

The Evaluation Stage in Marketing Decision Making

John C. Mowen

Oklahoma State University

Gary J. Gaeth

University of Iowa

Prior to making important decisions, marketing managers go through an evaluation process in which available alternatives are compared. Yet, no systematic discussion of the evaluation process exists in the marketing literature. This article reviews the marketing and behavioral decision theory literature in order to identify factors that may cause errors in the two fundamental elements of the evaluation process—the estimation of probabilities and the determination of the value of outcomes. Propositions are developed that specify circumstances in which marketing management decisions may be influenced by judgmental biases, and procedures are identified for debiasing such judgments.

Traditionally, rather than investigating how managers go about making decisions, marketing researchers have focused on identifying various prescriptive decision making models that managers “should” follow. For example, decision calculus models have been developed and applied in areas such as sales route planning (CALLPLAN, Lodish 1971), setting advertisement expenditure levels (ADBUDG, Little 1970), estimating the profitability of coupon promotions (Neslin and Shoemaker 1983) and modeling macro-marketing mix models (BRANDAID, Little 1975). Thus, the prevalent approach to investigating marketing decision making has tended to be normatively rather than descriptively based.

More recently, researchers have identified a potentially

weak link in this prescriptive approach to improving managerial decision making. Chakravarti, Mitchell, and Staelin (1981) argued that one source of difficulty in using such models is that frequently they rely on managerial judgment as input for parameter estimation. To the extent that the managerial judgments are systematically incorrect, the decision calculus model will perform poorly. Moriarty (1985) noted similar problems in obtaining accurate sales forecasts from managers to use as input for quantitative models. The statistical controls proposed by Moriarty (1985, also see Fraser and Hite 1988) accept the inevitability of error in managerial decision making and cannot be used to identify the underlying mechanisms responsible for these biases.

Another characteristic of the prescriptive models of marketing decision making is that they tend to focus on using the inputs to produce an “optimal” choice. For example, the decision calculus models are essentially algorithms that integrate data in a consistent and mathematically correct manner. In part, such approaches act to replace humans in the computational aspects of the decision making process.

In addition to a computational choice phase, there are other equally critical stages in the decision making process, including problem recognition, search, alternative evaluation, and post-decision assessment. While each stage is important, we argue that understanding the evaluation stage is crucial to marketing decision making. The judgments that take place during the evaluation stage form the foundation for choice. If the judgments are flawed, choice will inevitably be suboptimal (i.e., “garbage in—garbage out”) whether a human or a decision calculus model does the computations and suggests the optimum choice.

The first major goal of the article is to discuss the evaluation stage of the decision making process. While extensive reviews on choice heuristics already exist (e.g., see Bettman 1979), no systematic review of the factors that influence evaluation can be found in the marketing literature. We suggest that the large literature on heuristics and biases in

the field of behavioral decision theory has application to understanding evaluation. Thus, the article analyzes how heuristics and biases may influence the evaluation stage of the decision process and develops a series of propositions that summarize their impact on marketing decision making. Researchers in other disciplines have analyzed the role of heuristics and biases within the context of their field (e.g., Hogarth and Makridakis 1981, in management science). While investigators have discussed specific judgmental heuristics in the marketing literature (e.g., Chakravarti et al. 1981), no overall review relating the behavioral decision making field to marketing has been written.

Given that managerial decision making is influenced by heuristics, a major issue concerns what corrective actions can be taken to debias their effects. Thus, a second major goal of the article is to review various approaches for how to improve the evaluation process by debiasing decision makers. A general discussion of debiasing decision makers has not been previously published in the business literature.

THE EVALUATION PROCESS

In understanding the evaluation stage of the decision making process, it is important to distinguish several concepts. In this article the term "decision making" is used in a generic sense to describe the overall process of solving problems, searching for alternatives, evaluating options, choosing among alternatives, and assessing results. The term, "choice," is used more specifically to refer to occasions when the decision maker must select between two or more options. "Evaluation" refers to the judgment of probability, the judgment of value, and the integration of these two components into an overall assessment of the outcome. The terms, "evaluation" and "valuation" designate separate ideas. "Valuation" is a narrow concept referring to the goodness or badness of an outcome, should it occur. "Evaluation" is a broader term that denotes the overall utility or assessment of an option as well as its probability of occurrence. Valuation and probability estimates are integrated to form an overall evaluation of a prospect.

These distinctions are consistent with those made in the behavioral decision theory literature. For example, Hogarth (1987) argued that in the evaluation process, the decision maker engages in two different types of judgment tasks—the estimation of probabilities/frequencies (i.e., makes a prediction) and the valuation of outcomes. Generically, a "judgment" is tantamount to associating an estimate with a rating on a scale. In prediction judgments, decision makers act as though they are making estimates of the probability (e.g., on a scale from 0 to 1) that an event will occur or the frequency of its occurrence. Valuation judgments involve the assessment of the goodness or badness of an event independent of its probability of occurrence.

The concept that in the evaluation stage judgments of probability and value are combined to form an overall assessment of an option underlies numerous models found in the behavioral science literature. Typically called expectancy-value models, they have been used to predict attitudes (e.g., Fishbein and Ajzen 1980), motivation level (e.g., Vroom 1964), subjective expected utility (for a discussion

see Schoemaker 1982), and risk perception (Bettman, Capon and Lutz 1975).

In the field of behavioral decision theory a large literature has developed that identifies a variety of factors that may bias the evaluative process. The next two sections discuss a variety of these heuristics and associated biases that may influence prediction and value judgments. In addition, propositions are developed that describe how such biases may influence the evaluation stage in marketing decision making. Although the concepts and findings on which these propositions are based are not new, they serve to identify general principles that can be applied to each of the marketing areas. They are illustrated, however, by research and examples drawn from specific marketing areas, such as sales management and product development.

MAKING PREDICTION JUDGMENTS

When a marketing manager makes a prediction, he or she is engaging in one or more of three activities: (1) estimating the probability that something will occur, (2) estimating the frequency with which something has occurred or will occur, or (3) estimating the amount of a stimulus. One of the findings in the behavioral decision theory literature is that decision makers are prone to take certain information processing shortcuts when making such judgments. These shortcuts have been called heuristics, or "best guess" rules of thumb, which assist us in making decisions (Gettys, Kelly, and Peterson 1973). People tend to use such heuristics in order to make a complex environment manageable or to make their decision making more efficient. This notion has been termed "bounded rationality" (Simon 1957).

The use of judgmental heuristics frequently provides "good enough" answers at relatively low cost (Hogarth 1987). On the other hand, misapplication or overconfidence in heuristics may lead marketing managers into decisions that are inconsistent with what would be derived from the use of an appropriate normative model. When the latter situation occurs, heuristics may result in judgmental biases. Several of these heuristics have application to the managerial judgment process.

Representativeness

Tversky and Kahneman (1974) defined representativeness as a rule of thumb in which a person determines the probability that object A belongs to class B by assessing the degree that object A represents (i.e., is similar to or stereotypical of) class B. A prototype manifestation of the heuristic is the "belief in the law of small numbers" in which individuals tend to believe that a sample is a true representation of a population, even when the sample is extremely small.

Insensitivity to predictability occurs when people fail to consider the underlying reliability of information. For example, if a prospective salesperson is described in a highly positive way, a sales manager may act on the favorableness of the description rather than examining the reliability of the evidence on which the description was based. Finally, people frequently fail to consider the effects of regression to the

mean when attempting to identify the underlying cause for an outcome (Tversky and Kahneman 1981). For example, Kahneman and Tversky (1973) described airplane pilot trainers who concluded that giving positive reinforcement after a student pilot performed an excellent maneuver was harmful because the student tended to do the maneuver more poorly the next time. Of course, what the instructors failed to consider was that the students' performance was merely regressing to the mean because the successful maneuver was really a chance event.

Dependence on the representativeness heuristic may influence a variety of marketing management decisions that involve the problem of determining the probability of an event. Identified below are two areas of marketing decisions that the representativeness heuristic could affect, employee evaluations and forecasting success.

Predicting Sales Performance

A common managerial task is the prediction of the future performance of sales personnel. A variety of factors may influence the sales generated by salespeople including their personal characteristics (such as skill level and training), their effort level, and the characteristics of their territory (e.g., level of competition, economic environment, total market potential, etc.). The representativeness heuristic could influence this forecast in a number of ways. First, the law of small numbers suggests that a manager may make inferences about performance based on a small sample of performance data points (or worse, a single measure). In addition, the manager might use only one indicator of performance, such as sales, and ignore others, such as number of contacts.

Proposition 1: In predicting outcomes, managers may exhibit the small sample size bias by relying on an inadequate number of indicators of performance.

Performance prediction can also be biased by an insensitivity to the prior probability (e.g., base rate) of an outcome. One factor that could influence the likelihood that a salesperson will have success in a territory is the impact of the environment on the territory's sales potential. A territory that has a poor environment, say because of intense competition and/or poor economic conditions, will make it less likely that a salesperson placed there can perform as well as a salesperson whose territory has a good sales environment. However, research by Mowen and his colleagues (e.g., Mowen et al. 1985) has shown that the prior probability of achieving a given level of sales in a territory may not be used in assessing sales person performance. These data are consistent with an explanation based on an insensitivity to base rates.

Proposition 2: In predicting outcomes, managers may exhibit the tendency to ignore base rates and prior probabilities.

Cox and Summers (1987) investigated the intuitive predictions of sales rates by department store buyers. The buyers were given information on the first week's retail sales and inventory data on 12 handbag styles. Additional

information relevant to the predictions was also given such as dollar sales for the entire hand bag department during the initial week. The results revealed that experienced retail buyers failed to regress their predictions appropriately to the mean. Indeed, the authors argued that the "... experienced retail buyers display similar biases and use the same types of heuristics as found for naive subjects in previous psychological research on humans" (p. 295). These data suggest that when making sales forecasts managers may fail to account for regression effects.

Proposition 3: When making forecasts, managers will tend to ignore potential error in the diagnostic data and the population mean resulting in a failure to regress to the mean.

Forecasting Outcomes

Managers are frequently faced with the problem of forecasting the likelihood of success of a decision such as a brand launching, an employee hiring, or a marketing mix strategy. The representativeness heuristic suggests that if the brand, employee, or strategy is stereotypically described in very positive terms, the perceived likelihood of success will be rated as high even if the reliability of the prototype description is poor. Managers need to consider what factors could cause the reliability of a description to be poor. One possibility is that the description is based on a stereotype gained from past experience. Thus, an employee might be tall, attractive, and wear nice clothes, all stereotypes of success. Through "halo effects" these positive features could be generalized to equate the person with the stereotype. Based on the positive description, the perception that success will follow may be created.

Proposition 4: Managerial estimates of the probability of an event are likely to be biased upward for those events that are stereotypic of past experience, however unreliable that experience might be.

The Availability Heuristic

The availability heuristic is based on the idea that people may assess the frequency of occurrence of an object in a class or the probability of an event by the ease with which such instances are brought to mind (Tversky and Kahneman 1974). These authors reported a classic demonstration of the availability effect in a study in which subjects were given lists of famous men and women. In some of the lists the men were more famous than the women and in some of the lists the women were more famous than the men. The results showed that even though the lists contained essentially the same number of men and women, when the list included names of famous females (males), subjects incorrectly estimated that it contained more names of females (males).

A variety of factors may influence the ability of a marketing manager to more easily recall certain events. One such factor has been called egocentric biases. Ross and Sicoly (1979) argued that the availability of a person's actions in his memory will lead that person to attribute greater responsibility for himself in a joint project. Quite simply, one's own actions are almost always more available to oneself

than to other people. Thus, if several individuals are involved in a joint project, each person will tend to believe that s/he contributed more to the outcome than others will estimate because their own actions are more salient and more readily recalled than the actions of others. Similarly, salespeople may take greater credit for a successful sale than a sales manager gives them because their own actions to make the sale are highly salient to them.

Proposition 5: Egocentric biases may lead marketing managers and employees to attribute greater responsibility for a success to themselves than to others.

Anderson, Lodish and Weitz (1987) noted that the availability of information in memory may influence resource allocation behavior in a channels setting. These authors hypothesized that information on some factors, such as income generated by the product, would be less salient and available in comparison to other factors such as customer acceptance of products, support provided by suppliers, and dollar sales volume. Consistent with an availability bias explanation, the results revealed that the channel members underemphasized income generated from the product in allocating time.

Proposition 6: Managerial estimates of the probability of an outcome (e.g., a sale) are likely to be biased upward for those events most readily available in memory.

Hindsight and the Outcome Bias

Closely related to the availability heuristic is the phenomenon of hindsight. As described by Fischhoff (1982b), hindsight refers to the tendency of people to

. . . consistently exaggerate what could have been anticipated in foresight. They not only tend to view what has happened as having been inevitable but also to view it as having appeared "relatively inevitable" before it happened (p. 341).

One consequence of hindsight is that decision makers tend to believe that others should have been able to anticipate events much better than was actually the case. As shown by Fischhoff and Beyth (1975, Fischhoff 1975), people even incorrectly remember their own predictions, resulting in the exaggeration in hindsight of what they actually knew in foresight. Errors in judgment caused by hindsight are not limited to novice decision makers, as evidenced by research using medical diagnoses and employee evaluation (Mitchell and Kalb 1981). While empirical research is required to test for these effects among marketing managers, we suspect these results will extend to marketing decision making.

Proposition 7: Marketing managers, in post-event hindsight, will inflate the accuracy of their initial pre-event estimates of the probability of the outcome that occurred.

Closely related to the hindsight bias is the outcome bias, which occurs when people evaluate decision makers on the

outcome of the decision rather than the quality of decision process (Hawkins and Hastie 1990). Thus, when a decision results in a positive (negative) outcome, evaluators rate the quality of the decision and the competence of the decision maker positively (negatively), regardless of the actual quality of the decision itself.

The outcome bias has direct application to managerial assessments of sales personnel. We would speculate that managers focus on the outcomes of sales efforts rather than on the quality of the sales effort itself when evaluating sales personnel.

Proposition 8: Marketing managers may base their assessments of employee decisions more on the outcome of the decision than on the quality of the decision process itself.

Calibration and the Tendency for Overconfidence

Managerial predictions carry with them at minimum an implicit estimate of the level of confidence that the judgment is correct. Thus, a manager might say, "I am 90% sure that the product will generate at least \$40,000,000 in sales." As Fischhoff et al. (1977) pointed out, while it is often possible to evaluate the accuracy of a prediction, it is much more difficult to determine the appropriateness of the degree of confidence. Results collected from both laboratory and "real world" studies suggest that decision makers are generally overconfident (see Lichtenstein, Fischhoff and Phillips 1982). Those few experts who are well-calibrated tend to be found in areas where many repeated judgments are made under conditions of immediate and objective feedback (e.g., sports odds makers, students forecasting their own grades, and weather forecasters). Particularly disconcerting to the marketing manager is the finding that difficult or infrequent decisions are most susceptible to overconfidence (Lichtenstein et al. 1982). The product and sales manager of a firm is unlikely to make as many decisions during a career as a weather forecaster or odds maker does in a month. We believe that availability may be one cause for overconfidence. That is, one's own prediction is more readily available in memory than competing possibilities. As a result, one overestimates the likelihood that it is correct.

How might overconfidence affect the individual manager? First, consider the example that introduced this section. If prior results hold true to form, when managers are 90% certain they are right, they are actually correct about 75% of the time (Lichtenstein et al. 1982). Such overconfidence could lead to the initiation of strategies that are likely to fail. As mentioned, managerial decisions made infrequently and without complete feedback are especially difficult to calibrate.

Proposition 9: Marketing managers' confidence in their own estimates of the probability of an event will often be inflated, particularly in cases in which ambiguous and only occasional feedback occurs.

Anchoring and Adjustment

The anchoring and adjustment heuristic refers to the tendency of people to make estimates by starting from some

initial point and then adjusting from that value to generate their prediction. Two results summarize the research in this area. First, as the anchor changes (i.e., the starting point) so will the final decision (Johnson and Schkade 1989). Second, even if the anchor is reasonably accurate, the adjustments from it are typically insufficient.

The effects of anchoring and adjustment biases may systematically influence managerial predictions. For example, as part of their job, marketing managers estimate consumer activities, interests, and opinions. Hoch (1988) conducted a study in which marketing experts (marketing managers and marketing researchers), "regular consumers," and MBA students made predictions about the percentage of married American male and female consumers who would agree with eleven consumer-oriented questions. The results revealed a systematic tendency of the subjects to anchor on their own opinions. For "regular consumers" the tactic was effective because their own ratings more closely matched those of the sample than did either the MBAs or marketing professionals. Managers in particular recognized that they would have to adjust away from their own position because they would respond differently than the average consumer. For managers the adjustment process significantly improved their estimates to a point that they were roughly equivalent to the regular consumers'. MBA students, however, were least accurate because they anchored too much on their own opinions and failed to adjust sufficiently.

Decision makers often appear to use the status quo as the most available anchor. A natural result of this tendency is for firms to use the prior period's levels of sales to predict the next period's, or to search for solutions to problems "in the neighborhood" of the existing approach (Dawes 1988). Anchoring and adjustment from the status quo may also take place when decision calculus models such as CALLPLAN (Lodish 1971) are used. In the input data for the CALLPLAN model, sales personnel are required to make estimates of how much their sales would be influenced as the number of sales calls changed. A key issue concerns how sales personnel anchor their judgments. If they anchor on the status quo (e.g., current sales) but the environment changes, they are likely to adjust insufficiently. Indeed, Fudge and Lodish (1977) found that the salesperson estimates were generally pessimistic in relation to actual sales responsiveness to increases in selling effort.

Anchoring and adjustment processes have a natural application to managerial judgments concerning compound (multiple) events. Research has shown that decision makers tend to incorrectly adjust for conjunctive and disjunctive events. Specifically, people tend to overestimate the probability of conjunctive events and to underestimate the probability of disjunctive events (Cohen, Chesnick, and Haran 1971). Consider, for example, the problems involved in estimating the likelihood of success for a new product. When developing complex products, a series of events must compound successfully in order for the product to succeed. Even when each event is likely to occur, because of the conjunctive relationship the overall mathematical probability of success can be surprisingly low. Because the starting point for the estimate of the likelihood of success is often one of the initial probabilities, the tendency is to adjust insufficiently from that point and arrive at a success

estimate that is too optimistic. In such instances the decision makers are merely succumbing to the problem of anchoring and adjustment and insufficiently recognizing the effect of compounded probabilities on a compound structure, such as a new product's likelihood of success.

Proposition 10: Marketing management decisions will be biased towards using accessible estimates as anchors (e.g., the status quo), and the judgments will be insufficiently adjusted in the presence of additional information.

ASSESSING THE VALUE OF AN OUTCOME

In addition to making predictions, judgments also involve assessing the value of outcomes. The valuation process is closely allied to the estimation of utilities (Schoemaker 1982) and to certain areas of psychophysics (e.g., Steven's Power Law). Valuation involves the assessment of the goodness/badness of an outcome. The problem would be trivial if the valuation process were veridical. However, strong evidence exists that the psychological value of a given stimulus does not linearly relate to its actual value in dollars.

Prospect theory (Kahneman and Tversky 1979) makes specific predictions regarding the relationship between psychological value and actual value. The core idea of prospect theory is that when making decisions under uncertainty, people do not think in terms of total wealth as is assumed by most economic theories. The hypothetical value function developed by Kahneman and Tversky (1979) relates actual losses and gains to the psychological value of the gains and losses. The model predicts that each marginal increase in actual losses or gains has decreasing psychological value. This hypothesis has received considerable support in the social science literature and is consistent with the economic concept of decreasing marginal utility.

The behavioral implications of the hypothetical value function and traditional economic theory diverge, however, when outcomes are framed as a loss or a gain. One of the key points of prospect theory is that the same decision problem may be framed in different ways. (For a review of supporting evidence, see Tversky and Kahneman 1981.) That is, depending on a decision maker's reference point, the same decision dilemma may be framed as involving either gains or losses. If a decision problem is framed as involving a gain, risk aversion is likely to result. In contrast, if a decision is framed as involving a loss, greater risk taking can be expected.

Puto, Patton, and King (1985) demonstrated a framing effect in the risk-handling strategies of industrial vendor selection decisions. In the study, subjects were asked to respond to a written scenario describing a re-purchase situation. Subjects in the task had to decide whether to award the contract to a vendor offering a guaranteed offer or a vendor offering a 50-50 chance of either being better than or worse than the guaranteed offer. In addition, subjects were given a series of descriptions of various frames of reference that they could use in making the decision. The results revealed that decision makers who framed the decision in terms of the worst case outcome (focusing on losses) or who calcu-

lated expected values tended to choose the risky option. In contrast, those decision makers who framed the decision in terms of historical performance, guaranteed performance, or risk versus certainty tended to choose the conservative option.

The implication of prospect theory for managers is that they should be conscious of whether they frame a decision as involving gains or losses. In addition, they should be aware of the need to recognize a tendency to be risk-taking in the realm of losses and conservative in the realm of gains. Indeed, prospect theory may help to explain the frequently found phenomena of conservatism in established companies and risk-taking in smaller companies. The small start-up company may be operating in the realm of losses, leading to a tendency to take risks. In contrast, the established company may be operating in the realm of gains, leading to a tendency to be conservative in its decision making. Established companies, however, may also engage in extreme risk-taking behavior if they are in the loss domain.

Proposition 11: Managers are likely to make conservative decisions when the options in a marketing decision are framed as involving gains. In contrast, for those decisions framed as involving losses, risk-seeking predominates.

Applications of Valuation Processes to Pricing Issues

One of the primary areas of application of prospect theory to marketing is pricing. The issue concerns whether a decision maker frames a price change in terms of the base price of the brand or from the zero point on the hypothetical value function. Due to the non-linear nature of the valuation curve, consumers will respond divergently depending on how the price change is framed. If a price change is framed as a deviation from the zero point, it will have a greater impact than if framed as a deviation from the base price of the product. This occurs because the curve is steeper where it crosses the origin than at any other point in the hypothetical value function. Thus, as a general statement, managers would like to create a situation in which consumers frame a price decrease at the zero point because it will have a relatively larger psychological impact. In contrast, managers want consumers to frame a price increase from the perspective of the base price of the product because it will have a relatively smaller impact.

Interestingly, the strong effects of many sales promotion devices may result from consumers framing them as a deviation from the origin of the hypothetical value function. For example, rebates may act to break the link between the price discount and the price of the brand. That is, a \$500 rebate on a car may be framed as a gain of \$500 rather than as a reduction in price of \$500. The psychological value of the rebate is likely to be significantly larger than a reduction in price because it will be framed as a change from the zero point on the hypothetical value function. The effects of premiums, trading stamps, and sweepstakes may operate similarly.

What are the implications of these effects for managerial decision making? One issue concerns whether managers

have an intuitive understanding of how consumers value price changes resulting from sales promotion devices that create divergent frames. Because managers are not purchasing the product themselves, alternative sales promotion devices (e.g., price reduction versus rebate) are unlikely to influence the way they frame the price change. Because managers tend to anchor on their own valuations, one would suspect that they would find it hard to predict how consumers will react to different sales promotion offerings.

Proposition 12: Marketing managers may have difficulty intuitively estimating how consumers will view marketing actions because of the divergent frame perspectives of managers and consumers.

Sunk Cost Effects

In 1981, U.S. Senator Denton said: "To terminate a project in which \$1.1 billion has been invested represents an unconscionable mishandling of taxpayers' dollars." In this example, the senator fell prey to the sunk cost bias in which a person shows a tendency to continue an endeavor once an investment in money, time, or efforts has been made (Arkes and Blummer 1985). The tendency to make the sunk cost mistake appears to be extremely strong and numerous demonstrations of its impact have been published in management and psychology literature (e.g., Northcraft and Wolf 1984). In a marketing context, sunk costs would be exemplified by a manager who doggedly refuses to give up on an ailing product after making a sizable investment in its development.

The effects of framing and the valuation of outcomes provide a parsimonious account of the sunk cost findings. The abandonment of a losing product may be framed by a marketing manager as taking a loss. Because of the shape of the hypothetical value function in the loss domain, the outcome will be viewed highly negatively. Thus, the value of closing out the "mental account" and taking the loss on the product is perceived more negatively than the value of continuing to pursue the product in the hope of eliminating the loss (Arkes and Blummer 1985).

Proposition 13: Marketing managers may show a tendency to reveal the sunk cost bias and stay with a failing course of action too long.

IMPROVING DECISIONS THROUGH DEBIASING

The awareness that biases exist in the evaluation process may be viewed as a first step in improving the decision making process. Unfortunately, little research exists to guide us in developing debiasing techniques. What is available suggests that making the decision maker aware of a potential bias is insufficient and that training specifically designed to debias is necessary (Gaeth and Shanteau 1984). In this section, a framework is considered that decomposes training attempts into those oriented to task characteristics, those oriented to helping the decision maker, and those oriented to correcting the mismatch between the two. Following this, several training procedures that have been de-

veloped to remove or reduce the specific biases discussed above are presented.

Debiasing Predictions

Almost without exception, each of the heuristics identified in this article has spawned a parallel series of "training" studies aimed at overcoming them. In what may be the most general treatment of this stream of training research, Fischhoff (1982a) suggested that debiasing procedures can be categorized according to culpability. That is, is responsibility for biases laid at the "... doorstep of the judge, the task, or some mismatch between the two" (pp. 423–424).

The biases generated by the heuristics we have discussed so far have elements of all three of these causes. In the material to follow we illustrate the academic work on training and then apply it to managerial problems faced in a business environment.

Removing Hindsight, Representativeness, and Availability Biases

Although these three heuristics are based on different underlying processes, attempts to "train them out" have followed basically the same pattern. As an illustration, consider once again the (erroneous) law of small numbers that reflects insufficient attention to sample size. For example, a manager decides to roll-out a new product after obtaining a very positive consumer response from a small sample of consumers, perhaps through focus groups. The tendency to accept this information as if it accurately represents the population and roll-out the product is especially strong if the manager is personally committed to the new product. Note first that education and experience do not automatically provide a protection against the representativeness bias (Kahneman and Tversky 1972). That is, experienced decision makers are just as susceptible to these biases as novices and in some instances tend to be even less aware of their shortcomings (Christensen-Szalanski and Bushyhead 1981). Hence, the question is, can the manager be debiased? Fischhoff's tri-part model suggests that we should look at the task, the manager, and the interaction of the two.

The Task. A good start would be to ask if the manager is asking the right question. That is, can the decision be changed to afford less risk? For example, does a "go, no-go" decision really have to be made at this point? Perhaps further development or testing can be accomplished in smaller, less risky, increments. Similarly, can stress be lowered by reducing time pressure or by gathering more information?

The Manager. The fault may also lie with the manager. One possibility is that the wrong person is making the decision. To solve this problem, a market research specialist could be brought in to decide whether the sample was large enough to provide adequate power. Cognitive training might also be used to demonstrate the dangers associated with the belief in the law of small numbers and, thereby, teach the manager to make appropriate adjustments when dealing with small sample results. As mentioned earlier, an approach that uses an interactive form of training, which

provides explicit personalized feedback and cognitive process information, has been efficacious in a number of settings (Gaeth and Heath 1985).

Proposition 14: To reduce managerial bias, ensure that the appropriate person makes the judgment and that personalized training is based on the process, not just the outcome, of the decision.

Another approach to training that has been popular is to use decision simulations. In this procedure, managers participate in a realistic "game" that closely mimics the real-world decision problem but without the actual risk. The advantages of such a simulation approach include the ability to replay and analyze a decision as well as to provide immediate feedback. Simulations are especially useful for complex, but well-defined tasks such as predictions of mechanical failure or factory siting. Obviously, many decisions are unique or would be too expensive to simulate.

Proposition 15: To improve consistency and accuracy in decision making, develop marketing simulations in which managers make repeated decisions and receive prompt and objective cognitive feedback.

Matching the Task to the Manager. Marketing decision biases may also result from a mismatch between the task and the decision maker. The most effective solutions to this problem have centered on what can be thought of as a form of separation of labor strategy. Typically, this requires the manager to restructure the task into subtasks that can be taken on by different individuals or systems. For example, in a new product decision, MIS personnel might be given responsibility for an economic forecast, an outside vendor used to assess consumers' reactions, and the marketing research personnel placed in charge of the data interpretation. To pursue this divide-and-conquer approach further, the task can also be restructured into mechanical and human components. Hammond (1978) championed this approach arguing that people—including the experts in a field—are significantly better at selecting and coding information than they are at integrating it.

The process of systematically analyzing each of the factors that have relevance to a decision has the additional advantage of lowering the likelihood that an availability bias may occur. For example, one approach to reduce overconfidence in decisions involves having managers list reasons why their answers might be wrong. Arkes, Faust, Guilmette and Hart (1988) used a similar procedure to reduce the hindsight bias exhibited by neuro-psychologists. Another method used to discover where failures may occur is to construct a fault tree. In one study, Fischhoff, Slovic, and Lichtenstein (1978) showed subjects a fault tree that identified factors related to restaurant failure. One group of subjects estimated the probabilities of each of the branches as well as an additional "catch-all" branch for all other unlisted causes. Another group of subjects received fault trees with some of the branches pruned. According to normative theory, the pruning of one or more branches should result in the increase in the subjective probability of the "other factors" category. However, subjects shown the

pruned tree incorrectly increased their estimates of the probability of each of the remaining branches of the tree in addition to the catch-all branch. Thus, neglecting to create the complete tree resulted in a case in which what was out-of-sight (i.e., the pruned branches) was out-of-mind.

Proposition 16: Marketing managers should generate, where possible, as complete a fault tree as possible in order to identify all possible causes of failure.

Reducing Overconfidence

Arkes et al. (1987) showed that overconfidence can be reduced through manipulation of the decision context. In their first experiment they showed that subjects' overconfidence on general knowledge questions could be turned into underconfidence using discouraging feedback early in the decision sequence. They also found that overconfidence could be moderated but not eliminated when the subjects expected to defend their judgments to a group.

Proposition 17: To reduce overconfidence, ask managers to defend their decisions, provide incremental feedback on a subset of decisions, list all possible sources of failure.

Debiasing of Anchoring and Adjustment Biases

Anchoring and adjustment biases are particularly of concern for managerial forecasts. One approach to debiasing anchoring and adjustment effects is to ask decision makers to change consciously their initial starting point. For example, when making a sales forecast, ask one manager to start from an extremely high estimate. Another manager can start from an extremely low estimate. Answers can then be compared and analyzed.

Care must be taken, however, in relying on groups to reduce judgmental biases. As Bromiley (1987, p. 201) points out, "Many, if not most forecasts, even if originated by individuals, are modified and approved by other members of the organization." The group context in which managerial decisions occur could make consideration of anchoring and adjustment and other judgmental biases a moot point.

Mowen and Gentry (1980) found in a marketing task that groups exhibited the preference reversal phenomenon to a greater extent than individuals. Preference reversals occur when people choose alternative A (a conservative option) over item B (a risky option) but they also tend to place a higher value (e.g., set a higher selling price) on item B than item A. The results of the Mowen and Gentry study revealed that both individuals and groups chose to produce the conservative products more frequently than risky products. In contrast, both individuals and groups set a higher selling price for the high risk product. Further, the groups exhibited the reversal to a significantly greater extent than individuals. Because anchoring and adjustment processes have been proposed to account for preference reversals, these results indicate that groups may be more prone to biases resulting from the anchoring and adjustment than individuals.

Proposition 18: A marketing manager should not assume that collective decisions will result in less bias

because group forecasting may be more, rather than less, biased than individuals, especially if the group is responding to the corporate climate.

Debiasing Valuation Effects

We found little evidence of attempts to develop procedures to debias the valuation effects discussed in this article. Two reasons that may underlie this lack of research are worthy of consideration. First, variations of the subjective value of an outcome from its objective value may be conceptualized as representing the valid, but unique, utility of a stimulus for a person or firm. As such, it would be inappropriate to attempt to influence valuation effects. (However, it would be important that both the firm and the manager understand how each other values outcomes.) Second, Tversky and Kahneman (1981) viewed the hypothetical value function as representing a type of psychophysical relationship. If the flawed valuation process is "hardwired" into the perceptual processes of decision makers, debiasing techniques may be doomed to failure.

In our view, however, the effects of the framing of options represent biases of valuation. A possible means of reducing framing effects may consist of forcing managers to analyze problems from divergent frames. For example, when making a decision of whether to launch a new product, the manager should be asked to analyze the question from *both* a loss position and a gain position. Additional research is clearly needed in this area of study.

Efforts have been undertaken to debias decision makers who show tendencies to exhibit sunk cost effects. For example, Brockner et al. (1979) found that forcing decision makers to actively reconsider their decisions minimized the effects of entrapment, a type of sunk cost effect. These researchers also found that by setting a fixed limit on the amount that could be spent reduced sunk cost effects in an investment setting. Further, increasing the costs of *not* entering into alternative investments was an effective debiasing strategy. Such cost can be made salient, for example, by using cost/benefit ratio charts and emphasizing risks early in the decision making process.

Several other approaches to reducing sunk cost effects have been suggested. One involves carefully structuring the information available to the decision makers. For example, Northcraft and Wolf (1984) suggested the use of time-adjusted rates of return (TARR) to guide decision making. Conlon and Leatherwood (1988) argued that managers should attempt to build incentive systems that act to reduce biases in valuation. In particular, the structure of the incentive system should reward decision makers who consider a wide variety of courses of action. The incentive system should attempt to focus on rewarding good decision processes rather than focusing only on decision outcomes.

A final comment on the debiasing of valuation effects should be made. Levels of education and general sophistication in decision making are unlikely to eliminate the effects. Arkes and Blummer (1985) compared individuals exposed to the concept of sunk costs in economics classes to those not previously enrolled in courses in economics. The study replicated one of a series of nine studies reported by the authors. The results revealed that both groups succumbed to

sunk cost bias. Thus, training in economics had no ameliorative effects.

Based on the limited research into debiasing valuation effects, we believe that success depends on identifying specific instances in which problems may occur. Decision makers should then be trained to recognize these instances and be given specific instructions on how to compensate for the valuation biases. Another possibility would be to change or add decision makers as a matter of policy at certain stages in the process. The "new" decision maker would therefore be less susceptible to spending money to cover-up the sunk costs incurred earlier. While the lack of quality research on debiasing is frustrating, it also represents an excellent opportunity for future theoretical and empirical work.

CONCLUSIONS

In this article we have analyzed the evaluation stage of the decision making process by discussing factors that may bias predictions (e.g., judgments of probability) and value made by marketing managers. We argued that predictions can be influenced by judgmental heuristics, which may lead to systematic biases. In one sense we have followed a natural tendency to focus on the negative by looking at instances in which managerial judgment tends to be flawed. We once again stress, however, that heuristics are often the result of the efficient operation of the decision process and that they

yield good quality judgments. On the other hand, ample evidence exists that even experienced decision makers can fall prey to biases that diminish the quality of their judgments. Table 1 summarizes the heuristics identified, the biases that may result from their use, some types of marketing decisions that may be influenced by the biases, and some potential means of debiasing these tendencies.

A number of specific types of managerial decisions were emphasized in the article such as salesforce evaluation, pricing, and strategic product planning. The selection of these areas, in part, reflects our areas of expertise and in part the current marketing literature. The ideas discussed, however, apply to all marketing decision areas, whether in channels of distribution, advertising, or budgeting.

In summary, we argue that the evaluation stage of the decision process consists of the marketing manager making judgments involving prediction and valuation. In any decision making situation such judgments may be systematically biased through the application of heuristics. Managers should be aware of these heuristics and of the potential biases that may result and take steps to minimize the potential negative consequences. We also noted, however, that knowing that a bias may influence a decision is insufficient protection against its occurrence. In fact, decision makers may not recognize their own fallibility until they are personally confronted with it (Gaeth and Shanteau 1984). This attitude leads to biased *and* overconfident decision makers. We believe, however, that it is possible to take steps to debias managerial

TABLE 1
Heuristics and the Evaluation Process

<i>Heuristics</i>	<i>Biases</i>	<i>Example Application</i>	<i>Debiasing</i>
A. Representativeness: Prediction of the probability that object A belongs to class B by assessing the degree that A is similar to B.	<ol style="list-style-type: none"> 1. Belief in "small numbers." 2. Regression to the mean effects. 3. Ignoring base rates. 	Managers may base sales forecast on too few data points, or they may fail to consider base rates.	Provide explicit personalized feedback. Make highly salient the base rate information.
B. Availability: Predict probability of an event by the case with which instances of its occurrence can be brought to mind.	<ol style="list-style-type: none"> 1. Egocentric biases. 2. Hindsight biases. 3. Outcome biases. 4. Overconfidence biases. 	Taking greater credit for a successful outcome than objectively is warranted. Rewarding personnel on the basis of outcomes rather than by carefully evaluating behaviors.	Have disinterested manager make evaluation. Set behavior goals as well as outcome goals. Use simulations in which the person makes numerous decisions and is given outcome feedback.
C. Anchoring and Adjustment: Make prediction by starting at an initial point and then adjusting from that position to generate the estimate.	<ol style="list-style-type: none"> 1. Failure to adjust sufficiently to account for other's preferences. 2. Failure to change sufficiently from the status quo. 3. Failure to adjust sufficiently for compound events. 	Inability to combine multiple events in order to predict the likely success of a new product offering. Predicting changes in sales as a result of changes in allocation of selling effort.	Develop worst case scenarios. Deliberately develop extreme estimates as starting points. Recognize tendency to underadjust from initial estimate.
D. Subjective Valuation: Estimating the value of an outcome by referring to one's own subjective feeling response to the event.	<ol style="list-style-type: none"> 1. Framing effects cause decision conservatism in gain domain and risk taking in loss domain. 2. Sunk cost effects. 	Risk versus conservative vendor selected based upon how situation is framed. Incorrectly estimating consumer reactions to sales promotion devices. Failure to cut losses on poorly performing employee or product.	Provide managers with multiple frames of analysis. Set time limits for meeting targets prior to starting project. Structure task and use time-adjusted rates of return. Make sunk costs highly salient through cost-benefit charts.

judgments. These approaches include training to understand the causes of judgmental biases, matching experts to appropriate problems, creating fault trees, providing personalized process feedback through the development of simulation games, and identifying possible things that can go wrong in a decision.

ACKNOWLEDGMENTS

Our thanks to Irwin Levin, James Gentry, Hal Arkes and James Shanteau for their helpful comments on earlier drafts of this paper and Ginny Parrish for her editorial assistance. The helpful comments of two anonymous reviewers are also gratefully acknowledged.

REFERENCES

- Anderson, Erin, Leonard Lodish, and Barton Weitz. 1987. "Resource Allocation Behavior in Conventional Channels." *Journal of Marketing Research* 24 (February): 85-97.
- Arkes, Hal R. and Catherine Blummer. 1985. "The Psychology of Sunk Cost." *Organizational Behavior and Human Decision Processes* 35 (February): 125-140.
- Arkes, Hal R., Carolyn Christensen, Cheryl L. Lai, and Catherine Blummer. 1987. "Two Methods of Reducing Overconfidence." *Organizational Behavior and Human Decision Processes* 39 (February): 133-144.
- Arkes, Hal R., David Faust, Thomas J. Guilmette, and Kathleen Hart. 1988. "Eliminating the Hindsight Bias." *Journal of Applied Psychology* 73 (May): 305-307.
- Bettman, James. 1979. *An Information Processing Theory of Consumer Choice*. Reading, MA: Addison-Wesley.
- Bettman, James R., Noel Capon, and Richard Lutz. 1975. "Cognitive Algebra in Multi-Attribute Attitude Models." *Journal of Consumer Research* 7: 151-164.
- Brockner, Joel, Myril C. Shaw, and Jeffrey Z. Rubin. 1979. "Factors Affecting Withdrawal from an Escalating Conflict: Quitting Before It's Too Late." *Journal of Experimental Social Psychology* 15 (September): 492-503.
- Bromiley, Philip. 1987. "Do Forecasts Produced by Organizations Reflect Anchoring and Adjustment?" *Journal of Forecasting* 6 (July-September): 201-210.
- Chakravarti, Dipankar, Andrew Mitchell, and Richard Staelin. 1981. "Judgment Based Marketing Decision Models: Problems and Possible Solutions." *Journal of Marketing* 43 (Fall): 13-23.
- Christensen-Szalanski, Jay and James B. Bushyhead. 1981. "Physicians' Use of Probabilistic Information in a Real Clinical Setting." *Journal of Experimental Psychology: Human Perception and Performance* 7 (August): 928-935.
- Cohen, John, E. I. Chesnick, and D. Haran. 1971. "Evaluation of Compound Probabilities in Sequential Choice." *Nature* 232 (August): 414-416.
- Conlon, Edward and Mary Leatherwood. 1988. "Sunk Costs and Financial Decision Making." *Advances in Financial Planning and Forecasting* 3 (January): 37-61.
- Cox, Anthony D. and John O. Summers. 1987. "Heuristics and Biases in the Intuitive Projection of Retail Sales." *Journal of Marketing Research* 24 (August): 290-297.
- Dawes, Robin M. 1988. *Rational Choice in an Uncertain World*. New York: Harcourt Brace Jovanovich.
- Fischhoff, Baruch. 1975. "Hindsight = Foresight: The Effect of Outcome Knowledge on Judgment Under Uncertainty." *Journal of Experimental Psychology: Human Perception and Performance* 1 (August): 288-299.
- . 1982a. "Debiasing." In *Judgment Under Uncertainty: Heuristics and Biases*. Eds. Daniel Kahneman, Paul Slovic, and Amos Tversky. Cambridge, MA: Cambridge University Press, 422-444.
- . 1982b. "For Those Condemned to Study the Past: Heuristics and Biases in Hindsight." In *Judgment Under Uncertainty: Heuristics and Biases*. Eds. Daniel Kahneman, Paul Slovic, and Amos Tversky. Cambridge, MA: Cambridge University Press.
- Fischhoff, Baruch and Ruth Beyth. 1975. "I Knew It Would Happen—Remembered Probabilities of Once-Future Things." *Organizational Behavior and Human Performance* 13 (February): 1-16.
- Fischhoff, Baruch, Paul Slovic, and Sarah Lichtenstein. 1978. "Fault Trees: Sensitivity of Estimated Failure Probabilities to Problem Representation." *Journal of Experimental Psychology: Human Perception and Performance* 4 (May): 330-344.
- Fischhoff, Baruch, Paul Slovic, and Sarah Lichtenstein. 1977. "Knowing with Certainty: The Appropriateness of Extreme Confidence." *Journal of Experimental Psychology: Human Perception and Performance* 3 (November): 552-564.
- Fishbein, Martin and Icek Ajzen. 1980. *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, NJ: Prentice-Hall.
- Fraser, Cynthia and Robert E. Hite. 1988. "An Adaptive Utility Approach for Improved Use of Marketing Models." *Journal of Marketing* 52 (October): 81-95.
- Fudge, William K. and Leonard M. Lodish. 1977. "Evaluation of the Effectiveness of a Model Based Salesmen's Planning System." *Interfaces* 8 (November): 97-106.
- Gaeth, Gary J. and Timothy B. Heath. 1987. "The Cognitive Processing of Misleading Advertising in Young and Old Adults: Assessment and Training." *Journal of Consumer Research* 14 (June): 43-54.
- Gaeth, Gary J. and James Shanteau. 1984. "Reducing the Influence of Irrelevant Information on Experienced Decision Makers." *Organizational Behavior and Human Performance* 33 (April): 263-282.
- Gettys, Charles F., Clinton Kelly III, and Cameron R. Peterson. 1973. "The Best Guess Hypothesis in Multistage Inference." *Organizational Behavior and Human Performance* 10 (December): 364-373.
- Hammond, Kenneth R. 1978. "Toward Increasing Competence of Thought in Public Policy Formation." In *Judgment and Decision in Public Policy Formation*. Ed. Kenneth R. Hammond. Boulder, CO: Westview Press.
- Hawkins, Scott A. and Reid Hastie. 1990. "Hindsight: Biased Judgments of Past Events After the Outcomes Are Known." *Psychological Bulletin* 107 (May): 311-327.
- Hoch, Stephen J. 1988. "Who Do We Know: Predicting the Interests and Opinions of the American Consumer." *Journal of Consumer Research* 15 (December): 315-324.
- Hoch, Stephen J. and John Deighton. 1989. "Managing What Consumers Learn from Experience." *Journal of Marketing* 53 (April): 1-20.
- Hogarth, Robin. 1987. *Judgment and Choice*. New York: John Wiley and Sons.
- Hogarth, Robin and Spyros Makridakis. 1981. "Forecasting and Planning: An Evaluation." *Management Science* 35 (April): 115-138.
- Johnson, Eric J. and David A. Schkade. 1989. "Bias in Utility Assessments: Further Evidence and Explanations." *Management Science* 35 (April): 406-424.
- Kahneman, Daniel and Amos Tversky. 1972. "Subjective Probability: A Judgment of Representativeness." *Cognitive Psychology* 3 (July): 430-454.
- Kahneman, Daniel and Amos Tversky. 1973. "On the Psychology of Prediction." *Psychological Review* 80 (May): 237-251.
- Kahneman, Daniel and Amos Tversky. 1979. "Prospect Theory: An Analysis of Decision Under Risk." *Econometrica* 47 (March): 263-291.
- Kahneman, Daniel, Paul Slovic, and Amos Tversky. 1982. *Judgment Under Uncertainty: Heuristics and Biases*. Cambridge, MA: Cambridge University Press.
- Lichtenstein, Sarah, Baruch Fischhoff, and Lawrence D. Phillips. 1982. "Calibration of Probabilities: The State of the Art to 1980." In *Judgment Under Uncertainty: Heuristics and Biases*. Eds. Daniel Kahneman, Paul Slovic, and Amos Tversky. Cambridge, MA: Cambridge University Press.
- Little, John D. C. 1970. "Models and Managers: The Concept of a Decision Calculus." *Management Science* 16 (April): B466-B485.
- Little, John D. C. 1975. "BRANDAID: A Marketing Mix Model, Part 1: Structure." *Operations Research* 23 (July-August): 628-655.
- Lodish, Leonard M. 1971. "CALLPLAN: An Interactive Salesmen's Call Planning System." *Management Science* 18 (December): P25-P40.
- Mitchell, Terence R. and Laura S. Kalb. 1981. "Effects of Outcome Knowledge and Outcome Valence on Supervisors' Evaluations." *Journal of Applied Psychology* 66 (October): 604-612.
- Moriarty, Mark M. 1985. "Design Features of Forecasting Systems In-

- volving Management Judgments." *Journal of Marketing Research* 22 (November): 353-364.
- Mowen, John C. and James Gentry. 1980 "Investigation of the Preference Reversal Phenomenon in a New Product Introduction Task." *Journal of Applied Psychology* 65 (December): 715-722.
- Mowen, John C., Janet Keith, Stephen Brown, and Donald Jackson. 1985 "Utilizing Effort and Task Difficulty in Evaluating Salespeople." *Journal of Marketing Research* 22 (May): 185-191.
- Neslin, Scott A. and Robert W. Shoemaker. 1983. "A Model for Evaluating the Profitability of Coupon Promotions." *Marketing Science* 2 (Fall): 361-388.
- Northcraft, Gregory B. and Garret Wolf. 1984. "Dollars, Sense and Sunk Costs: A Life Cycle Model of Resource Allocation Decisions." *Academy of Management Review* 9 (April): 225-234.
- Puto, Christopher P., Wesley E. Patton, and Ronald H. King. 1985. "Risk Handling Strategies in Industrial Vendor Selection Decisions." *Journal of Marketing* 49 (Winter): 89-98.
- Ross, Michael and Fiore Sicol. 1979. "Egocentric Biases in Availability and Attribution." *Journal of Personality and Social Psychology* 37 (March): 322-336.
- Schoemaker, Paul. 1982. "The Expected Utility Model: Its Variants, Purposes, Evidence and Limitations." *Journal of Economic Literature* 20 (June): 529-563.
- Simon, Herbert. 1957. *Models of Man: Social and Rational*. New York, NY: John Wiley and Sons.
- Tversky, Amos and Daniel Kahneman. 1974. "Judgment Under Uncertainty: Heuristics and Biases." *Science* 185 (4157): 1124-1131.
- Tversky, Amos and Daniel Kahneman. 1981. "The Framing of Decisions and the Psychology of Choice." *Science* 211 (4481): 453-458.
- Vroom, Victor H. 1964. *Work and Motivation*. New York: John Wiley and Sons.

ABOUT THE AUTHOR

John C. Mowen holds the Carson Centennial Chair of Business Administration at Oklahoma State University. His Ph.D. is in social psychology from Arizona State University where he did his post-doctoral work in marketing. His research focuses on managerial and consumer decision making. He has published numerous referred journal articles in, among others, the *Journal of Marketing Research*, the *Journal of Marketing*, *Decision Sciences*, *Journal of Applied Psychology*, *Journal of Public Policy and Marketing*, and the *Journal of Personal Selling and Sales Management*.

Gary J. Gaeth (Ph.D., Kansas State University, 1984) is Associate Professor of Marketing at the University of Iowa. He specializes in models of consumer decision making behavior, assessing the impact of marketing mix variables and marketing management for the service industry. He has published articles in the *Journal of Marketing*, *Journal of Marketing Research*, *Journal of Consumer Research*, and retailing and decision making journals. He serves on the editorial boards of the *Journal of Retailing*, *Journal of Services Marketing*, and the *Journal of Direct Marketing*.