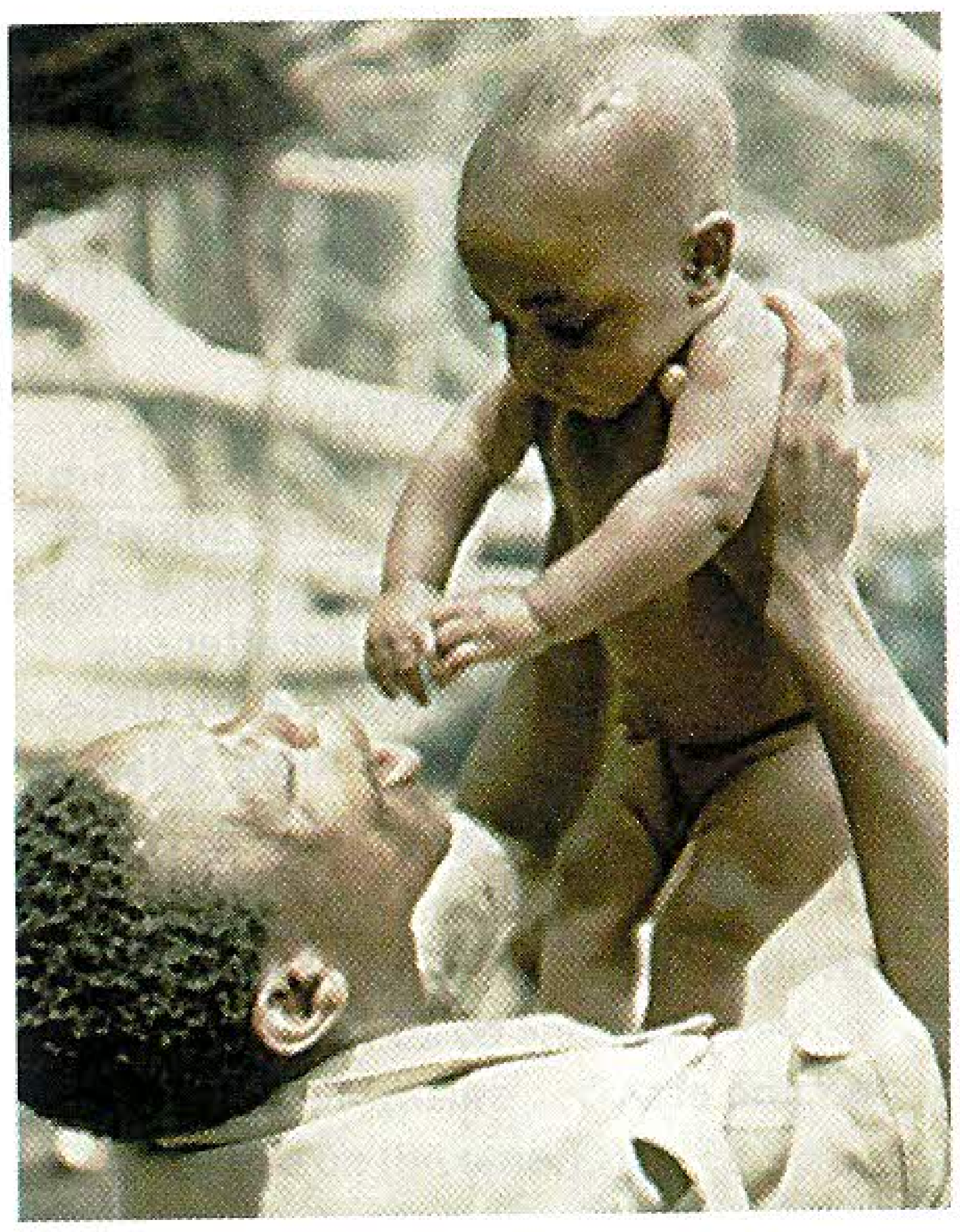
national election survey is like sampling the beans; 1500 randomly sampled people, drawn from all areas of a country, provide a remarkably accurate snapshot of the opinions of a nation. Without random sampling, large samples—including call-in phone samples and TV website polls—often merely give misleading results.



Naturalistic observation Psychologist Gilda Morelli has lived among and observed the Efe people of Central Africa for more than 20 years, studying paternal and maternal care and observing children's development.

Naturalistic Observation

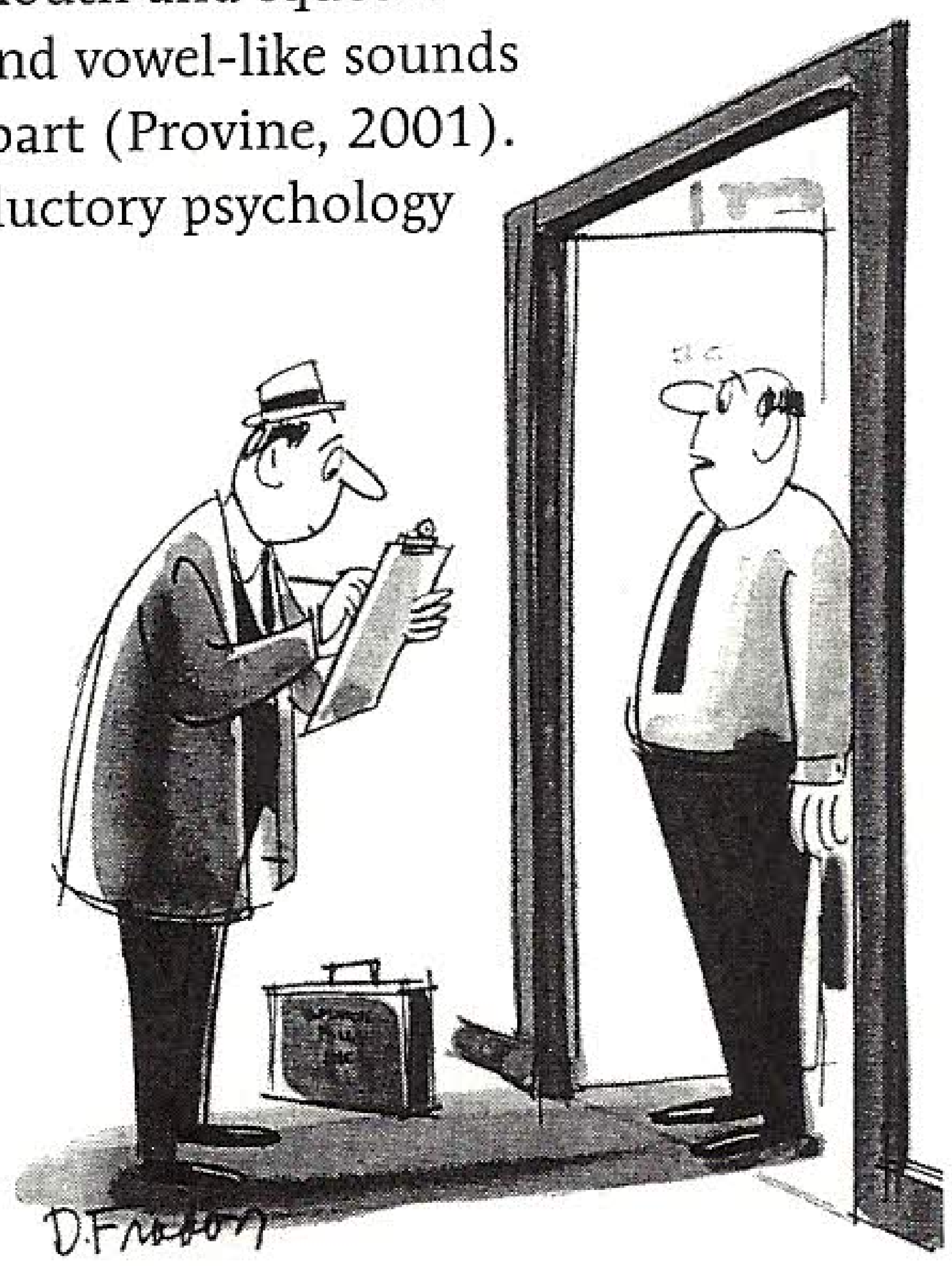
OBJECTIVE 7 | Identify an advantage and a disadvantage of using naturalistic observation to study behavior.

A third descriptive research method involves watching and recording the behavior of organisms in their natural environment. These **naturalistic observations** range from watching chimpanzee societies in the jungle, to unobtrusively videotaping (and later systematically analyzing) parent-child interactions in different cultures, to recording students' self-seating patterns in the lunchrooms of multiracial schools.

Like the case study and survey methods, naturalistic observation does not *explain* behavior. It *describes* it. Nevertheless, descriptions can be revealing. We once thought, for example, that only humans use tools. Then naturalistic observation revealed that chimpanzees sometimes insert a stick in a termite mound and withdraw it, eating the stick's load of termites. Such unobtrusive naturalistic observations, recalls chimpanzee observer Jane Goodall (1998), paved the way for later studies of animal thinking, language, and emotion: "Observations, made in the natural habitat, helped to show that the societies and behavior of animals are far more complex than previously supposed," thus expanding our understanding of our fellow animals. We later learned that chimps and baboons also use deception to achieve their aims. Psychologists Andrew Whiten and Richard Byrne (1988) repeatedly saw one young baboon pretending to have been attacked by another as a tactic to get its mother to drive the other baboon away from its food.

Naturalistic observations are also done with humans. Here are three examples I think you will enjoy.

- *A funny finding.* We humans laugh 30 times more often in social situations than in solitary situations. (Have you noticed how seldom you laugh when alone?) When we do laugh, 17 muscles contort our mouth and squeeze our eyes, and we emit a series of 75-millisecond vowel-like sounds that are spaced about one-fifth of a second apart (Provine, 2001).
- *Sounding out students.* What, really, are introductory psychology students saying and doing during their everyday lives? To find out, Matthias Mehl and James Pennebaker (2003) equipped 52 such University of Texas students with a belt-worn tape recorder that, for up to four days, captured 30 seconds of their waking hours every 12.5 minutes—thus enabling the researchers to eavesdrop on more than 10,000 half-minute life slices. On what percentage of the slices do you suppose they found the students talking with someone? What percentage captured the students at a computer keyboard? The answers: 28 and 9 percent, respectively. (What percentage of *your* waking hours are spent in these activities?)



"How would you like me to answer that question? As a member of my ethnic group, educational class, income group, or religious category?"

correlation a measure of the extent to which two factors vary together, and thus of how well either factor predicts the other. The *correlation coefficient* is the mathematical expression of the relationship, ranging from −1 to +1.

scatterplot a graphed cluster of dots, each of which represents the values of two variables. The slope of the points suggests the direction of the relationship between the two variables. The amount of scatter suggests the strength of the correlation (little scatter indicates high correlation). (Also called a *scattergram* or *scatter diagram*.)

- *Culture, climate, and the pace of life.* Naturalistic observation also enabled Robert Levine and Ara Norenzayan (1999) to compare the pace of life in 31 countries. By operationally defining *pace of life* as walking speed, the speed with which postal clerks completed a simple request, and the accuracy of public clocks, they concluded that life is fastest paced in Japan and Western Europe, and slower paced in economically less-developed countries. People in colder climates also tend to live at a faster pace (and are more prone to die from heart disease). Naturalistic observation describes behavior more than it explains it. But this study illustrates how naturalistic observation can also be used with correlational research, our next topic.

>> Learning Outcomes

Description

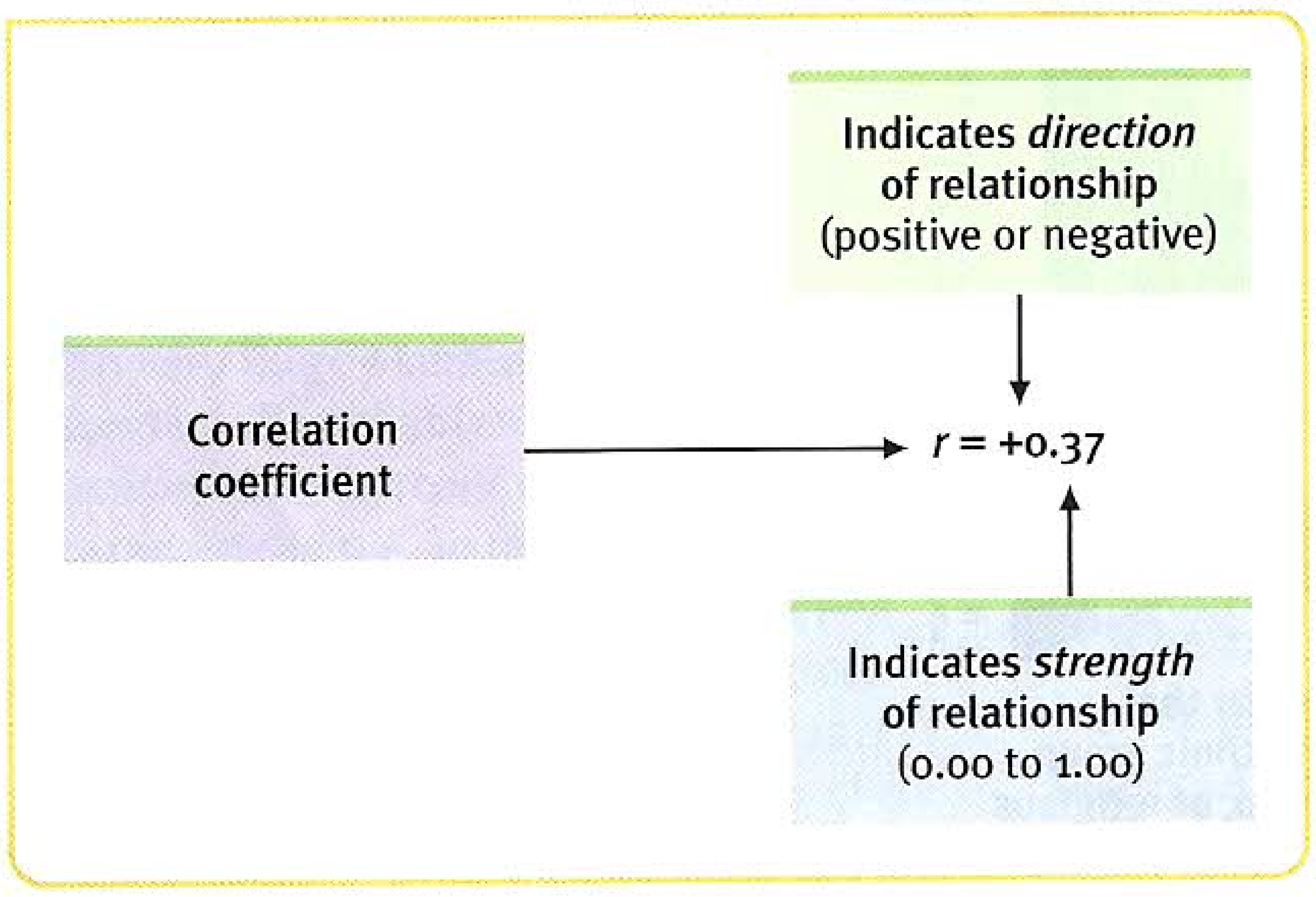
Objective 5 | Identify an advantage and a disadvantage of using case studies to study behavior.
Researchers using case studies focus in depth on one individual, in the hope of revealing universal principles. Case studies describe behavior. They can suggest hypotheses, but studying an unrepresentative individual may lead to false conclusions.

Objective 6 | Identify the advantages and disadvantages of using surveys to study behavior and mental processes, and explain the importance of wording effects and random sampling.
Surveys describe behavior by gathering information from a large number of people. This technique relies on people giving accurate self-reports of their attitudes or behaviors. Wording effects—subtle influences in the sequence or phrasing of questions—can affect responses. Random sampling helps researchers achieve a sample that fairly represents the population under study. Because random sampling chooses people by chance, each person in the entire group has an equal chance of participating.

Objective 7 | Identify an advantage and a disadvantage of using naturalistic observation to study behavior.
Naturalistic observation gives researchers an opportunity to watch and record behavior in naturally occurring situations. Like other forms of description, naturalistic observation cannot explain behaviors, but it can expand our understanding and lead to hypotheses that can be studied by other methods.

ASK YOURSELF: Can you recall examples of misleading surveys you have experienced or read about? What principles for a good survey did they violate?

FIGURE 1.2
How to read a correlation coefficient



Correlation

Objective 8 | Describe positive and negative correlations, and explain how correlational measures can aid the process of prediction.

Describing behavior is a first step toward predicting it. When surveys and naturalistic observations reveal that one trait or behavior accompanies another, we say the two **correlate**. The *correlation coefficient* is a statistical measure of a relationship (**FIGURE 1.2**): It reveals how closely two things vary together and thus how well either one *predicts* the other. Knowing how much aptitude test scores *correlate* with school success tells us how well the scores *predict* school success.

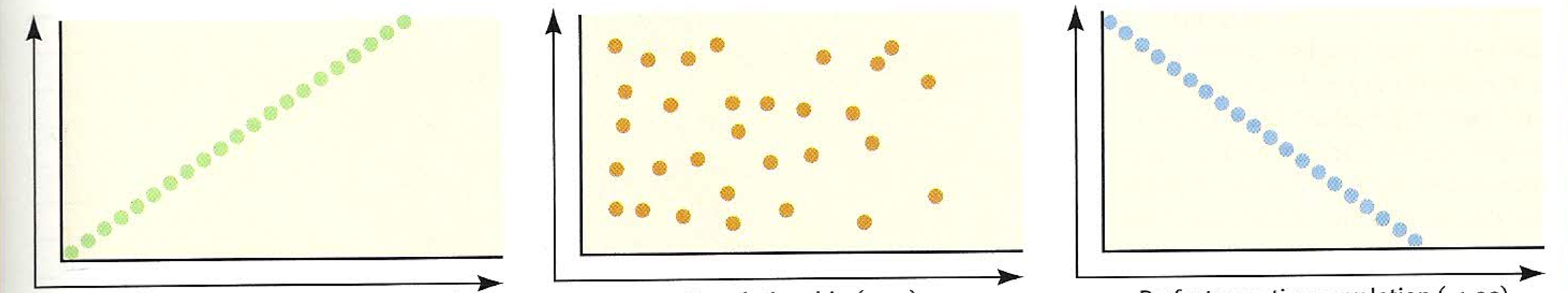


FIGURE 1.3
Scatterplots, showing patterns of correlation Correlations can range from +1.00 (scores on one measure increase in direct proportion to scores on another) to –1.00 (scores on one measure decrease precisely as scores rise on the other).

Throughout this book we will often ask how strongly two things are related: For example, how closely related are the personality scores of identical twins? How well do intelligence test scores predict achievement? How closely is stress related to disease?

FIGURE 1.3 illustrates perfect positive and negative correlations, which rarely occur in the "real world." These graphs are called **scatterplots,** because each point *plots* the value of two variables. A positive correlation means that two sets of scores, such as height and weight, tend to rise or fall together. A correlation's being negative has nothing to do with its strength or weakness; a negative correlation means two things relate inversely (one set of scores goes up as the other goes down). As toothbrushing goes up from zero, tooth decay goes down; brushing and decay correlate (negatively). A weak correlation, indicating little or no relationship, has a coefficient near zero.

Here are some recent news reports of correlational research. Can you spot which are reporting positive correlations, which negative?

- The more TV is on in the homes of young children, the less time they spend reading (Kaiser, 2003).
- The more sexual content teens see on TV, the more likely they are to have sex (Collins & others, 2004).
- The longer children are breast-fed, the greater their later academic achievement (Horwood & Fergusson, 1998).
- The more income rose among a sample of poor families, the fewer psychiatric symptoms their children experienced (Costello & others, 2003).

(These are negative, positive, positive, and negative correlations, respectively.)

Statistics can help us see what the naked eye sometimes misses. To demonstrate this for yourself, try an imaginary project. Wondering if tall men are more or less easygoing, you collect two sets of scores: men's heights and men's temperaments. You measure the heights of 20 men, and have someone else independently assess their temperaments (from zero for extremely calm to 100 for highly reactive).

With all the relevant data (**TABLE 1.2**) right in front of you, can you tell whether there is (1) a positive correlation between height and reactive temperament, (2) very little or no correlation, or (3) a negative correlation?

Comparing the columns in Table 1.2, most people detect very little relationship between height and temperament. In fact, the correlation in this imaginary example is moderately positive, +0.63, as we can see if we display the data as a scatterplot. In **FIGURE 1.4** (page 32), moving from left to right, the upward, oval-shaped slope of the cluster of points shows that our two imaginary sets of scores (height and reactivity) tend to rise together.

If we fail to see a relationship when data are presented as systematically as in Table 1.2, how much less likely are we to notice them in everyday life? To see what is right in front of us, we sometimes need statistical illumination. We can easily see evidence of gender discrimination when given statistically summarized information about job level, seniority, performance, gender, and salary. But we often see no discrimination when the same information dribbles in, case by case (Twiss & others, 1989).

TABLE 1.2

HEIGHT AND TEMPERAMENT OF 20 MEN

	Height in Inches	Temperament
1	80	75
2	63	66
3	61	60
4	79	90
5	74	60
6	69	42
7	62	42
8	75	60
9	77	81
10	60	39
11	64	48
12	76	69
13	71	72
14	66	57
15	73	63
16	70	75
17	63	30
18	71	57
19	68	84
20	70	39

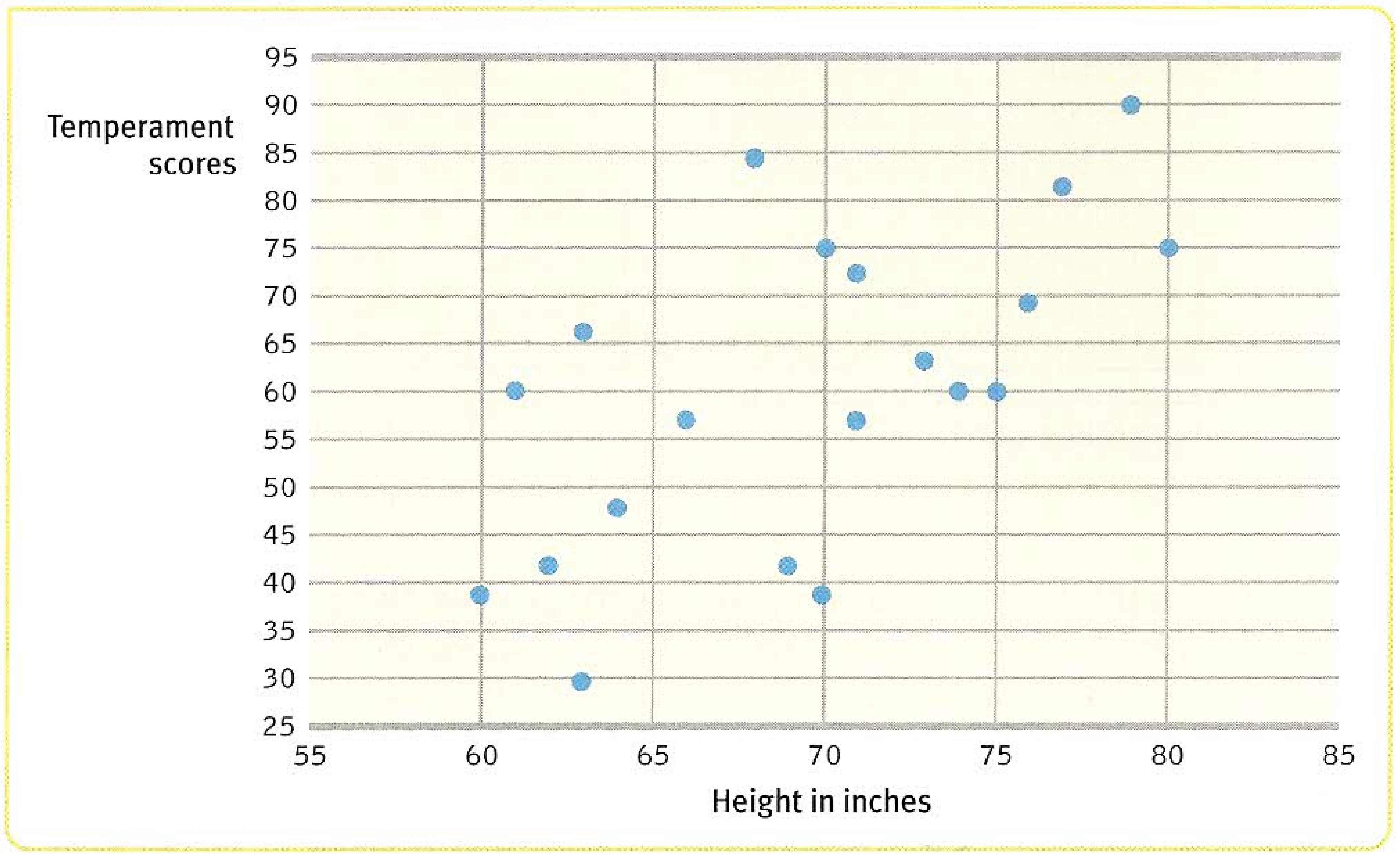


FIGURE 1.4
Scatterplot for height and temperament This display of data from 20 imagined people (each represented by a data point) reveals an upward slope, indicating a positive correlation. The considerable scatter of the data indicates the correlation is much lower than +1.0.

Though informative, psychology's correlations usually leave most of the variation among individuals unpredicted. As we will see, there is a correlation between parents' abusiveness and their children's later abusiveness when they become parents. But this does not mean that most abused children become abusive. The correlation simply indicates a statistical relationship: Although most abused children do not grow into abusers, nonabused children are even less likely to become abusive.

The point to remember: A correlation coefficient helps us see the world more clearly by revealing the extent to which two things relate.

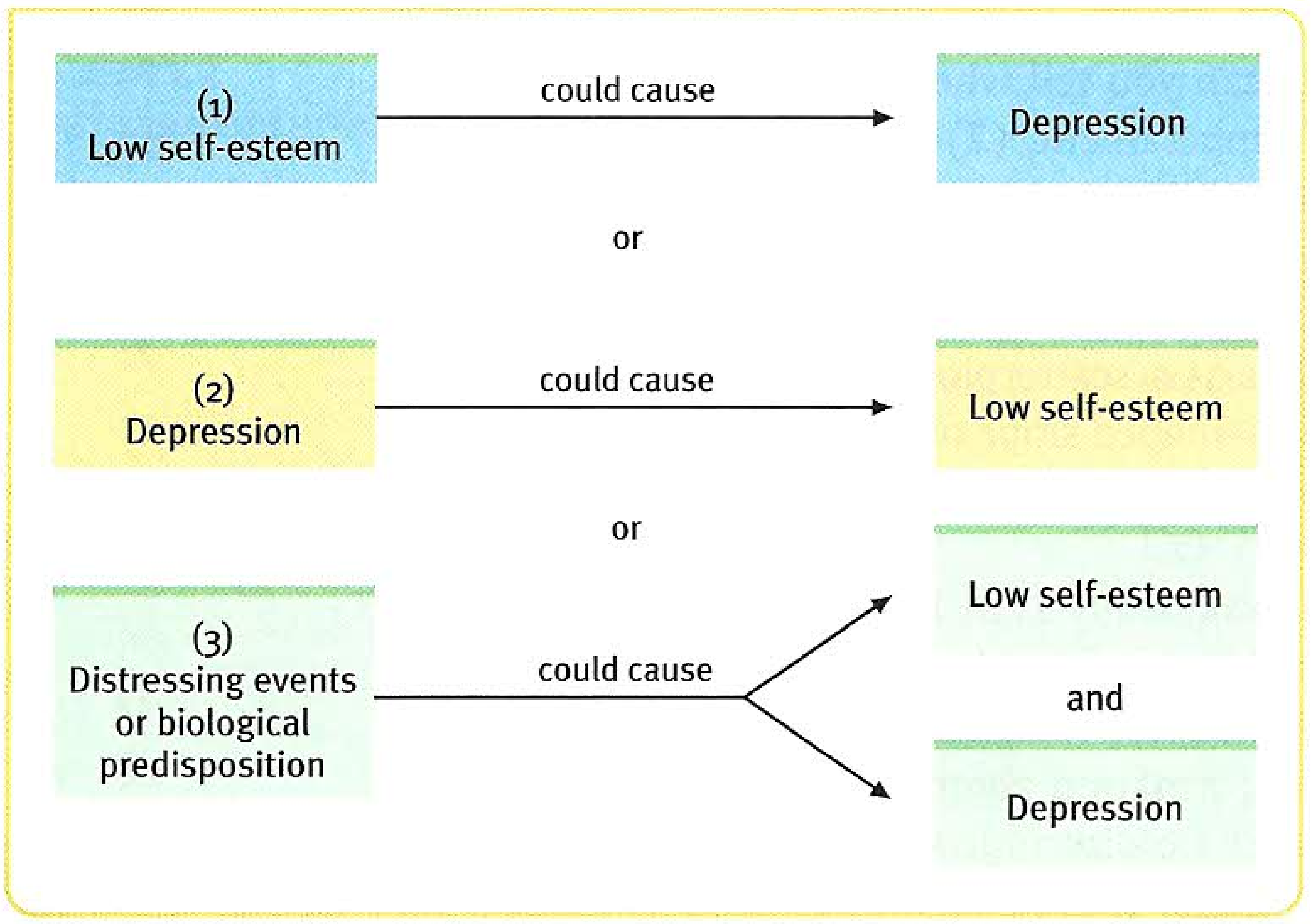
Correlation and Causation

OBJECTIVE 9 | Explain why correlational research fails to provide evidence of cause-effect relationships.

Correlations help us predict, and they restrain the illusions of our flawed intuition. Watching violence correlates with (and therefore predicts) aggression. But does that mean it *causes* aggression? Does low self-esteem *cause* depression? If, based on the correlational evidence, you assume that they do, you have much company. A nearly irresistible thinking error is assuming that correlation proves causation. But no matter how strong the relationship, it does not!

For example, what about the negative correlation between self-esteem and depression? Perhaps low self-esteem does cause depression. But as **FIGURE 1.5** suggests, we'd get the same correlation between low self-esteem and depression if depression caused people to be down on themselves, or if something else—a third factor such as heredity or brain chemistry—caused both low self-esteem and depression. Among men, length of marriage correlates positively with hair loss—because both are associated with a third factor, age. And people who wear hats are *more* likely to suffer skin cancer—because both are associated with fair-skinned people (who are vulnerable to skin cancer and more likely to wear protective hats).

FIGURE 1.5
Three possible cause-effect relationships People low in self-esteem are more likely to report depression than are those high in self-esteem. One possible explanation of this negative correlation is that a bad self-image causes depressed feelings. But, as the diagram indicates, other cause-effect relationships are possible.



R. Sidney/The Image Works

Correlation need not mean causation Length of marriage correlates with hair loss in men. Does this mean that marriage causes men to lose their hair (or that balding men make better husbands)? In this case, as in many others, a third factor obviously explains the correlation: Golden anniversaries and baldness both accompany aging.

This point is so important—so basic to thinking smarter with psychology—that it merits one more example, from a survey of over 12,000 adolescents: The more teens feel loved by their parents, the less likely they are to behave in unhealthy ways—having early sex, smoking, abusing alcohol and drugs, exhibiting violence (Resnick & others, 1997). "Adults have a powerful effect on their children's behavior right through the high school years," gushed an Associated Press (AP) story on the study. But the correlation comes with no built-in cause-effect arrow. Said differently (turn the volume up here), *correlation does not prove causation*. Thus, the AP could as well have said, "Well-behaved teens feel their parents' love and approval; out-of-bounds teens more often think their parents are disapproving jerks."

The point to remember: Correlation indicates the *possibility* of a cause-effect relationship, *but it does not prove causation*. Knowing that two events are correlated need not tell us anything about causation. Remember this principle and you will be wiser as you read and hear news of scientific studies.

A *New York Times* writer reported a massive survey showing that "adolescents whose parents smoked were 50 percent more likely than children of nonsmokers to report having had sex." He concluded (would you agree?) that the survey indicated a causal effect—that "to reduce the chances that their children will become sexually active at an early age" parents might "quit smoking" (O'Neil, 2002).

Illusory Correlations

OBJECTIVE 10 | Describe how people form illusory correlations.

Correlations make visible the relationships we might otherwise miss. They also restrain our "seeing" relationships that actually do not exist. A perceived nonexistent correlation is an **illusory correlation.** When we *believe* there is a relationship between two things, we are likely to *notice* and *recall* instances that confirm our belief (Trolier & Hamilton, 1986).

Illusory correlations help explain many a superstitious belief, such as the presumption that more babies are born when the moon is full or that infertile couples who adopt become more likely to conceive (Gilovich, 1991). Those who conceive after adopting capture our attention. We're less likely to notice those who adopt and never conceive, or those who conceive without adopting. In other words, illusory correlations occur when we over-rely on the top left cell of **FIGURE 1.6** (on page 34), ignoring equally essential information in the other cells.

Such illusory thinking helps explain why for so many years people believed (and many still do) that sugar made children hyperactive, that getting cold and wet caused one to catch a cold, and that weather changes trigger arthritis pain. Physician Donald Redelmeier, working with psychologist Amos Tversky (1996), followed 18 arthritis patients for 15 months. The researchers recorded both the patients' pain reports and the daily weather—temperature, humidity, and barometric pressure. Despite patients' beliefs, the weather was uncorrelated with their discomfort, either on the same day or

illusory correlation the perception of a relationship where none exists.

FIGURE 1.6
Illusory correlation in everyday life
Many people believe infertile couples become more likely to conceive a child after adopting a baby. This belief arises from their attention being drawn to such cases. The many couples who adopt without conceiving or conceive without adopting grab less attention. To determine whether there actually is a correlation between adoption and conception, we need data from all four cells in this figure. (From Gilovich, 1991)

	Conceive	Do not conceive
Adopt	confirming evidence	disconfirming evidence
Do not adopt	disconfirming evidence	confirming evidence

Michael Newman Jr./PhotoEdit

up to two days earlier or later. Shown columns of random numbers labeled "arthritis pain" and "barometric pressure," even college students saw a correlation where there was none. We are, it seems, prone to perceiving patterns, whether they're there or not.

Because we are sensitive to dramatic or unusual events, we are especially likely to notice and remember the occurrence of two such events in sequence—say, a premonition of an unlikely phone call followed by the call. When the call does not follow the premonition, we are less likely to note and remember the nonevent.

Likewise, instances of positive-thinking people being cured of cancer impress those who believe that positive attitudes counter disease. But to assess whether positive thinking actually affects cancer, we need three more types of information. We need an estimate of how many positive thinkers were *not* cured. Then we need to know how many cancer patients were and were not cured among those not using positive thinking. Without these comparison figures, the positive examples of a few tell us nothing about the actual correlation between attitudes and disease. (Chapter 14 explores the effects of emotions on health and illness.)

The point to remember: When we notice random coincidences, we may forget that they are random and instead see them as correlated. Thus, we can easily deceive ourselves by seeing what is not there.

Perceiving Order in Random Events

OBJECTIVE 11 | Explain the human tendency to perceive order in random sequences.

Illusory correlations arise from our natural eagerness to make sense of our world—what poet Wallace Stevens called our "rage for order." Given even random data, we look for order, for meaningful patterns. And we usually find such, because *random sequences often don't look random*. Consider a random coin flip: If someone flipped a coin six times, which of the following sequences of heads (H) and tails (T) would be most likely: HHHTTT or HTTHTH or HHHHHH?

Daniel Kahneman and Amos Tversky (1972) found that most people believe HTTHTH would be the most likely random sequence. Actually, all three are equally likely (or, you might say, equally unlikely) to occur. A bridge or poker hand of 10 through Ace, all of hearts, would seem extraordinary; actually, it would be no more or less likely than any other specific hand of cards (**FIGURE 1.7**).

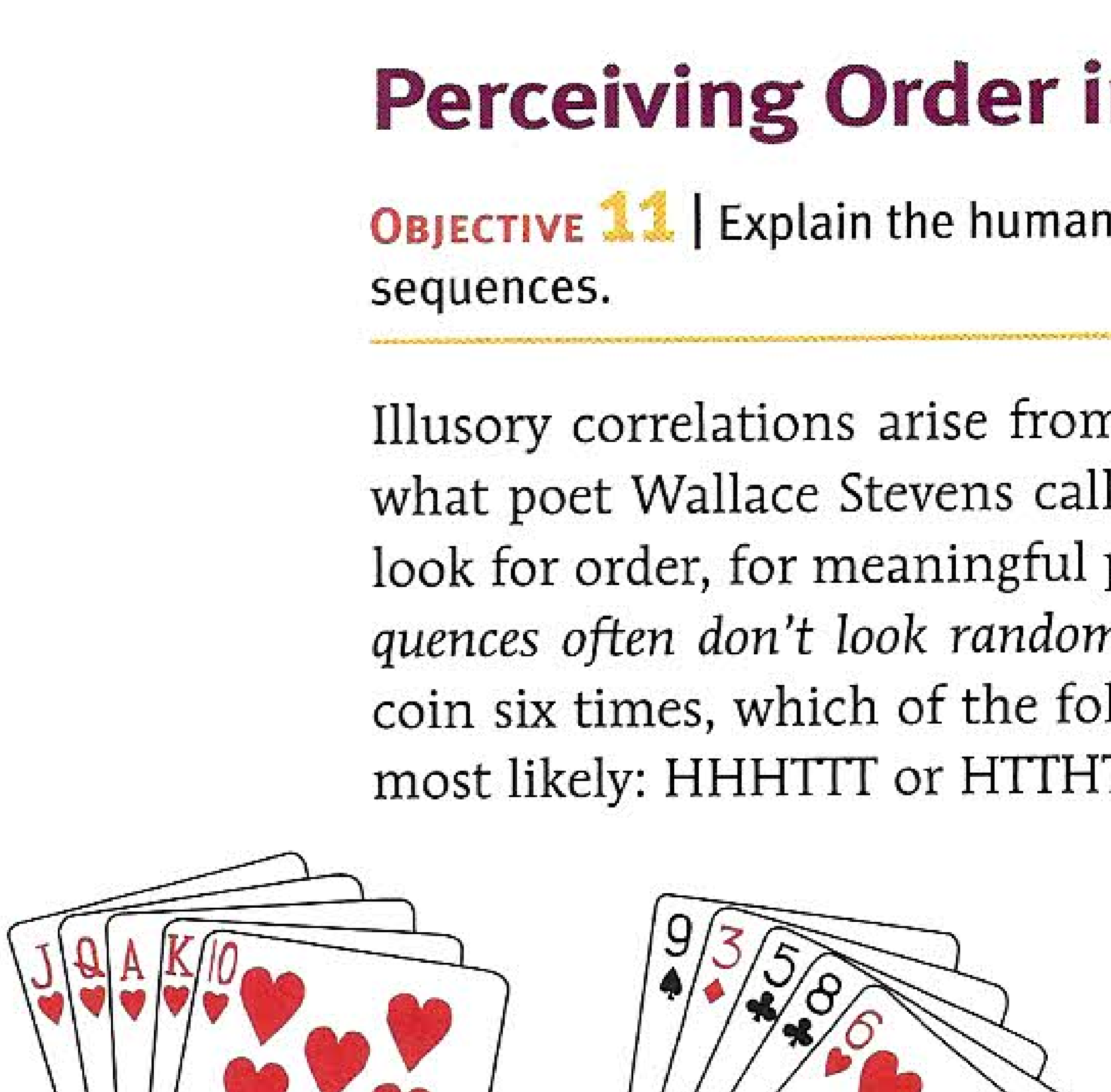


FIGURE 1.7
Two random sequences
Your chances of being dealt either of these hands are precisely the same: 1 in 2,598,960.

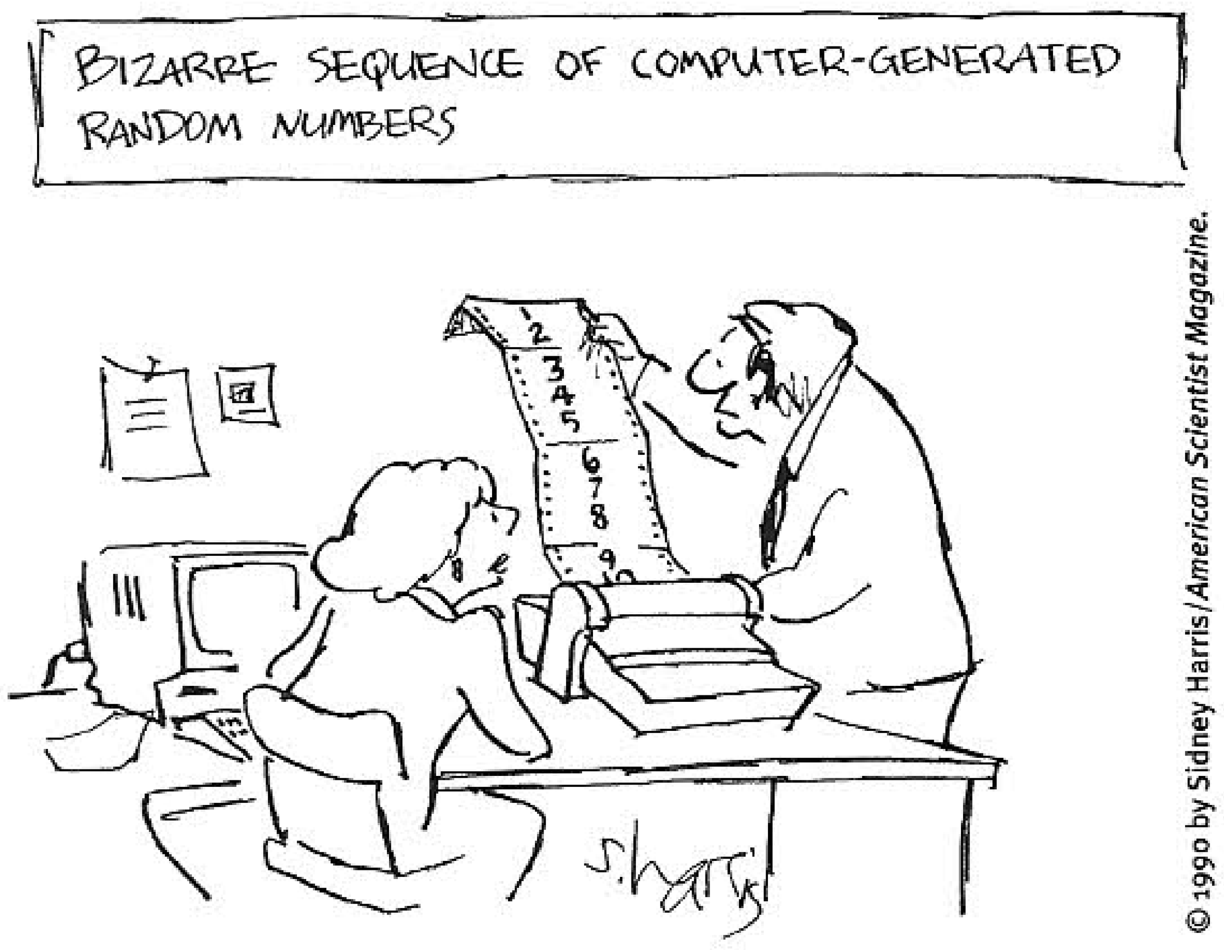
In actual random sequences, patterns and streaks (such as repeating digits) occur more often than people expect. To demonstrate this phenomenon for myself (as you can do), I flipped a coin 51 times, with these results:

1. H	11. T	21. T	31. T	41. H	51. T
2. T	12. H	22. T	32. T	42. H	
3. T	13. H	23. H	33. T	43. H	
4. T	14. T	24. T	34. T	44. H	
5. H	15. T	25. T	35. T	45. T	
6. H	16. H	26. T	36. H	46. H	
7. H	17. T	27. H	37. T	47. H	
8. T	18. T	28. T	38. T	48. T	
9. T	19. H	29. H	39. H	49. T	
10. T	20. H	30. T	40. T	50. T	

Looking over the sequence, patterns jump out: Tosses 10 to 22 provided an almost perfect pattern of pairs of tails followed by pairs of heads. On tosses 30 to 38 I had a "cold hand," with only one head in eight tosses. But my fortunes immediately reversed with a "hot hand"—seven heads out of the next nine tosses. Similar streaks happen, about as often as one would expect in random sequences, in basketball shooting, baseball hitting, and mutual fund stock pickers' selections (Gilovich & others, 1985; Malkiel, 1989, 1995; Myers, 2002). Whether flipping coins, watching basketball, or monitoring investment adviser performance, random sequences often don't look random, and so get overinterpreted ("When you're hot, you're hot—give her the ball!").

What explains these streaky patterns? Was I exercising some sort of paranormal control over my coin? Did I snap out of my tails funk and get in a heads groove? No such explanations are needed, for these are the sorts of streaks found in any random data. Comparing each toss to the next, 24 of the 50 comparisons yielded a changed result—just the sort of near 50-50 result we expect from coin tossing. Despite the seeming patterns in these data, the outcome of one toss gives no clue to the outcome of the next toss.

However, some happenings seem so extraordinary that we struggle to conceive an ordinary, chance-related explanation (as applies to our coin-tosses). In such cases, statisticians often are less mystified. When Evelyn Marie Adams won the New Jersey lottery *twice*, newspapers reported the odds of her feat as 1 in 17 trillion. Bizarre? Actually, 1 in 17 trillion are the odds that a given person who buys a single ticket for two New Jersey lotteries will win both times. But statisticians Stephen Samuels and George McCabe (1989) report that, given the millions of people who buy U.S. state lottery tickets, it was "practically a sure thing" that someday, somewhere, someone would hit a state jackpot twice. Indeed, say fellow statisticians Persi Diaconis and Frederick Mosteller (1989), "with a large enough sample, any outrageous thing is likely to happen." "The really unusual day would be one where nothing unusual happens," adds Diaconis (2002). An event that happens to but one in 1 billion people every day occurs about six times a day, 2000 times a year.



© 1990 by Sidney Harris/American Scientist Magazine.

Bizarre-looking, perhaps. But actually no more unlikely than any other number sequence.

On March 11, 1998, Utah's Ernie and Lynn Carey gained three new grandchildren when three of their daughters gave birth—on the same day (*Los Angeles Times*, 1998).

Jerry Telfer/San Francisco Chronicle

Given enough random events, something weird will happen Angelo and Maria Gallina were the beneficiaries of one of those extraordinary chance events when they won two California lottery games on the same day.

>> LEARNING OUTCOMES

Correlation

OBJECTIVE 8 | Describe positive and negative correlations, and explain how correlational measures can aid the process of prediction.
A *correlation coefficient* is a statistical measure of the strength and duration of the relationship between two factors. In a positive correlation (ranging from 0 to +1.00), the two factors rise or fall together. In a negative correlation (ranging from 0 to −1.00), one item rises as the other falls. Scatterplots and the correlations they reveal help us to see relationships that the naked eye might miss.

OBJECTIVE 9 | Explain why correlational research fails to provide evidence of cause-effect relationships.
A correlation indicates the *possibility* of a cause-effect relationship, but it does not prove causation or, if causation exists, the direction of the influence. A third factor may be the cause of the correlation.

OBJECTIVE 10 | Describe how people form illusory correlations.
Illusory correlations are random events that we notice and falsely assume are related. They arise from our sensitivity to dramatic or unusual events. Once we believe two things are related, we tend to notice and recall instances that confirm this belief.

OBJECTIVE 11 | Explain the human tendency to perceive order in random sequences.
We search for patterns in an attempt to make sense of the world around us. Patterns or sequences occur naturally in sets of random data, but we tend to interpret these patterns as meaningful connections.

ASK YOURSELF: Can you think of an example of correlational research that you recently heard about from a friend or on the news? Was an unwarranted conclusion drawn?

Experimentation

Happy are they, remarked the Roman poet Virgil, "who have been able to perceive the causes of things." We endlessly wonder and debate *why* we act as we do. Why do people smoke? Have babies while they are still children? Do stupid things when drunk? Become troubled teens and open fire on their classmates? Though psychology cannot answer these questions directly, it has helped us to understand what influences drug use, sexual behaviors, thinking when drinking, and aggression.

Exploring Cause and Effect

OBJECTIVE 12 | Explain how experiments help researchers isolate cause and effect.

Many factors influence our everyday behavior. To isolate cause and effect—say, in looking for causes of depression—psychologists statistically control for other factors. For example, many studies have found that breast-fed infants grow up with somewhat higher intelligence scores than those of infants bottle-fed with cow's milk (Angelsen & others, 2001; Mortensen & others, 2002; Quinn & others, 2001). Mother's milk correlates modestly but positively with later intelligence. But does this mean that smarter mothers (who more often breast-feed) have smarter children? Or, as some researchers believe, do the nutrients of mother's milk contribute to brain development? To help answer this question, researchers have "controlled for" (statistically removed differences in) maternal age, education, and intelligence. Still, breast-fed infants exhibit slightly higher intelligence as young children.

The clearest and cleanest way to isolate cause and effect is, however, to **experiment.** Experiments enable a researcher to focus on the possible effects of one or more factors by (1) *manipulating the factors of interest* and (2) *holding constant ("controlling") other factors*. Knowing that correlations of infant nutrition and later intelligence can't possibly control for all other possible factors, a British research team led by Alan Lucas (1992) decided to experiment, using 424 hospital preterm infants. With parental

experiment a research method in which an investigator manipulates one or more factors (independent variables) to observe the effect on some behavior or mental process (the dependent variable). By random assignment of participants, the experimenter aims to control other relevant factors.

permission, the researchers randomly assigned some infants to the usual infant formula feedings and others to donated breast milk feedings. When given intelligence tests at age 8, the children nourished with breast milk had significantly higher intelligence scores than their formula-fed counterparts. No single experiment is conclusive, of course, but by randomly assigning infants to a feeding condition, these researchers were able to hold constant all factors except nutrition. This eliminated alternative explanations and supported the conclusion that, so far as the developing intelligence of preterm infants is concerned, breast is best. (*Note:* The other infants were not harmed by the experiment, because they received the standard feeding.)

If a behavior (such as test performance) changes when we vary an experimental factor (such as infant nutrition), then we know the factor is having an effect. *The point to remember:* Unlike correlational studies, which uncover naturally occurring relationships, an experiment manipulates a factor to determine its effect.

Understanding experimentation is central to thinking critically with psychological science. So, let's consider further how we experiment.

Evaluating Therapies

OBJECTIVE 13 | Explain why the double-blind procedure and random assignment build confidence in research findings.

Our tendency to seek new remedies when we are ill or emotionally down can produce misleading testimonies. If three days into a cold we start taking vitamin C tablets and find our cold symptoms lessening, we may credit the pills rather than the cold naturally subsiding. If, after nearly failing the first exam, we listen to a "peak learning" subliminal tape and then improve on the next exam, we may credit the tape rather than conclude that our performance has returned to our average. In the 1700s, blood-letting *seemed* effective. Sometimes people improved after the treatment; when they didn't, the practitioner inferred the disease was just too advanced to be reversed. (We, of course, now know that blood-letting is a *bad* treatment.) So, whether or not a remedy is truly effective, enthusiastic users will probably endorse it. To find out whether it actually is effective, we must experiment.

And that is precisely how new drug treatments and new methods of psychological therapy are evaluated (Chapter 17). In many of these studies, the participants are *blind* (uninformed) about what treatment, if any, they are receiving. One group receives the treatment. Others receive a pseudotreatment—an inert *placebo* (perhaps a pill with no drug in it). Often, neither the participant nor the research assistant collecting the data knows whether the participant's group is receiving the treatment. This **double-blind procedure** enables researchers to check a treatment's actual effects apart from the research participants' (and their own) enthusiasm for it and from the healing power of belief. The **placebo effect** is well documented in reducing pain, depression, and anxiety (Kirsch & Sapirstein, 1998). Just *believing* you are getting a treatment can boost your spirits, relax your body, and relieve your symptoms.

The double-blind procedure is one way to create an **experimental condition** in which people receive the treatment and a contrasting **control condition** without the treatment. By **randomly assigning** people to these conditions, researchers can be fairly certain the two groups are otherwise identical. Random assignment roughly equalizes the two groups in age, attitudes, and every other characteristic. With random assignment, as occurred with the infants in the breast milk experiment, we also can know that any later differences between people in the experimental and control conditions will usually be the result of the treatment.

Another example: On the advice of their physicians, millions of postmenopausal women turned to hormone replacement therapy after correlational studies found

double-blind procedure an experimental procedure in which both the research participants and the research staff are ignorant (blind) about whether the research participants have received the treatment or a placebo. Commonly used in drug-evaluation studies.

placebo [pluh-SEE-bo; Latin for "I shall please"] **effect** experimental results caused by expectations alone; any effect on behavior caused by the administration of an inert substance or condition, which is assumed to be an active agent.

experimental condition the condition of an experiment that exposes participants to the treatment, that is, to one version of the independent variable.

control condition the condition of an experiment that contrasts with the experimental condition and serves as a comparison for evaluating the effect of the treatment.

random assignment assigning participants to experimental and control conditions by chance, thus minimizing preexisting differences between those assigned to the different groups.