Arguments begin by marshaling reasons and organizing them in a clear and fair way. Chapter I offers general rules for composing short arguments. Chapters II–VI discuss specific kinds of short arguments.

1. Identify premises and conclusion

The very first step in making an argument is to ask yourself what you are trying to prove. What is your conclusion? Remember that the conclusion is the statement for which you are giving reasons. The statements that give your reasons are your premises.

Consider these lines from Winston Churchill:

I am an optimist. It does not seem to be much use being anything else.

This is an argument—as well as an amusing quip—because Churchill is giving a reason to be an optimist: his premise is that "It does not seem to be much use being anything else."

Premises and conclusion are not always so obvious. Sherlock Holmes has to explain one of his deductions in "The Adventure of Silver Blaze":

A dog was kept in the stalls, and yet, though someone had been in and fetched out a horse, [the dog] had not barked….

Obviously the … visitor was someone whom the dog knew well.1

Holmes has two premises. One is explicit: the dog did not bark at the visitor. The other is a general fact that Holmes assumes we know about dogs: dogs bark at strangers. Together these premises imply that the visitor was not a stranger. It turns out that this is the key to solving the mystery.

When you are using arguments as a means of inquiry, you sometimes may start with no more than the conclusion you wish to defend. State it clearly, first of all. Maybe you want to take Churchill a step farther and

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argue that you and I should be optimists too. If so, say so explicitly. Then ask yourself what reasons you have for drawing that conclusion. What reasons can you give to prove that we should be optimists?

You could appeal to Churchill’s authority. If Churchill recommends optimism, who are we to quibble? This appeal will not get you very far, however, since equally famous people have recommended pessimism. You need to think about the question on your own. Again, what is your reason for thinking that we should be optimists?

One reason could be that optimism boosts your energy to work for success, whereas if you feel defeated in advance you may never even try. Optimists are more likely to succeed, to achieve their goals. (Maybe this is what Churchill meant as well.) If this is your premise, say so explicitly.

This book offers you a ready list of different forms of arguments that can take. Use this list to develop your premises. To defend a generalization, for instance, check Chapter II. It will remind you that you need to give a series of examples as premises, and it will tell you what sorts of examples to look for. If your conclusion requires a deductive argument like those explained in Chapter VI, the rules outlined in that chapter will tell you what types of premises you need. You may have to try several different arguments before you find one that works well.

Exercise Set 1.1: Distinguishing premises from conclusions

Objective: To give you practice distinguishing premises from conclusions in other people’s arguments.

Instructions: Rewrite each argument below, underlining the conclusion of each argument and putting brackets around each premise.

Tips for success: Distinguishing premises from conclusions is sometimes more of an art than a science. We wish people were always clear about the premises and conclusions of their argument, but that’s just not the case. Therefore, learning to distinguish premises from conclusions takes practice. As you practice, there are two strategies that you should keep in mind.

The first strategy is simply to ask yourself what the author of this argument is trying to convince you to believe. The claim that the author is trying to get you to believe is the argument’s conclusion. Then you can ask what reason the author gives to try to convince you. These will be the argument’s premises.

The second strategy for distinguishing premises from conclusions is to look for indicator words. Some words or phrases are conclusion indicators. These are words or phrases that tell you that you’re about to read or hear the conclusion of an argument. Other words or phrases are premise indicators. These tell you that you’re about to read or hear a premise. Here’s a sample of the most common conclusion and premise indicators:

<table>
<thead>
<tr>
<th>Conclusion Indicators</th>
<th>Premise Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>therefore</td>
<td>because</td>
</tr>
<tr>
<td>thus</td>
<td>since</td>
</tr>
<tr>
<td>hence</td>
<td>given that</td>
</tr>
<tr>
<td>so</td>
<td>for</td>
</tr>
<tr>
<td>consequently</td>
<td>on the grounds that</td>
</tr>
<tr>
<td>this shows that</td>
<td></td>
</tr>
</tbody>
</table>

You’ll start to notice more indicator words as you get better at analyzing arguments.

Two more pieces of advice: First, don’t rely solely on indicator words. Some arguments will not use any indicator words. Others will use indicator words in other ways. Some words, like because, since, and so, have many other uses; not every use of because indicates that you’re about to hear a premise. When in doubt, fall back on our first strategy: ask yourself whether the author is giving you a reason for the conclusion. If your answer is no, you haven’t found a premise, even if the sentence includes because or since.

Second, don’t assume that everything in a passage is either a premise or a conclusion. Not all passages contain arguments. Some passages are telling stories, describing things, giving explanations, issuing commands, making jokes, or doing other things besides giving reasons for a conclusion. Even in passages that do contain arguments, some sentences or clauses will provide background information, make side comments, and so on. Again, the key is to ask yourself, “Is this sentence stating a conclusion or giving me a reason to believe that conclusion?” If it is doing either, it’s part of an argument; if not, it’s not.
1. Racial segregation reduces some persons to the status of things. Hence, segregation is morally wrong.

Adapted from: Martin Luther King, Jr., "Letter from a Birmingham Jail," Liberation: An Independent Monthly, Jun 1963

2. While performing an autopsy on a dead sea turtle, Dr. Stacy found shrimp in the turtle's throat. Sea turtles can only catch shrimp if they are stuck in nets with the shrimp. Therefore, the dead sea turtle was probably caught in a net.


3. Most people experience no side effects from the yellow fever vaccine. People with egg allergies shouldn't get the yellow fever vaccine, though, because some part of the vaccine is grown inside eggs.

Adapted from: Division of Vector Borne Infectious Diseases, "Vaccine | CDC Yellow Fever," Centers for Disease Control and Prevention. http://www.cdc.gov/ncezid/dvbid/YellowFever/vaccine/

4. There are two ways of settling a dispute: by discussion and by physical force. Since the first way is appropriate for human beings and the second way appropriate for animals, we must resort to force only when we cannot settle matters by discussion.

Adapted from: Cicero, De Officiis 11

5. Positron-emission tomography, better known as PET, is a method for examining a person's brain. Before undergoing PET, the patient inhales a gas containing radioactive molecules. The molecules are not dangerous for the patient because they break down within a few minutes, before they can do any damage.


6. The head of the spy ring is very dangerous. He is also exceptionally clever and a master of disguise. He has a dozen names and a hundred different appearances. But there is one thing he cannot disguise: he is missing the tip of his little finger. So, if you ever meet a man who is missing the top joint of his little finger, you should be very careful!

Adapted from: The 39 Steps, directed by Alfred Hitchcock (London: Gaumont British, 1935)

7. Some people buy college degrees on the Internet because they're trying to pretend that they went to college. That's a waste of money, since it's easy to make a college degree on your computer, and a degree that you make yourself is just as good as a degree that you bought on the Internet.


8. People are created equal and endowed with unalienable rights. Governments exist to protect those rights. When a government violates those rights, people have a right to rebel against that government and create a new one. The king of Great Britain has repeatedly violated the rights of the American colonists. Thus, the American colonists have a right to rebel against the king of Great Britain.

Adapted from: U.S. Declaration of Independence
Rule 2: Develop your ideas in a natural order

9. It shouldn’t surprise anyone that charter schools associated with the public school system perform better than those that operate on their own. Although the public-school bureaucracy can sometimes make it hard to get things done, it also provides invaluable support and services to the charter schools that are associated with it. I don’t see why some people are intent on destroying the public-school system.


10. The only remaining question was why the man had been murdered. Was it a politically motivated crime or a private one? I thought right away that it must be a privately motivated crime. Political assassins move quickly and flee. But in this case, the murderer’s footprints are all over the room, showing that he had spent quite a while in this room.


Need more practice? Take a look at the editorials, op-eds, and letters to the editor on the Web site for your favorite newspaper. Most of these will contain arguments. Working by yourself or with a classmate, identify the premises and conclusions in those arguments.

Develop your ideas in a natural order

Short arguments are usually developed in one or two paragraphs. Put the conclusion first, followed by your reasons, or set out your premises first and draw the conclusion at the end. In any case, set out your ideas in an order that unfolds your line of thought most clearly for the reader.

Consider this short argument by Bertrand Russell:

The evils of the world are due to moral defects quite as much as to lack of intelligence. But the human race has not hitherto discovered any method of eradicating moral defects. . . .

Intelligence, on the contrary, is easily improved by methods known to every competent educator. Therefore, until some method of teaching virtue has been discovered, progress will have to be sought by improvement of intelligence rather than of morals.

Each sentence in this passage prepares the way for the next one, and then the next one steps smoothly up to bat. Russell begins by pointing out the two sources of evil in the world: “moral defects,” as he puts it, and lack of intelligence. He then claims that we do not know how to correct “moral defects,” but that we do know how to correct lack of intelligence. Therefore—notice that the word “therefore” clearly marks his conclusion—progress will have to come by improving intelligence.

Getting an argument to unfold in this smooth sort of way is a real accomplishment. It’s not easy to find just the right place for each part—and plenty of wrong places are available. Suppose Russell instead argued like this:

The evils of the world are due to moral defects quite as much as to lack of intelligence. Until some method of teaching virtue has been discovered, progress will have to be sought by improvement of intelligence rather than of morals. Intelligence is easily improved by methods known to every competent educator. The human race has not hitherto discovered any means of eradicating moral defects.

These are the same premises and conclusion, but they are in a different order, and the word “therefore” has been omitted before the conclusion. Now the argument is much harder to understand, and therefore also much less persuasive. The premises do not fit together naturally, and you have to read the passage twice just to figure out what the conclusion is. Don’t count on your readers to be so patient.

Expect to rearrange your argument several times to find the most natural order. The rules discussed in this book should help. You can use them to figure out not only what kinds of premises you need but also how to arrange them in the best order.

Rule 2: Develop your ideas in a natural order

Exercise Set 1.2: Outlining arguments in premise-and-conclusion form

Objective: To give you practice rewriting arguments in a clear, logical structure.

Instructions: Each of the following passages contains an argument. Put the premises in a natural, meaningful order, and write them out in a numbered list. Then, write the conclusion at the end of the list.

Tips for success: It's often helpful to outline arguments in premise-and-conclusion form. This involves several steps.

First, identify the premises and the conclusions, just as you did in Exercise Set 1.1.

Then, put the premises in a meaningful order—that is, an order that helps you understand how the premises connect with one another and with the conclusion. In many cases, there won't be a single best ordering. Try a few different orderings and pick the one that makes the most sense to you.

When you have settled on a meaningful order for the premises, write the premises down in a numbered list. It's helpful to make each premise a complete sentence, replacing pronouns like him or it with the names of the people or things they stand for.

Finally, write the conclusion at the end of the list. Some logicians draw a line between the premises and the conclusion, much like the line that mathematicians draw between an arithmetic problem and its answer. This line shows that the premises "add up" to the conclusion. Other logicians write therefore or include the symbol ∴ (which means therefore) before the conclusion.

Sample

Some companies are creating genetically modified animals, such as salmon, that provide more meat for consumers. If genetically modified salmon escaped into the wild, they would compete with "natural" salmon for food. Natural salmon, though, have been honed by natural selection to flourish in the wild. Genetically modified salmon are not designed to flourish in the wild. Thus, non-genetically modified salmon would outcompete genetically modified salmon if genetically modified salmon escaped into the wild.

Adapted from: "Dawn of the Frankenfish," The Economist, Jan 10, 2010

1. If genetically modified animals escaped into the wild, they would compete with "natural" salmon for food.
2. Natural salmon have been honed by natural selection to flourish in the wild.
3. Genetically modified salmon are not designed to flourish in the wild.
4. Therefore, (4) Non-genetically modified salmon would outcompete genetically modified salmon if genetically modified salmon escaped into the wild.

This argument already presents its ideas in a natural order. The only thing needed to put it into premise-and-conclusion form is to identify the premises, put them in a numbered list, and add "therefore" before the conclusion.

The first sentence in the passage is not a premise in the argument. Its purpose is to provide context for the argument, not to give a reason to accept the conclusion. We do not need to include it in our outline of the argument.

1. As a basketball player, Michael Jordan had a unique combination of grace, speed, power, and competitive desire. He had more NBA scoring titles than anyone else. He retired with the NBA's highest scoring average. Therefore, Michael Jordan is the greatest basketball player of all time.


2. Someone who can't get enough to eat clearly lives in poverty. But someone who can't afford the things that his or her society regards as necessities also lives in poverty. Wealthier societies will regard more things as necessities than poorer societies. Thus, the
Rule 2: Develop your ideas in a natural order.

"poverty line," which is the amount of money someone must have to count as "non-poor," will be higher in a wealthier society than in a poorer society.

Adapted from: David Phillips, Quality of Life: Concept, Policy, and Practice (Abingdon, UK: Routledge, 2006), 110

3. Investigators from the Bigfoot Researchers Organization have either glimpsed or heard Bigfoot on twenty-seven out of thirty Bigfoot-scouting expeditions in the United States and Canada. Dr. Krantz, one of the investigators, believes that Bigfoot is a species of primate known as a Gigantopithecus. Therefore, Bigfoot really does exist.


4. Smaller high schools are better than larger high schools since smaller high schools have been shown to have higher graduation rates and a higher proportion of students going on to college. New York City has broken a number of large high schools up into seven smaller schools.


5. In 1908, something flattened eight hundred square miles of forest in a part of Siberia called Tunguska. Theories abound about "the Tunguska event." Some people say it was a UFO. Some even say it was a tiny black hole. Recently, however, scientists discovered that a lake in the area has the shape of an impact crater that would have been created by an asteroid or comet. So, the Tunguska event was caused by an asteroid or comet.


6. There is a "generation gap" in Americans' knowledge of politics. That is to say, older people know more about politics than younger people. This is not the result of older people generally being more interested in politics than younger people. Opinion polls from the 1940s through the mid-1970s show that younger people used to be at least as well informed about politics as the older people of their time were.

Adapted from: Robert D. Putnam, Bowling Alone (New York: Simon & Schuster, 2000), 36

7. All cars should have a spear mounted on the steering wheel, aimed directly at the driver's chest. After all, we should do everything we can to encourage cautious driving. Since people behave much more cautiously when they know that their life is on the line, steering wheel–mounted spears would make people drive much more cautiously.


8. Human nature is not inherently good. Human nature consists of those human traits that are spontaneous; these things cannot be learned. Thus, if something can be learned, then it is not part of human nature. Yet, goodness is not spontaneous; people must learn how to be good.


9. It is possible for someone to wonder whether her life is meaningful even if she knows that she has enjoyed her life. This shows that a meaningful life is not the same as an enjoyable life. At the same time, someone who is alienated from her life or feels like her life is pointless, even if she is doing things that might seem worthwhile from an objective perspective, is not leading a meaningful life. This shows that a meaningful life is not the same as a life spent on objectively worthwhile projects. All of this shows that neither enjoyment nor objectively worthwhile projects, considered separately from the other, are sufficient for a meaningful life.

Rule 2: Develop your ideas in a natural order

10. Suppose that Tim learns that his grandfather had done something terrible in the 1920s, several years before the birth of Tim's mother. Suppose also that Tim has invented a time machine. While it may seem that Tim could go back in time and kill his grandfather to prevent him from doing this terrible thing, in fact, it is impossible for Tim to kill his grandfather. The past has already happened. It cannot be changed. Since Tim's grandparents had Tim's mother, who went on to have Tim, it must be the case that Tim did not kill his grandfather.

Adapted from: David Lewis, "The Paradoxes of Time Travel," American Philosophical Quarterly 13 (1976), 199-200

Need more practice? Following the steps described in the "Tips for success" section, outline the arguments from Exercise Set 1.1 in premise-and-conclusion form. Work with a friend or classmate if you want to be able to compare your work with someone else's. For even more practice, do the same thing with the arguments in the editorials, op-eds, and letters to the editor that you found on your favorite newspaper's Web site.

For a more sophisticated way to show the relationships among premises in an argument, see Appendix III: Argument Mapping (p. 262). Argument maps are especially helpful in understanding complex arguments.

Exercise Set 1.3: Analyzing visual arguments

Objective: To help you recognize short arguments in visual materials.

Instructions: Go to the companion Web site for this book. Click on the link for "Chapter II" and then on the link for "Exercise Set 1.3." You will get a list of links to images and videos. Write a premise-and-conclusion outline of the argument that you think the image or video is trying to communicate.

Tips for success: We are constantly bombarded by visual material—from billboards to artwork to online videos—that aims to persuade us of something. Sometimes the material tries to persuade us to do something or to want something. Sometimes it tries to persuade us to believe something. You can think of many of these materials as visual arguments. They don't necessarily present their premises and conclusions in words, but many of them still can be read as offering reasons in support of conclusions—that is, as arguments.

When you're thinking about a visual argument, it's entirely up to you to present the argument's ideas in a natural order. The first thing you'll need to do is determine the conclusion of the visual argument. What is the argument trying to get you to do or believe? Then you'll need to ask yourself whether the picture or video offers you reasons to believe that conclusion. If so, these will be the premises of the argument.

To identify these premises, think about what the connection is between the images that you are seeing and the conclusion that those images are meant to support. To take an extremely simple case, suppose an advertisement shows an athlete enjoying a Sprite. The conclusion of this visual argument is that you ought to drink Sprite too. What is the connection between the image of the athlete drinking Sprite and the claim that you ought to drink it? If the athlete takes a sip after a hard game or workout, perhaps the message is that Sprite is especially refreshing. In that case, the argument might be something like this: "Sprite is especially refreshing. You like refreshing drinks. Therefore, you ought to drink Sprite." Or maybe the athlete is sitting around with her friends, and they are all having a good time and drinking Sprite. In that case, the message might be that hip young adults—especially people who like this particular athlete's sport—drink Sprite and that if you want to be like these people, you should drink Sprite too.

Different people are likely to come up with different interpretations of each visual argument. In fact, you can probably come up with different interpretations of each one yourself. Don't worry about finding the one and only correct interpretation. Just focus on finding a plausible interpretation— one that the creator of the visual argument might recognize as the message he or she was trying to send.

The exercises for this exercise set, including a sample exercise, can be found on the companion Web site for this book.

Need more practice? Look through a recent magazine or a Web site that includes advertisements. Analyze the visual arguments offered in each of the advertisements that you encounter.
Rule 3: Start from reliable premises

Important terms: Premises, conclusions, reliable premises, unreliable premises

Critical thinking activity: Found arguments
For an out-of-class activity that gives you practice in applying Rules 1 and 2, see the “Found arguments” assignment sheet (p. 425) in Part 3.

Critical thinking activity: Creating a visual argument
For an out-of-class activity that gives you practice in dealing with visual arguments, see the “Creating a visual argument” assignment sheet (p. 427) in Part 3.

Start from reliable premises

No matter how well you argue from premises to conclusion, your conclusion will be weak if your premises are weak.

Nobody in the world today is really happy. Therefore, it seems that human beings are just not made for happiness. Why should we expect what we can never find?

The premise of this argument is the statement that nobody in the world today is really happy. Sometimes, on certain rainy afternoons or in certain moods, this may almost seem true. But ask yourself if this premise really is plausible. Is nobody in the world today really happy? Ever? At the very least, this premise needs some serious defense, and very likely it is just not true. This argument cannot show, then, that human beings are not made for happiness or that you or I should not expect to be happy.

Sometimes it is easy to start from reliable premises. You may have well-known examples at hand or reliable sources that are clearly in agreement. Other times it is harder. If you are not sure about the reliability of a premise, you may need to do some research and/or give an argument for the premise itself (see Rule 31 for more on this point). If you find you cannot argue adequately for your premise(s), then, of course, you need to try some other premise!

Exercise Set 1.4: Identifying reliable and unreliable premises

Objective: To give you practice recognizing reliable starting points for arguments.

Instructions: Rewrite the following arguments in premise-and-conclusion form, just as you did in Exercise Set 1.2. Then, state whether each premise is reliable and explain why or why not.

Tips for success: Arguments are both a way to convince others of something and a way to learn new things. A good argument leads you (and/or others) from premises that you already accept to conclusions that you (and/or they) did not previously accept. To do that, however, arguments need to start from premises that you or they already accept. Furthermore, when two or more people hold different views on a topic, they can't have a productive discussion unless they start from some kind of common ground. Therefore, an important part of learning to give good arguments is learning to recognize which premises are reliable and widely acceptable starting points. Deciding whether a starting point is reliable and acceptable in this way can be tricky, and can vary with the situation, but there are some rules of thumb that can guide your thinking.

First, widely accepted facts are usually reliable starting points. For instance, it's widely accepted that there is a wide variety of species on Earth and that these species resemble each other in various ways. Those facts can provide reliable starting points for an argument about evolution.

It's worth finding out how widely accepted your "facts" really are, though. Something that seems like common knowledge to you might be widely doubted in other social circles, other parts of the country, or other parts of the world. For instance, it is widely accepted in many parts of the world that the variety of species we see today evolved by natural selection, but there are also social circles and parts of the world where that is frequently denied. If you are addressing your argument to someone who denies what you regard as a widely accepted fact, you may need to find another starting point for your argument.

Second, premises that are supported by appropriate testimony or sources are usually reliable. For instance, if a trustworthy person tells you that she has been to Brazil and seen pink dolphins living in the Amazon River, you could count "There are pink dolphins living in the Amazon River" as a reliable premise.

There are also guidelines to help you spot unreliable premises. Premises that are widely known to be false or easily shown to be false are unreliable. (Again, though, remember that what's "widely known to be false" in one context may be generally accepted elsewhere. Remember your audience!) Other premises are unreliable not because we know that they're false but because we don't know, or can't know, whether they're true. Wild generalizations and overly vague claims fall into this category. So do controversial claims offered without support, and claims that we could not
possibly verify. Remember, though, that there's a difference between claiming that a premise is unreliable and claiming that it is false. Saying that a premise is unreliable could just mean that you don't know whether it's true.

Later rules in this book, especially the rules in Chapter IV about using sources, will give you further and more developed guidelines for finding reliable starting-points. Rule 31 will also invite you to offer additional reasons for seemingly unreliable premises, turning those premises into well-supported conclusions of their own arguments. But all of that is still to come. For now, just look at the premises before you, and use your common sense.

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Rule 3: Start from reliable premises

Computers will soon take over most human tasks. After all, Deep Blue, a computer, beat Garry Kasparov, the World Chess Champion, in 1997. And if computers can defeat the best human alive in an activity that symbolizes intelligence more than any other, then surely their supremacy in everything else we do is not far off.


(1) Deep Blue, a computer, beat the World Chess Champion in 1997.
(2) If computers can beat the best human alive in chess, then their supremacy in everything else we do is not far off.
Therefore,(3) Computers will soon take over most human tasks.

Premise (1) is reliable, since it is a widely accepted fact. (If the argument were intended for an audience that didn't know about Deep Blue's victory, the author would probably want to point to news reports about the match as a way of supporting the premise with sources.)

Premise (2), however, is unreliable. It is implausible speculation to say that a victory in chess suggests that "supremacy in everything else we do" is just around the corner. After all, chess is a very different kind of activity from most things that humans do. (Think of the differences between chess and writing a novel, cooking a meal, playing basketball, or navigating the social jungles of a school or office.)

This response takes a nuanced approach to premise (1), explaining that the premise is not only widely known, but easily verified in case anyone is uncertain about it (a sad day for chess fans everywhere.) The real problem, just as this response says, is with the reliability of premise (2).

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Sample

1. Anybody could become a zombie—a relative, a friend, or even a neighbor. Zombies are constantly looking to eat the brains of the living. This is why you should always be prepared to escape from or fight back against a zombie attack.


2. Social networking sites have revolutionized the way we interact with our friends. Such sites allow people to stay in contact with hundreds or even thousands of people. Human nature, however, prevents us from having meaningful relationships with that many people. Therefore, most of your "friends" on those sites are not people with whom you have meaningful relationships.


3. Radioactive materials are materials that decay into other materials. For instance, certain isotopes of carbon are radioactive; they decay into different isotopes of carbon. By looking at the ratios of radioactive materials to the products of radioactive decay in a piece of rock, we can estimate the age of the rock fairly well. This process is called "radiometric dating." Radiometric dating reveals that some large rock formations in the Earth's crust are up to four billion years old. Thus, the Earth itself is at least four billion years old.

   Adapted from: G. Brent Dalrymple, The Age of the Earth (Palo Alto: Stanford University Press, 1994), 399

4. There are other advanced civilizations in our galaxy. To see why this must be so, consider the following facts: There are billions of stars in our galaxy, and many of them probably have planets
Rule 3: Start from reliable premises

8. Despite what the skeptics would have you believe, many people are capable of seeing ghosts. Ghosts are real, and anyone with the psychic ability known as extrasensory perception (ESP) is capable of seeing them. ESP is a real phenomenon, according to Professor Joseph Rhine of Duke University. In fact, about half of all people have ESP, although many never realize it.

  Adapted from: Hans Holzer, Ghosts: True Encounters with the World Beyond (New York: Black Dog & Leventhal Publishers, 1997), 20

9. You should be a vegetarian. Every time you eat meat, your meal is the result of the suffering and death of an animal. Besides, it’s disgusting to put a piece of a dead animal’s carcass into your mouth and chew it. There is plenty of great vegetarian food, including tasty meat alternatives. Also, vegetarianism is healthier than eating meat. One more reason to be a vegetarian is that you’d be joining the company of a long list of incredible people, from Leonardo da Vinci, Isaac Newton, and Thomas Edison to Paul McCartney, Shania Twain, and Tobey Maguire.

  Adapted from: "Reasons to Be Vegetarian," YouTube, Jan 7, 2009, http://www.youtube.com/watch?v=c36fjzjUrWg

10. The Bureau of Justice Statistics reports that at least three hundred thousand children in the United States are forced into prostitution and other sex-trafficking crimes every year. They estimate the average age of entry into forced prostitution is twelve years old. Forcing a child to work as a prostitute is wrong. It is a travesty that eliminating child prostitution is not a bigger priority for our country.


Need more practice? Go back to the arguments presented in Exercise Sets 1.1 and 1.2 and decide which of their premises are reliable. For even more practice, go to the Web site for this book and click on the "Chapter 1" link. You’ll find a link to a list of Web sites that feature online debates. Find debates that interest you and read the arguments presented in those debates. Determine which premises are reliable and why.
Rule 4: Be concrete and concise

Be concrete and concise

Avoid abstract, vague, and general terms. "We hiked for hours in the sun" is a hundred times better than "It was an extended period of laborious exertion." Be concise too. Airy elaboration just loses everyone in a fog of words.

NO:
For those whose roles primarily involved the performance of services, as distinguished from assumption of leadership responsibilities, the main pattern seems to have been a response to the leadership's invoking obligations that were concomitants of the status of membership in the societal community and various of its segmental units. The closest modern analogy is the military service performed by an ordinary citizen, except that the leader of the Egyptian bureaucracy did not need a special emergency to invoke legitimate obligations.1

YES:
In ancient Egypt the common people were liable to be conscripted for work.

Exercise Set 1.5: Decomplexifying artificially abstruse quotations

Objective: To help you recognize and avoid overly elaborate writing.

Instructions: Each passage in this exercise consists of a famous quote that has been rewritten using overly abstract, vague, or obscure terms. Rewrite the quote in simpler language.

Tips for success: Start by reading the passage in its entirety to get a sense for the meaning of the whole passage. Then, go back over the passage phrase by phrase, trying to figure out what each phrase means. Rewrite each phrase in the simplest language you can find, deleting words or phrases that don't add to the meaning of the sentence. Don't worry about coming up with the exact wording of the original quotation. Just try to express the ideas in the passage as simply and directly as possible.

Sample

Of this relatively limited extension of one of the ambulatory limbs of this particular male of the species Homo sapiens, it might also be possible to declare that a relatively much larger extension of the reach of the human species as a whole, so to speak, is also concurrently taking place at this point in time.


this small step for a man is also a giant leap for humankind.

Neil Armstrong's original statement, which he made when he first set foot on the moon, is, "That's one small step for [a] man, one giant leap for mankind." In the "complexified" form of this quotation, the first clause ("Of this relatively limited extension of one of the ambulatory limbs of this particular male of the species Homo sapiens") corresponds to the phrase "That's one small step for [a] man," and the rest of the quotation corresponds to "one giant leap for mankind."

The sample response isn't exactly what Armstrong said, and that's okay. It says what Armstrong said in a clear, straightforward way. That's what matters.

1. I seem to have the distinct impression that my canine companion and I are no longer physically located within the geographical confines of the midwestern American state generally known as Kansas.

Adapted from: The Wizard of Oz, directed by Victor Fleming (Los Angeles: Metro-Goldwyn-Mayer, 1939)

2. Do not inquire as to what it is that your country might accomplish on your behalf, but instead inquire what actions you might take to further the interests of the country that you regard as your own.

Adapted from: John F. Kennedy, Inaugural Address, Jan 20, 1961

3. Being able to express oneself in as concise a way as possible—that is, using the fewest, plainest words with which it is feasible to
Rule 4: Be concrete and concise

communicate the essential meaning of one's thought—is at the very core of a knack for repartee.

Adapted from: William Shakespeare, Hamlet 2.2

4. Putting aside all prevarication, my most beloved one, it would be utterly impossible for me, even with great effort, to care any less than I do at this precise moment.

Adapted from: Gone with the Wind, directed by Victor Fleming (Las Angeles: Metro-Goldwyn-Mayer, 1939)

5. We must strive to exhibit in our own persons the sorts of alterations that we most fervently desire to observe in the world that we inhabit.

Adapted from: Mahandas Gandhi, quoted in John McCain & Mark Salter, Character Is Destiny (New York: Random House, 2005), 14

6. My maternal grandmother’s daughter was in the frequent habit of informing me that the period between birth and death is similar to a container of cocoa-based confections.

Adapted from: Forrest Gump, directed by Robert Zemeckis (Los Angeles: Paramount Pictures, 1994)

7. Regularly turning in for the night at a fairly early hour, combined with the practice of awakening at an hour that is earlier than the hour at which most others arise, will tend to the acquisition of such desirable personal features as good physical constitution, a comfortable financial situation, and the sort of discernment and other related intellectual abilities that conduce to earning the respect of others.

Adapted from: Benjamin Franklin, Poor Richard’s Almanack (1732; repr., New York: Skyhorse Publishing, 2007), 13

8. It has been my constant practice to rely upon the compassionate actions of people with whom I had not yet become acquainted prior to the performance of said action.

Adapted from: A Streetcar Named Desire, directed by Elia Kazan (Burbank, CA: Warner Bros, 1951)

9. A female member of the human species who finds herself without the company of a male of the species is akin to an aquatic, scale-covered vertebrate with gills and fins that has not the possession of a pedal-driven, two-wheeled vehicle that is powered by a rider sitting astride a frame to which the wheels are attached.

Adapted from: Gloria Steinem, quoted in Deborah G. Fodder, The 100 Most Influential Women of All Time (New York: Citadel Press, 2002), 258

10. I harbor an aspiration that, at some point in the future, my four offspring, who are currently fairly young, will be assessed not according to the pigmentation of their skin but by considering the character traits that they possess.

Adapted from: Martin Luther King, Jr., speech in Washington, DC, Aug 28, 1963

Need more practice? Make a list of famous quotations, well-known song lyrics, titles of famous books, etc. Have a friend or classmate do the same. Rewrite each item on the list in the overly abstract, complex style used in this exercise. Trade “complexified” lists with your friend or classmate and try to decipher the items on his or her list. For even more practice, repeat this activity with the arguments from other exercises in this book: Rewrite each premise and conclusion in an overly complex style and challenge your classmate to figure out what the argument says.

A helpful way to be concrete and concise is to define your terms carefully. For tips on giving good definitions, see Appendix II: Definitions.

Build on substance, not overtone

Offer actual reasons; don’t just play on the overtones of words.

NO:
Having so disgracefully allowed her once-proud passenger railroads to fade into obscurity, America is honor bound to restore them now!

This is supposed to be an argument for restoring (more) passenger rail service. But it offers no evidence for this conclusion whatsoever, just some emotionally loaded words—shopworn words, too, like a politician on
Exercise Set 1.6: Diagnosing loaded language

**Objective:** To train you to recognize and avoid loaded language.

**Instructions:** Look for "loaded language"—that is, emotionally charged words or phrases—in each of the following arguments. If the argument contains loaded language, indicate which words or phrases are loaded and suggest a less loaded way of saying the same thing. If the passage does not contain any loaded language, say so.

**Tips for success:** A good argument should stand on the strength of its premises and the connection between the premises and the conclusion—not on the beauty of its rhetoric or the emotional charge of the way it's presented. Learning to recognize loaded language helps you avoid being taken in by arguments that sound good but lack substance; it also helps you avoid giving arguments yourself that sound good but don't actually provide good reasons for their conclusions.

Loaded language comes in both negative and positive varieties. That is, some loaded language carries negative emotional overtones. It casts an idea, a person, or whatever in a negative light. For instance, calling bankers "corporate pirates" makes them sound bad. Other loaded language carries positive emotional overtones. For instance, calling a camp for holding prisoners of war a "pacification center" makes it sound good—almost like the kind of place you'd want to go for a relaxing vacation. Look out for both kinds of loaded language.

Some loaded language is subtle. Its emotional power may depend on the context in which it is used. For instance, the term *Ivy League school* is not necessarily emotionally charged; it refers to one of a specific group of American universities. However, imagine two politicians in a debate. If one says, "Now, I may not have gone to an Ivy League school like my opponent, but . . . .", the term *Ivy League school* suddenly has an air of elitism and privilege. It can make the politician's opponent seem out of touch with ordinary people. Look out for subtle loaded language too.

When it comes to suggesting less loaded ways of saying the same thing, look for terms that carry less—and ideally, no—emotional charge. For instance, if you're talking about doctors who perform abortions, don't call them "baby killers." A phrase like that mostly just plays on our feelings. Many people think that performing abortion and killing babies are importantly different, and so they would not accept it as a neutral description. On the other hand, you shouldn't call them "doctors who help women with medical problems" either. To people who think abortion is murder, this glosses over a tremendous moral difference between doctors who perform abortions and those who don't. Instead, just call them "doctors who perform abortions."
Rule 5: Build on substance, not overtone

Sample

Certain irresponsible American politicians have been spewing lies about the latest attempts at reform. Whether these lies come from a combination of stupidity and a hysterical imagination or from cleverness and a willingness to exploit innocent Americans for personal political gain, these lies must be exposed for the damaging falsehoods that they are.

Adapted from: Keith Olbermann, Countdown with Keith Olbermann, MSNBC, Aug 10, 2009

This argument is full of loaded language. Calling the politicians “irresponsible” makes them sound bad without yet saying what they’re doing wrong; it could be deleted without affecting the actual substance of the argument. “Spewing lies” is an emotionally evocative way of saying “making false statements.” Speculating about whether the “lies” come from “stupidity and a hysterical imagination” or “a willingness to exploit innocent Americans” makes the politicians sound dumb, unstable, or evil, but it doesn’t actually add any force to support the conclusion. Even worse, it falsely suggests that stupidity and malice are the only possible motives for these politicians’ statements. That whole clause can be cut, too. The argument could claim simply that some politicians are making false statements about the latest attempts at reform and that the falsehood of those statements should be made clear to the public.

This response identifies specific instances of loaded language. It explains how each instance is emotionally charged and recommends an alternative. In cases where the loaded language adds nothing substantive to the argument, this response rightly recommends that the loaded language be deleted.

Notice that in rephrasing Olbermann’s statement, this response arrives at a neutral statement that may still not be true. That is, his claim is that some politicians are making false statements about the latest attempts at reform. It remains to be seen if they are or are not; now we’d expect Olbermann to go on to offer some evidence. The point of identifying and neutralizing loaded language is simply to bring us to the point of recognizing the need for evidence in this relatively open-minded way rather than being so worked up over the alleged lie-spewing and irresponsibility that we don’t have the breathing room to even notice that no evidence has yet been offered.

1. Religious fanatics lost the battle on anti-gay discrimination in the military. This isn’t the end of their dangerous influence, though. Now that they’ve seen that their hate mongering against homosexuals isn’t going to win elections, they may just step up their fearmongering against other groups.


2. Of course I’m going to beat Henry Cooper! He’s nothing! He’s a tramp! He’s a bum! I’ll knock him out in five rounds—no, three!


3. The dirty little secret behind factory farms’ profits—namely, that there’s no good reason for their monstrously cruel mistreatment of animals—is getting out. Since morally decent people abhor senseless animal cruelty, people everywhere are turning against factory farms.


4. If you are trying to lose weight, it’s important that you not skip meals. If you skip meals, you’re likely to experience hunger and food cravings later, making it harder for you to stick to your diet. Instead of skipping meals to control your calorie intake, eat appropriately sized meals on a regular basis.


5. We can all agree that the defendant bought the murder weapon earlier that night. The pawn shop owner saw him buy it, and his friends saw him carrying it. So how does that switchblade end up in the old man’s chest if the boy didn’t kill him? Remember that imaginative little fable that the boy told? He claims that the knife fell through a hole in his pocket on his way to the movie theater. You don’t really believe that, do you? The boy’s a murderer, plain and simple.

Adapted from: 12 Angry Men, directed by Sidney Lumet (Los Angeles: United Artists, 1957)
Rule 6: Use consistent terms

Short arguments normally have a single theme or thread. They carry one idea through several steps. Therefore, couch that idea in clear and carefully chosen terms, and mark each new step by using those very same terms again.

NO:
When you learn about other cultures, you start to realize the variety of human customs. This new understanding of the diversity of social practices may give you a new appreciation of other ways of life. Therefore, studying anthropology tends to make you more tolerant.

YES:
When you learn about other cultures, you start to realize the variety of human customs. When you start to realize the variety of human customs, you tend to become more tolerant. Therefore, when you learn about other cultures, you tend to become more tolerant.

The “Yes” version might not be stylish, but it is crystal clear, whereas the “No” version hardly seems like the same argument. One simple feature makes the difference: the “Yes” argument repeats its key terms, while the “No” version uses a new phrase for each key idea every time the idea recurs. For example, “learning about other cultures” is redescribed in the “No” version’s conclusion as “studying anthropology.” The result is that the connection between premises and conclusion is lost in the underbrush. It’s interesting underbrush, maybe, but you are still liable to get stuck in it.

Re-using the same key phrases can feel repetitive, of course, so you may be tempted to reach for your thesaurus. Don’t go there! The logic depends on clear connections between premises and between premises and conclusion. It remains essential to use a consistent term for each idea. If you are concerned about style—as sometimes you should be, of course—then go for the tightest argument, not the most flowery.
MOST CONCISE:
When you learn about other cultures, you start to realize the variety of human customs, a realization that in turn tends to make you more tolerant.

You can talk about studying anthropology and the like, if you wish, as you explain each premise in turn.

Be sure, of course, to use your terms in the same sense: it may be misleading or confusing to switch their meanings mid-stream! (See the fallacy of equivocation in Appendix I.)

CHAPTER EXERCISES

Exercise Set 1.7: Evaluating letters to the editor

Objective: To give you practice applying Rules 1-6.

Instructions: The following arguments are adapted from letters to the editor in various newspapers and magazines. State how well each argument follows each of the rules presented in this chapter.

Tips for success: For each argument, proceed through this chapter’s rules systematically. Think of each rule as asking a question about the argument. Does the argument make clear what the conclusion of the argument is (Rule 1)? Does it present ideas in a natural order (Rule 2)? Are the premises reliable (Rule 3)? Could the argument be clearer or more concise (Rule 4)? If so, which words or expressions are unclear? What might the author have said instead? Does the argument use loaded language (Rule 5)? If so, which words or expressions are loaded? Can you suggest a more neutral substitute? Does the author confuse the argument by using more than one term for the same idea (Rule 6)? If so, identify the inconsistent terminology and suggest one term that the author might use throughout the argument.

Be as specific as possible in explaining the ways in which the argument does or does not follow each rule. If you think some of the premises are unreliable, say which premises those are. Explain why those premises are unreliable. If the argument is unclear or wordy, say which words or expressions could be improved. If the argument uses loaded language, say which terms are loaded and briefly explain why they’re loaded. You might even suggest a more neutral substitute. Likewise, if the author would be better off sticking to a single, consistent term for some idea, point out exactly what terms he or she uses and suggest the best one to use.

Sample

Training poor farmers in developing countries how to use organic farming practices is an effective way to fight poverty. One organization, Harambee-Kenya, has trained hundreds of farmers to use natural farming methods, such as drip irrigation using buckets. These farmers have gone from food shortages to food security and even food surpluses. Some are using the cash they earn by selling their excess agricultural output to finance their children’s medical and educational expenses.


This letter does a good job with Rule 1: The conclusion of the argument is clearly stated in the first sentence. The letter then presents the premises in a natural, understandable order (Rule 2). The premises are not yet known to be reliable, though (Rule 3). It would be better if the author cited a source where we could verify her claims about the success of Harambee-Kenya’s program, since that is not part of most Americans’ experience (and her audience consists of Americans). Most of the letter does a good job with Rule 4, although the last sentence could be simplified to something like: “Some are using the cash they earn by selling their extra food to pay for their children’s medical and school fees.” The letter does not use loaded language (Rule 5). It has a few problems following Rule 6: it uses “organic” in the first sentence and “natural” in the second, and it uses “fight poverty” in the first sentence but much more elaborate phrases and ideas in the last two.

Notice that this response addresses each rule. It also justifies most of its claims about how well the argument follows each rule. For example, instead of just saying, “The argument does not follow Rule 3,” it explains why the premises are not reliable. Furthermore, it offers a nuanced evaluation with respect to various rules. For instance, instance of saying, “The argument does not follow Rule 4,” this response acknowledges that the argument follows Rule 4 for the most part, but points out a specific sentence that could be more concrete and concise.
1. Outlaw drug dealers don't check to see how old their customers are. They don't care. Licensed dealers would check to make sure that buyers weren't underage. If marijuana were legalized, it would be sold mainly by licensed dealers. Thus, legalizing marijuana would actually make it harder for teenagers to get drugs.


2. The conquest of England by French-speaking Normans in 1066 completely transformed the English language. Consider Beowulf, written before the conquest, and Chaucer's The Canterbury Tales, written a few centuries after the conquest. Well-educated modern English speakers could understand The Canterbury Tales without too much difficulty, but they probably couldn't understand a single line of Beowulf, which was written in Old English.

Adapted from: Robert Helm, letter to the editor, The Economist, Jun 10, 2010

3. Politicians today are in love with 30-second sound bites. They run screaming from anything requiring thoughtful, intelligent, or honest discussion. We ought to be ashamed of the level of discourse in our politics. Instead of actual debate, we get nothing but innuendo and idiocy.

Adapted from: Margaret LeRoy, letter to the editor, USA Today, Oct 31, 2010

4. Science, technology, engineering, and math education in the United States is in a crisis. Incorporating engineering into the curriculum can improve learning outcomes in technical fields: Engineering makes abstract lessons about science and math more engaging. Including engineering activities also helps improve students' imaginations.


5. It usually takes at least 25 years for important scientific discoveries to translate into big changes in health care. This was the case for vaccinations, antibiotics, open-heart surgery, chemotherapy, and organ transplants. Thus, it's no surprise that the Human Genome Project, which cataloged human DNA, did not immediately result in the incredible medical advances predicted by a few overly enthusiastic scientists.


6. Media coverage about youth suicides usually misses the point when it comes to the real cause of suicide. The media emphasizes stress; cold, dark winters; and academic or social challenges. But most people who face those problems don't kill themselves. The real cause of suicide is mental illness. That's what makes the difference between the people who respond to those stresses by attempting suicide and those who don't. To prevent suicide, society needs to provide better access to mental health services and reduce the stigma around the use of those services. Young people are our future. When we fail to maximize their success, let alone their chances of survival, we fail ourselves and our country.


7. Fight for your local library! Local libraries provide the public with free, equitable access to information. When you need a book for your child's school report or want to learn how to plant a garden, train a pet, or repair a dryer, the library has the information you need—and librarians to help you find it. Furthermore, libraries encourage people to read and learn for pleasure. There are limits to what you can get on the Internet.


8. Western countries claim to value justice, democracy, and egalitarianism. Yet, the United Nations Security Council's permanent
members—Britain, the United States, Russia, China, and France—have a veto over any matter before the Council. This gives each of those countries the power to overrule international consensus on important matters. That is neither just, democratic, nor egalitarian. It is only right, then, that the Security Council be reformed so that no country holds veto power.


9. A misplaced emphasis on sports in schools is a disservice to the young students who spend more time on athletics than academics. Some schools have an out-of-control sports culture. Many school administrators and coaches blantly disregard academic eligibility requirements in order to put star athletes on the field. For the good of the students themselves, school administrators need to take academic eligibility requirements seriously.


10. Some people insist that there are no well-documented instances of genuine UFO sightings or alien encounters. What these people overlook is the fact that publications that document such sightings and encounters are routinely suppressed by mainstream society. In Manhattan, the vast majority of bookstores and magazine stands refuse to stock the books and periodicals that detail sightings and encounters. Those books and periodicals are not cataloged in any of the standard reference sources. If people dig deep enough, though, they will find that publications like *UFO, UFO Universe, Fortean Times,* and *Perceptions* do document genuine UFO sightings and alien encounters.


**Need more practice?** Working with a friend or classmate, find the letters to the editor in your favorite magazine or newspaper. For each letter, decide whether the letter contains an argument. If so, evaluate how well the letter follows the rules from this chapter. Then, compare your evaluation with your friend’s or classmate’s. If you disagree about how well a letter follows any of the rules, see if you can come to an agreement by explaining how the letter does or does not follow the rule.

**Critical thinking activity: Writing a letter to the editor**

For an out-of-class activity that gives you practice in constructing arguments of your own, see the “Writing a letter to the editor” assignment sheet (p. 426) in Part 3.
Chapter II
Generalizations

Some arguments offer one or more examples in support of a generalization.

Women in earlier times were married very young. Shakespeare's Romeo and Juliet was not even fourteen years old. In the Middle Ages, thirteen was the normal age of marriage for a Jewish woman. And during the Roman Empire, many Roman women were married at age thirteen or younger.

This argument generalizes from three examples—Juliet, Jewish women in the Middle Ages, and Roman women during the Roman Empire—to "many" or "most" women in earlier times. To show the form of this argument most clearly, we can list the premises separately, with the conclusion on the "bottom line":

Juliet in Shakespeare's play was not even fourteen years old.

Jewish women during the Middle Ages were normally married at thirteen.

Many Roman women during the Roman Empire were married at age thirteen or younger.

Therefore, women in earlier times were married very young.

It is helpful to write short arguments in this way when we need to see exactly how they work.

When do premises like these adequately support a generalization?

One requirement, of course, is that the examples be accurate. Remember Rule 3: start from reliable premises! If Juliet wasn't around fourteen, or if most Roman or Jewish women weren't married at thirteen or younger, then the argument is much weaker. If none of the premises can be supported, there is no argument at all. To check an argument's examples, or to find good examples for your own arguments, you may need to do some research.

But suppose the examples are accurate. Even then, generalizing from them is a tricky business. The rules in this chapter offer a short checklist for assessing arguments by example.

Rule 7: Use more than one example

A single example can sometimes be used for the sake of illustration. The example of Juliet alone might illustrate early marriage. But a single example offers next to no support for a generalization. Juliet alone may just be an exception. One spectacularly miserable billionaire does not prove that rich people in general are unhappy. More than one example is needed.

NO:
French fries are unhealthy (high in fat).

Therefore, all fast foods are unhealthy.

YES:
French fries are unhealthy (high in fat).

Milkshakes are unhealthy (high in fat and sugar).

Deep-fried chicken and cheeseburgers are unhealthy (high in fat).

Therefore, all fast foods are unhealthy.

The "Yes" version may still be weak (Rule 11 returns to it), but it certainly gives you more to chew on, so to speak, than the "No" version.

In a generalization about a small set of things, the strongest argument should consider all, or at least many, of the examples. A generalization about your siblings should consider each of them in turn, for instance, and a generalization about all the planets in the solar system can do the same.

Generalizations about larger sets of things require picking out a sample. We certainly cannot list all women in earlier times who married young. Instead, our argument must offer a few women as examples of the rest.

How many examples are required depends partly on how representative they are, a point the next rule takes up. It also depends partly on the size of the set being generalized about. Large sets usually require more examples.

The claim that your town is full of remarkable people requires more evidence than the claim that, say, your friends are remarkable people. Depending on how many friends you have, even just two or three examples might be enough to establish that your friends are remarkable people; but, unless your town is tiny, many more examples are required to show that your town is full of remarkable people.

Exercise Set 2.1: Finding relevant examples

Objective: To give you practice finding relevant appropriate examples to support a generalization.
Rule 7: Use more than one example

**Instructions:** Find two to three relevant examples to support each of the following generalizations. You may have to do a little research to find good examples in some cases.

**Tips for success:** A generalization is a claim about some or all things of a certain type. When thinking about generalizations, it’s helpful to ask yourself two questions: First, what type of thing is the generalization about? Second, what does the generalization say about the things of that type?

Consider the fast-food example above. What type of thing is it about? It’s about fast-food products. What does it say about the members of that group? It says that they’re all unhealthy.

To give good examples in support of a generalization, you need to be sure that your examples are the right type of thing. If you want to support the generalization that fast foods are unhealthy, you need to give examples of things that are both fast foods and unhealthy.

Some generalizations are negative—not because they say something about a type of thing, but because they say that few or no things of that type are a certain way. For instance, consider the generalization “No mammals can breathe underwater.” What type of thing is this generalization about? Mammals. What does it say about mammals? It says that none of them can breathe underwater. To give examples for this generalization, you’ll need to find things that are mammals and are not able to breathe underwater.

Not all generalizations are expressed as clearly as the ones we’ve considered so far. You will sometimes need to think carefully about what a generalization means before looking for examples.

**Sample**

Lots of professional sports teams are named after animals.

The Chicago Bulls, the Florida Marlins, and the Philadelphia Eagles are professional sports teams that are named after animals.

To verify that these examples are appropriate, create a “mental checklist” of requirements for good examples. An example that supports this generalization must (a) be a professional sports team and (b) be named after an animal. Compare each example against your “mental checklist” of requirements. Is each example a professional sports team (as opposed to, say, a college sports team)? Is each example named after an animal? If the answer to both

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**Rule 7: Use more than one example**

1. Some birds can swim.
2. Some billionaires are college dropouts.
3. Everyone who walked on the moon in the twentieth century was American.
4. Politicians are liars.
5. Every planet in our solar system has multiple moons.
6. Most of the shows on television right now are not worth watching.
7. Developed, democratic countries no longer practice capital punishment.
8. William Shakespeare wrote many tragedies.
9. England has produced famous musicians.
10. The world’s most populous countries are in Asia.

**Need more practice?** Working with a friend or classmate, create a list of generalizations. Then, go down your list and try to identify at least three examples for each generalization.
Use representative examples

Even a large number of examples may still misrepresent the set being generalized about. A large number of ancient Roman women, for instance, might establish very little about women generally, since ancient Roman women are not necessarily representative of other women. The argument needs to consider women from other early times and from other parts of the world as well.

Everyone in my neighborhood favors McGraw for president.

Therefore, McGraw is sure to win.

This argument is weak because single neighborhoods seldom represent the voting population as a whole. A well-to-do neighborhood may favor a candidate who is unpopular with everyone else. Student wards in university towns regularly are carried by candidates who do poorly elsewhere. Besides, we seldom have good evidence even about neighborhood views. The set of people eager to display their political preferences to the world is probably not a representative cross-section of the neighborhood as a whole.

A good argument that “McGraw is sure to win” requires a representative sample of the entire voting population. It is not easy to construct such a sample. Public opinion polls, for instance, construct their samples very carefully. They learned the hard way. The classic example is a 1936 poll conducted by the Literary Digest to predict the outcome of the presidential contest between Roosevelt and Landon. Names were taken, as they are now, from telephone listings, and also from automobile registration lists. The number of people balloted was certainly not too small: more than two million “ballots” were counted. The poll predicted a wide victory for Landon. In the event, though, Roosevelt won easily. In retrospect it is easy to see what went wrong. In 1936, only a select portion of the population owned telephones and cars. The sample was sharply biased toward wealthy and urban voters, more of whom supported Landon.

Polls have improved since then. Nonetheless, there are still worries about representativeness of their samples, and they still regularly forecast elections wrong. For example, these days most of my students don’t have landlines at all—only cell phones with unlisted numbers. The pollsters aren’t calling them. Phone polls may actually be getting less representative again.

It is often an open question, then, just how representative a given sample may be. Anticipate this danger! Do some research. Juliet, for example, is just one woman. Is she representative of women in her time and place?

In Shakespeare’s play, Juliet’s mother says to her:

Think of marriage now; younger than you,
Here in Verona, ladies of esteem,

Rule 8: Use representative examples

Exercise Set 2.2: Improving biased samples

Objective: To train you to recognize sources of sample bias in order to avoid unrepresentative examples.

Instructions: Each of the following arguments uses an unrepresentative set of examples. Suggest specific ways to improve each argument by changing the way examples are chosen. Explain why those changes would make the argument’s examples more representative.

Tips for success: Many generalizations are about diverse groups. Consider, for instance, an opinion poll showing that Europeans disapprove of capital punishment. Europeans are a diverse group of people. No single individual is representative of all Europeans. To find representative examples, then, we need to look for a group of people that is, on the whole, representative of all Europeans. That is, we need to select examples so that our group has the same characteristics as the group of all Europeans—the same proportion of men to women, of college-educated people to non-college-educated people, of native-born to immigrants, of wealthy people to poor people, etc. A group of examples is called a sample. The implication of Rule 8, then, is that you want your sample to be representative of the group that you are making a generalization about. A sample that misrepresents the group is called a biased sample.

This passage suggests that Juliet’s marriage at fourteen is not exceptional; in fact, fourteen seems to be a little on the old side.

In general, look for the most accurate cross-section you can find of the population being generalized about. If you want to know what students think about some subject at your university, don’t just ask the people you know or generalize from what you hear in class. Unless you know quite a range of people and take quite a range of classes, your personal “sample” is not likely to mirror the whole student body. Similarly, if you want to know what people in other countries think about the United States, don’t just ask tourists—for of course they are the ones who chose to come here. A careful look at a range of foreign media will give you a much more representative picture.
Rule 8: Use representative examples

How can we ensure that our sample is unbiased? The simplest answer is that we want our sample to be a random sample. A random sample of a particular group—say, Europeans—is a sample in which every member of the group has an equal chance of being included in the sample.

Collecting a random sample is not the same as choosing examples haphazardly or without a plan. Constructing a random sample is actually very difficult. Two rules of thumb can help you avoid the most common mistakes. You’ll want to think about these rules of thumb in offering advice about the arguments in this exercise.

First, be sure that you are sampling from the entire group that you’re making a generalization about. For instance, if you’re generalizing about all North American college students, you need to be sure that students from a wide range of colleges have a proportionate probability of being included in your sample. Don’t overlook students from public and private colleges, large and small colleges, and colleges in various regions of North America, etc. You also need to be sure that all kinds of students have an proportionate chance of being in your sample—men and women, students who live in dorms and students who commute to campus, premeds and theater majors, eighteen-year-olds who came straight from high school and fifty-year-olds who are going back for a second degree, etc.

Furthermore, Rule 8 requires choosing your examples in ways that ensure a truly proportionate sample. If you select students at random from the college’s email directory, you’ll miss students who don’t use their college email address. If you contact students who are on campus during the day, you’ll miss students who only take evening classes. When you design your methods for choosing and contacting members of the group, think carefully about whether your methods overlook, or under- or over-represent, any part of the group. Try to ensure that each member of the group has an equal chance of being in the sample.

If you can only sample a specific group of college students, it’s best to change your generalization. For instance, if you can only manage to sample students at your school, then instead of making a claim about all North American college students, make a claim about college students at your school.

Second, don’t let individual members of the group decide for themselves whether they want to be in the sample. For instance, if you work for a magazine and you want to know what your readers thought about last week’s issue, track down a random sample of readers and ask them what they thought. Don’t just put an ad in the next issue inviting readers to submit their opinions. It’s true that all readers are invited to join the sample, but only the ones with strong opinions will actually bother to write to you. Quite likely their views will not represent the views of your readership as a whole. Instead, choose a random sample of your readers and do everything you can to get each one of your chosen readers to respond to your survey.

Sample

In 2002, students at the University of North Carolina turned up their nose at jobs at Newell Rubbermaid. The manufacturer of rubber gloves wasn’t cool enough to warrant their attention, and students had enough job offers to go elsewhere. In 2003, though, the few UNC students who landed jobs at Newell were widely regarded as the lucky ones. At least they had jobs! It seems that students unlucky enough to find themselves in the Class of 2001 faced an unusually harsh job market.


The argument could be improved by including students from colleges all over the country, as well as including more students from UNC. The conclusion is supposed to be about all Americans in the Class of 2002, but the sample consists only of UNC students—and actually only of UNC students who might want a job with one particular manufacturer. For example, including students from other colleges and including students who want other kinds of jobs, as well as those who aren’t looking for jobs right away, would give everyone who’s graduating in 2002 a chance to be in the sample.

This response does three things. First, it offers specific suggestions about how to improve the argument: include students from colleges all over the country, as well as students who want jobs outside the manufacturing sector or aren’t looking for jobs right away. Second, it explains why the sample in the argument is biased: it consists of only UNC students who might want a job in a manufacturing firm. Third, it explains how the proposed change would improve the argument: it would give everyone in the Class of 2003 a chance to be in the sample.

1. I’ve been looking at prices of homes for sale in my neighborhood, charting with local real estate agents, and reading the occasional article on home values in my local paper. All signs here point to a decline of about 10 percent in the value of real estate. I guess the nation’s real estate problems really are as bad as they say!

Rule 8: Use representative examples

2. Not all doctors are rolling in money. By the time they finish their education, most would-be doctors are buried under a mountain of debt. At Michigan State University’s medical school, average student debt at graduation is $160,937. That kind of debt discourages students from going into much-needed but lower-paying medical careers, including primary care.


3. The University of St. Andrews in Scotland now has over twelve hundred Americans among its roughly seven thousand students. That’s up from about two hundred American students a decade earlier. The University of Edinburgh, also in Scotland, enrolls about the same number of Americans as St. Andrews. Trinity College and the University of Limerick, both in Ireland, are also attracting more American students. The students cite lots of reasons for going—to see a different part of the world, to experience a different educational system, and to avoid the hefty price tags at top-notch private universities at home. Whatever the students’ reasons, though, foreign universities are enrolling more and more American students.


4. Women have long been underrepresented and underfunded in the sciences and mathematics. In recent years, though, women have made significant and visible progress in academia. At MIT, female scientists’ salaries and lab spaces are now equal to those of their male colleagues. Female scientists now head MIT, the University of Michigan, Princeton University, and four campuses of the University of California.


5. It’s not easy to make it big in the music business. According to Nielsen SoundScan, there were 97,751 albums released in 2009.

6. Each package of Nestle Foods’ new line of high-quality, freeze-dried soup products contained a postage-paid survey form. The package encouraged customers to complete the survey and mail it back to Nestle Foods. Over ten thousand survey responses flooded the Nestle offices, and they were all extremely positive. Everybody loved it! Nestle had hit upon a winning product line.

Adapted from: Anthony G. Bennett, The Big Book of Marketing (Columbus, OH: McGraw-Hill), 102

7. Most Americans don’t have a problem with full-body scans at security check points in airports. Fewer than 1 percent of travelers at the Las Vegas Airport opt out of the full-body scan. Most of the travelers interviewed about the scanners there say that their safety is more important than their privacy.


8. There are over 450 species of sharks—for now, at least. Sharks have been subjected to serious overfishing, both for food and for the use of their cartilage, which allegedly has therapeutic powers. Beyond overfishing, the shark population is threatened by human encroachment on the mangroves that serve as nurseries for baby sharks. Great white sharks, hammerheads, and oceanic whitetip sharks, to name just a few, have seen population declines of 90 percent or more in the last few decades alone. Clearly, the word “biodiversity” has become nothing but a joke, and people don’t really care about endangered species at all.


Of those, just over 2 percent sold more than five thousand copies—and only twelve sold more than a million. That leaves over ninety-five thousand albums selling less than five thousand copies apiece.

Rule 9: Background rates may be crucial

9. The American justice system is so dysfunctional that it puts lots of people behind bars for crimes they didn’t commit. The Innocence Project at Cardozo Law School uses DNA testing to investigate the cases of people who were convicted of serious crimes prior to the widespread use of DNA evidence. In the first decade of its existence, the project exonerated nearly two-thirds of the inmates whose cases they investigated. That’s over one hundred people wrongly convicted of serious crimes!

Adapted from: Donald E. Campbell, Incentives, 2nd ed. (Cambridge: Cambridge University Press, 2003), 14

10. Over seven hundred scientists from around the world have gone to dissentfromdarwin.org to register their skepticism about the theory of evolution. These scientists include members of the national academies of science in their home countries and faculty from prestigious institutions in a range of scientific disciplines. Thus, many scientists are skeptical about the theory of evolution.

Adapted from: "Ranks of Scientists Doubting Darwin’s Theory on the Rise," Discovery Institute, Feb 8, 2007, http://www.discovery.org/a/2732

Need more practice? Work with one or more classmates. Have each person create hypothetical scenarios in which someone tries unsuccessfully to create a representative sample to support a particular conclusion. Make them amusing too—mistakes in reasoning often are! These scenarios should take the form, "Suppose that someone tried to prove that all cars are made in America by driving around Detroit counting the different makes of cars"—or more generally, "Suppose that someone tried to prove Y by doing X to find examples." (Be sure that X is a generalization and that Y is a faulty method for finding a representative sample.) Then, trade scenarios with your classmates and suggest improvements to the methods for finding representative samples.

Background rates may be crucial

To persuade you that I am a first-rate archer, it is not enough to show you a bull’s-eye I have made. You should ask (politely, to be sure), "Yes, but how many times did you miss?" Getting a bull’s-eye in one shot tells quite a different story than getting a bull’s-eye in, say, a thousand, even though in both cases I genuinely do have a bull’s-eye to my name. You need a little more data.

Exercise Set 2.3: Identifying relevant background rates

Objective: To give you practice identifying relevant background rates when dealing with generalizations and statistics.

Instructions: Each of the following arguments jumps to a conclusion on the basis of dramatic statistics or a few vivid examples. In order to justify each conclusion, you would need to know more about relevant background rates. State what additional information you would need to know...
Rule 9: Background rates may be crucial

to calculate the relevant background rates. (This will require you to figure out which background rates are relevant.)

Tips for success: Arguments from a few vivid examples work because we naturally tend to pay more attention to dramatic and vivid events or examples than to the relatively boring "background" where nothing happens, like horoscopes that didn't work out or ships and planes that didn't disappear in the Bermuda Triangle. But non-events or non-examples are actually just as important as examples in evaluating the generalization we might make from them. That is what the occurrence rate tells you: how significant the examples really are against the relevant background.

When dealing with an argument for a generalization, think about which background rates are relevant for deciding how well the particular examples or statistics in the argument support the argument's conclusion. In the Bermuda Triangle example above, for instance, the relevant rate is the rate at which planes disappear in the Bermuda Triangle. Likewise, if someone argues that a particular diet plan works well because a dozen famous models follow it, the relevant rate is the percentage of people on this diet plan—models or not—who lose weight. (In both cases, we also need to know another rate to evaluate the argument: the rate at which planes disappear in the rest of the world and the percentage of people on any diet plan—and on none—who lose weight.)

Once you know what rate you're looking for, ask yourself what further information you would need to calculate that rate. In the Bermuda Triangle example, you would need to know how many planes pass through that area. In the diet example, you would need to know (roughly) how many people are on this diet plan and how many of them have lost weight. Often, this information is the information you would be looking for if you responded to an argument for a generalization with the snide, but still appropriate, comment, "Oh, yeah—out of how many?"

Sometimes background rates matter in a more subtle way. Consider this little puzzle:

Tanya is a talented card player with the most impassive poker face you've ever seen. Which is she more likely to be: a high school teacher or a professional poker player?

Tanya sounds a great deal like a professional poker player, and since this doesn't appear to be an argument by generalization, you might not think to consider background rates. If you do consider background rates, though, you'll realize that there are a very large number of high school teachers—many of whom could be excellent poker players—and almost no professional poker players at all. Thus, regardless of Tanya's penchant for poker

and the impassiveness of her face, she's much more likely to be a high school teacher.

The lesson here is to think about background rates even when the argument does not obviously invoke any generalizations.

Sample

In a recent experiment, some students used a studying technique called "retrieval practice essays." After reading a passage, the students wrote down what they remembered from it, without the passage in front of them. A week later, these students answered two out of three questions about the passage correctly. Therefore, writing retrieval practice essays is a good way to study.


We need to know how well students did if they studied using different techniques—or even if they didn't study at all. That is, we need to know the proportion of questions that students get right if they used other forms of studying besides the "retrieval practice essay."

You might think that this argument gives the only background rate that you need. However, in claiming that retrieval practice essays are a good way to study, the argument is implicitly comparing retrieval practice essays to other forms of studying. So, we need to be able to compare the rates for the various alternatives, including the rate for students who don't study at all.

1. In the second half of 2010, the University of Western Ontario did not have a single car stolen on campus. The campus police must be doing an outstanding job protecting the university.


2. Women are vastly underrepresented in the 111th U.S. Congress, just as they were in all previous Congresses. The Senate has only seventeen women, while the House of Representatives has seventy-two women.

Rule 9: Background rates may be crucial

3. Being highly paid goes hand in hand with loving your job. Across a range of professions, two out of three highly paid professionals say they love their job. This figure goes up to 75 percent for highly paid top executives in multinational corporations.


4. Three out of four sisters in the Ramsay family have struggled with anorexia. Their mother also had problems with anorexia when she was younger. Anorexia must run in families.


5. Jennifer's financial troubles began when she lost her job. After ordering supplies online to perform some hoodoo rituals, her financial situation has turned around. Tammie and Angela have similar stories: When they fell on hard times, they turned to hoodoo rituals and found their financial problems disappearing. Therefore, people in financial trouble who perform hoodoo rituals are likely to recover from their financial problems.


6. The New York Yankees have won the World Series twenty-seven times. The opposing team in this year's American League championship has never even been to the World Series. The opposing team should be intimidated by how much better the Yankees' track record is with respect to the World Series.


7. New York's "Take 5" lotto game sells one hundred thousand winning tickets every single day. Therefore, buying a "Take 5" ticket gives you a good shot at winning too.

Adapted from: "NY Lotto Commercial Takes 5," YouTube, Feb 2, 2008, http://www.youtube.com/watch?v=7NMaHRH2YQk

8. Digital downloads and rampant piracy have greatly reduced the record labels' main source of revenue: album sales. The best selling CD in 2007, for instance, sold only 3.7 million copies, according to Nielsen SoundScan.


9. Pennsylvania changed its motorcycle helmet law in 2003, making it legal for most adult riders to decide for themselves whether to wear a helmet. The results have been catastrophic. By 2006, trauma center admissions rates for motorcycle-related head injuries soared 33 percent, including an 11 percent increase in deaths. Clearly, motorcyclists who choose not to wear helmets are foolishly exposing themselves to significant risks.


10. David Arroyo's shooting spree in Tyler, Texas, left two people dead and wounded four others. Among the wounded were Arroyo's son and several police officers. Among the dead were Arroyo's ex-wife and a bystander, Mark Wilson, whose heroism prevented Arroyo's rampage from becoming an even bigger tragedy. Wilson, who owns a handgun, heard Arroyo's shots from his nearby apartment. He ran outside and started shooting at Arroyo, who was about to kill another victim. Arroyo turned to face Wilson instead. While the ensuing gun battle left Wilson fatally wounded, it bought enough time for more police to arrive. Those police officers managed to take Arroyo down. The lesson here is that if more law-abiding citizens carried guns, more deaths could be averted.


Need more practice? Make a list of ten stereotypes. These could be stereotypes about types of people (e.g., scientists or musicians), types of events (e.g., baseball games, political elections, royal weddings), etc. Give one or two examples from real life or fiction that support the stereotype. Then ask yourself what background rate(s) you would need to know to determine whether the stereotype is true and what information you would need to calculate the relevant background rate(s).
Rule 10: Statistics need a critical eye

Statistics need a critical eye

Some people see numbers—any numbers—in an argument and conclude from that fact alone that it must be a good argument. Statistics seem to have an aura of authority and definitiveness (and did you know that 88 percent of doctors agree?). In fact, though, numbers take as much critical thinking as any other kind of evidence. Don’t turn off your brain!

After an era when some athletic powerhouse universities were accused of exploiting student athletes, leaving them to flunk out once their eligibility expired, college athletes are now graduating at higher rates. Many schools are now graduating more than 50 percent of their athletes.

Fifty percent, eh? Pretty impressive! But this figure, at first so persuasive, does not really do the job it claims to do.

First, though “many” schools graduate more than 50 percent of their athletes, it appears that some do not—so this figure may well exclude the most exploitative schools that really concerned people in the first place.

The argument does offer graduation rates. But it would be useful to know how a “more than 50 percent” graduation rate compares with the graduation rate for all students at the same institutions. If it is significantly lower, athletes may still be getting the shaft.

Most importantly, this argument offers no reason to believe that college athletes’ graduation rates are actually improving, because no comparison to any previous rate is offered! The conclusion claims that the graduation rate is now “higher,” but without knowing the previous rates it is impossible to tell.

Numbers may offer incomplete evidence in other ways too. Rule 9, for example, tells us that knowing background rates may be crucial. Correspondingly, when an argument offers rates or percentages, the relevant background information usually must include the number of examples. Car thefts on campus may have doubled, but if this means that two cars were stolen rather than one, there’s not much to worry about.

Another statistical pitfall is overprecision:

Every year this campus wastes 412,067 paper and plastic cups. It’s time to switch to reusable cups!

No doubt the amount of campus waste is huge. But no one really knows the precise number of cups wasted—and it’s extremely unlikely to be exactly the same every year. Here the appearance of exactness makes the evidence seem more authoritative than it really is.

Rule 10: Statistics need a critical eye

Be wary, also, of numbers that are easily manipulated. Pollsters know very well that how a question is asked can shape how it is answered. These days we are even seeing “polls” that try to change people’s minds, about say, a political candidate, just by asking loaded questions (“If you were to discover that she is a liar and a cheat, how would that change your vote?”).

Then too, many apparently “hard” statistics are actually based on guesswork or extrapolation, such as data about semilegal or illegal activities. Since people have a major motive not to reveal or report things like drug use, under-the-counter transactions, hiring illegal aliens, and the like, beware of any confident generalizations about how widespread they are.

Yet again:

If kids keep watching more TV at current rates, by 2025 they’ll have no time left to sleep!

Right, and by 2040 they’ll be watching thirty-six hours a day. Extrapolation in such cases is perfectly possible mathematically, but after a certain point it tells you nothing.

There’s much more to be said about statistics and probability than we could possibly say in this book. You might consider taking a course in statistics in order to understand these topics more deeply. We think everyone who aspires to be an educated person should take at least one such course! In the meantime, take a look at the “Resources” section on this book’s companion Web site for links to helpful books and online resources about statistics and probability. Perusing those resources might even help you complete the following exercises.

Exercise Set 2.4: Evaluating simple arguments that use numbers

Objective: To develop a critical eye for arguments using simple statistics.

Instructions: Each of the following arguments uses numbers in a misleading way. Explain why each argument’s use of numbers does not adequately support the argument’s conclusions.

Tips for success: Many misleading uses of statistics can be detected with three simple questions: What exactly are these statistics saying? Are these statistics believable? And: Do these statistics really show what the argument claims they show? Be sure to ask yourself each of these questions when evaluating the following arguments—or any arguments that use statistics.
Rule 10: Statistics need a critical eye

In addition, Rule 10 introduces some specific pitfalls in arguments that use simple statistics: rates or percentages offered without relevant background information; statistics, often surprisingly precise, that no one is likely to know with any confidence; results of manipulative surveys or opinion polls; thoughtless extrapolations; and in general, the sloppy use of numbers to try to justify conclusions that the statistics just don’t support. Look out for all of these pitfalls in the arguments below.

Whereas Rule 9 urged you to include background rates when giving examples, the use of rates or percentages without background information is just as problematic. If you see an argument that only gives rates or percentages, ask yourself whether those rates might be misleading. Do you know enough background information to figure out whether, say a 10 percent decline is significant? If not, the argument’s author may be trying to mislead you into thinking that something is a big deal, even when it’s not.

Another question to ask yourself when dealing with statistics is how someone would have learned that particular statistic—and how reliable that method is. Suppose you are told that 68 percent of people floss daily. How would anyone know that? Most likely, a pollster asks people whether they floss daily. People sometimes lie (or, let’s just say, shade the truth) for pollsters, though—especially when they are embarrassed about the true answer, don’t quite want to face it themselves, or otherwise fear that the true answer is not “socially desirable.” So, that figure of 68 percent probably overestimates the percentage of people who floss daily.

In general, the harder it will be to figure out a statistic, the more skeptical you should be that a statistic is accurate. (But don’t go overboard with this, either. Statisticians have developed very clever techniques to get around these kinds of problems. You’ll need to consider whether a particular argument was written by someone with the ability and motivation to use those techniques.)

Even with statistics that could be determined with some accuracy, some organizations might be more interested in getting a particular result than learning the truth. Pollsters can skew the results by using biased samples or asking loaded questions. Running tests over and over again until you get the desired result is another way to manipulate statistics. A toothpaste company can keep asking groups of ten dentists which toothpaste they recommend until they find a group where nine out of ten recommend the company’s brand. If a statistic comes from a source that is more interested in getting their preferred result than in getting the truth, you should be skeptical of the statistic.

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Sample

According to U.S. News & World Report’s compilation of statistics provided by law schools, 93 percent of law school graduates have a job nine months after finishing law school. That’s up nearly ten percentage points from 1997, when law schools reported an average employment rate of 84 percent. The employment picture for law school graduates is better than ever!


This argument cites two “employment rates” for recent law school graduates to show that the employment picture for law school graduates is “better than ever.” There are several reasons to be skeptical of this argument. First of all, it’s worth noting that these statistics come from the law schools themselves, who have an incentive to inflate employment rates. Second, the argument doesn’t specify that 93 percent of graduates are employed as lawyers, which is what we really want to know about. It could be that half are employed as lawyers and 44 percent are flipping burgers and working as omelet cooks. Third, the argument claims that the employment picture is “better than ever” but it offers only one point of comparison: 1997. It could be that 1997 was a particularly bad year for law school graduates; we would need more background information to evaluate the relevance of that statistic.

This response starts by explaining what the argument attempts to do with statistics. It then cites three reasons, related to those statistics, to be skeptical of the argument. Notice that the response doesn’t give us a strong reason to think the conclusion itself is false. The upshot is that we just don’t know. We would need to do more research to know whether law school graduates really do have good prospects. The point is that thinking critically about statistics can help prevent you from being taken in by misleading arguments.

1. A burglary occurs every fifteen seconds in the United States. Up to 80 percent of forced entries occur through a front door or a window. That’s why it’s essential to invest in a product like the OnGARD Security Door Brace, which helps prevent would-be burglars from breaking through your front door.

Adapted from: Stop a Home Invasion with the Strongest Door Brace in the World, OnGARD Brace, YouTube, Dec 20, 2010, http://www.youtube.com/watch?v=4FR0V030jlg
Rule 10: Statistics need a critical eye

2. A recent survey by British researchers found that heterosexual men have an average of 12.7 sexual partners over the course of their lives. The same study found that heterosexual women average 6.5 sexual partners. An American survey, recently reported by the U.S. government, found a similar discrepancy: heterosexual men averaged seven sexual partners, while heterosexual women averaged four. Men must be more promiscuous than women.


3. Beef is not high in cholesterol. Three ounces of cooked lean beef contain 73 milligrams of cholesterol. By comparison, the same amount of roast chicken contains 76 mg; fried chicken, 74 mg; pork, 77 mg; shrimp, 130 mg; cheddar cheese, 90 mg.

Adapted from: "12 Myths about Beef," a flyer distributed at the North Carolina State Fair on behalf of the National Cattlemen's Association, n.d.

4. Cigarettes contain 101 different kinds of poison. That's one hundred more poisons than rat poison. Therefore, smoking cigarettes is even more foolish than eating rat poison.


5. President George W. Bush relaxed federal rules about how much arsenic was allowed in drinking water. Whereas the old rules previously required drinking water to have no more than ten parts per billion of arsenic, Bush's revised rules would allow up to thirty parts per billion for water systems that serve communities of up to ten thousand residents. That exposed fifty million Americans to higher levels of arsenic. The changes in those rules amounted to an attack on public health.


6. Our psychics are supernaturally accurate. Our Psychic Managers thoroughly test every psychic who applies to work for us, screening them for accuracy, professionalism, and compassion. Only two out of every hundred psychics who apply make the cut.


7. During a typical week, the average person lies to thirty percent of the people who hear or see them. The average person is lying to forty percent of the people who hear or see them. The average person is lying to fifty percent of the people who hear or see them. The average person is lying to sixty percent of the people who hear or see them.


8. When the U.S. government introduced full body scanners at airports, many people were concerned that the X-rays used in some scanners could cause cancer. The government assured the public that the levels of radiation produced by the scanners were so low that there was nothing to worry about. Now, scientists are saying that the actual dose of radiation delivered to the skin could be up to twenty times higher than originally estimated. Thus, people should think twice before they go through a full body scanner at the airport.


9. In 1996, the Australian government banned most guns. They forced gun owners to surrender 640,381 guns to the government. Guess what happened? In the following year, homicides increased 3.2 percent across the country; assaults were up 8.6 percent; armed robberies rose 43.2 percent; and most amazingly, gun homicides in the Australian state of Victoria soared 171 percent! There's no doubt that crime has gotten much worse since the government banned guns.


10. The outsourcing of jobs to developing countries is wreaking havoc on the livelihoods of middle-class families in the developed world.
Critical thinking activity: Finding misleading statistics

For an out-of-class activity that gives you practice in applying Rule 10, see the "Finding misleading statistics" assignment sheet (p. 428) in Part 3. This activity has an optional, in-class extension.

Consider counterexamples

Counterexamples are examples that contradict your generalization. No fun—maybe. But counterexamples actually can be a generalizer's best friends, if you use them early and use them well. Look for them on purpose and systematically. It is the best way to sharpen your own generalizations and to probe more deeply into your theme.

Consider this argument once again:

French fries are unhealthy (high in fat).

Milkshakes are unhealthy (high in fat and sugar).

Deep-fried chicken and cheeseburgers are unhealthy (high in fat).

Therefore, all fast foods are unhealthy.

This argument offers multiple and apparently representative examples. However, as soon as you start thinking about counterexamples instead of just more examples, you will find that the argument overgeneralizes. Subway sandwiches, for example, are "fast food" as well, but vegetables and buds are the primary ingredients, meats and cheeses are add-ons, and nothing is deep-fried. So it turns out that not all fast foods are unhealthy.

If you can think of counterexamples to a generalization that you want to defend, then you need to adjust your generalization. If the last argument were yours, for instance, you might change the conclusion to "Many fast foods are unhealthy."

Such a counterexample may also prompt you to think more deeply about what it is about fast foods that tends to make them unhealthy. Is it partly that deep-frying—with the huge fat load that results—is such a quick and easy way of cooking? Highly processed foods, such as fast-food meat and cheese and milkshake ingredients, also tend to be fattier, or unhealthy in other ways. So maybe what you really want to say is that the demand for quick cooking and cheap, standardized ingredients tends to make the results less healthy (although this is not invariably, as the example of Subway sandwiches suggests). This is a more subtle and interesting claim than the original one, and gives your thinking more room to move.

Ask yourself about counterexamples when you are assessing others' arguments as well as evaluating your own. Ask whether their conclusions might have to be revised and limited, or rethought in more subtle and complex directions. The same rules apply both to others' arguments and to yours. The only difference is that you have a chance to correct your overgeneralizations yourself.

Exercise Set 2.5: Finding counterexamples

Objective: To give you practice identifying counterexamples to generalizations.

Instructions: Try to find a counterexample to each of the generalizations below. If there are no counterexamples, say so.

Tips for success: Remember that a counterexample is an example that counts against a generalization. Consider the generalization "All birds can fly." It's a generalization about birds. It says that all members of that group (i.e., birds) can fly. A counterexample to that generalization would be a bird that cannot fly. Penguins are counterexamples to the generalization. So are ostriches, and so (unfortunately for them) were dodo birds.

In order to decide whether something is a counterexample to a particular generalization, you'll need to think about the same questions you asked yourself in Exercise Sets 2.1 and 2.2: What type of thing is the...
Rule 11: Consider counterexamples

generalization about? What does the generalization say about this type of thing? A counterexample must be the right type of thing. If your generalization is about birds, your counterexample must be a bird. Furthermore, your counterexample must contradict the generalization. If the generalization says that birds can fly, your counterexample must be a bird that is not able to fly.

Many logicians, philosophers, and mathematicians use the word counterexample to refer specifically to an example that disproves a "universal" generalization—that is, a generalization that says something about all members of a group (e.g., "All birds can fly"). You might also think of counterexamples in a less technical sense as "exceptions" to a generalization, even non-universal generalizations. In this weaker sense of counterexample, the rainforests of Norway and Alaska are counterexamples to the generalization that most rainforests are in the tropics. While this exercise focuses exclusively on universal generalizations, it will be important to keep this weaker sense of counterexample in mind for later exercises.

Sample

All major world leaders have been men.

Margaret Thatcher, prime minister of Great Britain from 1979 to 1990, was a major world leader and she is not a man.

The generalization here is about major world leaders. It says that all of them have been men. Thus, a counterexample must be a major world leader who is not (or was not) a man. There are plenty of others besides Thatcher, of course: Historical figures include Queen Elizabeth I (England), Catherine the Great (Russia), the Dowager Empress Cixi (China), and somewhat more recently, Indira Gandhi (India) and Golda Meir (Israel). More contemporary figures include Angela Merkel (Germany), Julia Gillard (Australia), and Dilma Rousseff (Brazil), among others.

As usual, there may be some interpretive questions about the generalization. Cleopatra was the last pharaoh of ancient Egypt. She governed an important country and played an important role in the politics of the ancient Mediterranean world. Does that make her a "major world leader"? The American secretary of state plays an important role in world politics. Does that make female secretaries of state, like Madeleine Albright, Condoleezza Rice, and Hillary Clinton "major world leaders"? Do major world leaders even have to be in politics? What about female leaders of major multinational organizations, such as Indra Nooyi, CEO of PepsiCo, or Helen Gayle, CEO of the international aid organization CARE?
Chapter II Exercises

Tips for success: To evaluate an argument is to decide how strong the argument is. When you encounter an argument in which someone tries to support a generalization by giving examples, ask yourself how well it follows Rules 7–11. The better it does, the stronger the argument is. To be sure that you’ve done a thorough job in evaluating an argument, it’s best to take a systematic approach. Go through Rules 7–11 one by one, asking yourself how well the argument follows each one.

There are some things to keep in mind when applying these rules.

In general, the more examples an argument gives, the better it does in following Rule 7. Although Rule 7 literally says that an argument should “use more than one example,” two examples usually aren’t much better than one. The real question is whether the argument gives enough examples. How many is “enough”? That’s a tough question. When an argument is generalizing about a small number of things, it’s best to look at every one of those things. When there are too many examples to consider all of them, you need to take a sample. Knowing how big a sample needs to be to count as “enough” examples is tough, since it varies from case to case. But you should know that it’s possible to support generalizations about really large groups, like the entire population of the United States, based on surprisingly small samples—sometimes only one or two thousand people, provided that the samples are truly representative.

In deciding how well an argument follows Rule 8, keep in mind what you learned from Exercise Set 2.2. Ask yourself how many of the examples are representative. If most or all of them are representative, the argument does a good job following Rule 8.

To decide whether an argument follows Rule 9, ask yourself whether you need to know any background rates. Often background rates are expressed in terms of percentages. Suppose someone tells you that nineteen Toyota Priuses have crashed because of defective accelerators. In order to conclude that Priuses are notably unsafe, you need to know what proportion of Priuses have crashed because of defective accelerators. Does the argument provide that percentage—or at least the information you’d need to calculate that percentage? Or can the arguer reasonably assume that you know the background rates (in this case, actually very low)? If not, the argument does a poor job following Rule 9.

Deciding whether an argument follows Rule 10 is more difficult because there are so many ways that statistics can be abused. When you encounter statistics in an argument, think carefully about what the statistics mean, where they came from, and whether they really support the generalization that they’re meant to support.

When it comes to Rule 11, ask yourself first whether the conclusion is a universal generalization—that is, a generalization that says something

Sample

Nothing on television is worth watching, News shows mostly feature sensation-alized crime stories and public figures’ peccadilloes. Just about everything else is a “reality” TV show—actually about as far from reality as you can get—or a show that revels in out-of-the-top materialism and celebrities’ problems.


This is a weak argument. It gives only a few examples, described in vague and loaded generalities. Although these examples cover a lot of what’s on TV, it’s still not enough to generalize about everything on TV (Rule 7). What about dramas, sitcoms, movies, educational programming, children’s programming, etc.? Thus, the argument doesn’t do a good job with Rule 8. The author of the argument is probably relying on the reader to know what percentage of TV is devoted to news and reality TV, so it does okay with Rule 9. The argument doesn’t misuse any statistics (Rule 10), but that’s only because it doesn’t use any statistics. The biggest problem with the argument is that it ignores counterexamples (Rule 11): some dramas, movies, and educational pro- gramming are definitely worth watching. Other shows are at least possible counterexamples. Some people think that cooking shows are worth watching, for instance.

Notice that this response addresses each rule in turn. It states how well the argument follows the rule, and then it justifies those claims by explaining how the argument does or does not follow the rule.
1. Voters spend far too much time in the voting booth. I saw one person take eleven minutes to fill out her ballot.

Adapted from: Anne Kreutzer, letter to the editor, Washington Post, Nov. 9, 2006

2. Most states have better academic achievement than California does. Eighth-graders in Tennessee are better at reading than Californian eighth-graders. In Arizona, eighth-graders score higher on math tests than eighth-graders in California do.


3. No empire lasts very long. Just look at the empires that collapsed in the twentieth century. The Soviet Union was going to last forever, but it collapsed after seventy years. Hitler’s and Mussolini’s regimes were supposed to last for thousands of years. You know what happened to them. Even the British Empire came to an end.


4. When public health experts try to help Americans become healthier, Americans just get fatter. When the government encouraged Americans to quit smoking, ex-smokers gained an estimated fifteen pounds on average. Take another example: When the public health experts said to switch to a low-fat diet, Americans switched. But they replaced their high-fat foods with sugary drinks and low-fat snacks devoted by the fastful. What happened? Americans got so much fatter that the experts resinded their low-fat advice.


5. People who talk about wanting revolution are dangerous. They’re not just playing around. We ignore them at our own peril. We didn’t take them seriously in Germany in the 1930s, and look what happened. We didn’t take them seriously in Russia in 1917, or in Venezuela with Hugo Chavez, or in Cuba with Castro. But they were serious—and the world paid a price for ignoring them.

Adapted from: Glenn Beck, FOX News, Jan 9, 2010

6. Most major news outlets do not provide much coverage of defensive gun uses. There are more than two million defensive gun uses in the United States each year. But in 2001, the three major television news networks did not run a single story about someone who used a gun to stop a crime. The newspaper USA Today didn’t print a single story on defensive gun use either. The New York Times did publish one article on defensive gun use—but it was only 163 words long, compared to a combined 50,745 words that year on crimes committed with guns.


7. A power company in the state of Georgia is trying to build a new nuclear power plant. They plan to use a safer, more efficient nuclear reactor design from Westinghouse, called the AP1000. China started building a power plant with an AP1000 reactor last year, and the construction costs there have skyrocketed. So far, they’re already more than three times higher than expected. Therefore, building power plants with AP1000 reactors will usually lead to cost overruns.


8. Themistocles was a virtuous man, and though he taught his son many things, he could not teach his son to be virtuous. Likewise, Aristides was a virtuous man, but his son was not, even though Aristides had his son trained in many things. Pericles, too, was a virtuous man whose son was not virtuous. Thucydides, another virtuous man, had two sons, to whom he gave a good education,
but he did not succeed in making them virtuous. So, we can see that even a good man cannot teach his children to be virtuous.


9. In the 1920s, Dr. Harrison Matland was investigating whether boxing caused brain damage. A fight promoter gave him a list of twenty-three former boxers whom the promoter regarded as “punch drunk.” Though he sought all twenty-three of them, Matland only located ten. Of those ten, all suffered clear signs of brain damage. Four had dementia. Two had difficulty speaking coherently. Two had trouble walking. One was blind. One had the symptoms like those of Parkinson’s disease. This proved that many former boxers have brain damage.


10. The ISI Web of Knowledge database contains 928 scientific papers that were published in peer-reviewed scientific journals between 1993 and 2003 and listed with the keywords “global climate change.” Of those 928 papers, about 75 percent explicitly or implicitly endorsed the view that humans are causing changes in the global climate. The remaining 25 percent discussed scientific methods or paleoclimate research, taking no stand on whether humans are causing climate change. None of the papers rejected the claim that humans are causing global climate change. Thus, there is a strong scientific consensus that humans are causing global climate change.


Need more practice? For more practice evaluating arguments for generalizations, look and listen for generalizations in newspapers, in conversations with your friends or family, on television, or online. Ask yourself what arguments people give for those generalizations—if any—and see how well those arguments measure up against the rules from this chapter.

Exercise Set 2.7: Arguing for and against generalizations

Objective: To give you practice supporting generalizations by constructing arguments that follow Rules 7–11.

Instructions: Consider the following generalizations. Are they true or false? Support your answer with an argument that follows Rules 7–11. You may need to do a little bit of research to complete this exercise. If you can’t find the examples to support your initial answer, even after doing some research, you may need to change your answer!

Tips for success: If you’re not sure whether a generalization is true or false, look for examples and counterexamples before you begin constructing your argument. Examples count in favor of the generalization; counterexamples count against it.

If you think that a generalization is true, give examples to support it, keeping in mind Rules 7, 8, 9, and 11 in particular. If you think that a generalization is false, give examples that support the opposite claim. For instance, if you think the generalization “Most reptiles are dangerous” is false, construct an argument to support a generalization like “Many reptiles are not dangerous.”

It’s natural to focus on examples that support whatever it is we believe (or want to believe). Rule 11, in particular, provides a helpful check on this tendency. No matter what generalization you’re considering, actively look for exceptions to that generalization.
Illegal drugs are safer than alcohol.

This generalization is false. While it's arguable that some drugs, such as marijuana and certain hallucinogens, are safer than alcohol, most illegal drugs are more dangerous than alcohol. Cocaine, crack, methamphetamine, opium, and heroin are particularly dangerous because they are all highly addictive, they do serious damage to the body, and it's easy to overdose on them. Ecstasy can cause brain damage, and impair ecstasy can be lethal. While alcohol is addictive and can damage your body or kill you, it is not as addictive or damaging as these drugs. Thus, in general, illegal drugs are not safer than alcohol.

This response does two things. First, it states whether the generalization is true or false. Then, it gives an argument to support that claim. The argument does a reasonably good job following each of the rules from this chapter. It gives many examples (Rule 7), which are representative of the most widely used illegal drugs (Rule 8). While it doesn't say how many kinds of illegal drugs there are (Rule 9), one can probably rely on the reader to know roughly how many kinds of drugs are left out. The argument does not give any statistics to support its claim, which means that it doesn't give any misleading statistics (Rule 10), although well-chosen statistics could have strengthened the argument. The argument does mention some specific counterexamples (Rule 11), but only to point out that there are only a few of them.

1. Most U.S. presidents were born in Ohio or Virginia.
2. The Japanese make the best cars.
3. Classical music is boring.
4. Your classes this term are interesting.
5. Playing professional football is dangerous.
6. Anything that can go wrong, will. (Murphy's Law)