between pre and post-choice evaluation modes (Hsee et al. 1999). Our reversals occurred in the two cases in which pre- and post-choice evaluation mode differ (see Figure 2): when randomly-assigned subjects were encouraged to compare their assignments to forgone alternatives (a separate evaluation process followed by a joint evaluation process), and when choosers could *not* easily compare their choices to forgone alternatives (a joint evaluation process followed by a separate evaluation process). Consistent with Hsee et al. (1999), this suggests that decision makers should take care to make choices under the same conditions in which evaluations will occur. Notably, however, the most typical consumer scenario – choice among several alternatives but consumption in isolation – leaves open the possibility that decision makers who always choose their favorites lose the benefit of the road less taken.

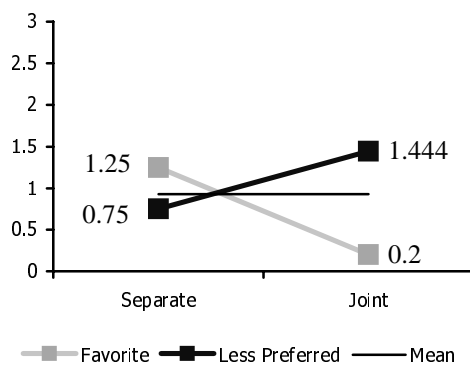
TABLE 1
MODEL RESULTS

Parameter (n = 114)	Estimates for $\rho \neq 0$	StdErr	t-stat	P-value
Choice:				
Favored Item	.733	.208	3.532	[.000]
Distance	.308	.106	2.911	[.004]
Free Choice ^a	n.a.	n.a.	n.a.	n.a.
Free Choice*Favored	.402	.171	2.349	[.019]
Valuation:				
Constant	.608	.046	13.106	[.000]
Free Choice	.064	.032	1.971	[.049]
Evalmode	-.060	.029	-2.071	[.041]
Favored Item	-.087	.037	-2.372	[.018]
Choice*Evalmode	-.030	.032	-.933	[.351]
Choice*Favored Item	-.019	.037	-.530	[.596]
Evalmode*Favored Item	.034	.032	1.046	[.296]
Choice*Favored*Evalmode	.124	.033	3.804	[.000]
Cutoffs:				
μ_1	.362	.045	8.017	[.000]
μ_2	.569	.049	11.642	[.000]
μ_3	.699	.050	13.840	[.000]
σ	.359	.030	11.776	[.000]
Test for endogeneity: ^b				
ρ	-.913	.366		
LL	-247.513			
2 Δ (LL)	7.890			
p-value for LR test, $\rho \neq 0$.0049			

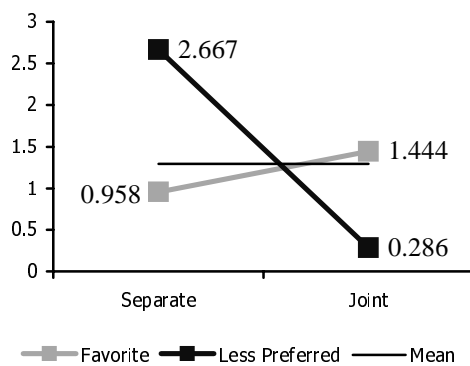
^a The main effect of free choice is included in the table by convention (because the interaction between choice and rank is also estimated), but the statistics are not estimated and have no meaning. Because each subject, whether freely choosing or assigned, chooses exactly one of two alternatives, choice condition does not vary within individual, and thus can have no effect on the likelihood of one item being chosen over another.

^b Because ρ is restricted to the unit interval, lack of asymptotic normality rules out the usual t -test. Instead, we perform a likelihood-ratio (or Wald) test, which here is Chi-square distributed with one degree of freedom. This is consistent with standard practice with Heckman or Tobit II type models, although hyperbolic arctangent transforms are also commonly applied for inference on ρ .

FIGURE 1
BOLSTERING RESULTS

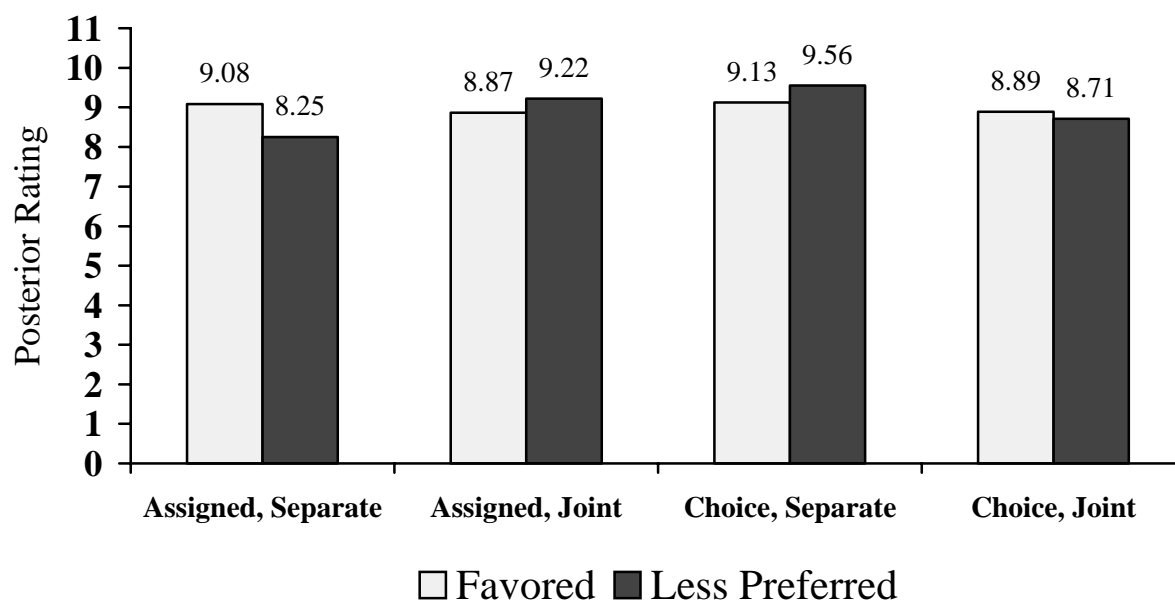


Assigned Condition



Free Choice Condition

FIGURE 2
POSTERIOR RATINGS



APPENDIX

RESULTS FOR THE EXOGENOUS MODEL

The following table gives results of the experimental study assuming a traditional exogenous model (i.e., the choice model is a multinomial probit estimation; the valuation model is ordered probit, but errors are uncorrelated, so there is no correction for endogeneity). The three main effects, which are significant at $p \leq .05$ in our model (presented in Table 1), are not significant below, that is, when $\rho = 0$.

Parameter (n = 114)	Estimates for $\rho = 0$	StdErr	t-stat	P-value
Choice:				
Favored Item	0.557	0.217	2.570	0.010
Distance	0.156	0.125	1.249	0.212
Free Choice ^a	n.a.	n.a.	n.a.	n.a.
Free Choice*Favored	0.423	0.172	2.458	0.014
Valuation:				
Constant	0.425	0.044	9.746	0.000
Free Choice	0.059	0.034	1.755	0.079
Evalmode	-0.058	0.034	-1.726	0.084
Favored Item	-0.047	0.034	-1.403	0.161
Choice*Evalmode	-0.036	0.034	-1.067	0.286
Choice*Favored Item	0.023	0.034	0.671	0.502
Evalmode*Favored Item	0.039	0.034	1.175	0.240
Choice*Favored*Evalmode	0.127	0.034	3.768	0.000
Cutoffs:				
μ_1	0.358	0.045	7.932	0.000
μ_2	0.564	0.049	11.437	0.000
μ_3	0.695	0.051	13.586	0.000
σ	0.320	0.027	11.746	0.000

References

- Bettman, James R. Mary Frances Luce, and John W. Payne (2001), *Emotional Decisions: Tradeoff Difficulty and Coping in Consumer Choice*. Monographs of the *Journal of Consumer Research*, Number 1.
- Boiney, Lindsey G., Jane Kennedy, and Peter Nye (1997), "Instrumental Bias In Motivated Reasoning: More When More Is Needed," *Organizational Behavior and Human Decision Processes*, 72 (1), 1-24.
- Brehm, J. (1956), "Postdecision Changes in the Desirability of Alternatives," *Journal of Abnormal and Social Psychology*, 52, 384-389.
- Brownstein, Aaron (2003), "Biased Pre-Decision Processing," *Psychological Bulletin*, in press.
- Busemeyer, Jerome R., & James T. Townsend (1993), "Decision Field Theory: A Dynamic Cognitive Approach To Decision Making," *Psychological Review*, 100, 432-459.
- Carlson, Kurt A. and Lisa R. Klein (2001), "Predecisional Distortion of Information in Actual Product Choices," working paper, Cornell University.
- Carmon , Ziv and Dan Ariely (2000), "Focusing on the Forgone: How Value Can Appear So Different to Buyers and Sellers," *Journal of Consumer Research*, 27 (December), 360-370.
- Chernev, Alexander (2001), "The Impact of Common Features on Consumer Preferences: A Case of Confirmatory Reasoning," *Journal of Consumer Research*, 27 (March), 475-488.
- Cooper, Joel and Russell H. Fazio (1984), "A New Look at Dissonance Theory," *Advances in Experimental Social Psychology*, 17, 229-266.
- Current Authors (2003), "Modeling Choice Endogeneity in Phased Decision Tasks," working paper.
- Dhar, Ravi and Itamar Simonson (1992), "The Effects of the Focus of Comparison on Consumer Preferences," *Journal of Marketing Research*, 29 (4 November), 430-440.
- , Steven M. Nowlis, and Stephen J. Sherman (1999), "Comparison Effects on Preference Construction," *Journal of Consumer Research*, 26 (3 December), 293-306.
- Draganska, Michaela and Jain, Dipak (2002), "Structural Models of Competitive Market Behavior: An Estimation Approach Using Disaggregate Data," working paper, Stanford University Graduate School of Business.
- Festinger, Leon (1957), *A Theory of Cognitive Dissonance*. Evanston, IL: Row Peterson.
- Heckman, James J. (1978), "Dummy Endogenous Variables in a Simultaneous Equation System," *Econometrica*, 47:153-161.

---- (1979), "Sample Selection Bias as a Specification Error," *Econometrica*, 47 (1 January), 153-161.

Hsee, Christopher K. and France LeClerc (1998). Will Products Look More Attractive When Evaluated Jointly Or When Evaluated Separately? *Journal of Consumer Research*, 25, 175-186.

----, George Loewenstein, Sally Blount, and Max Bazerman (1999), "Preference Reversals Between Joint and Separate Evaluations of Options: A Review and Theoretical Analysis," *Psychological Bulletin*, 125, 576-591.

----, Jiao Zhang, Fang Yu, and Yiheng Xi (2003), "Lay Rationalism and Inconsistency Between predicted Experience and Decision," *Journal of Behavioral Decision Making*, in press.

Iyengar, Sheena S., and Mark R. Lepper (1999), "Rethinking the Value Of Choice: A Cultural Perspective On Intrinsic Motivation," *Journal Of Personality And Social Psychology*, 76, 349-366.

----, and ---- (2000), "When Choice Is Demotivating: Can One Desire Too Much Of A Good Thing?," *Journal Of Personality And Social Psychology*, 76, 995-1006.

----, and ---- (2001), "Choice and its Consequences: On the Costs and Benefits of Self-Determination." in Abraham Tesser (Ed.), *Perspectives on the Self*. Washington, D.C.: American Psychological Association.

Kahneman, Daniel, Jack Knetsch, and Richard Thaler (1990), "Experimental Tests of the Endowment Effect And the Coase Theorem," *Journal Of Political Economy*, 98 (6 December): 1325-1348

-----, ----, and ---- (1991), "The Endowment Effect, Loss Aversion, and Status Quo Bias", *Journal of Economic Perspectives*, 5, 193-206

----, Peter P. Wakker, and Rakesh Sarin (1997), "Back to Bentham? Explorations of Experienced Utility," *Quarterly Journal of Economics*, 112 (2 May), 375-405.

Lepper, Mark. R., Greene, D., & Nisbett, Richard. E. (1973). "Undermining Children's Intrinsic Interest With Extrinsic Reward: A Test of the "Overjustification" Hypothesis," *Journal of Personality and Social Psychology*, 28, 129-137.

Maddala, G. S. (1983), *Limited-Dependent and Qualitative Variables in Econometrics*. Cambridge, England: Cambridge University Press.

Manski, Charles F. (1979), "Structure of Random Utility Models," *Theory and Decision*, 8(3), 229-254.

McFadden, Daniel S. (1974), "Conditional Logit Analysis of Qualitative Choice Behavior," in P. Zarembka, ed., *Frontiers in Econometrics*. New York: Academic Press.

Meloy, Margaret G. (2000), "Mood-Driven Distortion of Product Information," *Journal of Consumer Research*, 27 (December), 345-359.

Morwitz, Vicki G. and Carol Pluzinski (1996), "Do Polls Reflect Opinions or Do Opinions Reflect Polls? The Impact of Political Polling on Voters' Expectations, Preferences, and Behavior," *Journal of Consumer Research*, 23(1 June), 53-67.

Oxford English Dictionary (1989), "Bolstering," *Oxford English Dictionary On-Line*. www.oed.com, retrieved September 4, 2001.

Ratner, Rebecca K., Barbara E. Kahn, and Daniel Kahneman (1999), "Choosing Less-Preferred Experiences for the Sake of Variety," *Journal of Consumer Research*, 26 (1 June), 1-15.

Raudenbush, Stephen W. (2001), "Comparing Personal Trajectories and Drawing Causal Inferences From Longitudinal Data," *Annual Review of Psychology*, 52, 501-25.

Rost, Jurgen (1985), "A Latent Class Model for Rating Data," *Psychometrika*, 50 (1), 37-49.

Russo, J. Edward, Victoria Husted Medvec, and Margaret G. Meloy (1996), "The Distortion of Information During Decisions," *Organizational Behavior and Human Decision Processes*, 66 (April) 102-110.

----, Margaret G. Meloy, and Victoria Husted Medvec (1998), "Predecisional Distortion of Product Information," *Journal of Marketing Research*, 35 (November), 438-452.

Sen, Sankar and Eric J. Johnson (1997), "Mere-Possession Effects without Possession in Consumer Choice," *Journal of Consumer Research*, 24 (1 June), 105-117.

Shaver, J. Myles (1998), "Accounting for Endogeneity When Assessing Strategy Performance: Does Entry Mode Choice Affect FDI Survival," *Management Science*, 44 (4 April), 571-585.

Shiv, Baba and Joel Huber (2000), "The Impact of Anticipating Satisfaction on Consumer Choice," *Journal of Consumer Research*, 27 (September), 202-216.

Tetlock, Philip E. and Richard Boettger (1989), "Accountability: A Social Magnifier of the Dilution Effect," *Journal of Personality and Social Psychology*, 45, 74-83.

----, Linda Stitka, and Richard Boettger (1989), "Social and Cognitive Strategies for Coping with Accountability: Conformity, Complexity, and Bolstering," *Journal of Personality and Social Psychology*, 57 (4), 632-640.

---- (1991), "An Alternative Metaphor in the Study of Judgment and Choice: People as Politicians," *Theory and Psychology*, 1 (4), 451-475.

Thaler, Richard (1980), "Toward A Positive Theory of Consumer Choice," *Journal of Economic Behavior and Organization*, 1 (1): 39-60.

Tversky, Amos, Schmuel Sattath, and Paul Slovic. (1988), "Contingent Weighting in Judgment and Choice," *Psychological Review*, 95, 371-384.

Villas-Boas, J. Miguel and Russell S. Winer (1999), "Endogeneity in Brand Choice Models," *Management Science*, 45 (October), 1324-1338.

West, Patricia M., Christina L. Brown, and Stephen J. Hoch (1996), "Consumption Vocabulary and Preference Formation," *Journal of Consumer Research*, 23 (2 September), 120-135.

Winship, Christopher and Robert D. Mare. (1992), "Models for Sample Selection Bias," *Annual Review of Sociology*, 18:327-50.

Zhang, Shi and Gavan J. Fitzsimons (1999), "Choice-Process Satisfaction: The Influence of Attribute Alignability and Option Limitation," *Organizational Behavior and Human Decision Processes*, 77 (3 March), 192-214.