

INTRODUCTION TO LOGIC AND CRITICAL THINKING

Sixth Edition

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University of Pittsburgh



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**Introduction to Logic and Critical Thinking,
Sixth Edition****Merrilee H. Salmon**

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I. INTRODUCTION

We live in the Information Age. Computers that are connected to the Internet allow us to gather information quickly about almost anything. One or two keystrokes will bring up the latest news, biographies of famous and not-so-famous people, details of historical events, sources of quotations, and instructions for cooking food or building furniture. Locating consumer goods and reviews of them is simple. We now take for granted the easy access to information that in the past was difficult to acquire, even for those who had government archives or the finest university library at their disposal.

Moreover, the Internet is not our only source of information. We still read newspapers, books, and magazines. We attend lectures, watch television, listen to the radio, and talk with friends off-line.

All this information, if it is to be useful to us, must be processed—understood, sorted for relevance, checked for accuracy and completeness, balanced against competing information, organized coherently, and analyzed for its implications. If we plan to act on information, we also need to consider how our actions will affect others.

This is where logic and critical thinking come in. They are tools that allow us to navigate the flow of information, to sort out the good from the bad, to find patterns, to combine apparently unrelated bits, and to figure out how information can enrich our intellectual lives and help us manage our practical affairs.

Logic and critical thinking are not new to you. You could hardly have come this far in life without them. Many of the most important logical principles are embedded in language, and you learn them when you learn how to use such terms as *and*, *or*, and *not*. You use logic and critical thinking when you organize materials to write term papers, try to persuade others to share your beliefs, convince friends to see one movie rather than another, and defend your words and actions against critics. You are using critical thinking when you recognize that many Internet postings are unbelievable nonsense. Some Internet observers say that without editorial filtering of content, 95 percent of what is offered as information on the Internet is garbage. You also recognize that opinions, rumors, and fantasies can slip through editorial filters even when the media are behaving responsibly. You are aware that the source of information matters, and you are cautious about accepting the self-interested statements of politicians and advertisers.

Do you enjoy reading police procedural novels or watching movies based on them, such as *The Girl with the Dragon Tattoo*? Do you watch television programs about investigations of crime scenes? Using logic and critical thinking to figure out these stories is important to your enjoyment of them. You examine the evidence along with the investigator, follow the questioning of witnesses, notice when something that at first seemed insignificant turns out to be relevant, and finally put all the clues together to solve the crime.

You probably also apply your critical thinking skills when you look at photographs in newspapers or on the Internet. Pictures, when they are used to convey information,

need critical examination. Photoshopping can digitally enhance and change pictures in deceptive ways. People used to say “pictures don’t lie,” but that was not strictly true even before the days of photoshopping. Photos could always be retouched, cut, and pasted to create an illusion. Moreover, any photograph, like any story—even a true one—begins from a point of view, establishes a context, and ignores some aspects of a setting to focus on others. Critical thinkers who are aware of this can use their knowledge both to avoid being deceived and to appreciate better the artistry of storytelling and photography.

Did you take an ACT or SAT exam before entering college? These examinations test logic and critical thinking skills. Other examinations, such as the GRE, the LSAT, the GMAT, and the MCAT, which are used to rank students who want to enter graduate or professional schools after college graduation, also have a critical thinking component. The results of these tests are supposed to show whether students will perform well at various levels of education in different fields.

Tests of critical thinking are used also to measure how much students learn when they are in college. In *Academically Adrift*, Richard Arum and Josipa Roksa examine results of testing college students for critical thinking skills as they progress from their first to their fourth year. Their study looked at the scores of thousands of college students who took the Collegiate Learning Assessment exam and found that the critical thinking ability of 45 percent of students did not improve after two years of college. Even after four years, 36 percent did not improve. Educators, shocked by these findings, have tried to explain the poor scores. Arum, one of the authors of the study, blames a lack of academic rigor. He believes that college courses have been so dumbed down that students no longer have to work hard to get good grades. Because students are not sufficiently challenged, he says, they do not spend enough time studying, reading, and writing to improve their critical-thinking skills. Other educators believe, however, that a more likely reason that students did not improve was because they already had high levels of skill when they entered college. Still others say that this type of test does not accurately reflect what students learn in college. Despite differences in how to account for the students’ poor performance on the Collegiate Learning Assessment exam, however, all the educators agree that skill in critical thinking is an essential attribute of an educated person.

The aim of this book is to develop students’ skill in logic and critical thinking by offering an organized approach to the subject matter and providing skill-building exercises. We begin by characterizing our subject matter.

Critical thinking refers to many different activities and abilities. The following list includes some of the important ones:

- Analyzing the meaning of information;
- Checking information for accuracy and completeness;
- Putting various pieces of information together in a coherent way;

- Comprehending instructions and advice;
- Following directions;
- Solving problems;
- Judging what information is relevant to a particular issue and whether that information is evidence for the truth of some assertion;
- Questioning matters that do not make sense;
- Attempting to avoid mistakes in thinking (fallacies);
- Marshaling relevant information (evidence) when this is needed to support some statement (constructing arguments);
- Judging whether purported evidence supports a conclusion (recognizing and evaluating arguments); and
- Making decisions and plans in light of the best available information or evidence.

We are especially interested in (1) analyzing meanings; (2) recognizing arguments and evaluating their strengths; (3) recognizing and avoiding fallacies; and (4) making decisions in light of available information or evidence.

(1) We need to interpret information to determine whether we understand it. Interpreting verbal information requires special sensitivity to language, which is the topic of the second chapter of this book.

Critical thinking involves paying careful attention to what we hear and read so that we can understand and respond appropriately. So far, we have mostly been concerned with language that transmits information, usually in declarative sentences, such as “Thirty students are in the critical thinking class.” When the transmitted information is questionable, it makes sense to ask for evidence—that is, information that supports or undermines the truth of some assertion.

However, language is not always used to provide information. We engage in small talk just to “stay in touch” with others. We *express* our feelings of joy, sorrow, sympathy, anger, hope, and fear in language. We ask *questions*, make *requests*, and issue *warnings* (“Heads up!”) and *commands* (“Do not write in this book.”). Asking for evidence for expressions of feeling, questions, commands, and the like would not be appropriate.

To understand meanings, we need to pay attention to the circumstances or context in which words are spoken or written. In casual conversation, for example, comments about unpleasant weather can serve to open a conversation or keep it alive. In contrast, if you are interested in weather because you are planning to fly in a small plane, it makes sense to determine whether information that is presented is correct.

When your close friend tells you that her head hurts or that chocolate ice cream is wonderful, she is expressing her feelings, and you don’t ask for her to provide evidence for how she feels. In a different context, such as a survey conducted by a company selling painkillers or ice cream, seeking further information to support what people say about their pains and preferences makes sense.

Even though information is often conveyed in songs and poetry, we chiefly pay attention to their expressive content. When we read an epic poem, such as Homer's *Iliad*, we can respond aesthetically to the poem without raising the question of whether Helen of Troy existed and whether her kidnapping by a Trojan prince caused a war between the Greeks and Trojans. The *Iliad* is a work of art and can be valued as such without raising questions of factual accuracy.

It is possible, however, to shift attention from the aesthetic value of works like the *Iliad* and read them for historical clues as well. In fact, many expeditions have been mounted to find evidence for the Trojan War, and scholars debate whether and to what extent the *Iliad* was based on actual historical events. When the focus is on the information contained in the poem rather than on its expressive features, questions about evidence arise.

(2) As these examples show, context and interest guide how we analyze what is said and under what circumstances we need to look for further information to verify the truth of what is said. Context and interest also influence the amount and type of information that is required. If someone cries "Fire!" in the office building where you are working, you don't look for evidence; you get out of the building as soon as possible. If you learn that a building where you used to work burned today, you might check it out before accepting what you have been told.

Being misinformed can result in costly mistakes, but gathering information to use as evidence can also be costly. Costs can be measured in time, money, and even goodwill. We risk offending people, for example, by questioning their accuracy or invading their privacy. Before we decide whether to collect evidence, we have to balance the costs of doing so against the costs of being wrong.

As noted, information that is relevant to the truth of some assertion and presented in support of it is called evidence. The popularity of television series about crime scene investigators (CSI) has made "evidence" a familiar term. In CSI shows, the opening scene usually focuses on the aftermath of some brutal crime, often a murder. A team of investigators descends on the scene to collect information that will allow them to identify the victim, to determine what happened, and to find the person who committed the crime.

Crime scene investigators are experts in forensic science; they focus primarily on physical evidence but also gather verbal evidence when they collect statements from witnesses and examine documents. Using such verbal evidence, they construct arguments to prove who committed a crime. Some, but not all, verbal evidence consists of descriptions and summaries of physical evidence. In many sciences, such as prehistoric archaeology, geology, and chemistry, physical evidence is the primary focus of scientific research. In other disciplines, such as history and many of the social sciences, verbal evidence is more important. Documents, for example, are the focus of most historical work and provide the basic information for constructing arguments about the causes of important historical events.

But historians also look at physical evidence, such as when they determine a date for a document from the composition of its paper and ink. Prehistoric archaeology is concerned with what material remains can tell us about human life before there were written records or where no written records survive. Here physical evidence is paramount. Historical archaeology, however, studies material remains of humans who also kept written records. For example, archaeologists and historians both conduct intense studies of the United States Civil War. Historians use correspondence, military orders, and other documents to build their arguments about what happened and why. Archaeologists survey and dig to find physical remains of fortifications, weapons and other traces of battles, troop movement, and the like. Sometimes the written records do not agree with the physical findings. Either type of information may be misleading. A soldier's eyewitness account of a battle may not give an accurate account of the number of troops engaged or the area of the battlefield; an archaeologist may be misled about the size of a battle because of soil movement and erosion or degradation of battle debris. So we cannot say that one type of evidence always trumps another. In each case of conflict between verbal and physical evidence, arguments for either side must be examined carefully.

(3) Fallacies are mistakes in reasoning, such as thinking that some irrelevant information supports the truth of a statement. Avoiding such mistakes is an important objective for a critical thinker. Most of us are suspicious of exaggerated statements made in advertisements and by politicians, and are apt to ask why we should believe them. Sometimes, however, we do not ask for evidence, or we accept the flimsiest sort of reasons, in support of things that we want to believe anyway. We are especially vulnerable to mistakes in reasoning when our minds are clouded by desire, fear, greed, or other strong emotions.

We often do not look for evidence when information comes from friends and various "authorities," such as teachers, television newscasters, and newspaper reporters. When we trust a source, we accept what that source says. Trust, however, should not always override a need for further information. If a friend tells you that some substance produces a safe high, you would be wise to seek further evidence. The amount of evidence you require depends in part on what could happen if the friend's assertion turns out to be false.

Sometimes we use or accept means other than evidence to persuade people to do things. This is not always wrong. It is appropriate, for example, to appeal to people's sense of compassion to persuade them to aid victims of poverty or oppression. But it is not appropriate to believe, on the basis of such compassion alone, that a particular group is responsible for the oppression, that one type of aid is more appropriate than some other type, or that the democratic government of the impoverished people will collapse if the aid is withheld. To fail to distinguish between nonevidential persuasion and evidence that would support an assertion is to commit a fallacy.

(4) In addition to the critical tasks already mentioned, we need to think critically about our decisions. When we are trying to decide on some action, we want to consider the consequences for ourselves and others. We should examine not only what the various results of our action would be but also how probable each outcome is, and the relative benefits or costs of these outcomes. Would you, for example, invest \$5 in a lottery ticket if the winning ticket pays \$5,000, but your chance of winning is only one in a million? There are just two outcomes to consider in this case: you win or you don't. But not winning is the outcome with a much higher probability, and you must figure out whether the cost of \$5 is worth the risk.

Real-life decisions are rarely so straightforward as the decision whether to purchase a single inexpensive lottery ticket. Many criminals are in jail because—aside from their indifference to moral considerations—they believed correctly that the probability of being apprehended for their crime was small but failed to balance that low probability against the severe cost of being caught.

Sometimes just being aware of the pitfalls of not thinking critically spurs us to more careful thought. As in many other areas of life, however, practice is the best way to improve critical-thinking skills.

Exercise Set 1.1

These exercises are designed to raise your awareness of the need to interpret information, to distinguish between unsupported assertions and arguments providing supporting evidence, and to recognize when evidence must be provided to support what is asserted or to take some recommended action.

1. Many people argue that President Obama is not a native citizen of the United States because his father was Kenyan. His father was in fact from Kenya. Is any further information needed to show that Obama is not a native citizen?
2. Suppose a friend tells you that taking Professor Cyril's class is certain to boost your GPA. Would you decide to take the course based on that statement? What information would you look for to support what your friend says?
3. Suppose you tell your professor that you missed an examination because you were ill. How could you support that assertion?
4. Can you name two disciplines in addition to history in which verbal evidence is usually more important than physical evidence?
5. Recently a reality-show producer announced that he was teaming up with AOL to produce comedic videos of classic works by Shakespeare and others, based on *Cliffs Notes*. The producer says the idea is to bring classic works of fiction to the online masses, including students. Suppose that "Twelfth Night" is the first show produced and a professor asks his Shakespeare class to view it. Does the professor's assignment mean that his Shakespeare course is being dumbed down?

No, it's just an alternate method of study. As long as it's not the only way they go over that material, it can be a way to add levity to the class or can be used to critique based on the knowledge they have.

6. You are interested in buying a used 2008 automobile. The salesman at the used-car lot says the former owner was a little old lady who drove the car only on Sundays. Would you base your decision to buy or not on his word? If not, what sort of evidence would you seek?
7. You read the following in a nonfiction travel book about the Greek island Corcyra (Corfu):

Climb to Vigla in the time of cherries and look down. You will see that the island lies against the mainland roughly in the form of a sickle. On the landward side you have a great bay, noble and serene, and almost completely landlocked. Northward the tip of the sickle almost touches Albania and here the troubled blue of the Ionian is sucked harshly between ribs of limestone and spits of sand. Kalamai fronts the Albanian foothills, and into it the water races as into a swimming pool; a milky ferocious green when the north wind curdles it.

—L. Durrell, *Prospero's Cell*

Durrell says that from a given vantage point (Vigla) in summer (the time of cherries), you can see the sickle shape of the island. He describes (makes further assertions about) Corfu's location with respect to surrounding geographical features, states, and towns. His language is expressive (for example, "the troubled blue . . . is sucked harshly between ribs of limestone") and is designed to convey the feelings of both serenity and untamed beauty that the island inspires.

- a. Does the author offer any evidence for the assertions he makes?
 - b. Suppose you are reading this book to acquire some information about the island because you hope to visit it as a tourist. Should you gather evidence to support the accuracy of Durrell's descriptions?
 - c. Suppose you are a military commander who plans an invasion of the island. Should you seek evidence for the truth of Durrell's descriptions?
8. You read by a recognized expert on mushrooms about *Amanita verna*, a type of wild mushroom. He says this mushroom looks much like a variety commonly found in grocery stores. It is pure white (when fresh) and very beautiful. Then he says the following:

Edibility: Deadly poisonous. The symptoms are delayed, making applications of first aid almost useless. Never eat a white *Amanita*.

—A. H. Smith, *The Mushroom Hunter's Field Guide*

- a. What assertions does Dr. Smith make in the quoted passage?
 - b. Why do you think Dr. Smith mentioned the similarity between *Amanita verna* and grocery-store mushrooms?
 - c. Is "Never eat a white *Amanita*" an assertion?
 - d. Would you seek further information before following Dr. Smith's advice?

9. President Abraham Lincoln wrote the following sentence in a letter to a friend:

If slavery is not wrong then nothing is wrong.

How would you interpret what Lincoln says? (That is, what does he mean?
Does he think slavery is wrong?)

10. In the spirit of saving the planet, the method of shallow cultivation is offered as an alternative to the use of poisonous herbicides to control weeds:

Shallow cultivation is an effective way to control weeds. Experiments have shown that hoeing or tilling only the top 2–4 inches of soil before seed sprouts can set eventually exhausts most of the vast supply of weed seeds that lie dormant in the soil.

—P. H. Johnson, “Make Your Soil Smile,” *Organic Gardening*, March 1987

- a. What does the author mean by “shallow cultivation”?
- b. Is evidence (physical or verbal) presented for any assertions?
- c. If you are a backyard gardener trying to save money and avoid poisons, would you seek further evidence before trying shallow cultivation instead of herbicides to control weeds?
- d. If you are a truck farmer whose only income depends on the success of your crops, would you seek further evidence that shallow cultivation is an effective means of weed control?

11. A reporter for the University of Arizona’s student newspaper conducted telephone interviews with insurance agents from four major companies. She inquired into auto insurance rates for a twenty-year-old male college student who had no history of automobile accidents. Specifying the same automobile make, model, and year in each interview, she found that some identical auto insurance policies cost as much as \$200 more per year than others. Her closing line for her story:

It pays to shop around and research the various types of coverage in order to get the best deal.

—B. Medlyn, *Arizona Daily Wildcat*

What evidence supports the author’s assertion that it pays to shop for the best deal in auto insurance?

12. Proponents of legalizing marijuana say it is not so dangerous as alcohol insofar as the latter is responsible for thousands of deaths in America annually. They also say that smoking marijuana is safer than smoking tobacco, which is responsible for several fatal diseases.
- a. Describe what evidence, if any, is offered for the assertion that marijuana is less dangerous than alcohol.
 - b. Describe what evidence, if any, is offered for the assertion that marijuana is safer than smoking regular cigarettes.
 - c. If marijuana really is no more dangerous than alcohol or cigarettes, is that a good enough reason to believe that marijuana should be legalized? Why or why not?

A. Hoeing or tilling only the top 2-4 inches of soil.

B. Yes, they assert that shallow cultivation is a valid alternative to herbicides, then include a quote from an expert about the topic.

C. Yes, but not too much. Maybe a visual example of it working.

D. Yes, one quote is not enough data to be sure, and you have much more to lose than a backyard gardener. I would need an explanation on how it works and examples of it working.

13. Smart phones and tablets will soon handle the majority of our personal computing needs because we want to be mobile while staying connected with the people and things we care about.

Does this argument strongly support the claim about smart phones and tablets? Do you agree that mobility trumps the strengths of laptops—which are semimobile—and desktop computers? What do you consider the biggest disadvantage of mobile devices?

14. In the last act of the play, Lear holds the lifeless body of his daughter Cordelia in his arms. He says the following:

*I know when one is dead and when one lives;
She's dead as earth.-- Lend me a looking-glass;
If that her breath will mist or stain the stone,
Why then she lives.*

—Shakespeare, *King Lear*

The grief-stricken Lear first admits Cordelia is dead and then hopes in vain that she is still alive. What evidence does he call for to settle the matter?

15. In a memo concerning whether commercial speech is protected by the First Amendment [which guarantees freedom of speech], Supreme Court Justice Harry Blackmun wrote that false or misleading advertising could be regulated

not because it is commercial or pecuniary in purpose but because [regulation] prevents commercial injury and without it commerce would be impossible.

—L. Greenhouse, *Becoming Justice Blackmun*

What reason does Justice Blackmun give for restricting false advertising? Can you clarify the reasoning involved?

It is a sobering thought that overexposure to lead was probably a factor in the decline of the Roman Empire. . . . Romans lined their bronze cooking, eating, and wine storage vessels with lead. They thus avoided the obvious and unpleasant taste and symptoms of copper poisoning. They traded them for the pleasant flavor and more subtle poisoning associated with lead. Lead was also common in Roman life in the form of paints, and lead pipes were often used to carry water. Examination of the bones of upper-class Romans of the classical period shows high concentrations of lead—possibly one cause of the famous decadence of Roman leadership. The lower classes lived more simply, drank less wine from lead-lined containers, and thus may have picked up far less lead.

—P. Ehrlich, *The Population Bomb*

Justice Blackmun states that "regulation prevents commercial injury, and without it commerce would be impossible".

I believe he meant that if false advertising were allowed, it would harm legitimate companies and consumers, restricting the economy, and waning trust between sellers and buyers.

Ehrlich portrays a decadent upper class suffering from lead poisoning, leading Rome to ruin. However, he does not say whether any bodies of lower-class Romans have been examined for levels of lead.

- a. Assume it is true that the lower classes lived more simply and drank less wine from lead-lined containers. Does this persuade you that they picked up far less lead than the upper classes? Why or why not?
 - b. What evidence might support the assertion that the lower classes were exposed to just as much lead? (*Hint: Who was mining the lead, working with lead paints and lead pipes, and manufacturing lead-lined containers for wine?*)
17. On a recent sports news show on television, a football player comments on whether college football players should be paid for playing ball:
- Football players should be paid because they work five or six hours a day, and have to play—work again—on Saturdays. It is just like a real job.
- a. The player asserts that playing college football is just like a real job. Does he give any evidence for this?
 - b. Can you think of any important differences between playing college football and working at a real job? (*Hint: To answer this you may have to clarify the meaning of “real job.”*)
 - c. Is it obvious that anyone who works five or six hours a day and again on Saturdays should be paid for that work?

II. ARGUMENTS AND LOGIC

In Exercise Set 1.1, many questions concerned information that can support the truth of some assertion. Such information, or evidence, as already noted, can be either verbal or physical. When you return damaged goods to a store to prove their condition, you present physical evidence to support your claim that the goods are damaged. Similarly, detective stories tell us that without a body (or other physical evidence), it is difficult to support claims that a murder has been committed. Some, but not all, verbal evidence describes physical evidence. To establish the birth date of George Washington, for example, the evidence you seek is verbal—the words, spoken or written, of some authoritative source.

Arguments are sets of sentences consisting of an assertion to be supported and the verbal evidence for that assertion. When we support some sentence by offering verbal evidence for it, we are **arguing** for that sentence.

The terms *argument* and *arguing* are frequently used in another way: *argument* to refer to a dispute or disagreement and *arguing* to refer to the activity of disagreeing. These different meanings are related in the sense that when we are involved in a disagreement or dispute, we often try to show that our position is correct by stating evidence to support it.

In terms of critical thinking, the word *argument* most commonly refers to a set of sentences related in such a way that some purport to provide evidence for another, without any suggestion of dispute or disagreement.

Logic is the field of study concerned with analyzing arguments and appraising their correctness or incorrectness. Thus it plays an important part in critical thinking. Logic, however, is broader than critical thinking because it does not confine itself to examining particular arguments but is a formal systematic study of the principles of valid inference and correct reasoning. For the purposes of this text, we can think of logic and critical thinking as disciplines that are separate but overlapping. We are especially interested in the area of overlap.

Arguments are made up of sentences. The sentences that state the evidence are **premisses**; the sentence being argued for is the **conclusion**. An argument can have any number of premisses, but (by definition) it can have only one conclusion.

The following argument has just one premiss, which is written above the line that separates it from the conclusion:

| | |
|---------------------------------------|-------|
| Mary has a twin sister. | |
| | <hr/> |
| Therefore, Mary is not an only child. | |

The next argument has two premisses:

| | |
|---------------------------------|-------|
| Abortion is the same as murder. | |
| Murder is wrong. | |
| | <hr/> |
| Therefore, abortion is wrong. | |

Many arguments have more than two premisses. Charles Darwin once said that his entire book, *The Origin of Species*, was just one long argument for a single conclusion: the truth of evolution.

Whether a particular sentence is a premiss or a conclusion depends on the role it plays in a given argument. The sentence “Abortion is the same as murder,” which is a premiss in the above argument, might be the conclusion of a different argument:

| | |
|--|-------|
| Abortion is the deliberate killing of a human fetus. | |
| Human fetuses are persons. | |
| Any deliberate killing of a person is murder. | |
| | <hr/> |
| Therefore, abortion is murder. | |

We could continue to develop other arguments with new premisses to support any of the premisses of the above argument, particularly if its truth is challenged. For example, is every deliberate killing of a person murder? Can you think of an exception?

Although it is almost always possible to doubt the premisses of an argument and to ask for other arguments to support those premisses, this process normally ends when the interested parties find premisses that they can agree upon as a starting point. Sometimes this happens quickly, especially when premisses state what is easily observed to be true. But when the arguments concern important issues, such as the morality of abortion, it may be hard to agree on premisses that are less controversial than the proposed conclusions. Sometimes disagreements are so deep that it is impossible for opponents to find any acceptable premisses they can share.

Usually the point of an argument is to support the truth of its conclusion. Demonstrating the truth of a conclusion requires both:

1. the truth of all the premisses;¹ and
2. the right type of support by the premisses for the conclusion.

Logic pays special attention to the second point—the relationship between the premisses and the conclusion. To determine the *logical* strength of an argument, the question of whether the premisses are actually true may be set aside in favor of answering whether the premisses *would* support the conclusion *if* they were true. Although the actual truth of premisses is relevant for critical thinking, it is important to recognize that the truth of premisses and the support they would provide for a conclusion if they were true are two separate issues.

Premises and conclusions of arguments are usually **declarative** sentences, which present information and make assertions. Declarative sentences—unlike ordinary questions and commands—can be either true or false.

Occasionally you will find that a special kind of question called a *rhetorical question* serves as a premiss or conclusion of an argument. The following excerpt, taken from an editorial, argues against using female American soldiers to sexually humiliate detainees during interrogations at military prisons, as described in a Pentagon report.

Does anyone in the military believe that a cold-blooded terrorist who has withstood months of physical and psychological abuse will crack because a woman runs her fingers through his hair suggestively or watches him disrobe? If devout Muslims become terrorists because they believe Western civilization is depraved, does it make sense to try to unnerve them by having Western women behave like trollops?

—Editorial Page, “The Women of Gitmo,” *The New York Times*, 7/15/2005

In this argument the premisses have the grammatical form of questions. But these are rhetorical questions, which means they are devices to emphasize the only suitable response. The writer implies that these questions demand resoundingly negative answers. Thus such questions, unlike ordinary questions, are used to “state the facts.”

¹ An exception to this requirement for true premisses occurs in a form of reasoning called indirect argument.

Using rhetorical questions instead of declarative sentences as premisses or conclusions of arguments is a dramatic and often persuasive way to make a point.

Example

Your friend says to you, “You’re not going to wear *that* shirt to the party, are you?”
(Rhetorical question.)

III. RECOGNIZING ARGUMENTS

Before learning how to classify and evaluate different types of arguments, we want to distinguish arguments from other patterns of language, such as unsupported assertions. In arguments, a sentence that is asserted is supported by other sentences. It makes no sense to accuse someone of presenting a poor argument for a case if no argument at all is offered. The most we can reasonably do in such circumstances is to say that an argument *should* be given to support the assertion.

When we are trying to identify an argument, the first question to ask is what point the author or speaker is making. When we have identified the sentence that makes the point (the conclusion, if it is an argument), then we can ask what assertions, if any, are intended as support or evidence (premisses) for that point.

Examples

1. Cigarette smoking is a serious health hazard. Statistical studies show that cigarette smokers are not only at much greater risk for contracting lung cancer but also have higher incidences of emphysema and heart disease.

In this example, the claim that cigarette smoking is a serious health hazard is the conclusion, and citing statistical studies showing that smokers have higher rates of certain types of serious illness than nonsmokers supports it.

2. Marijuana should not be legalized because it is potentially dangerous and not enough is known about its long-term effects, and because use of marijuana leads to use of hard drugs.

Even though this argument is stated in a single sentence, we can divide that sentence into parts that are themselves sentences and that stand in the relationship of premisses and conclusion. The conclusion of this argument is the declarative sentence: “Marijuana should not be legalized.” The three premisses, conjoined in a compound declarative sentence, are: “it is potentially dangerous,” “not enough is known about its long-term effects,” and “use of marijuana leads to use of hard drugs.” Each of these component sentences is an assertion, the truth of which can be questioned. For this argument to establish the truth of its conclusion, all of these premisses must be true, *and* together they must provide reasons for accepting the conclusion.

Sometimes special words called **indicator words** introduce the premisses or the conclusion of an argument. In several arguments presented already, the word *therefore* served to introduce conclusions. This is a very common use of the term in English. Other terms that often introduce conclusions of arguments are *thus*, *and so*, *consequently*, *necessarily*, *hence*, *it follows that*, and *for that reason*. Words that frequently indicate premisses are *because*, *since*, *for*, and *for the reason that*.

In the following arguments, the indicator words are italicized:

1. There is no difference in the dedication or productivity of men and women office workers. *Therefore*, men and women office workers in comparable positions should be paid the same.

In the above argument for equalizing pay between men and women office workers, the indicator word *therefore* introduces the conclusion of the argument. The premisses are stated before the conclusion.

2. Regarding Wael Ghonim's use of Facebook and Twitter in promoting the Egyptian revolution:

There [is] nothing new about revolutions being social and involving media, *for* in the American Revolution, a pamphlet published in 1776, "Common Sense," by Thomas Paine was second only to the Bible in readership and inspired the colonists to take action against their British ruler. Besides being widely read in private, "Common Sense" also was featured in readings in taverns and coffee houses.

—L.G. Crovitz, *The Wall Street Journal*, 2/14/2011

In the argument above, the conclusion is stated first without an indicator word. The word *for* introduces the premisses.

Although these indicator words often signal premisses or conclusions of arguments, they have other uses as well. Thus when we see these words, we cannot take for granted that we have identified an argument. *Since*, for example, is sometimes used to indicate passage of time, as in "Every week since Harry has been away at college, he has received his hometown paper in the mail."

Because is frequently used to express a causal connection between two events rather than to offer evidence. An example occurs in the sentence "Tony Blair became unpopular because of his role involving Great Britain in the war in Iraq."

Here no attempt is made to prove that Tony Blair, the former British prime minister, became unpopular. Presumably that is so widely known that it needs no support. The sentence asserts, but does not argue, that the reason for his unpopularity was his conduct regarding the war in Iraq. If we want to *argue* that leading Britain into the war caused his unpopularity, we would present evidence that Blair enjoyed popularity before he acted on questionable information about the danger Iraq posed to Britain. We might gather evidence that people were angry with his sending soldiers into a war

based on false assertions. Or the argument might try to eliminate other possible causes of his unpopularity, such as slanderous attacks by Blair's political enemies.

When a subject matter is unfamiliar, it can be difficult to distinguish a causal assertion from an argument. If, for example, someone were to tell me that the National Collegiate Athletic Association (NCAA) will soon rule that football players can be paid by colleges for playing ball *because* there has been so much pressure in favor of this move, I would not know whether she was presenting evidence for the assertion that the rule will be changed or whether she was explaining why the rule will be changed. Because I don't keep up with football news, I don't know which rulings have been made or are being contemplated.

If I am being told that pressure for paying players is a *reason to believe* that the ruling will change, the passage is intended as an argument. If I am being told that the new rule going into effect is a result of pressure that was exerted, the passage is a causal explanation. In many cases we must ask questions, examine the context for clues, or make "educated guesses" about the intent of a set of sentences before we can decide whether it argues for a conclusion or makes a causal assertion.

The indicator terms *for*, *since*, *thus*, and *therefore* are also used in causal explanations of why something happened: "He was invited to the wedding since he's my mother's favorite cousin." "My dog ran away; therefore I am putting up this sign to ask for help in finding him." "She sets high goals for herself; thus she was disappointed to place third in the marathon."

Although sentences that assert a causal connection are not themselves arguments, they can be premisses or conclusions of arguments, as in the following example.

Improper handling of raw poultry is a major cause of salmonella poisoning.
Salmonella can be controlled by cooking poultry thoroughly and disinfecting or
cleaning with hot soapy water any surfaces that have been in contact with raw poultry.

Therefore, if you want to avoid infecting your family with salmonella poison,
you will clean all surfaces that have been in contact with raw poultry.

In addition to their use in causal statements, *thus* and *therefore* sometimes introduce an example or an important point, as in "Not all mammals give birth to live young. *Thus* the platypus is an egg-laying mammal." Closely related to this meaning of *thus* is its use as a synonym for "in this way": "Every day during the last school term, I read over what I had written the previous day, crossed out the rough parts, and rewrote bits of it. *Thus* I learned to write a decent essay."

Although indicator words can alert us to the presence of an argument, because of their other uses they are not absolutely reliable. Moreover, some arguments lack any indicator words. In these cases, we depend on the context as well as the meanings of the sentences to determine whether someone is presenting an argument or instead a series of unsupported assertions.

Here is an argument that has no indicator words:

A judgment of acquittal by reason of insanity is appropriate only when a jury verdict of guilty would violate the law or the facts. We cannot say that this was the situation in Washington's case. The district court did not err in its refusal to enter a judgment of acquittal by reason of insanity.

—United States District Court of Appeals,
(District of Columbia; Bazelon, *Washington v. United States*)

The context (a decision by a court of appeals) is helpful in determining that the above is an argument, because court rulings are supposed to be supported by reasons. The last sentence of the passage asserts that the district court's judgment was not in error, and the reasons for this (the premisses) are given in the first two sentences. To decide whether an argument is present, we should ask ourselves (1) "What point is being made?" and (2) "What evidence is offered to support it?" In this case, we can spot the conclusion if we know that it is the business of district courts of appeals to decide whether lower court rulings are correct. Without background knowledge, however, it can be difficult to decide whether a given sentence is intended to be a premiss or a conclusion.

When no indicator words are present, try to insert them (premiss indicators before suspected premisses and conclusion indicators before conclusions) to see whether the passage makes sense when reconstructed in this way. This method will not always work, because if we are unsure of the context we may be unable to see whether one way of constructing the passage makes more sense than another. Assuming that the district court of appeals was ruling on whether the lower court was correct, if we insert indicator words in the previous example, it reads like this:

Since a judgment of acquittal by reason of insanity is appropriate only when a jury verdict of guilty would violate the law or the facts and *since* we cannot say that this was the situation in Washington's case, *therefore* the district court did not err in its refusal to enter a judgment of acquittal by reason of insanity.

The meaning of the original passage is not changed when the indicator words are inserted; this supports our view that an argument is present and that we have identified its premisses and conclusion correctly.

When we insert indicator words to mark the premisses and conclusion of an argument, we must pay attention to stylistic variations in the way arguments are presented in ordinary language. Frequently, for emphasis, the conclusion of an argument is stated before the premisses, but it is stylistically awkward to begin an argument with *therefore*. If we want to insert indicator words and at the same time have the passage retain correct English style, we sometimes have to reorder the sentences, putting the conclusion sentence last.

In summary, it is helpful, when trying to decide whether an argument is present, to consider the context carefully and to ask the following:

- What point is the speaker or writer trying to make?
- Is the speaker or writer presenting evidence to support the truth of some assertion?
- Is the speaker or writer trying to explain why something happened rather than arguing that it did happen?
- Is an example or illustration—rather than an argument—being presented?

Exercise Set 1.2

PART I. In each of the following arguments:

Use the indicator words to help identify the premisses and the conclusion.

Rewrite the argument in *standard form*. That is to say, write each premiss on a line by itself. Underneath the last premiss, draw a line, and write the conclusion beneath the line. Although in standard form premisses are written above the conclusion, it is advisable to identify the conclusion first. Consider the following example. The conclusion is enclosed in parentheses, and each premiss is underlined:

(The earth is spherical in shape.) For the night sky looks different in the northern and southern parts of the earth, and this would be so if the earth were spherical in shape.

—Aristotle, *de Caelo*

In standard form the argument, which has two premisses, looks like this:

The night sky looks different in the northern and southern parts of the earth.
This would be so if the earth were spherical in shape.

The earth is spherical in shape.

(C) America is not facing an inevitable decline as a world power.

1. Since identical twins, who have the same genes, are more likely to have the same blood pressure than fraternal twins, who share half the same genes, we can conclude that high blood pressure is inherited.

(P1) The only reason (C) would be false is if there are no solutions to its problems: massive debt, poor education, and political impasse.

2. People who say that America is facing inevitable decline as a world power are wrong because the serious problems the U.S. faces, such as massive debt, poor education and political impasse, all have solutions.

(P2) America's serious problems have solutions.

3. In England under the blasphemy laws it is illegal to express disbelief in the Christian religion. It is also illegal to teach what Christ taught on the subject of non-resistance. Therefore, whoever wishes to avoid being a criminal must profess to agree with Christ's teachings but must avoid saying what that teaching was.

—B. Russell, *Skeptical Essays*

4. A coin has been tossed twelve times and has shown a *head* each time. Thus it is very likely that the next time this coin is tossed it will also show a *head*.
5. In poker, a flush beats a straight, and a full house beats a flush, so a full house beats a straight.

(C) The next time that coin is tossed it will show a head.

(P1) The coin has shown a head 12 times in a row

(P2) The result of the previous flips influence the outcome of future flips.

(C) Moral philosophy is an indispensable first step in the larger political campaign for restricting smoking.

(P1) We need to be persuaded that something ought to be done before there is any hope whatsoever that it will.

(P2)

6. Moral philosophy is an indispensable first step in that larger political campaign [for restricting smoking] because we need to be persuaded that something *ought* to be done before there is any hope whatsoever that it will.

—R. E. Goodin, *No Smoking*

7. The poet ought always to seek what is necessary or likely in characters as well as in the construction of the incidents, so that it is either necessary or likely that a character say or do such things as well as necessary, or likely that this incident arise with that one. It is apparent, therefore, that the solutions of plots ought to happen as a result of the plots themselves and not from a contrivance.

—Aristotle, *Poetics*

8. **Background:** *Feng shui*, sometimes called “geomancy,” refers to traditional Chinese beliefs concerning the manipulation and flow of energy (*qi*).

A building facing a vacant lot on the south is good geomantically because in China, during the summer, the south winds are refreshing and bring good ventilation or cosmic breath.

—E. Lip, *Feng Shui for the Home*

9. Over a period of two years now, I have tested my instrument [the newly invented telescope]—or rather dozens of my instruments—by hundreds and thousands of experiments involving thousands and thousands of objects, near and far, large and small, bright and dark; hence I do not see how it can enter the mind of any-one that I have simply remained deceived in my observation.

—Galileo, cited by D. Boorstin in *The Discoverers*

10. Since creationism can be discussed effectively as a scientific model, and since evolutionism is fundamentally a religious philosophy rather than a science, it is clearly unsound educational practice and even unconstitutional for evolution to be taught and promoted in the public schools to the exclusion or detriment of special creation.

—H. Morris, *Introducing Creationism in the Public Schools*

11. Evolutionary theory merits a place among the sciences for . . . [i]t offers a unified set of problem-solving strategies that can be applied, by means of independently testable assumptions, to answer a myriad of questions about the characteristics of organisms, their interrelationships, and their distributions.

—P. Kitcher, *Abusing Science*

12. In the cast of a die [one of a pair of dice], the probability of ace is one-sixth, because we do actually know either by reasoning or by experience, that in a hundred or a million of throws, ace is thrown in about one-sixth of that number, or one in six times.

—J. S. Mill, *A System of Logic*

13. All those who have been president of the United States have worked hard and tried their best to make our nation as good as it can be. Thus, we should view any of their actions that brought harm to the country to be the result of bad decisions and mistakes rather than an evil intention to weaken America.
14. Last night how they'd [FBI agents searching for a kidnapped baby] figured it was: People who *buy* babies black market don't talk about it. But, okay, eventually they do have to buy *things*. So, if the Graves baby is alive, somewhere, maybe in Ohio, maybe far from Pittsburgh—could be in Switzerland, for God's sake—it got handed over or is about to be handed over to someone who might buy a stroller or some health insurance.

—K. George, *Taken*

PART II. In each of the following arguments, the conclusion is enclosed in parentheses. Try to insert appropriate indicator words before sentences that are premisses or conclusions, and see whether the passage makes sense. With some choices of indicator words, the sentences need to be rearranged.

1. Women tend to do better on essay tests than on timed multiple-choice tests. Men tend to do better on timed multiple-choice tests than on essay tests. SAT tests are timed multiple-choice tests. (SAT tests are biased in favor of men.)
2. (The human mind is not the same thing as the human brain.) The human body, including the brain, is a material thing. The human mind is a spiritual thing. Nothing is both a material thing and a spiritual thing.

—K. Campbell, *Body and Mind*

3. (The year 1859 is perhaps the most important one in the history of biology to date.) In that year Charles Darwin published his theory of evolution by natural selection, which has deeply affected not only biology, but other branches of human thought as well.

—L. C. Dunn and T. H. Dobshansky, *Heredity, Race and Society*

4. (A mortgage-backed security has a prepayment risk.) If a homeowner decides to pay off a mortgage ahead of schedule, i.e., prepay the mortgage, the mortgage-backed security containing that particular mortgage does not receive all the anticipated interest payments.

—*Investment Forum*

5. With no legal, regulated disposal facilities available, illegal dumping becomes more attractive. Far more damage will be done to the environment from illegal dumping than from regulated, legal disposal. (Hazardous-waste disposal facilities are essential to the protection of Pennsylvania's environment.)

—F. Kury, *Pittsburgh Post-Gazette*

6. Bernard Madoff, imprisoned after being convicted of defrauding investors of billions of dollars in a giant Ponzi scheme, claimed in an interview that some

of the banks he dealt with knew what he was doing but chose to ignore it. The banks denied any knowledge of the fraud.

Experienced news reporters commenting on this interview said that Madoff had done nothing but lie over the decades while he was committing the fraud, so (why would anyone believe him now?)

7. Since women tend to live longer than men and on average earn less than men and have less pension coverage than men, (women need to invest more for retirement).
8. (Poker is one of the finest exercises for keeping gray matter alive.) “Poker involves mathematics, planning, and strategy—all complicated mental processes—and these are exactly what imparts the benefit of producing more brain neurons,” says Paul D. Nussbaum, Ph. D., a neuropsychologist and an expert in Alzheimer’s disease at the University of Pittsburgh School of Medicine. Further, a regular activity must be both novel and mentally challenging to prevent dementia, and poker can provide both forms of brain stimulation.

—R. Lederer, “We All Speak Poker,” *AARP Magazine*, July–August 2005

PART III. In each of the following, the *indicator words* are italicized. Try to determine whether an argument is offered or whether the *indicator words* are used as part of a causal explanation, to indicate passage of time, or for some other purpose:

1. In some parts of the country, parents have objected to high-school classes requiring students to read *ROMEO AND JULIET*, by William Shakespeare, *because* it portrays teen lust, drug use, and suicide.
2. Blessed is the man that walketh not in the counsel of the ungodly, nor standeth in the way of sinners, nor sitteth in the seat of the scornful. *For* the Lord knoweth the way of the righteous; but the way of the ungodly shall perish.

—Book of Psalms

3. President Nixon resigned *because* of the scandal associated with the Watergate break-in and his desire to avoid impeachment.
4. *Since* Peter the Great, there has been a long, distinguished list of non-Westerners who have sought to bring the ideas of the West to their countries.

—F. Zakaria, *The Post-American World*

5. Man disavows, and Deity disowns me:
Hell might afford my misery a shelter;
Therefore hell keeps her ever hungry mouths all
Bolted against me.

—W. Cowper, “Lines Written During a Period of Insanity”

6. This promotion of colleges to universities is consistent with the long-honored American custom of “raising” a thing by adding to the number of syllables used to describe it. For example, rain is raised to precipitation. College has only two syllables, and even seminary only four. But university, with five syllables, adds distinction. *Thus*: University of Montevallo, Alabama . . . Upper Iowa University . . . Midwestern University, Texas.

—P. Fussell, *Class*

7. *Since* our laws of logic are derived from our practical experience, our reasoning can be valid only so long as we apply it to our environment as it is here and now, so to speak. Should our environment change, we would have to change our logic accordingly.

—N. A. Court, *Mathematics in Fun and in Earnest*

8. To air one’s views at an improper time may be in bad taste. If you have received a letter inviting you to speak at the dedication of a new cat hospital, and you hate cats, your reply, declining the invitation, does not necessarily have to cover the full range of your emotions. You must make it clear that you will not attend, but you do not have to let fly at cats. The writer of the letter asked a civil question; attack cats, then, only if you can do so with good humor, good taste, and in such a way that your answer will be courteous as well as responsive. *Since* you are out of sympathy with cats, you may quite properly give this as a reason for not appearing at the dedicatory ceremonies of a cat hospital. But bear in mind that your opinion of cats was not sought, only your services as a speaker. Try to keep things straight.

—W. Strunk, Jr. and E. B. White, *The Elements of Style*

9. In Richard Strauss’s tragic opera *Elektra*, Elektra is obsessed with revenge against her mother Klytämnestra and her mother’s lover Aegisth, because the two of them murdered Elektra’s father. She waits for her brother Orest to return home to help her, but when she hears that he is dead, she seeks the help of her younger sister, Chrysothemis. Chrysothemis shrinks from the deed, but Elektra says (sings):

You must help me kill Klytämnestra *because* she murdered our father.

—R. Strauss, *Elektra*

10. In the same scene of the opera, Elektra also sings:

You must help me kill Klytämnestra *because* Orest is not here to help me do it.

—R. Strauss, *Elektra*

IV. EXTENDED ARGUMENTS

Thus far, we have looked at arguments that offer one or more premisses in support of a single conclusion. Frequently, however, in real life, we meet not only arguments like this but also a series of interrelated arguments—sometimes in a single paragraph or

even a single sentence. We call these **extended arguments**. Some extended arguments attempt to establish a conclusion by stating premisses and, in addition, by producing evidence for those premisses. Thus, the premisses of the main argument are conclusions of subsidiary arguments. Some arguments display both the pros and cons of a position and present arguments for each side before selecting one conclusion. Other extended arguments present several different arguments in support of the same conclusion. Still others argue for several closely related conclusions. The techniques for analyzing these more complicated extended arguments—that is, for identifying premisses and conclusions—are just the same as for simpler arguments, with slight “bookkeeping” modifications.

First of all, as before, it is helpful to try to discover the main point the speaker or writer is making and to identify the reasons offered in support of that point. Then we can begin to investigate whether any of the premisses of that argument are supported by reasons. If they are, we can say that the main argument contains *subarguments*, which can be investigated as well. This procedure can be messy. But our goal is to understand complicated arguments by reducing them to simpler parts.

Example

Women need to invest more for retirement, for several reasons.

1. According to the National Bureau for Health Statistics (2009), women tend to live an average of 5 years longer than men, and thus spend a longer time in retirement.
2. On average, women earn less than men. According to Bureau of Labor Statistics (2010) women who worked full-time, year-round earned only 80 cents for every dollar earned by men. Because women earn less money, they have less money to invest.
3. Women have less pension coverage than men. According to the Social Security Administration, while earning lower wages, women also work fewer years than men, often because they are caring for children or elderly parents. They thus earn fewer credits for social security. In addition, women are less likely than men to work for companies that provide 401-K or other private pension plans.

In the above extended argument, the main conclusion is stated first, followed by three reasons for accepting the conclusion. Each of the reasons is supported by statistical evidence taken from information provided by U.S. government agencies.

Example

Since there can be no talk of an independent ideology formulated by the working masses themselves in the process of their movement, the only choice is either bourgeois or socialist ideology. There is no middle course. Hence {to belittle the socialist ideology in any way, to turn aside from it in the slightest degree means to strengthen the bourgeois ideology}.

—V. I. Lenin, *What Is to Be Done?*

In the above extended argument, the main conclusion is stated last, following the conclusion indicator word *hence*. The premiss that supports this conclusion is underlined and is itself supported by the sentence following the premiss indicator word *since*. In this example, as in many extended arguments, a conclusion of a preliminary argument is restated in simpler terms (“There is no middle course”) when it is used as the premiss of the next argument.

Exercise Set 1.3

Isolate the arguments in each of the following passages and identify their premisses and conclusions. Write each argument in standard form.

1. We have seen that the capacity to be alone is a valuable resource. It enables men and women to get in touch with their deepest feelings; to come to terms with loss; to sort out their ideas; to change attitudes. In some instances, even the enforced isolation of prison may encourage the growth of the creative imagination.

—A. Storr, *Solitude*

2. Because publishers are aiming at a national market, the number-one criterion for any textbook is avoidance of controversy. Since they must respond to a variety of specific criteria from their buyers, this has resulted in what has been called the “dumbing down” of textbooks.

—C. Holden, *Science* 235 (1987)

3. **Background:** This passage describes the popular energy behind the movement that ousted Egyptian President Hosni Mubarak in early 2011. Free, or open, trade is a policy that allows trade across international boundaries without interference, such as imposing special taxes or duties.

There is a wholly political argument for open trade with Egypt. That energy we saw on TV can go only in a few directions. Egyptians can pour their energies into building a 21st-century economy for Egypt and with it a more productive and peaceful Middle East. Or, if the Egyptian economy falters, they will redirect that energy into grievance and blame seeking, which in our time is a straight path to joining Islamic jihad against the West. . . . In short, we should want them to make money, not war. For now it looks like that is exactly what most of the faces of Egypt’s remarkable revolution want to do.

—D. Henninger, *The Wall Street Journal*, 2/17/2011

4. Through analytic techniques of diverse kinds, through group therapies and encounter groups, by means of hypnosis, drug therapy, and brain stimulation, self-disclosure [the revealing of personal secrets] is aided and interpreted. But the therapeutic value of any one of these techniques is far from established; and the

need for caution in choosing persons best qualified to listen to personal revelation is increasingly clear.... The caution is well founded. One cannot trust all who listen to confessions to be either discreet or especially capable of bringing solace or help. In addition, the act of confessing can in itself increase the vulnerability of persons who expose their secrets, especially in institutionalized practices. Studies have shown that when self-revelation flows in one direction only, it increases the authority of the listener while decreasing that of the speaker. In ordinary practices of confiding, the flow of personal information is reciprocal, as the revelations of one person call forth those of another; but in institutionalized practices, there is no such reciprocity. On the contrary, therapists and others who receive personal confidences are often taught to restrain their natural impulse to respond in kind.

—S. Bok, *Secrets*

5. The grouping of these drugs [LSD, DOM, DMT, psilocybin, mescaline] is not arbitrary or simply for the sake of convenience. They can be considered members of the same drug class for two important reasons. First, they elicit a common set of effects: sensory perceptual (distorted time sense; altered sensations of colors, sounds, and shapes, ultimately developing into complex, often multimodal hallucinations; and synesthesia, or mixing of the senses); psychic (dreamlike feelings; depersonalization; and rapid and often profound alternations of affect such as depression or elation); and somatic (dizziness, tingling skin, weakness, tremor, nausea, and increased reflexes). Second, and perhaps more important, these drugs display cross-tolerance—that is, a decreased efficacy of one drug taken shortly after another drug. Thus, if a person has a full-blown hallucinatory experience following ingestion of LSD, the normal hallucinatory response to mescaline or DOM taken the next day will be dramatically blunted or abolished. Therefore, even though it may be argued, and perhaps correctly so, that drugs such as marijuana and PCP should also be classified as hallucinogenic, they do not belong to the class of LSD-like drugs since they show no evidence of cross-tolerance with them.

—B. L. Jacobs, “How hallucinogenic drugs work,” *American Scientist* 75 (July–August 1987):386

6. **Background:** Steve Jobs, founder of Macintosh, dropped out of college but stayed on campus, sitting in on courses that interested him. Fascinated by calligraphic work on campus posters and labels, he sat in on a calligraphy course to see how it was done.

None of this had even a hope of any practical application in my life. But 10 years later, when we were designing the first Macintosh computer, it all came back to me. And we designed it all into the Mac. It was the first computer with beautiful typography. If I had never dropped in on that single course in college, the Mac would have never had multiple typefaces or proportionally spaced fonts. And

since Windows just copied the Mac, it's likely that no personal computer would have them. If I had never dropped out, I would never have dropped in on this calligraphy class, and personal computers might not have the wonderful typography that they do.

—Steve Jobs, 2005 Commencement Address at Stanford

V. RECONSTRUCTING ARGUMENTS

1. INCOMPLETELY STATED ARGUMENTS

We have already considered the problem of identifying premisses and conclusions when there are no indicator words to help us recognize the parts of an argument. In addition, many arguments in English are incompletely stated, which is to say that some premisses and even the conclusion of an argument may be omitted. Once we recognize the presence of an argument, we frequently have to reconstruct it by supplying missing parts before we can evaluate its strength. In ordinary language, arguments may be stated incompletely to avoid boring a listener or reader with the obvious.

Suppose you are wondering whether Jeb, your lab partner in a chemistry class who was worried about paying a tuition bill, settled his account. Another friend who works in the registrar's office says, "Jeb must have come up with the money, since his application to graduate on Sunday has been approved." The approval of Jeb's application to graduate convinces you that his bill has been paid because, as every student knows, degrees are not granted to those with unpaid tuition bills. Even though "No student with an unpaid bill can graduate" is unstated, this is a premiss of the argument that supports the conclusion that Jeb's tuition was paid. Without this premiss, there is no clear connection between bill paying and graduation. Because you and your friend are both aware of the relevance and the truth of this premiss, however, there was no need to mention it.

Many, but not all, unstated premisses are, like the one just mentioned, **generalizations**. Sentences that say that *all* or *no* members of one class are members of another class are **universal generalizations**. "No student with an unpaid bill can be graduated" is an example of a (negative) universal generalization. "All tuition bills must be paid before graduation" is an example of an affirmative universal generalization.

"The Washingtons are probably wealthy, since they drive a new Cadillac" is another example of an argument with a missing—but presumably obvious—premiss: "Most families who drive new Cadillacs are wealthy." Generalizations that state that some proportion of members of one class are members of another class are **statistical generalizations**. The universal generalization "All families who drive new Cadillacs are wealthy" would not be a good choice for the missing premiss in this argument because driving an expensive automobile is not an infallible mark of wealth. "Most families

who drive new Cadillacs are wealthy” is more likely to be true than “All families who drive new Cadillacs are wealthy.” An indication—not always present—that a statistical generalization is implicit in the above argument is the word *probably*.

Statistical generalizations are sometimes stated numerically, as in “Fifty-three percent of American voters voted for Obama in the 2010 presidential election,” or “Fourteen infants out of one hundred born to mothers with HIV are also infected with HIV.” Universal generalizations can be thought of as limiting cases of statistical generalizations. That is to say, a generalization is statistical if its percentage is greater than 0 percent and less than 100 percent; otherwise a generalization is universal. As we have seen, not all statistical generalizations are stated numerically; *most*, *usually*, *seldom*, *frequently*, and *rarely* can indicate a statistical generalization. Statistical generalizations, like universal generalizations, provide a link between the particular facts mentioned in the stated premisses of an argument (“the Washingtons drive a new Cadillac”) and the conclusion (“the Washingtons are wealthy”).

In the context of an ordinary conversation or informal presentation of an argument, it is appropriate to omit premisses that are obviously true. However, if we are concerned with checking the correctness of an argument, it is good to state that argument as completely as possible. This means that we must occasionally spell out even what is obvious to everyone.

Another reason for seeking out the implicit or assumed, but unstated, premisses in an argument is that when some hidden premisses are exposed, they turn out not to be obvious after all. Consider the following extended argument offered by a student who is trying to persuade a classmate of the benefits of nuclear power:

Well, I’m for it because, first of all, we’re eventually going to use up all our fossil fuels. And, if we don’t do that soon, we’re going to have really bad problems with acid rain, which we already have. The Canadians definitely feel the effects of acid rain. But we don’t think about that because we [in the United States] don’t feel the effects right now. And eventually we’re not going to have an ozone layer left. Even though there are definite costs to nuclear power—I mean a disaster like there was at Chernobyl would be a nightmare—but if the plants were safely managed and operated, then a disaster like that would be less likely. . . .

At this point, the other student in the discussion interrupted to point out that nuclear power is not the only alternative to fossil fuels. Other sources of power, such as wind, hydroelectric, and solar, are available, she said. In this discussion (which was recorded in a study of how students reason in ordinary conversation), the first student had not said anything like “The only choice is between fossil fuels and nuclear power,” but the second student correctly understood that this was a hidden premiss in her argument. The first student’s argument for the use of nuclear power focused on problems

with fossil fuels, but this line of reasoning would support nuclear power only if other alternatives were not available or were not adequate to meet our energy needs.

After the hidden premiss (which in this case was not a generalization) was pointed out and challenged, the first student revised her argument. She conceded the point that solar, wind, and hydroelectric power might eventually be feasible alternatives to nuclear power and fossil fuels but said that, at the present stage of technological development, the alternatives could not supply the nation's energy needs.

In the give-and-take of conversation, which is where most of us learn to develop our skills at critical thinking, premisses that are implicit (unstated) are most easily recognized when they are not shared by all participants. The first student in the conversation knew about wind, solar, and hydroelectric power, but she did not consider them real alternatives to nuclear and fossil fuels. The second student was more optimistic about the development and use of alternate power sources, and so she was unwilling to accept the unstated premiss of the first student: that one has to choose between the dangers of nuclear power and the depletion of fossil fuels, with their attendant pollution.

The mistake of basing arguments on a premiss (either stated or unstated) that only two choices are available when a wider range of alternatives exists is common enough to be labeled a *fallacy*. The fallacy has several names: *black-and-white thinking*, *false choice*, *false dilemma*, and *false dichotomy*. This fallacy can be difficult to recognize when the premiss concerning the choice of alternatives is not stated.

An unstated premiss shared by participants in a conversation can sometimes be recognized by noting when it is referred to later as if it has been stated. For example, in another recorded discussion of nuclear power, one student argued for nuclear power on the basis that it costs less than fossil fuels. Although this stated premiss was challenged by another student, he did not challenge the unstated assumption (which both students shared) that the *least costly alternative should be chosen*. Later, however, when the second student pointed out that nuclear power actually costs more when the costs of nuclear waste disposal (currently borne by the U.S. government) are included, he remarked that because the first student thought the least costly alternative should be adopted, he therefore should not support nuclear power. Although the first student had not actually said that the least costly alternative should be adopted, he accepted the second student's remark as if he had said it, indicating this was indeed an unstated premiss in his argument for the use of nuclear power.

The following two arguments depend on unstated generalizations that are somewhat more difficult to detect than the unstated premisses in the examples just mentioned.

The first argument is taken from *Crime and the Criminal Law* by Barbara Wootton, one of the first female members of the British Parliament.

To punish people merely for what they have done would be unjust, for the forbidden act might have been an accident for which the person who did it cannot be held to blame.

The conclusion of Wootton's argument is that it is unjust to punish people without taking into account their intentions as well as their actions. The reason she offers for this conclusion is that the forbidden act might have been a blameless accident. The unstated premiss, required to connect blameless actions with ones for which they should not be punished, is a generalization: No persons should be punished for acts for which they do not deserve to be blamed.

Is this general principle correct? In the British system of law, as in the American, actions committed with an evil intent or a "guilty mind" (*mens rea*) are distinguished from accidental actions. Most of us would agree that people should be *blamed* only for acts they intended to do, or at least were negligent in failing to prevent. But both the American and British legal systems sometimes do punish people for "accidental" acts, even when no blame is warranted.

Example

If you are caught in an elevator stuck between floors for an hour and, as a result, find a parking ticket when you return to your car, you are not to blame for overparking. Nevertheless, you probably still have to pay the fine because the law treats this as a case of **strict liability**. In other words, the law recognizes no excuses. Many considerations can be offered to justify strict liability laws. In the case of parking fines, strict liability is justified by appealing to the good use the city makes of money collected from this source, the minor nuisance of paying a small fine even when the violator is not to blame, and the excessive court costs of allowing defenses for simple parking violations.

If we accept the principle of strict liability for some kinds of action, we cannot accept the general principle that connects punishment with blame in an unqualified way. The apparent conflict between strict liability and the principle that conduct should be punished only if it is blameworthy can be resolved by restricting the application of strict liability to **noncriminal** cases. Wootton's book, *Crime and the Criminal Law*, is clearly concerned with criminal justice, and her remarks can be taken to apply in this context. The principle connecting punishment with blameworthiness is well established in Anglo-American criminal law.

Example

Since reason alone can never *produce* any action or give rise to volition [desire], I infer that the same faculty [reason] is incapable of *preventing* volition or of disputing the preference with any passion or emotion.

—D. Hume, *A Treatise of Human Nature*

Hume, writing in the eighteenth century, was concerned with the nonrational aspect of human life—the area of feelings and emotion. One of his famous sayings is "Reason is and ought only to be the slave of the passions." Hume's words are less startling when we realize that "passions" in those days referred in a general way to

human feelings, not specifically to sexual passion. Hume believed that human morality must be founded on the sort of goodness that human beings—with all their biological limitations, natural feelings, and sympathies—are able to achieve, rather than on some intellectual view of an ideal form of goodness.

In this argument for “natural morality,” Hume’s conclusion is that “reason is incapable of preventing volition or of disputing the preference with any passion or emotion.” The words “I infer that” indicate a conclusion is being drawn. Hume offers as evidence the claim that “reason” (the human intellect) cannot by itself produce or cause our desires and wishes. The hidden premiss in this argument seems to be the claim that a general connection exists between the lack of power to cause something and the lack of power to prevent that same thing:

Nothing that is powerless to cause an activity or event of a certain sort is powerful enough to prevent that activity or event.

Does this premiss seem obviously true to you? A wall can stop a rolling ball, but it cannot set the ball in motion. Sometimes it seems that just looking the wrong way at machines prevents them from operating properly, yet only a trained repair person can cause those same machines to work the way they should. You can prevent your antique watch from operating by dropping it into dishwater, but you probably cannot build a new watch or repair the damaged one.

Perhaps we could restate or qualify Hume’s missing premiss so that it appears more plausible. If, for example, Hume was referring not to individual human capacities but to what humans in general can do, the example concerning your watch is no longer applicable because human beings can both produce and destroy watches. Can you think of a case in which humans in general have no power to cause or produce something but do have the power to prevent its operation?

When we are reconstructing arguments, such as when we are determining whether an argument is being offered, careful attention to context—written, spoken, or implied—is crucial. If we intend to deal seriously with Hume’s or Wootton’s arguments, we must consider them in the larger context of these authors’ works and use whatever information we can gather to supply missing premisses. When we are engaged in a discussion with someone who presents an argument, we should ask questions to clarify any unstated premisses. When we are presenting arguments of our own, we should be aware of any hidden premisses that could undermine these.

When we are reconstructing arguments in situations that provide inadequate contextual information, we should supply the missing premisses that are the most plausible under the circumstances. This means that they should have “the ring of truth.” That is, they should be premisses that, although they may not actually *be* true, at least are not known to be false or are not wildly unbelievable. The missing premisses

should also be sentences we could reasonably expect the proponent of the argument to accept.

A particularly insidious form of assuming the truth of an unstated premiss gives rise to the fallacy of **Begging the Question**. This fallacy occurs when some point is assumed to be true, in the absence of any justification for its truth and often in the absence of any agreement about its truth by the parties involved. The logical meaning of “to beg a question” is not the same as “to raise a question” or “to ask a question,” although the phrase is sometimes used this way in ordinary speech. The “question” in “begging the question” refers to the issue that is contested, and “begging” means “assuming.” The use of the term can be confusing because sometimes a question is begged at the same time a different but related question is asked, as in “Have you stopped beating your dog?” Whether you answer yes or no to such a question, you appear to admit to having beaten your dog. The unwarranted assumption (the question begged) behind the question being asked is that you beat your dog in the past.

Identifying and exposing the missing premisses of arguments is a fussy business, complicated by the need to understand the context in which an argument occurs, the information available to the person who presents the argument, the intentions of that person, the purpose of the argument, and other possible factors. Learning more about the structure of different types of arguments will aid our task of finding missing premisses.

Exercise Set 1.4

PART I. Identify each of the following sentences as:

1. a universal generalization; or
2. a statistical generalization.

In some of the exercises, you must depend on common sense or general background knowledge to determine the correct interpretation.

1. Few college ball players become professional athletes.
2. College graduates earn more than those who have never been to college.
3. Fifty-five percent of students on the Dean’s List are women.
4. Today’s students must borrow money to finance their college education.
5. Only the good die young.
6. He who is not thrashed is not educated.
—Menander
7. Whales are mammals.
8. Politicians are honest.
9. People who eat whole grains tend to have normal weight.
10. Computers are not immune to viruses.

PART II. In each of the following, an unstated generalization is required to connect the premisses with the conclusion of the argument. Try to supply a plausible generalization to complete each argument. If no plausible generalization will make the argument succeed, explain why.

1. Female office workers work just as hard as male office workers and are just as productive. Therefore, office workers who are women should receive the same pay as men in comparable positions.
2. Nuclear power should not be used because there is no government plan for the safe disposal of spent fuel.
3. Nuclear power should be used because it is less threatening to the environment than fossil fuels.
4. Using drugs is wrong because people addicted to drugs neglect their duties.
—William Bennett
5. Marijuana should be legalized because it is no more dangerous than alcohol, which is already legal.
6. The current mayor should be reelected because he promises to reduce taxes.
7. The use of fluorescent light bulbs should be mandatory because these require less energy than incandescent bulbs.
8. Tomatoes will be expensive in late winter because growers in Florida were hit by a hard freeze in December.
9. Joseph failed his exam this morning because he was up all night.
10. Your tires will be good for the drive from New York to Los Angeles because they have made it six times before without any trouble.
11. A head will show on the next toss of the coin, for the past six tosses have been heads.
12. Snowdrops are members of the amaryllis family of bulbs and are thus unattractive to rodents.

2. CONTEXTUAL CLUES FOR RECONSTRUCTING ARGUMENTS

We return to the problem of missing premisses after we have had more to say about evaluating different forms of arguments. Now we turn to the question of sorting out the components of arguments in contexts that contain sentences that are neither premisses nor conclusions.

Sometimes an argument is framed in a context of background information that tells us something about the quality of the evidence, how it was gathered, or why it is relevant to the conclusion. Consider the following passage:

A witty experiment by Philip Goldberg proves what everyone knows, that having internalized the disesteem in which they are held, women despise both themselves and each other. This simple test consisted of asking women

undergraduates to respond to the scholarship in an essay signed alternately by one John McKay and one Joan McKay. In making their assessments, the students generally agreed that John was a remarkable thinker, Joan an unimpressive mind. Yet the articles were identical; the reaction was dependent on the sex of the supposed author.

—K. Millett, *Sexual Politics*

Our first clue that this passage contains an argument is the assertion in the opening sentence that something is being proved. To *prove* something is to produce evidence that shows it is true. The conclusion of the argument (the sentence that is proved) is “having internalized the disesteem in which they are held, women despise both themselves and each other.” The evidence for this conclusion is contained in the premiss: “the reaction [to the essays identical but for supposed author] was dependent on the sex of the supposed author.” Millett’s premiss is in turn supported by (is a conclusion drawn from) the outcome of Goldberg’s experiment:

Women undergraduates evaluated identical essays, which differed only in the sexually distinctive names of the supposed authors, as being the work of a remarkable thinker when the supposed author was male, and an ordinary thinker when the supposed author was female.

Additional background information provided in Millett’s passage assures us that the conclusion was something already widely known and that the experiment, a simple test, was witty. None of this information is evidence to support the truth of the conclusion, but it does tell us something about the *quality* of the evidence presented and helps us to understand the author’s point of view.

Here is another argument stated in a context that contains additional information, by social commentator Andy Rooney:

Another way to tell a rich person from a poor person is one I learned years ago when I worked for a morning news broadcast. We often had important people on it as guests and I began to notice one thing that the rich men had in common. They never wore overcoats. Nelson Rockefeller must have been on the show five times on different winter days and he never wore an overcoat or carried one. It was a long while before I realized he was so rich he didn’t need one. He was never out in the cold because all he did was walk the 10 feet from his chauffeur-driven limousine to the building and anyone can stand that much cold. For all I know Rockefeller didn’t even own a raincoat or an umbrella. Most of the restaurants a rich person like him would eat in have canopies extended to the street.

—A. Rooney, “How to Spot Rich People”

The conclusion of Rooney’s argument is “They [rich men] never wear overcoats.” His premisses state that the sample of rich men he observed never wore overcoats. This evidence is strengthened by his suggestion as to why rich men do not

need overcoats. The rest of the passage contains information about how Rooney gathered his sample and speculation about rich men's ability to dispense with rain gear as well as overcoats.

Sometimes the context of an argument provides information that indicates something is true, although the argument itself attempts to establish that the situation is a good one or a bad one. In the following argument, philosopher Bertrand Russell, after telling us that rats behave a certain way toward food, argues that they are sensible to do so.

Rats will eat food that contains rat poison. But if, before eating, they were to subject their food to scientific analysis, they would die of hunger meanwhile, and so they are well advised to take the risk.

Examples that illustrate a point often occur in the context of arguments. Such illustrations are neither premisses nor conclusion, but they clarify points and aid understanding by making general ideas concrete. Patrick Lord Devlin does this in the following passage:

No society can do without intolerance, indignation, and disgust; they are the forces behind the moral law, and indeed it can be argued that if they or something like them are not present, the feelings of society cannot be weighty enough to deprive the individual of freedom of choice. I suppose that there is hardly anyone nowadays who would not be disgusted by the thought of cruelty to animals.

—P. Devlin, *The Enforcement of Morals*

Devlin supports his conclusion, which is underlined, with the premisses that follow in the same sentence. (His argument also depends on a generalization he does not state here but tries to establish elsewhere in his book: No society can live without morals.) Devlin's concrete example of disgust is provided in the last sentence of the quoted passage.

In addition to background information and examples that serve to illustrate and clarify points, arguments often contain remarks intended to put a reader or listener in a *properly receptive frame of mind* to accept their conclusions. Such additional material might convey an atmosphere of humor, fear, seriousness, or any number of other moods. For example, in the argument quoted earlier, Millett tells us that Goldberg's experiment proves "what everyone knows." Such a remark might intimidate a reader who feels inclined to disagree with Millett because it suggests that anyone who does not agree with her conclusion is disputing common wisdom. This sort of statement can distract the reader from a critical examination of the argument under consideration.

When we examine the support that evidence provides for a conclusion, we should separate carefully any additional material from the actual evidence. The extra material may appeal to our emotions and discourage us from taking a close, critical look at the central issue: Does the alleged evidence support the conclusion?

Sometimes arguments repeat, in slightly different words, points already made in a premiss or in the conclusion of the argument. When a conclusion is stated at the beginning of a passage and is followed by reasons for accepting that conclusion, the conclusion may be restated for emphasis at the end of the argument. Restating points when arguments are long and complicated can clarify a presentation by keeping track of where the argument has been and where it is leading. Repetition can help ensure that the reader or listener gets the point.

Less lofty motives, however, also inspire repetition. As advertisers have taught us, repeated exposure to an assertion can convince people that it is true, even when only flimsy evidence, or no evidence at all, has been offered. Thus, an advertising campaign for Brand X soap might call for billboard signs, newspaper and magazine ads, and television and radio spots, all flooding the market with the message “Brand X is the best soap.”

A different use of repetition is found when the conclusion of an argument is repeated but modified slightly to make it stronger or weaker.² Consider the following passage, taken from *The Odd Woman*, a novel by George Gissing, and try to decide what use is served by repeating the conclusion at the end of the argument after stating it initially:

It is the duty of every man, who has sufficient means, to maintain a wife.
The life of an unmarried woman is a wretched one; every man who is able
ought to save one of them from that fate.

Exercise Set 1.5*

Each of the following passages contains at least one argument. Rewrite each argument in standard form. Discuss the role of any additional material in the passages.

1. **Background:** Alexander Hamilton, a Founding Father, author of *The Federalist Papers*, and first U.S. Secretary of Treasury, was killed by Aaron Burr in a duel fought in 1804. Hamilton had participated in earlier duels, which were elaborate forms of conflict resolution in which the duelists usually did not try to kill their opponents but rather intended to demonstrate courage by submitting to the ordeal.

But with his son Philip’s death and his own growing attention to religion, Hamilton had developed a principled aversion to the practice. By a spooky coincidence, in the last great speech of his career Hamilton eloquently denounced dueling. During the Harry Crosswell case [in which Hamilton was attorney for the defense], he argued that [dueling] was forbidden “on the principle of natural justice that no man shall be the avenger of his own wrongs, especially by a deed alike

²These exercises are demanding. Teachers may wish to defer assigning them until later in the term after various forms of arguments, including categorical syllogisms, have been analyzed

interdicted [i.e., forbidden] by the laws of God and man.” In agreeing to duel with Burr, Hamilton claimed to be acting contrary to his own wishes in order to appease public opinion.

—R. Chernow, *Alexander Hamilton*

2. In the past there has been much argument whether, in the strategy of inflation control, one should seek to come to grips with the level of demand or whether one should seek to deal with the wage-price spiral. . . . The proper answer is that both are important. Inflation could be controlled by a sufficiently heavy reduction in the level of demand. It could also be controlled with a less drastic reduction if something could be done to arrest the interreactions of wages and prices, or, to speak more precisely, of wages, profits, and prices.

—J.K. Galbraith, *The Affluent Society*

3. Mobile telephone handsets emit radiation that can be absorbed by the head. There is some worry that this radiation can cause brain cancer, and the World Health Organization has announced that an increased risk of brain cancer from cell phone use is a possibility. But in recent years, although mobile telephone use has increased enormously (there are now more than 5 billion users worldwide), there has not been a corresponding increase in brain cancer, which remains a rare disease. So the fear that using your cell phone will give you brain cancer seems unfounded.
4. If you live in a country like the United States, it is easy to say that population is the major problem [for preserving the environment]. But if you think about it a little more deeply, you could rapidly come to understand that consumption and the kinds of technology that we use are also very important in setting the stage for the world of the future.

For example, people in rural Brazil or rural Indonesia [like most of their counterparts in developing countries] live at about one-fortieth of the consumption level of people in the United States. If you consider that we’ve added 135 million people to the population of the United States since the end of World War II, then you realize that the impact of the extra people in the United States on the world—in terms of levels of consumption, levels of pollution, uses of inappropriate technologies that may themselves be destructive—is about equal to the impact on the world of all the entire population of developing countries—4.2 billion people. It is not justifiable to say that population is the only factor. It’s our lifestyle and our way of dealing with the world that is truly significant.

—P. Raven, *Bulletin of the American Academy*, Spring 2005

5. “Most people wear some sign and don’t know what it’s saying. Choose your sign according to your audience,” Malloy said. “A good dark suit, white shirt and conservative tie are a young man’s best wardrobe friends, if he’s applying for a

white collar job in a big range of business and professional categories. They're authority symbols. It's that simple," he said.

—"Fashion," *Chicago Daily News*

6. Envy is, I should say, one of the most universal and deep-seated of human passions. It is very noticeable in children before they are a year old, and has to be treated with the most tender respect by every educator. The slightest appearance of favoring one child at the expense of another is instantly observed and resented. Distributive justice, absolute, rigid, and unvarying, must be observed by anyone who has children to deal with. But children are only slightly more open in their expressions of envy, and of jealousy (which is a special form of envy) than are grown-up people. The emotion is just as prevalent among adults as among children.

—B. Russell, *The Conquest of Happiness*

7. Money is, with propriety, considered as the vital principle of the body politic; as that which sustains its life and motion and enables it to perform its most essential functions. A complete power, therefore to procure a regular and adequate supply of revenue [by taxation], as far as the resources of the community will permit, may be regarded as an indispensable ingredient in every constitution. From a deficiency in this particular, one of two evils must ensue; either the people must be subjected to continual plunder, or the government must sink into a fatal atrophy, and, in a short course of time, perish.

—A. Hamilton, *The Federalist Papers*

8. Even if humans had stopped emitting greenhouse gases starting in 1988, when NASA scientist James Hansen announced to Congress that global warming had arrived, all the changes today resulting from global warming—the melting of Greenland's ice sheet, the slowing of the North Atlantic Gulf Stream, warmer ocean surfaces, and more intense hurricanes—would still be under way. There is so much carbon dioxide and other greenhouse gases in the atmosphere that even if humans stopped emitting new greenhouse gases tomorrow, the planet would continue to heat up for several more decades and probably longer. As surely as the science of climatology tells us that the warming of the earth is caused by humans, it also tells us that a dramatically warmer and transformed climate is almost certainly inevitable.

—T. Nordhaus and M. Shellenberger, *Break Through*

9. Theories, such as those of Peter Tompkins in his book *Mysteries of the Mexican Pyramids*, that link the pyramids of Egypt and Mexico also find little support in the available archaeological data. In fact, the last of the great pyramids at Giza on the Nile were built nearly 3,000 years before the great pyramids of the Sun and Moon at Teotihuacan [Mexico], or the well-known pyramids in the Maya Lowlands. As Kurt Mendelssohn has pointed out, it is difficult to imagine a

boatload of ancient Egyptians arriving in Mexico and introducing a monumental activity that had not been practiced in their homeland for millennia. Moreover, as many writers have argued, it is much more likely that a boatload of foreigners with no nearby support and no clear military or technological advantage would be killed before they got far from the beach rather than that they would be able to introduce a new architectural style all over ancient Mexico. In addition, the structures have major functional differences: the Egyptian pyramids come to a point and serve as tombs, while the Mexican ones are truncated and serve as foundations for temples, although they sometimes housed tombs as well.

—J. Sabloff, *The Cities of Ancient Mexico: Reconstructing a Lost World*

10. Inevitably historians are involved in selecting from the available sources the material they deem significant in the light of the problems under scrutiny. They never have access to all the facts anyway, and even those to which they do have access are selected to suit their own purposes. There is no history on a mortuary table. The “facts” therefore do not simply “speak for themselves”; the historian stage-manages their performance on the contemporary scene.

Selection, then, is inescapable.

—D. Livingstone, *The Geographical Tradition*

VI. REVIEW

The purpose of this chapter has been to introduce the subject matter of logic and critical thinking, especially where the two overlap. This is a prelude to more detailed attention to various aspects of reasoning that will help students assess the thinking of others and improve their own reasoning abilities. Some skills that contribute to critical thinking are the following:

1. Sensitivity to different uses of language;
2. The ability to recognize when evidence is required to support an assertion;
3. Awareness of the distinction between the truth of sentences and the support they would provide for some other sentence *if* they were true;
4. The ability to recognize arguments, to identify their parts, to supply unstated premisses, and to sort the premisses and conclusion of an argument from the context in which it is stated; and
5. The logical skill of evaluating an argument in terms of how well the premisses support the conclusion.

All of these critical-thinking skills are useful and important in our everyday lives. Our language reflects what is important in human culture; as with other vitally interesting aspects of human life, a special vocabulary has developed for discussing issues

in logic and critical thinking. Because some of this vocabulary may be new to you, or is used in a new way, it is helpful to review the definitions of the most important terms:

Argument A set of sentences related in such a way that some of the sentences are presented as evidence for another sentence in the set.

Conclusion The sentence in an argument that is supposedly supported by the evidence.

Declarative Sentence Declarative sentences—as opposed to questions, commands, requests, and exclamations—assert that something is the case.

Evidence Evidence is information that is offered in support of some assertion. It may be physical evidence, as when damaged goods are presented to support a claim that they are defective; or it may be verbal, in which case some sentences are offered to support the truth of another sentence.

Fallacy A mistake in reasoning, in particular, of supposing—or pretending—evidence has been presented in support of an assertion, when some form of nonevidential persuasion has been used instead.

Fallacy of Begging the Question A mistake in reasoning that occurs when some assumption is taken to be true without justification. For example, to say that a particular herb cannot be harmful because it is found in nature begs the question of whether all natural things are harmless.

Fallacy of Black-and-White Thinking A mistake in reasoning that occurs when it is supposed that only two alternatives are available although in fact others are possible. For example, “It cannot be white; therefore, it must be black” ignores the whole range of shades of gray.

Indicator Words Words commonly used to signal premisses or conclusions of arguments. Examples of premiss indicator words are *for*, *since*, *because*, and *for the reason that*. Examples of conclusion indicator words are *hence*, *thus*, *therefore*, and *so, it follows that*, and *for that reason*.

Logic The formal systematic study of the principles of valid inference and correct reasoning, and the application of those principles to the analysis and appraisal of arguments.

Premiss A sentence that is offered as evidence in an argument.

Statistical Generalization A sentence that states that some proportion of members of one class are members of another class. Common forms of these sentences are: “Most . . . are . . .” and “Most . . . are not . . .” Statistical generalizations may also be expressed numerically, as in “x percent of . . . are . . .”

Universal Generalization A sentence that states that all or none of the members of one class are members of another class. Common forms of these sentences are: “All . . . are . . .” and “No . . . are . . .,” where the blanks are filled in by terms that denote classes of individuals.

The terms in boldface above are the most important ones introduced in chapter 1 and are used throughout this text. Two other terms that are part of the standard vocabulary of logic and critical thinking are so often misused that they should be mentioned here:

Infer To infer is to conclude from something known or assumed. This is a mental activity that may be—but need not be—expressed in language.

For example, on the basis of the dark circles under a friend’s eyes, you might *infer* that your friend did not get enough sleep last night, but you would not say anything at all. If you *argue* that your friend did not get enough sleep, you *state* the evidence (cite the dark circles) and the conclusion. Arguing, unlike inferring, is an activity that requires the use of language. When you state your reasons for drawing an inference—when you express in language the premisses and the conclusion—you transform the inference into an argument.

ImPLY To imply is to provide a basis from which an inference may be drawn. Words, actions, looks, appearances may all “have implications”—that is, they may provide a basis for someone to infer something from them. It is also appropriate to speak of a person’s implying something, through words, silence, looks, or some other feature. *ImPLY* also has another special meaning, in the context of deductive logic: To say that one sentence implies another means that the second sentence follows from or is a consequence of the first. *Infer* is sometimes confused with *imply*, as in “Your scowls infer that you disapprove of Mary Ann.” A scowl can imply disapproval but not infer it. As Fowler, in his *Dictionary of Modern English Usage*, says of *imply* and *infer*, respectively: “Each word has its own job to do, one at the giving end and one at the receiving.”

The best way to review this type of subject matter is to work more exercises. If you can complete the exercises in the following section successfully, you will know that you have mastered the material covered in chapter 1. Some of these exercises are difficult, so do not be discouraged if they require a lot of effort. Moreover, because these arguments are stated in ordinary language—which is not always as precise as we would like—and because the selected passages are taken out of broader contexts, different interpretations of a given passage are possible. In a given case, for example, it may be unclear whether the author is providing an argument or a causal explanation, or whether providing just one argument or several. If a premiss seems to be missing, the most plausible missing premiss to supply might not be clearly identifiable. Whenever you think more than one interpretation is plausible, mention this and give your reasons for each interpretation. If the skills of logic and critical thinking you are developing in this course are to be useful in the ordinary situations you encounter in everyday life, you must practice with examples taken from such contexts.

Exercise Set 1.6

For each of the following passages:

- (a) Indicate whether or not the passage contains an argument (or several arguments).
- (b) Write the argument(s) in standard form.
- (c) If an argument depends on a missing generalization as an implicit premiss, supply the generalization.
- (d) Discuss any cases in which nonevidence, such as a threat, might be mistaken for evidential support.
- (e) Indicate what role any additional material not part of the premisses or the conclusion plays in the passage.

1. At best, though, there is very little chance of a longtime future in smokejumping. [Smokejumpers fight forest fires by using parachutes to get close to the fire and attempting to quench it.] To start with, you are through jumping at forty, and for those who think of lasting that long there are only a few openings ahead, administrative or maintenance.

—N. Maclean, *Young Men and Fire*

2. Since no man has a natural authority over his fellow man, and since force is not the source of right, convention remains as the basis of all legitimate authority among men.

—J.-J. Rousseau, *The Social Contract*

3. Scientifically, it [Captain James Cook's first voyage to the South Pacific] was a hugely successful venture. The transit of Venus was accurately observed and recorded, kangaroos were discovered, ethnographic studies of indigenous peoples carried out, the New Zealand coastline was charted, and a vast amount of material collected and shipped back to the Royal Society—thousands of plants, five hundred fish preserved in alcohol, five hundred bird skins and hundreds of mineral specimens.

—D. Livingstone, *The Geographical Tradition*

4. Suppose Achilles [the famous Greek warrior] runs ten times as fast as the tortoise [a very slow moving animal] and gives him a hundred yards start. In order to win the race, Achilles must first make up for his initial handicap by running a hundred yards; but when he has done this and has reached the point where the tortoise started, the animal has had time to advance ten yards. While Achilles runs these ten yards, the tortoise gets one yard ahead; when Achilles has run this yard, the tortoise is a tenth of a yard ahead; and so on, without end. Achilles never catches the tortoise, because the tortoise always holds a lead, however small.

—M. Black, "Achilles and the Tortoise,"
in W. Salmon, Ed., *Zeno's Paradoxes*

5. Poetry, indeed, cannot be translated, and therefore it is the poets who preserve languages; for we would not be at the trouble to learn a language when we can have all that is written in it just as well in translation. But, as we cannot have the beauties of poetry but in its original language, we learn it.
—S. Johnson
6. Adam was led to sin by Eve and not Eve by Adam. Therefore it is just and right that woman accept as lord and master him whom she led to sin.
—St. Ambrose
7. IBM's computer, Watson, defeated two champion human players at Jeopardy. This victory led some people to claim that the machine possessed powers of understanding on a level with humans. Against this view, philosopher John Searle argued that the machine did not and could not understand anything. It merely did what it was designed to do, namely, to simulate understanding. Computers can store vast amounts of information that they can retrieve with great speed on the basis of appropriate clues. But, Searle argues, computers are incapable of understanding, in the literal sense of the term.
8. [Some] Christians seem to think that they have a right to use the law to enforce Christian morality on divorce, abortion, contraception, assisted procreation, suicide and so on. I am myself a Christian and I have always thought that, while upholding their own moral values, Christians should also be especially concerned to uphold the value of personal autonomy. There has been a long tradition of Christian theological thought . . . which emphasizes the primacy of the individual "conscience." St. Thomas Aquinas says, for example, that it is a sin to go against the dictates of one's conscience. Again, it has always been a tenet of traditional Christianity that it is a sin to coerce non-Christians into the Christian Church, and one may legitimately infer that it is similarly against Christian faith to use the law to coerce non-believers in respect of moral matters.
—M. Charlesworth, *Bioethics in a Liberal Society*
9. [The] vision of a society of autonomous moral agents choosing freely for themselves, and willingly tolerating a situation of moral or ethical pluralism, on the basis of their commitment to the value of liberty or moral autonomy, has been subjected, over the last thirty years, to a sustained critique from various quarters. There have been, first, attacks on the notion of autonomy itself: for example that it grossly overestimates the capacity of people to make decisions for themselves and neglects the degree to which every human decision is influenced by both external and internal (psychological) factors. Thus it has been said that we are inescapably part of a particular community and that communal values and practices largely set our ethical goals for us. We discover them and do not directly choose them. This is especially the case in so-called "traditional" societies where the whole idea of autonomous individuals choosing their own life

projects and engaging in what Mill calls their own “experiments in living” is, so it is claimed, absurd.

—M. Charlesworth, *Bioethics in a Liberal Society*

10. Hair analysis has been found to be a good test in screening large groups of people for exposure to toxic trace metals. It is not as widely used as blood analysis, but studies have shown that concentrations of lead, cadmium, arsenic, and mercury in hair provide a good record of exposure.

Also, since the metal grows out with the hair, lengthwise sections of hair can show the approximate time when a short, intense exposure occurred.

Chromium is essential for the hormone insulin to work properly. Thus, in time, it may be that measurements of chromium in hair will be useful in identifying people with diabetes and in monitoring the course of the disease.

—J. Mayer and J. Goldberg, “Food for Thought”

11. My suggestion for a wine to accompany chocolate desserts is different [from wines made from the muscat grape]. I prefer a rich, slightly sweet red wine. Indeed, it was a chocolate dessert that led me to change my mind about late-harvest zinfandels.

The proper use for those alcoholic, full-fruited wines with considerable residual sugar is with chocolate. The very strength of the wine cuts through the rich heaviness of the chocolate.

—P. Machamer, “Wine,” *Pittsburgh Post-Gazette*

12. “Public schools must improve or face extinction,” says the president of the American Federation of Teachers.

Albert Shanker, leader of the 600,000 member union, said here yesterday the future of public education is threatened by the prospect of tuition tax credits and vouchers for parents who send their children to private and parochial schools.

With the student exodus, “Ultimately, we would have the end of public education in this country. Public schools could become like the poorhouse or the charity ward of a hospital. . . .”

“Tuition tax credits is not a disease you feel right away. It’s not like a toothache. . . . It’s like a creeping cancer,” Shanker said.

Some of the problems with public education that would cause parents to choose nonpublic schools are discipline and academic standards, he said.

—*Pittsburgh Press*

13. The thought tends to wrap itself in a joke because in this way it recommends itself to our attention and can seem more significant and more valuable, but above all because this wrapping bribes our powers of criticism and confuses them. We are inclined to give the *thought* the benefit of what has pleased us in the form of

the joke; and we are no longer inclined to find anything wrong that has given us enjoyment and so spoil the source of the pleasure.

—S. Freud, *Jokes and Their Relation to the Unconscious*

14. It is incontestable that sense perception plays a crucial role in the natural sciences. It serves as the sole means through which we can gather information about the world around us. Knowledge of general laws is posterior, in the empirical sciences, to knowledge of particular instances, and for the latter the evidence of the senses is required.

—R. Swartz, *Perceiving, Sensing, and Knowing*

15. If a person is known to lie occasionally, it is not reasonable to accept something *simply* on the ground that he testifies to it. Similarly, once the senses have been discovered to be capable of deception, it is not reasonable to regard a belief as solid or permanent *merely* because it is based on sensory evidence. For it may turn out that the occasion on which the senses provided the evidence for the belief was one on which the senses were deceptive; and then, of course, the belief would have to be abandoned. Despite this, however, it may still be reasonable to regard some sensory beliefs as permanent and indubitable, if occasions on which the senses are absolutely reliable can be distinguished from those on which they are likely to deceive.

—H. Frankfurt, *Demons, Dreamers, and Madmen*

16. Noting the diversity of Paraguayan languages, Dobrizhoffer comments: “Truly admirable is their varied structure, of which no rational person can suppose these stupid savages to have been the architects and inventors. Led by this consideration I have often affirmed that the variety and artful construction of languages should be reckoned among the other arguments to prove the existence of an eternal and omniscient God.”

—M. Harris, *The Rise of Anthropological Theory*

17. The first ten amendments (“The Bill of Rights”) to the United States Constitution grant certain rights to all citizens to protect them from certain kinds of interferences from their own government. One citizen cannot violate the constitutional rights of another citizen for the purely logical reason that constitutional rights are rights against the government, not rights against other individuals.

—J. Murphy and J. Coleman, *The Philosophy of Law*

18. My position has been that savage ignorance is just as rational as civilized knowledge. Magic and religion, to many people, are a part of common sense. As a part of common sense it is reasonable for them to hold it. If another part of their common sense is an uncritical attitude towards belief, an acceptance of the received or traditional ideas, then their belief in common sense is reinforced and doubly rational. In our society superstition and elementary popular science are all mixed up. But part of common sense in our society is the attitude of being critical

towards traditional or received ideas. Once one becomes critical, and establishes standards of being critical, then I personally believe that it is no longer reasonable to hold on to the more simple-minded magico-religious beliefs in prayers and spells. So I can provide a reason why I accept western science and not magic in, say, the matter of farming. At the same time I can insist that, within his common sense, or frame of reference, the savage is also being reasonable.

—I. C. Jarvie, *The Revolution in Anthropology*

19. Despite abundant literature on the subject, the occurrence of human cannibalism in Old World prehistory remains an open question. We are concerned here with dietary cannibalism—the use of humans by humans as food—evidence for which is found in patterns of bone modification and discard. The key features of dietary cannibalism involve close, detailed similarities in the treatment of animal and human remains. If it is accepted that the animal remains in question were processed as food items, then it can be suggested by analogy that the human remains, subjected to identical processing were also eaten.

—P. Villa et al., “Cannibalism in the Neolithic,” *Science* 233 (1986)

20. By the snapping of twigs, and the rustling of leaves, [the Deerslayer knew that] Hetty had evidently quitted the shore, and was already burying herself in the forest. To follow would have been bootless, since the darkness, as well as the dense cover that the woods everywhere afforded, would have rendered her capture next to impossible; there was also the never-ceasing danger of falling into the hands of their enemies. After a short and melancholy discussion, therefore, the sail was again set, and the ark pursued its course toward its habitual moorings.

—J. F. Cooper, *The Deerslayer*

21. So we have lots of uncertainty about [human cloning], and that is precisely why it is so problematic to justify a ban on harm-prevention grounds. The usual legal standard requires clear evidence of serious harm, at the least. Here we do not come close to meeting it. If we were to wait a bit, and see what happens, then we could form our judgments with greater knowledge as to how the practice did impact the lives of the newly cloned and their immediate families. At that point, we might learn things that support the worst fears of the opponents of cloning, and if so, then we can use hard evidence, not abstract fears, to decide what form of ban (whole or partial, conditional or absolute) to impose on the practice.

—R.A. Epstein, *Clones and Clones*

22. The Catholic Church had a deep investment in controlling the calendar. The Counter-Reformation movement saw an increasing tightening of days and dates both inside and outside the Lenten season. Under the circumstances, determining Easter was as much a sign of ecclesiastical authority as it was of natural astronomical rhythms. By the sixteenth century, the tables for calculating its annual date no longer synchronized with the lunar cycle and in 1582, Pope Gregory XIII signed a papal bull designed to reconcile the discrepancies. But in canceling ten

days of October of that year he put Italy and other Catholic countries out of step with Protestant and Orthodox countries which continued to follow the old style Julian calendar (England only shifted in 1752, Russia in 1918 and Greece in 1923). The new Gregorian calendar made it clear that accepting a way of judging the date [of Easter] was a matter of accepting papal supremacy.

—E. Welch, *Shopping in the Renaissance*

23. Describe the “argument” the author uses to convince Maria that free will does not exist:

We were eating cold fruit-soup. The soup was served in a huge tureen. It was a beautiful piece of china, and Maria was particularly fond of it. She hated things being broken, even a Woolworth tumbler. The veranda was surrounded by large polished panels of glass. I got up, by now trembling with anger, and lifted the tureen up from the table. I said:

“Look, Maria, let us settle this problem in an empirical way, once and for all. If you continue to assert that I have a Free Will, you will thereby enrage me to the point when I cannot help smashing this tureen against the windowpane, for my actions are determined by your words. If you recognize that there is no such thing as a Free Will, the tureen will automatically be safe. But what is a tureen compared to the problem we are trying to settle?”

“It is *my* tureen,” Maria said, watching my hands with anguish.

“I give you ten seconds to decide.” I started counting—one-two-three, in a cold rage. . . . At the count of nine, Maria said:

“All right, you win, put it down.”

“You admit that I have no Free Will?” I asked, to make quite sure.

“You certainly haven’t.”

—A. Koestler, *The Invisible Writing*

24. [B]ecause the . . . rules are designed to benefit all and because the punishments prescribed for their violation are publicized and the defenses respected, there is some plausibility in the exaggerated claim that in choosing to do an act violative of the rules an individual has chosen to be punished.

—H. Morris, “Persons and Punishment,” 1968, *The Monist* 52

25. And although it is utterly true that God’s existence is to be believed in because it is taught in the Holy Scriptures and, on the other hand, that the Holy Scriptures are to be believed because they have God as their source (because, since faith is a gift from God, the very same one who gives the grace that is necessary for believing the rest can also give us the grace to believe that he exists); nonetheless, this cannot be proposed to unbelievers because they would judge it to be a circle.

—R. Descartes, “Letter to the Dean and Doctors of the Faculty of Sacred Theology of Paris”