CHAPTER

Individual Decision Making

Making Decisions

Five Steps of Decision Making

Rationality and Bounded Rationality

Decision Making under Uncertainty

Focus on Escalation: Merrill Lynch Takes a Bath

Types of Decisions

Aiding Decision Making

Decision Analysis

Linear Models

Focus on Linear Models: The Fuel Crisis and National Airlines

Computerized Decision Aids

Ethical Decisions

Focus on Self-Interest: Adam Smith

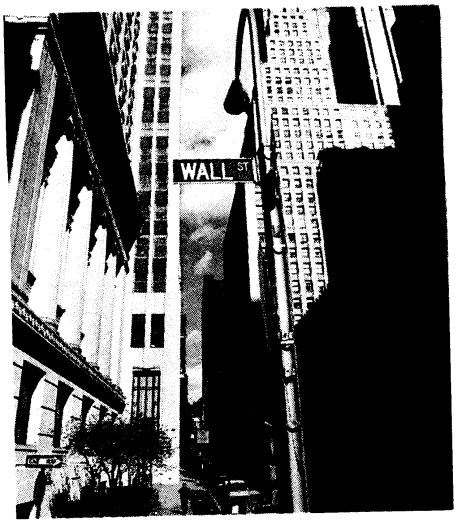
Managing Organizational Ethics

Institutionalizing Ethics

International Focus on South Africa: Ethics, Social Responsibility, and South African Investments

Creativity

Focus on Creativity: From Cats to Spoiled Beer



FOLLOWING THE LEADER

When E. F. Hutton speaks, its slogan claims, people listen. But in 1985, E. F. Hutton found itself deep in trouble because no one in Hutton was speaking or listening. What was not spoken about—or at least not questioned—was check kiting by Hutton's money managers. And what no one listened to was the voice of conscience whispering misgivings about an unethical and illegal practice.

The scheme was simple. A branch of E. F. Hutton would have, say, $70,000 on deposit in a small bank in Ohio. The Hutton branch would request a cash transfer from the account for $1 million. The bank, not wanting to lose Hutton's valuable business, would advance the money, and a day later Hutton would replace it. Hutton got the free use of $1 million of the bank's money for 24 hours.

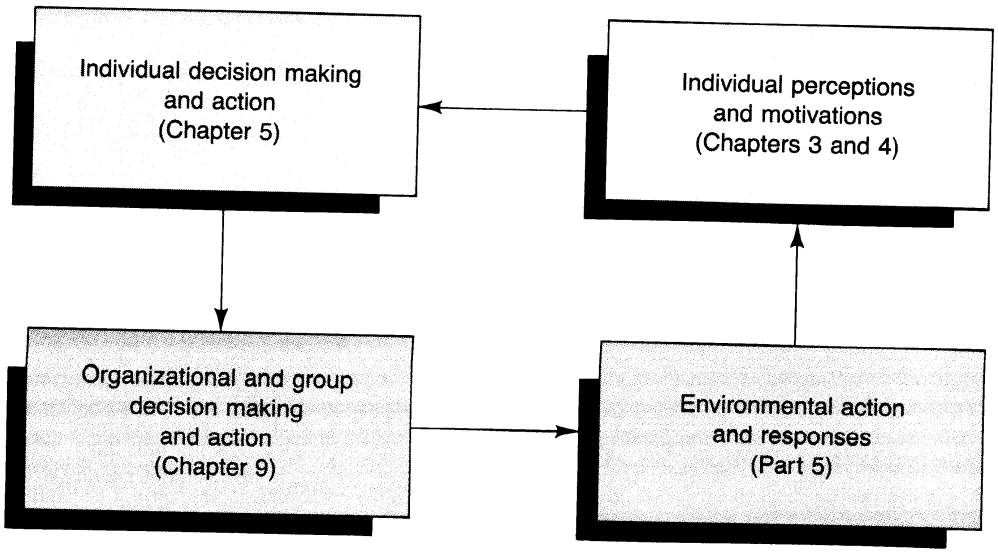
While substantial account overdrafts occur from time to time in business banking, Hutton made a practice of them. On any given day, the firm overdrew its bank accounts to the tune of millions of dollars. The interest on that money became a major source of revenue for Hutton. When the U.S. Justice Department finally investigated, E. F. Hutton was cited on 2,000 counts of mail and wire fraud, received a $2 million fine, and had to set up a multimillion-dollar fund to reimburse banks for lost interest payments.

Few employees at E. F. Hutton seem to have questioned the practice before the federal investigation; once established among Hutton executive echelons, it was taken for granted. In fact, an internal memo from the corporate department in charge of cash management advised, rather blandly, "If an office is overdrafting their ledger balance consistently, it is probably best not to request an account analysis." In other words, the memo said they would rather not know about it—and rather the bank not notice, either.

Source: Daniel Goleman, "Following the Leader: Sometimes It's Folly to Go Along with the Boss," *Science '85* (October): pp. 18–19.

FIGURE 5–1 Organizational Decision Making

Organizational decision making is cyclical. Individuals (1) think and (2) choose. Individual choices add up to (3) organizational choices, which invite (4) environmental responses. These responses in turn influence individual thought.



INTRODUCTION

E. F. Hutton's practice of intentionally overdrawing bank accounts was at worst illegal and at best unethical, and it provides a graphic example of organizational decision making gone haywire. Employees at E. F. Hutton were making decisions on a daily basis that could not have been consistent with the long-term interests and goals of the company. How could this have happened? This chapter provides answers to such questions by examining the processes of individual choice and decision making and the way decisions are made in organizations.

The complete cycle of organizational decision making is illustrated in Figure 5–1. Individual decision making is one component of the larger context of organizational decision making. The four components of organizational decision making can be described as follows:

1. Decision making begins when individuals perceive a discrepancy between how their organization could or should be and how it actually is. This perceived difference between what is and what could or should be precipitates decision making and action.
2. Individuals respond to these perceived discrepancies by making decisions and taking actions. This chapter focuses on the nature and importance of these individual decisions in the larger organizational context.
3. The process through which individuals' choices and actions come together to produce group or organizational choices and actions—group decision making, for instance—is the focus of Part 3. It should be noted that at the group or organizational level, good

decisions do not always produce good actions. When there are lots of people involved, even good decisions can be implemented incorrectly.

4. Finally, the larger environment in which the organization functions responds to behavioral changes. The importance of the environment and its responses to and influences on organizations is the focus of Part 5. These responses by the environment provide inputs that lead individuals to new perceptions, choices, and actions.

Making Decisions

The focus of this chapter is the individual decision-making component of organizational decision making. Decisions are responses to problems—differences between what is and what could or should be. Problems may vary in importance from figuring out which job you should accept after graduation to deciding which brand of toothpaste you should buy.

Five Steps of Decision Making

Recognition and Definition of the Problem Perceiving a discrepancy between what is and what could or should be is problem recognition, and provides the foundation for all individual decision making. Problem recognition requires the decision maker to: (1) understand goals and objectives (either of the organization or of the individual), (2) monitor accomplishment of those goals (performance discrepancies), and (3) evaluate the importance of the discrepancy. Problem recognition is a critical aspect of individual decision making. If a manager identifies the wrong problem or erroneously evaluates its importance, then the final decision will not address the real concerns of the organization.

Defining the problem correctly is critical to successful decision making. Because problem recognition is a *perceptual* process, managers may not come up with accurate assessments of the problems at hand, which gets decision making off on the wrong foot. Managers often make poor decisions because: (1) they allow available solutions to define the problem, (2) they focus on aspects of problems they know they can solve and ignore the larger, more difficult issues confronting them, or (3) they diagnose problems in terms of the most obvious symptoms.[1] In other words, decision makers often get sidetracked by tangential aspects of the real problem and by their beliefs about what problems they know they can solve.

Information Search If a perceived discrepancy is important, then the decision maker will implement a second stage of the decision-making

[1]G. Huber, *Managerial Decision Making* (Glenview, Ill.: Scott, Foresman, 1980).

process: determining why the problem occurred. The decision maker must gather information about the problem or discrepancy and possible ways to solve it. At this point, the decision maker should have a clear understanding of the problem and have collected sufficient information to begin the third phase of the decision-making process.

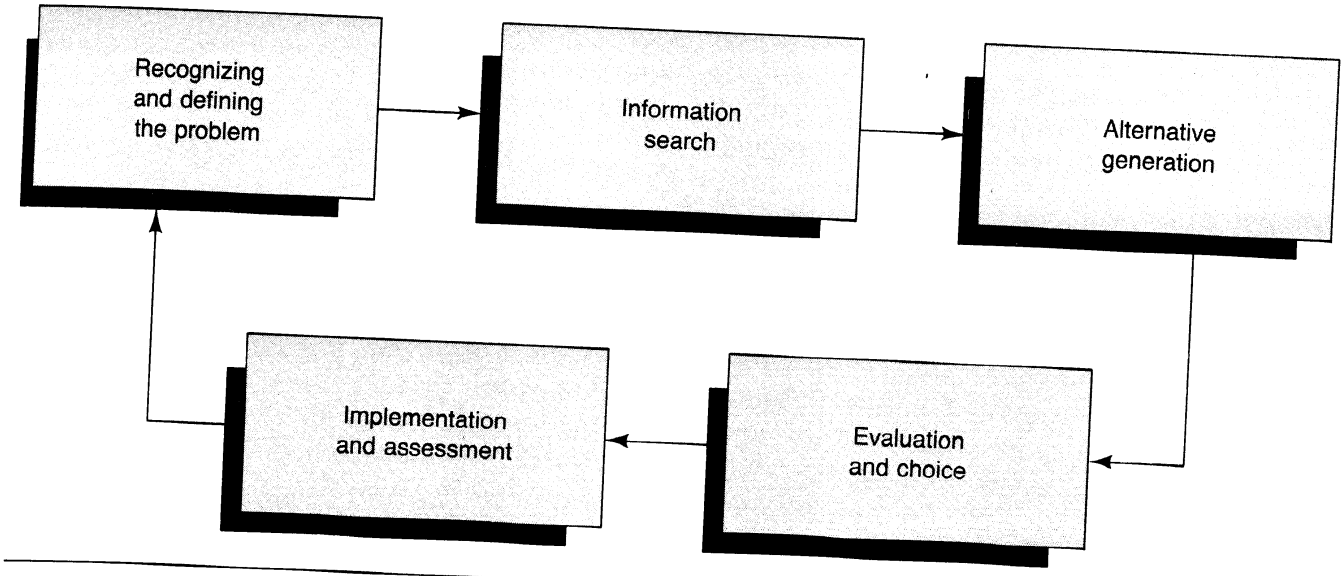
Alternative Generation The third phase of individual decision making is developing or identifying potential courses of action. This phase requires that the information previously gathered be transformed into a set of alternatives. Identifying alternatives is a difficult task; it requires a considerable amount of creativity and mental flexibility. Often managers spend too little time on this phase because they are willing to choose among alternatives before they have generated a diverse range of options. Theoretically, managers should continue to generate alternatives until the potential for improving on them is too small to justify the added expense. More often than not, managers are willing to stop generating alternatives at the first sign of a potentially acceptable solution.

Evaluation and Choice When a sufficient number of alternatives have been identified, the decision maker must evaluate them and make a choice. This evaluation can be accomplished in one of two ways. The decision maker can compare each alternative to every other alternative, or the decision maker can compare each alternative to the desired goal. While both methods have their strong points, the more clearly defined the problem and its antecedents (or causes) and the more specific the alternatives, the better the eventual choice.

Implementation and Assessment Once a choice has been made, the decision maker must implement the decision. While the choice process is important, decisions are worthless unless implemented. Individual decision makers are remiss if they do nothing to implement a decision after having devoted time, energy, and organizational resources to identifying an appropriate course of action. However, decision makers also may be remiss if they make no attempt to assess the appropriateness of the chosen course of action. After implementing the choice, the decision maker can monitor the outcomes to determine what changes have occurred. Did the discrepancy between desired and actual states disappear? If not, perhaps the real problem was not solved. The problem information may have been incomplete, or the wrong alternative was selected. Do changes need to be made in how alternatives are evaluated? Perhaps the decision was not correctly implemented. Regardless of the cause, if the decision does not resolve the discrepancy, then the process will begin again. Figure 5–2 illustrates this complete cycle of individual decision making.

FIGURE 5–2 Individual Decision-Making Process

Individual decision making, like organizational decision making, can be represented as a feedback cycle. The individual defines the problem and collects information to generate alternatives. When a choice is made and implemented, the outcome provides feedback about whether the problem was defined correctly, and whether it was solved or needs further attention.



RATIONALITY AND BOUNDED RATIONALITY

The five-phase cycle of individual decision making is often referred to as the "rational model." **Rationality** suggests that a decision has been based on the careful and calculated understanding of action alternatives and their consequences. In Western society, the term *rationality* also suggests high-quality decision making uninfluenced by irrelevant considerations.

While this five-phase rational decision-making process represents an ideal to which decision makers aspire, it is also a difficult (if not impossible) ideal to achieve. In order to be a rational decision maker, a manager would have to compile a complete listing of all alternatives and their consequences. The manager would have to know how the world (or at least the organization and its environment) would be affected by each alternative. Even for apparently simple decisions of the organization, this places substantial demands on the information collection, storage, and integration powers of individual decision makers—such great demands that the information-processing requirements of rationality exceed the capabilities of the human mind. Thus, while rationality is an attractive ideal, actual decision making typically falls short of rationality in a number of ways:[2]

[2]J. G. March and H. A. Simon, *Organizations* (New York: John Wiley & Sons, 1958).

1. The rational ideal requires complete knowledge and anticipation of the consequences that will follow each choice. In practice, knowledge is always incomplete.
2. Since the consequences of actions occur in the future, they can only be imagined. In attaching preference or value to a particular outcome, then, decision makers must rely on imagination rather than experience. The attractiveness of a consequence can be anticipated only imperfectly through imagination. Only by actually experiencing the consequence can we know our preference for that consequence.
3. Rationality requires a choice among all possible alternatives. But the number of alternative actions in any situation is unlimited. In practice, decision makers have the time to consider only a few of the infinite possibilities.
4. Human decision makers can retain only a relatively small amount of information in memory.
5. Limited human information-processing capabilities constrain the ability of decision makers to perform the necessary calculations (even given all the necessary information) to determine the best alternative.
6. Rationality assumes that decision makers have a stable, specifiable, and consistent hierarchy of needs and motivations. As noted in Chapter 4, however, human needs and goals change over time, and individuals and organizations often simultaneously pursue apparently incompatible objectives.

Given these limitations on any decision maker's abilities, it should not be surprising that actual decision making often falls far short of the rational ideal. However, because rationality is such an attractive goal, individuals are hesitant to give up their perceptions of themselves as rational decision makers. Much of research on managers as decision makers has been based on managers' self-reports of how they claim to make decisions. Managers typically describe the process by which they make decisions as closely following the five-phase rational cycle of individual decision making.

When actual managerial decision behavior has been systematically observed, quite a different picture has emerged. In contrast with the perception that managers sit in their offices, carefully consider information and alternatives, and make calculated choices, observation indicates that managers' decision-making processes are hardly ideal. One study found that in making decisions managers tend to avoid hard (systematic, analytical) data and to rely on softer forms of information, such as gossip or speculation.[3] Since managers make hundreds of decisions daily, it

[3]H. Mintzberg, "The Manager's Job: Folklore and Fact," *Harvard Business Review* (July-August 1975): 49–61.

seems likely that even approximating the systematic and time-consuming demands of rational decision making is beyond reach. A different decision-making model is required to capture the actual decision behavior of managers.

The rational model of decision making really defines how a decision should be made, rather than describing how managers actually make decisions. In his Nobel Prize–winning work, economist Herbert Simon suggested that individual decision making is bounded in its ability to approach rationality by the limits of the human information-processing apparatus. Given these limitations, Simon argued that prescriptions for how decisions should be made (such as the five-step rational ideal pictured in Figure 5–2) are not nearly so useful for understanding and predicting individual decision behavior as are descriptions of how decisions are made.[4] Simon's notion of **bounded rationality** is a descriptive model of individual decision making. Bounded rationality diverges from the rational ideal in four important ways. Bounded rationality characterizes actual individual decision-making behavior as based on a limited perspective, the sequential evaluation of alternatives, satisficing, and the use of judgmental heuristics.

Limited Perspective First, bounded rationality assumes that the information-processing demands of actual decision makers are managed by limiting the scope of decisions. Not all alternatives are considered, and not all goals are accommodated. Instead, the focus of the choice is limited to a manageable subset of goals, alternatives, and consequences. For example, bounded rationality assumes that a decision maker may simultaneously pursue multiple and conflicting goals. To reconcile the different goals, decision making is compartmentalized. Decisions at one point in time may attempt to achieve one goal; a second decision at some other point in time may help to achieve another, mutually exclusive, goal.

Consider, for example, a department head who issues a travel policy at the beginning of the fiscal year. The policy states that reimbursement for all company-sponsored travel will be limited to $500. The policy is designed to promote departmental budgetary goals. However, two weeks after the policy is put in place, an employee known for his "squeaky wheel" behavior requests reimbursement of $650 for a trip. After three meetings with the employee, the department head approves the $650 request. The decision satisfies the decision maker's need to limit further interactions with the troublesome employee—an important goal—but at the cost of violating the first goal of careful fiscal management. Limited-scope decision making reduces information search and processing demands and makes decision making manageable. But it has its costs.

[4]H. A. Simon, *Administrative Behavior* (New York: MacMillan, 1957).

Sequential Alternative Evaluation The second way in which bounded rationality deviates from the normative model of decision making is in evaluation of alternatives. Rather than simultaneously considering all possible alternatives and their consequences and choosing the best possible alternative, decision makers evaluate alternatives sequentially. For example, two alternatives are considered and the better one is chosen. That alternative may then be compared to another alternative. This "pair-wise" comparison requires considerably less mental activity than comparing a number of alternatives simultaneously. In fact, a recent study of personnel-selection decision making found that individuals who evaluated candidates in a sequential manner took significantly less time than those who evaluated the same number of candidates simultaneously.[5]

Satisficing Theoretically, a decision maker could continue making pair-wise comparisons of all possible alternatives until the optimal solution emerged. However, given the number of decisions that need to be made and the amount of time that would be consumed in such extended comparisons, another goal—taking timely action—must take precedence. Since the costs of finding an optimal course of action are too dear, decision makers must be willing to forego the best solution in favor of one that is acceptable or reasonable. That is, decision makers **satisfice.** They do not examine all possible alternatives. They look at a small number of familiar or likely solutions and choose one that produces a "good enough" outcome.

Judgmental Heuristics and Biases The fourth way in which bounded rationality differs from the rational ideal is its use of judgmental heuristics. **Judgmental heuristics** are rules of thumb, or shortcuts, that reduce the information-processing demands for decision makers. Judgmental heuristics summarize past experiences and provide an easy method to evaluate the present. Judgmental heuristics facilitate individual decision making by substituting rules or "standard operating procedures" for complex information collection and calculation. For the most part, heuristics save considerable mental activity. However, in certain situations, using these cognitive heuristics can result in systematically biased outcomes. To distinguish this misapplication of cognitive heuristics from their appropriate use, we will use the term *cognitive bias* to refer to the inappropriate use of cognitive heuristics that results in systematically biased decisions. Two examples of judgmental heuristics (or biases) are availability and representativeness.

[5]V. L. Huber, M. A. Neale, and G. B. Northcraft, "Decision Bias and Personnel Selection Strategies," *Organizational Behavior and Human Decision Processes* 40 (1987): 136–147.

Availability Decision makers often assess the frequency or likelihood of an event's occurrence by how easily they can remember it.[6] This "rule" is based on the notion that frequently occurring events are familiar to us, and, thus, are easy to recall. This heuristic is useful because familiar events often are more easily recalled than less frequent events. However, biased outcomes result from dependence on this rule when the ease of memory recall is influenced by factors unrelated to the frequency of an event's occurrence. If an event evokes emotions, is vivid, easily imagined, or specific and concrete, it will be more "available" from memory than will equally occurring events that are unemotional, bland, vague, or difficult to imagine.

Problems 1, 3, and 4 in Figure 5–3 all provide examples of the use of the **availability bias.** For all three of these problems, most people chose option A. B is really the correct choice, however. The corporations represented by answer B in Problem 1 have over twice the sales volume of the companies listed in answer A. Because the first group contains consumer firms, they are more likely to be familiar to us as consumers. The second (B) group contains industrial firms or holding companies that are less familiar to us. If the availability bias did not influence us, our exposure to these two groups of companies would not alter our judgments.

For Problem 3, driving a car on a 400-mile trip is actually much riskier than flying 400 miles on a commercial airliner. However, media attention to airplane crashes has made them quite vivid in our memories. Little attention is given to automobile accidents, probably because they are so common.

The common response to Problem 4 is that more words in the English language begin with "r" than have "r" as the third letter. In fact, we can draw up a rather extensive list of words that begin with the letter "r." However, considerably more words have "r" as their third letter. In deciding how to answer this question, you probably tried to come up with a list of words that begin with the letter "r" and another list that have "r" as the third letter. Because of the way in which we store information in memory, it is much easier to generate examples of words beginning with "r." If we think of our memory as analogous to a card catalogue in the library, it is very easy to come up with all sorts of "r" words (just as it would be easy to generate from the card catalogue listing authors whose last name was "Woolf"). The card catalogue would be of little use to us in trying to identify words with "r" as the third letter, just as it would not help in trying to find authors whose first name was Virginia. Neither the catalogue nor our memories is designed to store and retrieve information in that way.

[6]A. Tversky and D. Kahneman, "Judgment under Uncertainty: Heuristics and Biases," *Science* 185 (1974): 453–463.

FIGURE 5–3 Decision-Making Quiz

1. The following 10 corporations were ranked by *Fortune* magazine to be among the 500 largest United States–based firms, according to sales volume for 1982:

   Group A: American Motors, Wang Laboratories, Lever Brothers, Kellogg, Scott Paper
   Group B: Costal, Signal Companies, Dresser Industries, Agway, McDermott

   Which group (A or B) had the largest total sales for the five organizations listed?
2. The best student in the graduate organizational-behavior class writes poetry and is rather shy and small in stature. What was the student's undergraduate major: (a) Chinese studies or (b) psychology?
3. Which is riskier: (a) flying in a commercial airliner on a 400-mile trip or (b) driving a car on a 400-mile trip?
4. Are there more words in the English language that (a) begin with the letter "r" or (b) have "r" as the third letter?
5. On one day in a large metropolitan hospital, eight births were recorded by gender in the order of their arrival. Which of the following orders of births (B = boy, G = girl) was most likely to be reported?
   a. BBBBBBBB
   b. BBBBGGGG
   c. BGBBGGGB
6. A large car manufacturer has recently been hit with a number of economic difficulties, and it appears as if three plants need to be closed and 6,000 employees laid off. The vice-president of production has been exploring ways to avoid this crisis. She has developed two plans:
   a. Plan A will save one of the three plants and 2,000 jobs.
   b. Plan B has a one-third probability of saving all three plants and all 6,000 jobs, but it has a two-thirds probability of saving no plants and no jobs.

   Which plan would you select?

Source: M. H. Bazerman, *Judgment in Managerial Decision Making* (New York: Wiley, 1989).

Representativeness In Problem 2 in Figure 5–3, the most common response is that the undergraduate major of the student was Chinese studies. However, the correct response is that the individual majored in psychology. In selecting the first option, important base-rate information has been ignored. A base-rate probability is an overall probability that something will occur, all other things being equal. In this case, the base-rate probability that any MBA student is a psychology major is higher than the probability that the student is a Chinese studies major simply because overall there are a lot more psychology than Chinese studies majors. Thus, the rational choice is psychology because it so dominates Chinese studies. However, individuals who write poetry and are short in stature, studious, and shy more closely resemble our stereotypes of a Chinese person or the type of person who would be likely to major in Chinese studies. That individual, then, is representative

of our stereotype. Thus, we decide that Chinese studies must be the major of the best student, regardless of the fact that there are many more psychology majors than Chinese studies majors.

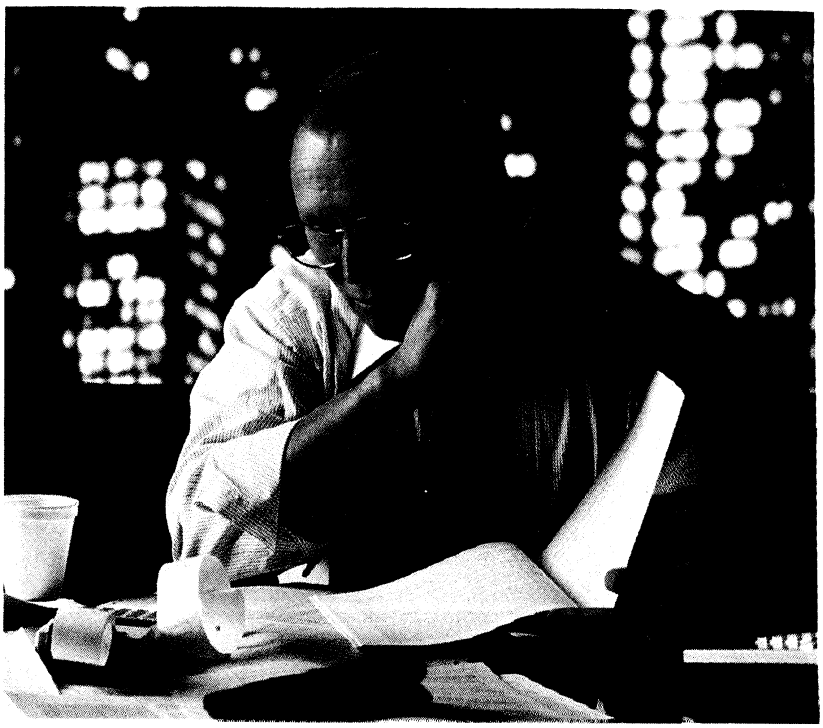
Problem 5 provides another example of the **representativeness** bias. The most common response to this problem is that option c is the most likely birth order to be observed. The common reason given for this choice is that the third option looks random. The first and second options are too ordered and, thus, seem highly unlikely to occur. The correct response is that all three of the options are equally likely to occur. The problem here is that we believe that a sequence of independent events (such as eight births) generated from a random process should resemble the essential characteristics of a random process, even when the sequence is too short for that process to express itself statistically. This is referred to as the "law of small numbers." Decision makers expect a few examples of a random event to behave in the same way as large numbers of the event.

In large samples of births, the births of girls and boys occur about equally. However, there is no reason why one should not expect a run of eight boy births or four boy births followed by four girl births in a small sample. The premise that randomness has some specific order (or specific lack of order) requires the assumption that there is some relationship or dependence between one occurrence and the next. Yet the gender of Mother A's baby has no effect on the gender of Mother B's.

This belief that events have some sort of memory is rampant in the bias known as the *gambler's fallacy.* Assuming a fair (untampered with) roulette wheel, if the ball landed on a red number ten times in a row, how would you bet (red or black) on the next spin of the wheel? Many decision makers would bet on a black number, feeling that a black number was due. Since there are an equal number of black and red numbers, the objective probability of the ball's landing on a red or black number must be exactly the same. The ball does not remember where it has landed in the past. While you may remember where the ball landed on the last spin of the wheel, from the ball's perspective each event is completely independent from the next. When examined in detail, the gambler's fallacy is obviously wrong, but it does have considerable intuitive appeal.

DECISION MAKING UNDER UNCERTAINTY

In addition to the information-processing demands it places on decision makers, rationality also assumes a complete understanding of means-ends relationships—what consequences occur as a result of actions. "Bounded rationality" shows that decision makers cannot possibly consider, evaluate, and integrate all means-ends information into decisions. Uncertainty raises an additional problem for decision makers: knowledge about means-ends relationships is often only fuzzy at best.



For some decisions, the amount of risk and uncertainty are well defined. The probability of being dealt a particular hand in cards, for instance, can be determined exactly ahead of time. The probability that a new product line will be successful cannot be determined exactly.

In Chapter 1, uncertainty was defined as "not knowing for sure." The terms **uncertainty** and **risk** both suggest that the consequences of an action can be known only in terms of a perceived likelihood of occurrence. A particular action may produce a desired consequence, but at the risk of other consequences. The consequences of the action are uncertain. Most decisions must incorporate this notion of risk or uncertainty. The number of certain means-ends relationships is very small.

Although individuals may wish their lives were filled with certainty, most of us are constantly faced with decisions among risky alternatives. Without complete knowledge, then, even the best plans and decisions are implemented at the risk of poor outcomes. Though we may try to ignore the risk inherent in our daily decisions, we often express our uncertainty about outcomes, saying "Chances are," "It seems likely that," "I think," and "I bet." A more formal way to express our uncertainty is through probabilities.

Probability (a statistical term) is a measure of the likelihood that a particular event will occur. Our confidence in a particular probability can be very high. For example, with a fair coin, most people would agree that there is a 50 percent probability of a tossed coin coming up heads. However, few people would agree on the probability that the Dow-Jones Industrial Average will be above 3100 on March 30, 1991. The difference between these two situations is that for the Dow-Jones

FIGURE 5–4 Chances of Being Dealt Different Poker Hands

In poker, the probability of being dealt a pair (two of the same card—for instance, two kings) is one in 2.5, or 40 percent. If you were offered $1 if you could deal yourself one pair, your expected value would be ($1 × .4) + ($0 × .6) = $.40.

Straight flush	1 in	64,974
Four of a kind	1 in	4,165
Full house	1 in	694
Flush	1 in	509
Straight	1 in	256
Three of a kind	1 in	48
Two pair	1 in	21
One pair	1 in	2.5
No pair	1 in	2

Source: Excerpt from *Oswald Jacoby on Poker* by Oswald Jacoby, copyright 1940, 1947, 1981 by Doubleday, a division of Bantam, Doubleday, Dell Publishing Company, Inc. Used by permission of the publisher.

average, we are forecasting the future without being able to understand or specify everything that could happen to affect it. When dealing with cards, coins, gambling, and games, it is much easier to produce accurate probabilities of an event's occurrence because we can identify all possible outcomes and all the processes that should affect them. The probability of a particular event's occurrence may be low, but it is knowable. For example, the probabilities of being dealt certain hands in a poker game are illustrated in Figure 5–4.

Reactions to Risk Decision makers' reactions to risk and uncertainty often do not reflect careful consideration of the consequences of alternatives. The rational ideal for decision making under uncertainty is to select the alternative with the highest expected value. The **expected value** of an action is the value assigned to each possible consequence of the action, multiplied by the probabilities that each of these possible consequences will occur.

As an example of expected value, imagine that you are deciding whether to insure your computer against theft. The insurance company's brochure indicates that the company will reimburse you for the full replacement cost of your computer less a $50 deductible charge if it is stolen. The cost of this insurance is $50 per year. If someone steals your computer and you have insurance, you lose $100. (The insurance company will replace your computer, but you will still be out the $50 deductible and the $50 cost of the insurance.) If someone steals your computer and you have no insurance, you will lose $3,500 (the cost of replacing the computer). If you buy the insurance and no one steals your computer, you will lose $50 (the insurance premium). If no one steals your computer and you are not insured, you lose nothing. Should you

FIGURE 5–5 Payoff Matrix for Computer Insurance Purchase

Insurance is a way of minimizing risk when outcomes are uncertain and stakes are high. As shown in this figure, a person who buys insurance spends a little to avoid losing a lot.

	Outcomes	
Choices	**Stolen**	**Not Stolen**
Buy insurance	−$100	−$50
Do not buy insurance	−$3,500	0

purchase the insurance for your new $3,500 computer? The payoff matrix for this decision is presented in Figure 5–5.

At this point, you still do not have sufficient information to answer the question. What is missing is information concerning the probability that your computer will be stolen. After doing a little research, you discover that there is a 1-in-100 chance that your computer will be stolen. Armed with this information, you can calculate the expected value of buying and not buying insurance:

$$\text{Expected Value } (EV)_{(\text{buy})}$$

$$= P_{(\text{stolen})} \times \text{Net loss}_{(\text{stolen})} + P_{(\text{not stolen})} \times \text{Loss}_{(\text{not stolen})}$$

$$= (.01)(-\$100) + (.99)(-\$50)$$

$$= -\$50.50$$

$$EV_{(\text{do not buy})}$$

$$= P_{(\text{stolen})} \times \text{Loss}_{(\text{stolen})} + P_{(\text{not stolen})} \times \text{Loss}_{(\text{not stolen})}$$

$$= (.01)(-\$3{,}500) + (.99)(\$0)$$

$$= -\$35.$$

Based upon these calculations and the rule of choosing the option with the greatest expected value, you should not buy the insurance. In the long run (which may include losing an occasional computer to thieves), you will come out ahead by not buying the insurance.

Do decision makers rely on expected-value calculations when they make decisions? For the decision presented in Figure 5–6, the "rational" decision is to select the alternative with the highest expected value. For option A, the expected value (or *EV*) of taking the $10 million is the outcome ($10 million) multiplied by the probability of that outcome (100%), or $10 million. For option B, the expected value is the sum of the two possible outcomes ($22 million and $0 million) each multiplied by the probability of their occurrence (50% and 50%), or: