CHAPTER 11

THE AVAILABILITY HEURISTIC

According to Amos Tversky and Daniel Kahneman (1974, p. 1127), the availability heuristic is a rule of thumb in which decision makers "assess the frequency of a class or the probability of an event by the ease with which instances or occurrences can be brought to mind." Usually this heuristic works quite well; all things being equal, common events are easier to remember or imagine than are uncommon events. By relying on availability to estimate frequency and probability, decision makers are able to simplify what might otherwise be very difficult judgments.

As with any heuristic, however, there are cases in which the general rule of thumb breaks down and leads to systematic biases. Some events are more available than others *not* because they tend to occur frequently or with high probability, but because they are inherently easier to think about, because they have taken place recently, because they are highly emotional, and so forth. This chapter examines three general questions: (1) What are instances in which the availability heuristic leads to biased judgments? (2) Do decision makers perceive an event as more likely after they have imagined it happening? (3) How is vivid information different from other information?

AVAILABILITY GOES AWRY

Which is a more likely cause of death in the United States—being killed by falling airplane parts or by a shark? Most people rate shark attacks as more probable than death from falling airplane parts (see Item #7 of the Reader Survey for your answer). Shark attacks certainly receive more publicity than do deaths from falling airplane parts, and they are far easier to imagine (thanks in part to movies such as *Jaws*). Yet the chances of dying from falling airplane parts are 30 times greater than the chances of being killed by a shark (Death Odds, 1990, September 24). In this case, availability is a misleading indicator of frequency.

Item #8 of the Reader Survey contains additional comparisons that many people find surprising (taken from Combs & Slovic, 1979). For instance, contrary to the relatively scarce media coverage they receive,

diabetes and stomach cancer kill roughly *twice* as many Americans annually as homicide or car accidents, and lightning claims more lives than tornadoes do. According to Tversky and Kahneman, these kinds of statistics are counterintuitive because most people estimate the frequency of an event by how easy it is to bring instances of the event to mind. Because car accidents, tornadoes, and murders are all headline grabbers, they are more "available" than higher frequency causes of death such as stomach cancer, lightning, and diabetes.

Availability can also lead to biased judgments when examples of one event are inherently more difficult to generate than examples of another. For instance, Tversky and Kahneman (1973) asked people the following question: In a typical sample of text in the English language, is it more likely that a word starts with the letter K or that K is its third letter (not counting words with less than three letters)? Of the 152 people who were asked questions such as this, 105 generally thought that words with the letter in the first position were more probable. In truth, however, there are approximately twice as many words with K in the third position as there are words that begin with it. Because it is easier to generate words that start with K than have K as the third letter, most people overestimate the relative frequency of these words.

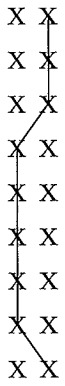
Still another way that availability can lead to biases is when one type of outcome is easier to visualize than another. Item #37 of the Reader Survey illustrates this kind of bias:

Consider the two structures, A and B, which are displayed below.

Structure A:

X X X X X X X X X
X X X X X X X X X
X X X X X X X X X

Structure B:



A *path* is a line that connects an X in the top row of a structure to an X in the bottom row by passing through one (and only one) X in each row. In other words, a path connects three X's in Structure A (one in each of the three rows) and nine X's in Structure B (one in each of the nine rows).

(a) In which of the two structures are there more paths?
(b) Approximately how many paths are in Structure A? Structure B?

Most people find it easier to visualize paths running through Structure A than Structure B, and as a consequence, they guess that Structure A contains more paths than Structure B. Of the respondents who Tversky and Kahneman (1973) presented with a version of this problem, 85 percent thought there were more paths in Structure A than Structure B. The median estimates they gave were 40 paths in Structure A and 18 paths in Structure B.

In reality, both structures contain the same number of paths. In Structure A, there are eight elements to choose from in the top row, eight in the middle row, and eight in the third row. This yields $8 \times 8 \times 8$ (or 512) possible combinations. In Structure B, there are $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$ potential combinations, which also comes out to a total of 512 paths. Thus, both structures have an equal number of paths, even though the paths in Structure A are easier to see than those in Structure B (the paths in Structure A are more distinctive than the paths in Structure B because, on the average, two paths in Structure A share only about one-eighth of their elements, whereas two paths in Structure B overlap in half of their elements).

AN IMAGINATIVE STUDY

In 1978, John Carroll published a study that linked the availability heuristic with the act of imagining an event. Carroll reasoned that if easily imagined events are judged to be probable, then perhaps the very act of imagining an event will increase its availability and make it appear more likely. He tested this hypothesis in two experiments.

In the first experiment, conducted one day before the American presidential election in 1976, subjects were asked to imagine watching televised coverage of the presidential election results either the night of the election or the following morning. Roughly half the experimental subjects were told to imagine that:

> Ford wins the election as Carter fails to hold some key states and Ford wins much of the Midwest and West. He wins 316 electoral votes to Carter's 222, and a listing of states and electoral votes under columns for Carter and Ford shows Ford with 32 states and Carter with 18 states and the District of Columbia.

The remaining experimental subjects were instructed to imagine that:

> Carter wins the election as his strength in the South and East builds an insurmountable lead that Ford's near sweep of the West cannot overtake. He wins 342 electoral votes to Ford's 196, with 28 states and the District of Columbia to 22 states for Ford.

These scenarios were constructed using the most up-to-date polls at the time of the study, and subjects were asked not only to imagine that the scenario they were given was true, but to imagine the winner's victory speech and the loser's concession of defeat. Thus, the overall image

was intended to be as plausible and as vivid as possible. Then, after subjects had imagined a particular outcome, Carroll asked them to predict how they thought the election would actually turn out.

The results showed that subjects who imagined Carter winning believed that Carter would win, and subjects who imagined Ford winning believed that Ford would win. According to Carroll, imagining a given outcome made that outcome more available and increased subsequent probability estimates that it would occur.

In the second experiment, Carroll (1978) asked University of Pittsburgh students to imagine either that their football team did well during the 1977 season or that it did poorly (Pittsburgh won the national championship in 1976, but the coach and several top players did not stay on in 1977). Although the results of the second experiment were not uniformly positive, there was again some indication that imagining an outcome made it seem more likely. For example, of the 35 subjects who imagined Pittsburgh having a good season, 63 percent predicted a major bowl bid in the 1977 season, but of the 38 subjects who imagined Pittsburgh having a poor season, only 40 percent did so. On the whole, then, Carroll was able to conclude that imagining an outcome made it appear more likely, and, since the time of his study, several other researchers have replicated and extended this finding (Anderson, 1983; Gregory, Cialdini, & Carpenter, 1982).

THE LIMITS OF IMAGINATION

What if an outcome is difficult to imagine? If a decision maker tries unsuccessfully to imagine an outcome, does the perceived likelihood of that outcome increase or decrease? In 1985, Jim Sherman, Robert Cialdini, Donna Schwartzman, and Kim Reynolds published a study that examined this question.

Sherman and his associates asked subjects to read about one of two diseases that were reported to be growing in prevalence on campus. Both diseases were referred to as "Hyposcenia-B," but they were described differently depending upon the experimental condition. In the "easy-to-imagine" conditions, subjects read about a disease with concrete symptoms such as muscle aches, low energy level, and frequent severe headaches. In the "difficult-to-imagine" conditions, subjects read about a disease with abstract symptoms such as a vague sense of disorientation, a malfunctioning nervous system, and an inflamed liver.

Subjects in the control groups simply read the description they were given of Hyposcenia-B—whether easy or difficult to imagine—and judged how likely they were to contract the disease in the future. Subjects in the experimental groups, on the other hand, were asked to read about the disease "with an eye toward imagining a three-week period during which they contracted and experienced the symptoms of the dis-

ease." Experimental subjects were also asked to write detailed descriptions of how they thought they would feel during these three weeks.

Sherman and his colleagues found that control subjects were not significantly influenced by how easy the symptoms were to imagine, but experimental subjects were strongly affected. Experimental subjects in the easy-to-imagine condition thought they were relatively *more* likely to contract the disease, but those in the difficult-to-imagine condition actually rated themselves as *less* likely to contract the disease than did control subjects who never imagined the disease. Sherman et al. (1985) concluded that imagining an outcome does not guarantee that it will appear more likely; if an outcome is difficult to envision, the attempt to imagine it may actually reduce the perceived likelihood that it will occur.

DENIAL

Another case in which imagining an event may not increase its apparent likelihood is when the outcome is extremely negative. Some events are so upsetting that the very act of contemplating them leads to denial that they might occur (Rothbart, 1970).

For many people, the most extreme example of such an event is nuclear war. In 1989, I published a study in which approximately 2000 people were asked to estimate the chances of a nuclear war within the next ten years. Although Chapter 13 will examine this study in detail, there are two findings relevant to availability. First, asking people to vividly imagine what a nuclear war would be like (i.e., increasing "outcome availability") had no significant effect on how likely they judged nuclear war to be. Second, asking them to consider the likelihood of various paths to nuclear war (i.e., increasing "path availability") had an equally insignificant effect on probability estimates. The latter finding is especially surprising in light of several studies that have documented the importance of path availability (Hoch, 1984; Levi & Pryor, 1987; Ross, Lepper, Strack, & Steinmetz, 1977; Sherman, Zehner, Johnson, & Hirt, 1983).

What may have happened is that the event subjects were asked to imagine—which included the incineration of close friends and family members—was so aversive as to elicit a feeling of denial that nuclear war could ever occur. If so, then this denial may have canceled out the effect of increased availability, leaving probability estimates unchanged. Thus, if the prospect of an event is so horrifying that it leads to denial, then imagining its occurrence may not make it seem more likely.

VIVIDNESS

A close cousin of availability is vividness. Vividness usually refers to how concrete or imaginable something is, although occasionally it can have other meanings. Sometimes vividness refers to how emotionally

interesting or exciting something is, or how close something is in space or time. A number of studies have shown that decision makers are affected more strongly by vivid information than by pallid, abstract, or statistical information (Nisbett & Ross, 1980).

For example, Eugene Borgida and Richard Nisbett (1977) published a study that contrasted the effectiveness of a statistical summary of college course evaluations and a more vivid form of presenting such evaluations. The subjects in their experiment, mostly prospective psychology majors at the University of Michigan, were assigned to one of three experimental conditions: (1) a *base rate* condition, in which they read through a statistical summary of 5-point course evaluations from "practically all the students who had enrolled in the course during the previous semester"; (2) a *face-to-face* condition, in which subjects heard between one and four student panelists evaluate the 10 courses (these panelists prefaced their remarks with 5-point ratings that were, on average, equal to the ratings given in the base rate condition); and (3) a *no evaluation* control condition, in which they neither heard nor read any evaluations of the courses. Then, after either reading the statistical summary or listening to the panel presentation (or, in the case of the control group, receiving no evaluation at all), students were asked to indicate which of 27 college courses they were likely to take in the future.

Because the base rate condition included a nearly exhaustive summary of student evaluations, the most "logical" result would have been for base rate subjects to follow course recommendations more often than face-to-face subjects. As shown in Table 11.1, however, Borgida and Nisbett found just the opposite. Subjects were more persuaded by a few other students talking in a panel presentation than by a comprehensive statistical summary of course evaluations. In fact, subjects in the base rate condition did not plan to take significantly more of the recommended courses or fewer of the nonrecommended courses than subjects in the control group. Only subjects in the face-to-face condition differed from subjects in the control group. Students in the face-to-face condition indicated that they would take an average of 1.4 more recommended courses and 0.9 fewer nonrecommended courses than students in the control condition.

These results show that a handful of individual testimonials can outweigh comprehensive statistical summaries. As many new car buyers are aware, vivid stories about one person's lemon can quickly erode the confidence that might otherwise come from reading an endorsement in *Consumer Reports* (Nisbett, Borgida, Crandall, & Reed, 1976). Similarly, particularly vivid crimes or terrorist actions can overshadow crime statistics and other summary reports. Because vivid information is more "available" and easier to recall than pallid information, it often has a disproportionate influence on judgments.

TABLE 11.1
THE POWER OF VIVID TESTIMONIALS

Condition	Recommended Courses	Nonrecommended Courses
Face-to-face	4.73	.50
No evaluation (control)	3.33	1.39
Base rate	4.11	.94

Note: This table is adapted from a study by Eugene Borgida and Richard Nisbett (1977). Students in the face-to-face condition planned to take significantly more recommended courses and fewer nonrecommended courses than did students in the control condition, but students in the base rate condition did not differ significantly from control subjects.

THE LEGAL SIGNIFICANCE OF GUACAMOLE

The power of vivid information is widely appreciated by advertising executives, politicians, and many other "professional persuaders." One area in which vividness can be absolutely pivotal is a court of law. Robert Reyes, Bill Thompson, and Gordon Bower (1980) illustrated this point in a study on the way that vivid information influences mock jury decisions. The experiment took place over two sessions.

In the first session, subjects read about a court case involving drunk driving. The defendant had run a stop sign while driving home from a Christmas party and had collided with a garbage truck. The defendant's blood alcohol level had not been tested at the time, and he was now being tried on the basis of circumstantial evidence. The defense was arguing that the defendant had not been legally drunk.

After reading a brief description of the defendant's character, subjects were presented with nine written arguments by the defense about why the defendant was innocent, and nine written arguments by the prosecution about why the defendant was guilty. Each of these 18 statements contained one piece of evidence, and each was presented in either a pallid style or a vivid style. For example, the pallid version of one of the prosecution's arguments went like this:

> On his way out the door, Sanders [the defendant] staggered against a serving table, knocking a bowl to the floor.

The vivid version of the same information went as follows:

> On his way out the door, Sanders staggered against a serving table, knocking a bowl of guacamole dip to the floor and splattering guacamole on the white shag carpet.

Similarly, a pallid argument for the defense went like this:

> The owner of the garbage truck admitted under cross-examination that his garbage truck is difficult to see at night because it is grey in color.

The vivid version stated the same information but added:

> The owner said his trucks are grey "Because it hides the dirt," and he said, "What do you want, I should paint them pink?"

Roughly half the subjects were given vivid arguments by the defense and pallid statements by the prosecution, and the remaining subjects received vivid arguments by the prosecution and pallid arguments by the defense.

After reading all 18 statements, subjects were asked to make three judgments: (1) How drunk do you think Sanders was at the time of the accident? (2) What is your personal opinion about Sanders' innocence or guilt? (3) If you were a member of a jury obligated to follow the rule of "guilty beyond a reasonable doubt," what would your verdict be? (These three judgments were later averaged to form one overall index of how guilty subjects thought Sanders was.) This ended the first session, and subjects were asked to return forty-eight hours later for the second part of the experiment.

When subjects arrived for the second session, they were asked to write brief descriptions of as many of the 18 arguments as they could remember. They were also asked to indicate their current opinion on the same three questions they had answered at the end of the first session. The instructions explained that subjects did not need to answer the same way they had during the first session, and that they should make their judgments as though they "were deciding the case now for the first time."

What Reyes, Thompson, and Bower found is that vividness had no significant effect on judgments of guilt during the first session, when subjects had just finished reading the 18 arguments, but that it had a substantial effect forty-eight hours later. Subjects in the vivid prosecution condition later judged the defendant to be significantly more guilty than did subjects in the pallid prosecution condition. Reyes, Thompson, and Bower (1980) explained this delayed effect in terms of vivid information being easier to remember than pallid information. Thus, as in the case of Borgida and Nisbett (1977), vivid information ultimately had more influence than pallid information, presumably because it was relatively more available, or easier to retrieve.

A DISCLAIMER

As convincing as these results are, it is worth noting that one prominent review of research on the "vividness effect" found relatively little support for the hypothesis that vivid information is more influential than pallid information. In an exhaustive review of laboratory studies on the vividness effect, Shelley Taylor and Suzanne Thompson (1982, p. 178) found that most research had turned up mixed results or no vividness

effect whatsoever, and they therefore concluded that, at least with respect to laboratory research, the vividness effect was "weak if existent at all."

This conclusion should certainly temper any judgments concerning the superior impact of vivid information. At the same time, there are several reasons to suspect that the vividness effect exists in at least some situations. First, Taylor and Thompson noted a number of exceptions to their general conclusion. For example, they found that case histories were often more persuasive than statistical or abstract information, and that, under certain conditions, videotaped presentations were more persuasive than written or oral presentations. Second, as Taylor and Thompson were well aware, there are many ways to explain the *absence* of a research finding. The failure to find a vividness effect in a given experiment can be explained just as well by flaws in the experiment as by a true absence of the vividness effect, and in several studies vividness was confounded with other factors. Finally, and again pointed out by Taylor and Thompson themselves, there is reason to believe that laboratory settings work against the vividness effect by focusing attention on material that people might normally ignore. Hence, laboratory research may seriously underestimate the impact of vivid material in daily life.

In the last analysis, then, it seems likely that the vividness effect exists in at least some situations, but that its size and scope are limited. Also, in keeping with the availability heuristic, vivid examples of an event may increase probability and frequency estimates more than pallid examples.

CONCLUSION

In many cases, the availability heuristic provides reasonably accurate estimates of frequency and probability. In some situations, though, the availability heuristic can lead to critical biases in judgment. For example, public health depends on an awareness of mortality rates from dread diseases such as stomach cancer. If the incidence of these diseases is underestimated, people will be less likely to take preventive measures (Kristiansen, 1983). Similarly, if vivid but infrequent causes of death are overestimated, attention and funding may be diverted from more common dangers. Some writers have suggested, for example, that Americans overestimate the danger of terrorist attacks during travel abroad (Paulos, 1986, November 24).

One way to correct this problem is by explicitly comparing over- and underestimated dangers with threats that are misperceived in the opposite direction. For example, the American Cancer Society might launch a public information campaign that compares the mortality rate from stomach cancer with death rates from highly publicized dangers, such as homicide or car accidents. Billboards might declare: "THIS YEAR,

MORE PEOPLE WILL DIE FROM STOMACH CANCER THAN FROM CAR ACCIDENTS." Such a comparison would undoubtedly lead people to see stomach cancer as a more common cause of death than they had thought (although it may also have the unwanted effect of reducing frequency estimates of traffic fatalities). Travel agents use the same strategy when they promote tourism by pointing out that travelers stand a greater chance of dying in a traffic accident overseas than being killed in a terrorist plot.

When it comes to probability and frequency estimates, no heuristic is more central than the availability heuristic. Nonetheless, it is important to keep in mind that the availability heuristic is only one factor influencing probability and frequency judgments. Chapter 12 discusses several other factors that affect probability estimates, and it offers a number of suggestions on how to minimize common sources of bias.