

Take the argument, "York is a teacher, therefore he is a Democrat." The strength of that argument depends on how being a teacher affects the probability that York is a Democrat. This is separate from the question, "How likely is it that York is a Democrat?" which requires us to consider all the evidence. Everything else being equal, the fact York is a teacher raises the probability he is a Democrat more than does the fact he wears glasses. So, without consulting the Principle of Total Evidence we can say that argument (A):

(A) York is a teacher, therefore he is a Democrat

is stronger than argument (B):

(B) York wears glasses, therefore he is a Democrat.

Of course, we can't say (A) is stronger than (B) without knowing that the proportion of teachers who are Democrats is higher than the proportion

In Depth

Everyday Statistical Syllogisms



Avalanche probability is rated on an avalanche hazard scale of 1 to 5. Hazard level 5, in which the snow pack is "generally poorly bonded and largely unstable" assesses the probability as this: "Many large spontaneous avalanches can be expected, even in moderately steep areas." Avalanche assessments are conclusions of inductive generalizations and follow the principles discussed in this chapter. Precise probability calculations are not always possible, even in matters of life and death.

of glasses-wearers who are Democrats. But we could know these proportions without consulting the Principle of Total Evidence.

Again, to repeat, you will find inductive reasoning—and this chapter—much easier to comprehend if you always keep in mind the difference between gauging the probability of a claim when everything is considered, and gauging the strength of this or that argument used to support the claim.

REASONING FROM THE GENERAL TO THE SPECIFIC (STATISTICAL SYLLOGISMS)

If you meet Mr. York, a teacher, then everything else being equal, it's a good bet he is a Democrat. Why? Because most teachers are Democrats. How might one establish that most teachers are Democrats? We will get to that in the next section; for the moment let's just assume that is the case.

Here is your reasoning:

Most teachers are Democrats.
York is a teacher.
Therefore York is a Democrat.

You would be right if you thought the strength of this argument, which is known as a statistical syllogism, depends on the general statement, "Most teachers are Democrats." The higher the proportion of teachers said to be Democrats, the stronger the argument, assuming what is said is true.

However, many other considerations bear on the *overall* probability that York is a Democrat. If, for example, York has told you he is a Democrat, that makes it all but certain he is one, everything else being equal. But our purpose here is not to quantify the *overall probability* that York is a Democrat. Our purpose is to gauge the strength of this particular argument. The strength of this argument remains what it is, regardless of what York has told you. Regardless of what he has said, the argument on the right is stronger than the argument on the left:

**Around 60 percent of teachers
are Democrats.**
York is a teacher.
Therefore York is a Democrat

**Around 90 percent of teachers
are Democrats.**
York is a teacher.
Therefore York is a Democrat.

To summarize, a **statistical syllogism** has this form:

Such-and-such proportion of Xs are Ys.
This is an X.
Therefore this is a Y.

The strength of these arguments depends on the proportion of Xs that are Ys: the greater the proportion, the stronger the argument. (Later in the chapter we will see that conclusions of this and other inductive arguments should be expressed at an appropriate "confidence level," but more about that in a moment.)



Inductive reasoning is at the heart of conclusions we reach about things around us. Take this truck. Reasoning from our past encounters with people who drive vehicles like this, we'd consider each of the following conclusions likely: The owner of this vehicle: (1) is a male, (2) doesn't worry about global warming, any other environmental problem, or his cholesterol level, and (3) doesn't play chess.

REASONING FROM THE SPECIFIC TO THE GENERAL (INDUCTIVE GENERALIZING FROM A SAMPLE)

Generalizing from a sample is something we all do every day. Is the soup seasoned right? We sample it. Is the coffee too strong? We take a sip. Should we buy the grapes at Kroger? When nobody's looking we pop one into our mouth and find out how they taste. Do students at our university want a new recreation center? We poll them.

Statisticians refer to any identifiable group of things as a population. It's what in Chapter 8 is called a category. It takes getting used to, to think of a pot of coffee as a population, but you can view it as a population of sips. Populations have various characteristics—some are small; others are large; some, like “crimes committed in New York City this year,” are extremely diverse; and others, like the sips in our coffee pot, not so much.

Our experience sometimes leads us to conjecture about the properties of populations that interest us. There seem to be a lot of Priuses in the faculty parking lot; are university professors as a group especially fond of them? Well—there are a lot of university professors; to answer our question scientifically, we need a better sample than the professors who park in our faculty parking lot. Those professors might not be typical.

Already you can see room for critical thinking. Who counts as a “university professor,” and when can someone be described as “fond of Priuses”? To begin answering the question, we would devise what statisticians call a sampling frame. A **sampling frame** is a precise definition of a population and of the attribute in which we are interested, a definition that enables us to tell for any individual whether he, she, or it is in the population and whether he, she, or it has the attribute of interest. A sampling frame for our question, for example, might be professors who are current members of the American Association of University Professors (AAUP) and are registered owners of a Prius. This sampling frame removes the vagueness from the question, “What proportion of university professors are fond of Priuses?”*

From the sampling frame, a sample would be selected for examination, a sample that, one hopes, would represent the population accurately. A sample represents a population accurately, or is said to be **representative**, if variables linked to the attribute of interest are present in the sample in the same proportion as in the population. For example, the kind of car someone drives is linked to his or her income; you'd want the same proportion of high-income individuals in the AAUP sample as in the general AAUP population. To the extent a variable is not present in the sample in the same proportion as in the population, the sample is **biased** with respect to that variable.

*From the standpoint of scientific sampling, a sampling frame must be chosen with care, to make sure that among other things it doesn't include duplicate entries or extraneous items or leave out members of the population we'd want included.

Because we don't know what all the important variables are—for example, we don't know what proportion of AAUP professors are at a given income level—the sample must be selected by a procedure that ensures that every member of the population has an equal chance of being included. A sample selected by such a method is a **random sample**. But even random samples will not be totally free from bias, because the variables present in a sample are subject to random variation from sample to sample. The range of this random variation is known as the sample's **error margin**, and the larger the sample the more probable it is that the random variation will fall within a given range. Or, to put exactly the same point in different terms, at a given level of probability, the larger the sample the smaller the error margin for that sample. The level of probability is referred to as the **confidence level**.

This can be terribly confusing, and an example will help. Proceed slowly.

Let's assume that, in fact, 20 percent of AAUP members own a Prius. Suppose now we take many random samples of 1,000 AAUP members. The proportion of AAUP members in the samples who own a Prius will vary randomly from sample to sample. What is the limit of this variation? There is a 95 percent probability that the random variation, for a random sample of 1,000, will be within 3 percentage points on either side of the true proportion (20 percent). In other words, for a random sample of 1,000, *at the 95 percent confidence level the error margin is ± 3 percentage points*. This means that in 95 out of every 100 random samples of this size, between 17 and 23 percent of the AAUP members will own a Prius. If the samples were larger, the error margin would be smaller at a given confidence level.

We won't discuss the mathematics that lie behind the calculations just described, but they are among the most basic mathematics in this field; you can trust them. They guarantee the details you'll find in Table 10-1, which applies to very large populations, and which you should look at now. You will see that the confidence level of the table is 95 percent, which is the level scientific polling organizations have settled on. In a reputable scientific poll, if the confidence level is not mentioned, assume it is 95 percent. Though we are illustrating things by talking about populations consisting of people, what we say applies to generalizing from a sample of any kind of identifiable entity.

The leftmost column of the table represents a series of increasing sample sizes. In the second column is the error margin corresponding to each sample size—expressed as plus or minus so many percentage points. These error margins are approximate; they've been rounded off for convenience. The third column is the entire range of those percentage points.

Notice three things. First, as the sample size increases, the error margin decreases. Second, a small sample has a huge error margin; with a sample of 10, the error margin is plus or minus 30 points (at the 95 percent confidence level). You can see that if you generalize from a small sample to a very large population, you'd want to give yourself a large margin of error if you wanted to be confident about the generalization.

Third, when you look at the table, the error margin narrows quickly as the size of the sample increases from 10 to 25; but then the narrowing effect slows down rapidly. By the time we get to a sample size of 500, which has an error margin of plus or minus 4 percentage points, you would have to double the sample size to narrow the error margin by only a single percentage point.

Table 10-1

Approximate Error Margins for Various Random Samples from Large Populations

Confidence level of 95 percent in all cases.

Sample Size	Error Margin (%)	Corresponding Range (Percentage Points)
10	±30	60
25	±22	44
50	±14	28
100	±10	20
250	±6	12
500	±4	8
1,000	±3	6
1,500	±2	4

The error margin decreases rapidly as the sample size begins to increase, but this decrease slows markedly as the sample gets larger. It is usually pointless to increase the sample beyond 1,500 unless there are special requirements of precision or confidence level.

(We assume, both here and in the text, that the population is large—that is, 10,000 or larger. When the population is small, a correction factor can be applied to determine the appropriate error margin. But most reported polls have large enough populations that we need not concern ourselves with the calculation methods for correcting the error margin here.)

Now that you see this, you won't be surprised to learn that, no matter what a reputable public opinion survey is about, it usually involves between 1,000 and 1,500 in the sample. Trying to further reduce the error margin generally isn't worth the extra expense.

With this information about scientific generalizing from samples in mind, let's look at the kind of generalizing from samples we do in everyday life.

Everyday Inductive Generalizing from a Sample

Everyday inductive generalizing from samples differs from the scientific variety in two important respects. First, it doesn't involve carefully selected samples. Second, as a result, one cannot calculate probabilities with anything like the precision of Table 10-1. However, the underlying principles of scientific inductive generalizing apply to reasoning of the everyday variety.

Let's begin here: A **variable**, as is obvious, is something that varies. As we mentioned, and as is clear anyway, some variables are associated with the attribute in which one is interested. Driving a Prius, for example, is associated with the level of one's income. If a sample is to represent a population, such variables must be present in the sample in the same proportion as in the population. To repeat what we said earlier, if that happens, the sample *represents*

the population well. If it doesn't, it is *biased* with respect to whatever variable it over- or under-represents.

At the heart of scientific inductive generalizing are procedures for sampling that help minimize bias in samples—that help ensure that samples are “representative” and not atypical or skewed. Thus, if we were statisticians critically examining (for instance) a public opinion poll, we might be especially interested in how the sample was selected. Unfortunately, samples used in everyday inductive generalizing are not selected scientifically. As a result, critical thinking about everyday reasoning from samples focuses on factors other than the procedure used to select a sample. Instead, *one focuses on the sample itself*, considering two things carefully.

First, one looks for important *differences* between the sample and the population it supposedly represents, differences that could bias the sample. Second, one considers whether the sample is *large and diversified* enough to be representative. For example, the title page of this book is the same from copy to copy. If you wanted to know what percentage of the title pages contain spelling mistakes, you would not need a very large sample; the population is so uniform that a small sample (even a sample of one) would contain all the diversification you require.

We can distill these considerations into two basic principles for thinking critically about everyday generalizing from samples.

Principles for thinking critically about an inductive generalization from a sample:

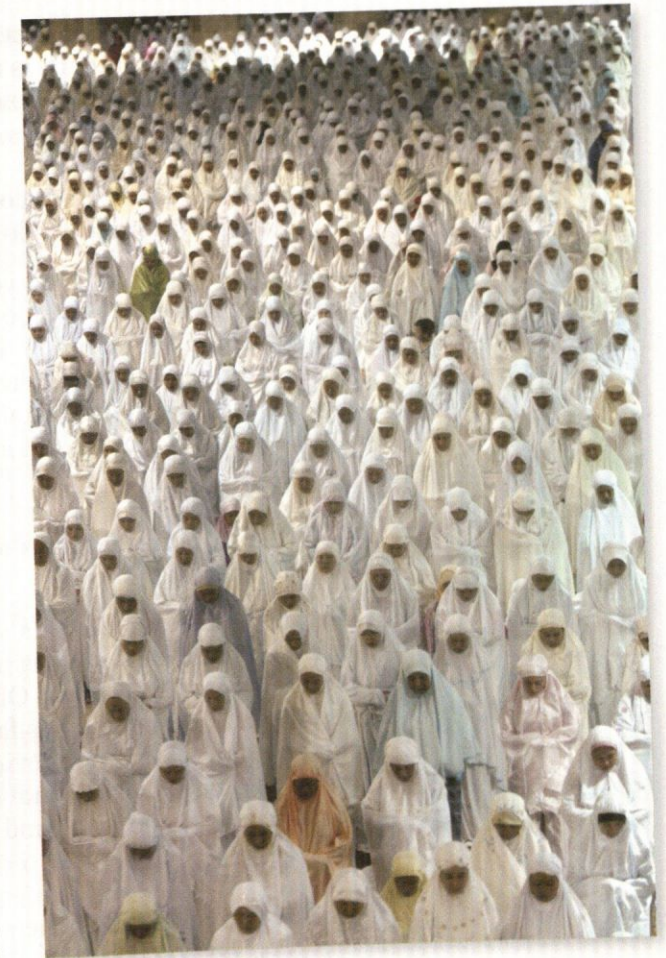
1. If a difference between the sample and the population it supposedly represents biases the sample, that difference weakens the argument.
2. Samples that are too small or too undiversified to represent the population well weaken the argument.

Examples of thinking critically about everyday generalizing from samples:

First example:

“There aren't any fleas in this motel room; therefore, there aren't fleas anywhere here in Lodi.”

The argument is so intuitively weak it is hard to imagine anyone saying such a thing. Still, let's just think about why it is weak. A presence of fleas is related to multiple variables that might well not be found in a sample consisting of a single motel room. Also, a motel room is more apt to have been



■ For the purposes of inductive generalizing, the diversification of a population should be replicated in the sample.

treated for pests in the first place. So this sample differs from the population it supposedly represents, is not diversified in the least, and is small. Compare this example with the following one.

Second example:

"Dave's Lawn Care does shoddy work maintaining the neighbor's lawn; they probably do shoddy work generally."

The population here consists of lawns maintained by Dave's. Yes, the sample in this example is no larger or more diversified than the one in the first example. But a motel room is apt to be atypical in that it may well have been treated for fleas, whereas there is no special reason for thinking the neighbor's lawn is atypical. So as it stands, this is a stronger argument for its conclusion than the first argument is for its conclusion.

Third example:

"Most of my teachers are Democrats, so I think most teachers are Democrats."

Let's just assume this speaker is thinking of a population of American university teachers and has in mind by "Democrats" something like the people who voted for Barack Obama in the last presidential election. Now the population "Democrats" is far larger and more multifaceted (diversified) than the populations in the previous two examples. The speaker's sample is not only too small and too undiversified, but relative to the population it represents, it is way too small and way too undiversified.

Fourth example:

"I don't like Jane; others probably feel the same."

Let's say the first statement is offered as support for the second statement. Then once again the speaker is generalizing from a single thing, in this case himself or herself, to the "population" of people who are in a position to like or dislike Jane. Many factors could affect whether Jane (or anyone) is likeable; the sample is insufficiently diversified with respect to such variables.

Fifth example:

"OMG! Look at this rash I got from that plant! I'll steer clear of it next time."

The speaker means that in the future he or she will stay away from plants of this species. Again, someone is generalizing from a sample of one. But here the "population" is relatively undiversified, and the potential differences between the sample and the population aren't many. (Variables that might be important include age of plant and dormancy.) It is true that a more diversified sample would have produced a stronger argument. But even as it stands, this is the strongest of the five examples so far.

Sixth example:

"Eight of the ten people in this class think the midterm was too hard, and we don't know about the other two, but it is safe to say everyone thinks the midterm was too hard."

Here the sample is small, but it is 80 percent of the population, so the argument is relatively very strong.

The following exercise sets will help you further explore the difference between statistical syllogisms and inductive reasoning from samples.

Divide the following statements into two categories, based on a distinction implicit in the material discussed so far in this chapter. Identify the distinction.

Exercise 10-1

- ▲ 1. Danielle is older than Christina.
2. Annual ryegrass dies out in the summer.
3. Feral donkeys cause considerable damage to the ecology of Death Valley.
- ▲ 4. A significant proportion of small-business owners oppose raising the minimum wage.
5. The president of the senior class didn't wear a tux to the prom, if you can believe it.
6. It costs \$55 a year to subscribe to *Consumer Reports*.
- ▲ 7. Glasses purchased online may not be satisfactory for your purposes.
8. Tony the Shark works for No Doz Escobar.
9. The most common seeing-eye dog is the German shepherd.
- ▲ 10. The Toledo museum isn't open this evening.

Five of the following items are inductive generalizations from samples and five are statistical syllogisms. Determine which are which.

Exercise 10-2

- ▲ 1. Rainbird sprinklers don't last long, judging from my experience.
2. That sprinkler won't last long: it's a Rainbird.
3. Don't worry about your tree losing its leaves; it's a camphor tree.
- ▲ 4. I don't think camphor trees are deciduous; at any rate ours isn't.
5. Blu-ray disks aren't any better than regular old DVDs; so don't expect this disk to be better than what you are used to.
6. Target gives refunds no questions asked. I found that out when I returned a shirt without a receipt.
- ▲ 7. It's difficult to find a grocery store in Fresno; the time I was there I looked all over the place and only found car parts places and liquor stores.
8. Marsha will be on time; she usually is.
9. Jorge and Susan are both really bright; apparently most music majors are.
- ▲ 10. Jorge and Susan are both really bright; after all, they are music majors.

Exercise 10-3

For each of the following, mark:

- A = statistical syllogism
 B = inductive generalization from a sample
 C = neither

- ▲ 1. Here, try this one. It'll stop your cough. It's a Breezer.
- 2. Costco charges less than Walmart for comparable items. I've shopped at both for years.
- 3. Alvid likes the president; after all, he's a Democrat.
- ▲ 4. The local Kia dealership is thriving, which suggests that Kia is doing well nationally.
- 5. Professor Stooler is a tough grader; he teaches physics.
- 6. Almost every Shih Tzu I've run into is smart; there probably aren't any anywhere that aren't.
- ▲ 7. A majority of Republicans favor immigration reform, and Horace is a Republican. Connect the dots.
- 8. Sally is apt to be cranky; she usually is when she skips breakfast.
- 9. Comcast service has improved a lot over the past year judging from what has happened around here.
- ▲ 10. It will still be cool there in June; the elevation at Denver is over 5,000 feet.

Exercise 10-4

Complete each of these statistical syllogisms by supplying an appropriate premise or conclusion.

Example:

Marilyn is a florist; I bet she's a nice person.
Premise: Most florists are nice people.

- ▲ 1. Don't waste your time trying to teach that dog to fetch. Otterhounds don't do that.
- 2. I don't see how you could have high blood pressure; you jog, what, ten miles a day?
- 3. Most people who drive that kind of car have money to burn, so I imagine he has money to burn.
- ▲ 4. Dr. Walker belongs to the ACLU; and most people who belong to the ACLU are liberals.
- 5. Sharon shops online; I bet she doesn't pay sales tax.
- 6. York belongs to the NRA; he's probably a Republican.
- ▲ 7. Most members of the NRA are Republicans; therefore, probably York is a Republican.
- 8. Most smokers drink; I imagine, therefore, that Sally drinks.
- 9. Melody will be upset; who wouldn't if her husband did that?
- ▲ 10. Verizon provides service to most small towns; so you'll probably get service in Chabot Gap.

Exercise 10-5

Complete each of these statistical syllogisms by supplying an appropriate premise or conclusion.

- ▲ 1. Christine's probably pretty athletic; she's a professional dancer.
- 2. I doubt Lays have preservatives; most chips these days don't.
- 3. Aubrey is fibbing; nine times out of ten, when somebody says she doesn't care what people think, she's fibbing.
- ▲ 4. Kids around here generally don't drop out of school, so Jim won't drop out.
- 5. I don't think their band will be popular; they play jazz.
- 6. Deanna isn't likely to help; she's too concerned about herself.
- ▲ 7. I expect it's going to rain; it usually does when it's hot.
- 8. Probably they have a key; most members do.
- 9. We might have trouble parking; it's New Year's Eve, don't forget.
- ▲ 10. Most governors haven't been very good presidents, and Mitt is a governor.

Identify the sample, the population, and the attribute of interest in each of the following inductive generalizations from a sample. **Exercise 10-6**

- ▲ 1. I've seen at least ten Disney movies and not one of them has been violent. Apparently Disney doesn't make violent movies.
- 2. Most of my professors wear glasses; it's a good bet most professors everywhere wear glasses.
- 3. Conservatives I know don't like Huckabee. Based on that, I'd say most conservatives don't like him.
- ▲ 4. Judging from what I saw, Columbus State is a fun place to be.
- 5. Seven of the last ten El Niños were associated with below-average rainfall across southern Canada. Therefore 70 percent of all El Niños will be associated with below-average rainfall across southern Canada.
- 6. MRS. BRUDER: Bruder! Bruder! Can you believe it? The Music Department is selling two grand pianos!
MR. BRUDER: Well, let's check it out. But remember, the last pianos they sold were overpriced. Probably all their pianos are overpriced.
- ▲ 7. Costco's store-brand coffee tastes as good as any name brand; I'll bet any store brand product from Costco is as good as the name brand.
- 8. A 55 percent approval rating? Them polls is rigged! Most people I know think he's a Marxist.
- 9. The young people around here sure are crazy! Did you see those two dudes drag racing?
- ▲ 10. The fries at McDonald's are too salty, judging from these.

Identify the sample, the population, and the attribute of interest in each of the following. **Exercise 10-7**

- ▲ 1. Whoa, is this joint overpriced or what! Look at what they want for quart of milk!

2. Carmel? People there are snobs, judging from what I've seen.
3. PCs are way faster than Macs! Just compare these two puppies!
- ▲ 4. Life insurance salespeople are always trying to sell you stuff you don't need; anyway, the ones I know do.
5. Did you see that? The drivers in this town are crazy!
6. I get lots of dropped calls with AT&T where I live; it's probably the same everywhere.
- ▲ 7. After the first test, I knew I'd do well in this class.
8. The doorbell doesn't ring and the hot water heater is busted. Doesn't anything work in this house?
9. I never saw a frost after March. I don't think it can happen this close to the coast.
- ▲ 10. English classes are boring, judging from the one I took.

Exercise 10-8 ▲ Rank order the following populations from least diversified to most diversified.

1. Television sitcoms
2. Movies
3. Episodes of Survivor
4. Movies rated PG
5. Movies starring Meryl Streep

Exercise 10-9 ▲ Rank order the following populations from least diversified to most diversified.

1. Professional athletes
2. National Football League referees
3. Physically fit people
4. Major League baseball players
5. Olympic shot-putters

Exercise 10-10 ▲ Rank order the following populations from least diversified to most diversified.

1. People
2. Cowboys
3. Democrats
4. Teachers
5. Cowboys who are teachers

Exercise 10-11

Think of as many variables as you can that are linked to each of the following attributes. For example, height and jumping ability are linked to being a professional basketball player: the more professional basketball players there

are in a population the more tall people who are good at jumping there are apt to be.

Your instructor may make this a timed competition, giving the person who wins an opportunity to go home after class.

- ▲ 1. Driving a Lexus
2. Owning a pet
3. Having no cavities
- ▲ 4. Being susceptible to poison oak or ivy
5. Owning a hand gun
6. Being afraid of the dark
- ▲ 7. Being nearsighted
8. Reading romance novels
9. Drinking Budweiser
- ▲ 10. Watching reality shows
11. Owning an iPad
12. Seeing a psychotherapist
13. Attending church once a week

Rate how well each sample represents its population on a scale of 1 to 5, where **Exercise 10-12**

1 = the sample represents its population very well.
5 = the sample represents its population very poorly.

- ▲ 1. The coffee in that pot is lousy; I just had a cup.
2. The coffee at that restaurant is lousy; I just had a cup.
3. Starbuck's coffee is bitter, judging from this cup.
- ▲ 4. Sherry doesn't write well, based on how poorly she did on this 5-page paper.
5. Sherry writes very well, based on how well she did on this 5-page paper.
6. Terrence will treat her like a queen, to judge from how well he treated her on their first date.
- ▲ 7. Acura transmissions fail before 100,000 miles, judging from what happened to my car.
8. I've been to one ballet and I've never been so bored in my life. I'm sure they will all be the same.
9. I love ballet! I've only been to one, but I fell in love instantly.
- ▲ 10. Lupe's sister and father both have high blood pressure. It probably runs in the family.
11. SALESPERSON: As you can see from these two pictures, HDTV is much sharper than regular TV.
12. Yes. Blue Cross will cover that procedure. They covered it for me.
13. Cockers eat like pigs, judging from the cocker I had as a kid.

Exercise 10-13

"Most Ohio State students I've met believe in God. Therefore, most Ohio State students believe in God."

How should each of the following suppositions affect the speaker's confidence in his or her conclusion?

1. Suppose the students in the sample were interviewed as they left a local church after Sunday services. (Ohio State has no admission requirements pertaining to religious beliefs.)
2. Suppose the students in the sample were first-year students.
3. Suppose the students in the sample were on the university football team.
- ▲ 4. Suppose the students in the sample were selected by picking every tenth name on an alphabetical list of students' names.
5. Suppose the students in the sample were respondents to a questionnaire published in the campus newspaper titled "Survey of Student Religious Beliefs."
6. Suppose the students in the sample were randomly selected from a list of registered automobile owners.

Exercise 10-14

Read the passage below, and answer the questions that follow.

In the Georgia State University History Department, students are invited to submit written evaluations of their instructors to the department's personnel committee, which uses those evaluations to determine whether history instructors should be recommended for retention and promotions. In his three history classes, Professor Ludlum has a total of one hundred students. Six students turned in written evaluations of Ludlum; two of these evaluations were favorable and four were negative. Professor Hitchcock, who sits on the History Department Personnel Committee, argued against recommending Ludlum for promotion. "If a majority of the students who bothered to evaluate Ludlum find him lacking," he stated, "then it's clear a majority of all his students find him lacking."

- ▲ 1. What is the sample in Hitchcock's reasoning?
2. What is the population?
3. What is the attribute of interest?
- ▲ 4. Are there differences between the sample and the population that should reduce our confidence in Hitchcock's conclusion?
5. Is the sample random?
6. Is the sample large enough?
- ▲ 7. Based on these considerations, how strong is Hitchcock's reasoning?

REASONING FROM THE SPECIFIC TO THE SPECIFIC: INDUCTIVE ARGUMENTS FROM ANALOGY

If you have heard of arguments from analogy, you may be surprised to learn that strictly speaking, there aren't any. Strictly speaking, an analogy is a metaphor or a simile, a nonpropositional entity that is neither true nor false. Metaphors and similes may be described as useful, enlightening, apt, accurate, startling, and in other ways; but they aren't literally true, and they aren't literally false. Consequently, an analogy cannot be the premise of an argument because a premise must be either true or false. What is commonly called an inductive argument from analogy is, in fact, an argument from a claim that two (or more) things share one or more attributes.

Let's begin by looking at the way these arguments work. Then we'll consider other uses of analogy.

The Way Inductive Arguments from Analogy Work

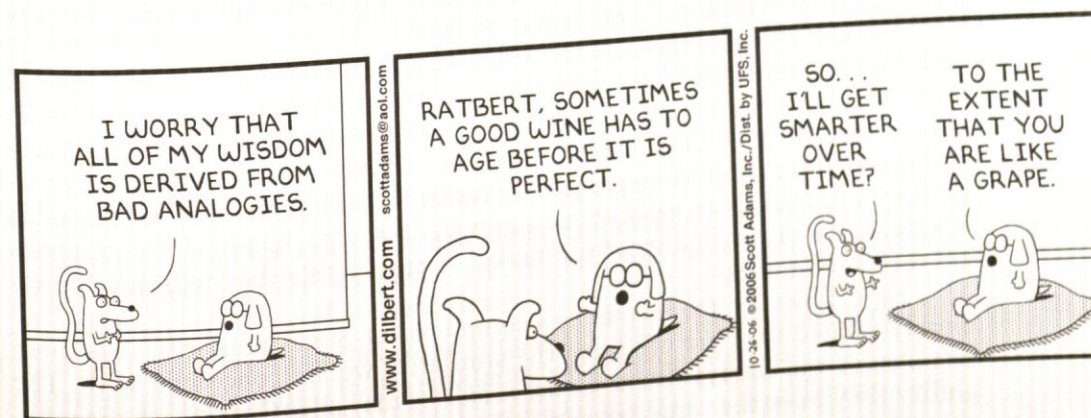
The fact that two things share some attributes increases the probability they will share others. For example, the fact that two cell phones are made by the same manufacturer increases the probability that they are of the same quality. Because of this, the fact that one cell phone doesn't work well is a reason for thinking the other cell phone won't either. That is how the premises of an inductive argument from analogy can support—*increase the probability of*—the conclusion.

Schematically, an argument from analogy has this form:

X and Y both share attributes p, q, r (and so forth).
X also has the attribute of interest to us—attribute I.
Therefore Y has attribute I.

An example in English can't hurt:

Cheryl and Denise are teenage sisters who go to the same school and watch the same TV programs.
Cheryl liked *The Chronicles of Narnia*.
Therefore, Denise will like *The Chronicles of Narnia*.



Examples of Thinking Critically About Arguments from Analogy

First example:

"The federal budget is like a household budget; bad things result from not balancing a household budget; therefore bad things will result from not balancing the federal budget."

Yes, whether the federal budget is like a household budget is rather a subjective question. Still, the federal budget is more like a household budget than it is like, say, a snowshoe; but the dissimilarities between the analogues are striking. Among them: the federal government, unlike a household, can raise taxes and print money. Given those dissimilarities, the argument does not seem strong.

Second example:

"Last year Kris Allen won *American Idol*. Two years ago David Cook won. Therefore Lee Dewyze will probably win this year, because he looks and sounds like the other two."

Here, too, whether someone looks and sounds like someone else is a judgment call; but most people who watch *American Idol* would agree these three singers look and sound more like each other than any of them looks or sounds like Barbara Streisand or Pavarotti. No doubt they would also agree they look and sound more like each other than they look or sound like the other contestant going into the current finals round, Crystal Bowersox. Are there dissimilarities that weaken the argument? Is Bowersox a better singer? Is she especially likeable? Does she have a compelling story? Have the judges praised her more? If one could not think of such dissimilarities, Dewyze would be the better bet.

Third example:

"Harvey mistreats his dog. He wouldn't make a good babysitter."

The analogues in this argument (Harvey's treatment of his dog and his treatment of someone's child) are so similar you wouldn't want Harvey to babysit your child.

Fourth example:

"Harvey mistreats his child. He wouldn't make a good dog sitter."

The analogues in this example are the same as in the previous one. Likewise, the similarities and dissimilarities between the analogues (whatever they may be) are the same in both examples. However, the fourth example is a stronger argument for its conclusion. A person who could mistreat a dog might draw the line there; after all, more people eat meat than eat children. But, we think, most (though perhaps not all) people who would mistreat a child wouldn't hesitate to mistreat an animal.

Again, appraisal of arguments from analogy is not an exact science. Analyzing them blindly according to some formula isn't the best idea.

Other Uses of Analogies

As you've seen, our primary interest in analogies has been their use in analogical arguments. But analogies are also used—and are also useful—in explanations,

as rhetorical devices, and in other capacities. Here's an example of an analogy that might look like an argument but isn't:

Bears, as everybody (especially Stephen Colbert) knows, are dangerous. If you get too close, you can lose it all. The same holds true of bear markets. In the presence of a bear market, the thing to do is the same as when in the presence of a real bear: Keep your distance!

Now, it may be that staying out of the stock market during a bear market is a wise move. But this passage certainly gives us no reason for believing it. No fact whatsoever about real bears is relevant to the stock market (except, maybe, for stocks in bear-hunting companies, if such things existed). Here, the analogy supplies a psychological connection and nothing more; the only thing the terms of the analogy share is the word "bear." Neither term tells us anything about the other, but you might be surprised at how many people fall for this kind of "reasoning."

On the other hand, analogies figure into moral and legal arguments in an important way. As you'll see in Chapter 12, a basic moral principle is based on the comparison of different cases, the principle that we should treat like cases alike. If we have two analogous cases, two people performing similar

Real Life

Bears!

The fact that bears are dangerous doesn't mean that bear markets are dangerous. See text above.



Real Life

Whom Do You Trust?

- When it comes to deciding which kind of car to buy, which do you trust more—the reports of a few friends or the results of a survey based on a large sample?
- When it comes to deciding whether an over-the-counter cold remedy (e.g., vitamin C) works, which do you trust more—a large clinical study or the reports of a few friends?

Many people trust the reports of friends over more reliable statistical information. We hope you aren't among 'em. (According to R. E. Nisbett and L. Ross, *Human Inference: Strategies and Shortcomings of Human Social Judgment* [Englewood Cliffs, N.J.: Prentice Hall, 1980], people tend to be insensitive to sample size when evaluating some product, being swayed more by the judgments of a few friends than by the results of a survey based on a large sample.)

actions in similar circumstances, for example, it would be morally suspect to praise one of them and blame the other. Similarly, the legal principle of *stare decisis* (to stand by things decided) is based on making analogies between present cases and cases that have been settled in the past. More on this, as well, in Chapter 12.

Analogies also come into play in explanations. Some explanations would be made more difficult or even impossible if we could not make use of analogous cases. For instance, back in Chapter 5 we mentioned that an analogy could be very helpful in explaining rugby to a person who knew nothing about the game. If the person did know something about American football, one could begin with that game and point out differences between football and rugby. This would be a great time-saver, since the points the two games have in common would not have to be listed as features of rugby.

Historical analogies are used both to explain and to argue for a point of view. For example, the history of the Roman Empire is often compared to that of the British Empire as historians look for similar themes in the hope of drawing conclusions about the way empires rise and fall. Lately, analogies between the Vietnam and Iraq conflicts have been used, especially by antiwar advocates, to try to show that the course of the second conflict will follow that of the first unless there is a drastic change in approach.

Finally, we should mention the use of **logical analogies** in the refutation of arguments. You can often show someone that an argument is invalid by providing another argument that is just like the first but obviously invalid. The important phrase here is "just like the first." What this means is that the second argument *must have the same form* as the first. You'll see what we mean as you follow this example, in which Gary presents an argument and Melinda refutes Gary's argument by logical analogy. Gary says, "All your liberal friends believe there should be universal health care, and anyone who wants socialized medicine also believes there should be universal health care. So, all your liberal friends want socialized medicine." Melinda points out that this conclusion doesn't follow. She uses an analogy: "Gary, that's invalid. That's just

like saying because all your friends breathe air and all terrorists breathe air, all your friends are terrorists."

With her example, Melinda has shown that, if Gary's argument were valid, her argument would also be valid. Since her argument obviously isn't valid, Gary's isn't either.

The following exercises will help you understand reasoning from analogy and how to evaluate it.

Exercise 10-15

Identify whether each of these is

A = argument from analogy

B = an analogy that isn't an argument

- ▲ 1. These shrubs have shiny green leaves, and so does privet. I bet these shrubs keep their leaves in the winter, too.
2. Working in this office is like driving around Florida without AC.
3. Between you and me, Huck has less personality than a pincushion.
- ▲ 4. You don't like picnicking? Well, you won't like camping, either. You can't do either without getting eaten by mosquitoes.
5. As soon as I saw all these formulas and stuff, I knew I'd like symbolic logic. It's just like math, which I love.
6. I love washing dishes like I love cleaning the bathroom.
- ▲ 7. Driving fast is playing with fire.
8. Too much sun will make your face leathery. I suppose it will have that effect on your hands, too.
9. Here, use that screwdriver like a chisel. Just give it a good whack with the hammer.
- ▲ 10. She's no good at tennis. No way she's good at racquetball.
11. "Religion . . . is the opium of the people. To abolish religion as the illusory happiness of the people is to demand their real happiness."
—Karl Marx
12. "Publishing is to thinking as the maternity ward is to the first kiss."
—Friedrich von Schlegel
13. "A book is like a mirror. If an ape looks in, a saint won't look out."
—Ludwig Wittgenstein
14. Historically, the market goes up when the employment situation worsens and goes down when it gets better. Right now, there is bad news on employment, and the latest statistics show unemployment is getting worse. This could be a good time to buy stocks.
15. Yamaha makes great motorcycles. I'll bet their pianos are pretty good, too.
16. "Life is a roll of toilet paper. The closer you get to the end, the faster it goes."
—Anonymous