

critical thinking & reasoning

chapter 6

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introduction

As we meander through our daily routines, we are surrounded by numerous messages and people trying to get our attention and convince us to do something. We sign into our e-mail accounts and are bombarded with sales pitches to help us get rich quick or promise to fix all of our embarrassing physical problems. We drive to school and see billboards touting tantalizing restaurants or pitching local political candidates. We converse with our friends and family about current events like the crazy car thief who tried to avoid the police by driving down train tracks right into an oncoming train. Throughout all of these exchanges, we must constantly strive to make sense of the messages and determine which are true and which are not true, which are probable and which are improbable, which are intended and which are unintended. When we do this we practice **critical thinking**. We evaluate the **arguments** presented and determine if their **logic** is sound or if they rely on **fallacies** to build their case. In this chapter you will learn how to use critical thinking in all areas of your life, including preparing and presenting speeches. You will also learn how to construct a logical argument that avoids the pitfalls of fallacious thinking.

critical thinking

Critical thinking has been defined in numerous ways. At its most basic, we can think of critical thinking as active thinking in which we evaluate and analyze information in order to determine the best course of action. We will look at more expansive

chapter objectives

After studying this chapter, you should be able to:

1. Understand and explain the importance of critical thinking
2. Identify the core skills associated with critical thinking
3. Demonstrate the difference between deductive and inductive reasoning
4. Construct a logically sound and well-reasoned argument
5. Avoid the various fallacies that can arise through the misuse of logic
6. Apply chapter concepts in final questions and activities

definitions of critical thinking and its components in the following pages.

Before we get there, though, let's consider a hypothetical example of critical thinking in action.

chapter outline

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We are approaching a new age of synthesis. Knowledge cannot be merely a degree or a skill... it demands a broader vision, capabilities in critical thinking and logical deduction, without which we cannot have constructive progress.

~ Li Ka Shing



Shonda was researching information for her upcoming persuasive speech. Her goal with the speech was to persuade her classmates to drink a glass of red wine every day. Her argument revolved around the health benefits one can derive from the antioxidants found in red wine. Shonda found an article reporting the results of a study conducted by a Dr. Gray. According to Dr. Gray's study, drinking four or more glasses of wine a day will help reduce the chances of heart attack, increase levels of good cholesterol, and help in reducing unwanted fat. Without conducting further research, Shonda changed her speech to persuade her classmates to drink four or more glasses of red wine per day. She used Dr. Gray's study as her primary support. Shonda presented her speech in class to waves of applause and support from her classmates. She was shocked when, a few weeks later, she received a grade of "D". Shonda's teacher had also found Dr. Gray's study and learned it

was sponsored by a multi-national distributor of wine. In fact, the study in question was published in a trade journal targeted to wine and alcohol retailers. If Shonda had taken a few extra minutes to critically examine the study, she may have been able to avoid the dreaded "D."

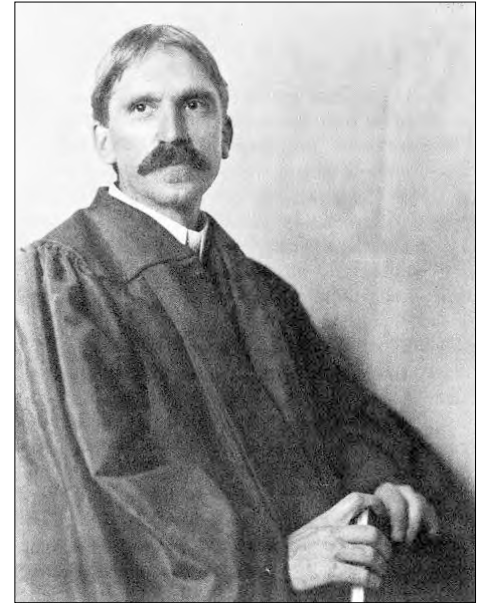
Shonda's story is just one of many ways that critical thinking impacts our lives. Throughout this chapter we will consider the importance of critical thinking in all areas of communication, especially public speaking. We will first take a more in-depth look at what critical thinking is – and isn't.

Before we get too far into the specifics of what critical thinking is and how we can do it, it's important to clear up a common misconception. Even though the phrase critical thinking uses the word "critical," it is not a negative thing. Being critical is not the same thing as criticizing. When we criticize something, we point out the flaws and errors in it, exercising a negative value judgment on it. Our goal with criticizing is less about understanding than about negatively evaluating. It's important to remember that critical thinking is not just criticizing. While the process may involve examining flaws and errors, it is much more.

critical thinking defined

Just what is critical thinking then? To help us understand, let's consider a common definition of critical thinking. The philosopher John Dewey, often considered the father of modern day critical thinking, defines critical thinking as:

"Active, persistent, careful consideration of a belief or supposed form of knowledge in light of the grounds that support it and the further conclusions to which it tends" (Dewey, 1933, p. 9).



The first key component of Dewey's definition is that critical thinking is *active*. Critical thinking must be done by choice. As we continue to delve deeper into the various facets of critical thinking, we will learn how to engage as critical thinkers.

Probably one of the most concise and easiest to understand definitions is that offered by Barry Beyer: "Critical thinking... means making reasoned judgments" (Beyer, 1995, p. 8). In other words, we don't just jump to a conclusion or a judgment. We rationalize and justify our conclusions. A second primary component of critical thinking, then, involves questioning. As critical thinkers, we need to question everything that confronts us. Equally important, we need to question ourselves and ask how our own biases or assumptions influence how we judge something.

In the following sections we will explore how to do critical thinking more in depth. As you read through this material, reflect back on Dewey's and Beyer's definitions of critical thinking.

critical thinking traits and skills

Critical thinkers tend to exhibit certain traits that are common to them. These traits are summarized in Table 6.1 (adapted from Facione, 1990, p. 6):

Recall that critical thinking is an active mode of thinking. Instead of just receiving messages and accepting them as is, we consider what they are saying. We ask if messages are well-supported. We determine if their logic is sound or slightly flawed. In other words, we act on the messages before we take action based on them. When we enact critical thinking on a message, we engage a variety of skills including: listening, analysis, evaluation, inference and interpretation or explanation, and self-regulation (adapted from Facione, 1990, p. 6)

Next, we will examine each of these skills and their role in critical thinking in greater detail. As you read through the explanation of and examples for each skill, think about how it works in conjunction with the others. It's important to note that while our discussion of the skills is presented in a linear manner, in practice our use of each skill is not so straightforward. We may exercise different skills simultaneously or jump forward and backward.



Without an open-minded mind, you can never be a great success.
~ Martha Stewart

listening

In order to understand listening, we must first understand the difference between *listening* and *hearing*. At its

Table 6.1 Traits of Critical Thinkers	
Open-Mindedness	Critical thinkers are open and receptive to all ideas and arguments, even those with which they may disagree. Critical thinkers reserve judgment on a message until they have examined the claims, logic, reasoning, and evidence used. Critical thinkers are fair-minded and understand that a message is not inherently wrong or flawed if it differs from their own thoughts. Critical thinkers remain open to the possibility of changing their view on an issue when logic and evidence supports doing so.
Analytic Nature	Critical thinkers are interested in understanding what is happening in a message. Critical thinkers ask questions of the message, breaking it into its individual components and examining each in turn. Critical thinkers dissect these components looking for sound logic and reasoning.
Systematic by Method	Critical thinkers avoid jumping to conclusions. Critical thinkers take the time to systematically examine a message. Critical thinkers apply accepted criteria or conditions to their analyses.
Inquisitive	Critical thinkers are curious by nature. Critical thinkers ask questions of what is going on around them and in a message. Critical thinkers want to know more and take action to learn more.
Judicious	Critical thinkers are prudent in acting and making judgments. Critical thinkers are sensible in their actions. That is, they don't just jump on the bandwagon of common thought because it looks good or everyone else is doing it.
Truth-Seeking Ethos	Critical thinkers exercise an ethical foundation based in searching for the truth. Critical thinkers understand that even the wisest people may be wrong at times.
Confident in Reasoning	Critical thinkers have faith in the power of logic and sound reasoning. Critical thinkers understand that it is in everyone's best interest to encourage and develop sound logic. More importantly, critical thinkers value the power of letting others draw their own conclusions.

most basic, hearing refers to the *physiological* process of receiving sounds, while listening refers to the *psychological* process of interpreting or making sense of those sounds.

Every minute of every day we are surrounded by hundreds of different noises and sounds. If we were to try to make sense of each different sound we would probably spend our day just doing this. While we may hear all of the noises, we filter out many of them. They pass through our lives without further notice. Certain noises, however, jump to the forefront of our consciousness. As we listen to them, we make sense of these sounds. We do this every day without necessarily thinking about the process. Like many

other bodily functions, it happens without our willing it to happen.

Critical thinking requires that we consciously listen to messages. We must focus on what is being said – and not said. We must strive not to be distracted by other outside noises or the internal noise of our own preconceived ideas. For the moment we only need to take in the message.

Listening becomes especially difficult when the message contains highly charged information. Think about what happens when you try to discuss a controversial issue such as abortion. As the other person speaks, you may have every good intention of listening to the entire argument.

However, when the person says something you feel strongly about you start formulating a counter-argument in your head. The end result is that both sides end up talking past each other without ever really listening to what the other says.

analysis

Once we have listened to a message, we can begin to analyze it. In practice we often begin analyzing messages while still listening to them. When we analyze something, we consider it in greater detail, separating out the main components of the message. In a sense, we are acting like a surgeon on the message, carving out all of the different elements and laying them out for further consideration and possible action.

Let's return to Shonda's persuasive speech to see analysis in action. As part of the needs section of her speech, Shonda makes the following remarks:



Americans today are some of the unhealthiest people on Earth. It seems like not a week goes by without some news story relating how we are the fattest country in the world. In addition to being overweight, we suffer from a

number of other health problems. When I was conducting research for my speech, I read somewhere that heart attacks are the number one killer of men and the number two killer of women. Think about that. My uncle had a heart attack and had to be rushed to the hospital. They hooked him up to a bunch of different machines to keep him alive. We all thought he was going to die. He's ok now, but he has to take a bunch of pills every day and eat a special diet. Plus he had to pay thousands of dollars in medical bills. Wouldn't you like to know how to prevent this from happening to you?

If we were to analyze this part of Shonda's speech (see Table 6.2), we could begin by looking at the claims she makes. We could then look at the evidence she presents in support of these claims. Having parsed out the various elements, we are then ready to evaluate them and by extension the message as a whole.

evaluation

When we evaluate something we continue the process of analysis by assessing the various claims and arguments for validity. One way we evaluate a message is to ask questions about what is being said and who is saying it. The following is a list of

typical questions we may ask, along with an evaluation of the ideas in Shonda's speech.

Is the speaker credible?

Yes. While Shonda may not be an expert per se on the issue of health benefits related to wine, she has made herself a mini-expert through conducting research.

Does the statement ring true or false based on common sense?

It sounds kind of fishy. Four or more glasses of wine in one sitting doesn't seem right. In fact, it seems like it might be bordering on binge drinking.

Does the logic employed hold up to scrutiny?

Based on the little bit of Shonda's speech we see here, her logic does seem to be sound. As we will see later on, she actually commits a few fallacies.

What questions or objections are raised by the message?

In addition to the possibility of Shonda's proposal being binge drinking, it also raises the possibility of creating alcoholism or causing other long term health problems.

How will further information affect the message?

More information will probably contradict her claims. In fact, most medical research in this area

Table 6.2 Analysis of Shonda's Speech	
Claims	Evidence
<ul style="list-style-type: none"> Americans are unhealthy America is the fattest country Americans suffer from many health problems Heart attacks are the number one killer of men Heart attacks are the number two killer of women 	<ul style="list-style-type: none"> Some news stories about America as the fattest country Research about heart attacks Story of her uncle's heart attack

contradicts the claim that drinking 4 or more glasses of wine a day is a good thing.

Will further information strengthen or weaken the claims?

Most likely Shonda's claims will be weakened.

What questions or objections are raised by the claims?

In addition to the objections we've already discussed, there is also the problem of the credibility of Shonda's expert "doctor."

A wise man proportions his belief to the evidence.

~ David Hume

inference and interpretation or explanation

The next step in critically examining a message is to interpret or explain the conclusions that we draw from it. At this phase we consider the evidence and the claims together. In effect we are reassembling the components that we parsed out during analysis. We are continuing our evaluation by looking at the evidence, alternatives, and possible conclusions.

Before we draw any inferences or attempt any explanations, we should look at the evidence provided. When we consider evidence we must first determine what, if any, kind of support is provided. Of the evidence we then ask:

1. Is the evidence sound?
2. Does the evidence say what the speaker says it does?
3. Does contradictory evidence exist?
4. Is the evidence from a valid credible source?

Even though these are set up as yes or no questions, you'll probably find in practice that your answers are a bit more complex. For example, let's say

"Imply" or "Infer"?

For two relatively small words, imply and infer seem to generate an inordinately large amount of confusion. Understanding the difference between the two and knowing when to use the right one is not only a useful skill, but it also makes you sound a lot smarter!

Let's begin with imply. Imply means to suggest or convey an idea. A speaker or a piece of writing implies things. For example, in Shonda's speech, she implies it is better to drink more red wine. In other words, she never directly says that we need to drink more red wine, but she clearly hints at it when she suggests that drinking four or more glasses a day will provide us with health benefits.

Now let's consider infer. Infer means that something in a speaker's words or a piece of writing helps us to draw a conclusion outside of his/her words. We infer a conclusion. Returning to Shonda's speech, we can infer she would want us to drink more red wine rather than less. She never comes right out and says this. However, by considering her overall message, we can draw this conclusion.

Another way to think of the difference between imply and infer is: A speaker (or writer for that matter) implies. The audience infers.

Therefore, it would be incorrect to say that Shonda infers we should drink more rather than less wine. She implies this. To help you differentiate between the two, remember that an inference is something that comes from outside the spoken or written text.

you're writing a speech on why we should wear our seatbelts at all times while driving. You've researched the topic and found solid, credible information setting forth the numerous reasons why wearing a seatbelt can help save your life and decrease the number of injuries experienced during a motor vehicle accident. Certainly, there exists contradictory evidence arguing seat belts can cause more



injuries. For example, if you're in an accident where your car is partially submerged in water, wearing a seatbelt may impede your ability to quickly exit the vehicle. Does the fact that this evidence exists negate your claims? Probably not, but you need to be thorough in evaluating and considering how you use your evidence.

A man who does not think for himself does not think at all.

~ Oscar Wilde

self-regulation

The final step in critically examining a message is actually a skill we should exercise throughout the entire process. With self-regulation, we consider our pre-existing thoughts on the subject and any biases we may have. We examine how what we think on an issue may have influenced the way we understand (or think we understand) the message and any conclusions we have drawn. Just as contradictory evidence doesn't

automatically negate our claims or invalidate our arguments, our biases don't necessarily make our conclusions wrong. The goal of practicing self-regulation is not to disavow or deny our opinions. The goal is to create distance between our opinions and the messages we evaluate.



the value of critical thinking

In public speaking, the value of being a critical thinker cannot be overstressed. Critical thinking helps us to determine the truth or validity of arguments. However, it also helps us to formulate strong arguments for our speeches. Exercising critical thinking at all steps of the speech writing and delivering process can help us avoid situations like Shonda found herself in. Critical thinking is not a magical panacea that will make us super speakers. However, it is another tool that we can add to our speech toolbox.

As we will learn in the following pages, we construct arguments based on logic. Understanding the ways logic can be used and possibly misused is a vital skill. To help stress the importance of it, the Foundation for Critical Thinking has set forth universal standards of reasoning. These standards can be found in Table 6.3.

When the mind is thinking, it is talking to itself.
~ Plato

Table 6.3
Universal Standards of Reasoning

All reasoning has a purpose.
All reasoning is an attempt to figure something out, to settle some question, to solve some problem.
All reasoning is based on assumptions.
All reasoning is done from some point of view.
All reasoning is based on data, information, and evidence.
All reasoning is expressed through, and shaped by, concepts and ideas.
All reasoning contains inferences or interpretations by which we draw conclusions and give meaning to data.
All reasoning leads somewhere or has implications and consequences.

logic and the role of arguments

We use logic every day. Even if we have never formally studied logical reasoning and fallacies, we can often tell when a person's statement doesn't sound right. Think about the claims we see in many advertisements today – Buy product X, and you will be beautiful/thin/happy or have the carefree life depicted in the advertisement. With very little critical

thought, we know intuitively that simply buying a product will not magically change our lives. Even if we can't identify the specific fallacy at work in the argument (non causa in this case), we know there is some flaw in the argument.

By studying logic and fallacies we can learn to formulate stronger and more cohesive arguments, avoiding problems like that mentioned above. The study of logic has a long history. We can trace the roots of modern logical study back to Aristotle in ancient Greece. Aristotle's simple definition of logic as the means by which we come to know anything still provides a concise understanding of logic (Aristotle, 1989). Of the classical pillars of a core liberal arts education of logic, grammar, and rhetoric, logic has developed as a fairly independent branch of philosophical studies. We use logic everyday when we construct statements, argue our point of view, and in myriad other ways. Understanding how logic is used will help us communicate more efficiently and effectively.

defining arguments

When we think and speak logically, we pull together statements that combine reasoning with evidence to support an assertion, arguments. A logical argument should not be confused with the type of argument you have with your sister or brother or any other person. When you argue with your sibling, you participate in a conflict in which you disagree about something. You may, however, use a logical argument in the midst of the





argument with your sibling. Consider this example:

Brother and sister, Sydney and Harrison are arguing about whose turn it is to clean their bathroom. Harrison tells Sydney she should do it because she is a girl and girls are better at cleaning. Sydney responds that being a girl has nothing to do with whose turn it is. She reminds Harrison that according to their work chart, they are responsible for cleaning the bathroom on alternate weeks. She tells him she cleaned the bathroom last week; therefore, it is his turn this week. Harrison, still unconvinced, refuses to take responsibility for the chore. Sydney then points to the work chart and shows him where it specifically says it is his turn this week. Defeated, Harrison digs out the cleaning supplies.

Throughout their bathroom argument, both Harrison and Sydney use logical arguments to advance their point. You may ask why Sydney is successful and Harrison is not. This is a good question. Let's critically think about each of their arguments to see why one fails and one succeeds.

Let's start with Harrison's argument. We can summarize it into three points:

1. Girls are better at cleaning bathrooms than boys.
2. Sydney is a girl.

3. Therefore, Sydney should clean the bathroom.

Harrison's argument here is a form of deductive reasoning, specifically a syllogism. We will consider syllogisms in a few minutes. For our purposes here, let's just focus on why Harrison's argument fails to persuade Sydney. Assuming for the moment that we agree with Harrison's first two premises, then it would seem that his argument makes sense. We know that Sydney is a girl, so the second premise is true. This leaves the first premise that girls are better at cleaning bathrooms than boys. This is the exact point where Harrison's argument goes astray. The only way his entire argument will work is if we agree with the assumption girls are better at cleaning bathrooms than boys.

Let's now look at Sydney's argument and why it works. Her argument can be summarized as follows:

1. The bathroom responsibilities alternate weekly according to the work chart.
2. Sydney cleaned the bathroom last week.
3. The chart indicates it is Harrison's turn to clean the bathroom this week.
4. Therefore, Harrison should clean the bathroom.

Sydney's argument here is a form of inductive reasoning. We will look at inductive reasoning in depth below. For now, let's look at why Sydney's argument succeeds where Harrison's fails. Unlike Harrison's argument, which rests on assumption for its truth claims, Sydney's argument rests on evidence. We can define evidence as anything used to support the validity of an assertion. Evidence includes: testimony, scientific findings, statistics, physical objects, and many others. Sydney uses two primary pieces of evidence: the work chart and her statement that she cleaned the bathroom last week. Because Harrison has no contradictory evidence, he can't logically refute Sydney's assertion and

is therefore stuck with scrubbing the toilet.



defining deduction

Deductive reasoning refers to an argument in which the truth of its premises guarantees the truth of its conclusions. Think back to Harrison's argument for Sydney cleaning the bathroom. In order for his final claim to be valid, we must accept the truth of his claims that girls are better at cleaning bathrooms than boys. The key focus in deductive arguments is that it must be impossible for the premises to be true and the conclusion to be false. The classic example is:

All men are mortal.
Socrates is a man.
Therefore, Socrates is mortal.

We can look at each of these statements individually and see each is true in its own right. It is virtually impossible for the first two propositions to be true and the conclusion to be false. Any argument which fails to meet this standard commits a logical error or fallacy. Even if we might accept the arguments as good and the conclusion as possible, the argument fails as a form of deductive reasoning.

A few observations and much reasoning lead to error; many observations and a little reasoning to truth.

~ Alexis Carrel

Another way to think of deductive reasoning is to think of it as moving from a general premise to a specific premise. The basic line of reasoning looks like this:



This form of deductive reasoning is called a syllogism. A syllogism need not have only three components to its argument, but it must have at least three. We have Aristotle to thank for identifying the syllogism and making the study of logic much easier. The focus on syllogisms dominated the field of philosophy for thousands of years. In fact, it wasn't until the early nineteenth century that we began to see the discussion of other types of logic and other forms of logical reasoning.

It is easy to fall prey to missteps in reasoning when we focus on syllogisms and deductive reasoning. Let's return to Harrison's argument and see what happens.

Logic: The art of thinking and reasoning in strict accordance with the limitations and incapacities of the human misunderstanding.

~ Ambrose Bierce



Considered in this manner, it should be clear how the strength of the conclusion depends upon us accepting as true the first two statements. This need for truth sets up deductive reasoning as a very rigid form of reasoning. If either one of the first two premises isn't true, then the entire argument fails.



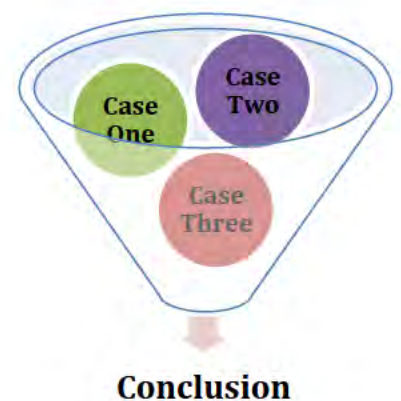
Let's turn to recent world events for another example:

In the debates over whether the United States should take military action in Iraq, this was the basic line of reasoning used to justify an invasion. This logic was sufficient for the United States to invade Iraq; however, as we have since learned, this line of reasoning also shows how quickly logic can go bad. We subsequently learned that the "experts" weren't quite so confident, and their "evidence" wasn't quite as concrete as originally represented.

defining induction

Inductive reasoning is often thought of as the opposite of deductive reasoning; however, this approach is not wholly accurate. Inductive reasoning does move from the specific to the general. However, this fact alone does not make it the opposite of deductive reasoning. An argument which fails in its deductive reasoning may still stand inductively.

Unlike deductive reasoning, there is no standard format inductive arguments must take, making them more flexible. We can define an inductive argument as one in which the truth of its propositions lends support to the conclusion. The difference here in deduction is the truth of the propositions establishes with absolute certainty the truth of the conclusion. When we analyze an inductive argument, we do not focus on the truth of its premises. Instead we analyze inductive arguments for their strength



or soundness.

Another significant difference between deduction and induction is inductive arguments do not have a standard format. Let's return to Sydney's argument to see how induction develops in action:

1. Bathroom cleaning responsibilities alternate weekly according to the work chart.
2. Sydney cleaned the bathroom last week.
3. The chart indicates it is Harrison's turn to clean the bathroom this week.
4. Therefore, Harrison should clean the bathroom.

What Sydney does here is build to her conclusion that Harrison should clean the bathroom. She begins by stating the general house rule of alternate weeks for cleaning. She then adds in evidence before concluding her argument. While her argument is strong, we don't know if it is true. There could be other factors Sydney has left out. Sydney may have agreed to take Harrison's week of bathroom cleaning in exchange for him doing another one of her chores. Or there may be some extenuating circumstances preventing Harrison from bathroom cleaning this week.

You should carefully study the Art of Reasoning, as it is what most people are very deficient in, and I know few things more disagreeable than to argue, or even converse with a man who has no idea of inductive and deductive philosophy.

~ William John Wills

Let's return to the world stage for another example. After the 9/11 attacks on the World Trade Center, we heard variations of the following arguments:

1. The terrorists were Muslim (or Arab or Middle Eastern).



2. The terrorists hated America.
3. Therefore, all Muslims (or Arabs or Middle Easterners) hate America.

Clearly, we can see the problem in this line of reasoning. Beyond being a scary example of hyperbolic rhetoric, we can all probably think of at least one counter example to disprove the conclusion. However, individual passions and biases caused many otherwise rational people to say these things in the weeks following the attacks. This example also clearly illustrates how easy it is to get tripped up in your use of logic and the importance of practicing self-regulation.

understanding fallacies

When we form arguments or examine others' arguments, we need to be cognizant of possible fallacies. A fallacy can be defined as a flaw or error in reasoning. At its most basic, a logical fallacy refers to a defect in the reasoning of an argument that causes the conclusion(s) to be invalid, unsound, or weak. The existence of a fallacy in a deductive argument makes the entire argument invalid. The

existence of a fallacy in an inductive argument weakens the argument but does not invalidate it.

It is important to study fallacies so you can avoid them in the arguments you make. Studying fallacies also provides you with a foundation for evaluating and critiquing other arguments as well. Once you start studying and thinking about fallacies, you'll find they are everywhere. You could say that we live in a fallacious world!

The study of fallacies can be dated back to the start of the study of logic. In ancient Greece, Aristotle classified fallacies into two categories – linguistic and non-linguistic. Within these two categories, he identified 13 individual fallacies. Through time we have reclassified fallacies using various typologies and criteria. For our purposes, we will focus on formal and informal fallacies.



formal fallacies

A formal fallacy exists because of an error in the structure of the argument. In other words, the conclusion doesn't follow from the premises. All formal fallacies are specific types of *non sequiturs*, or arguments in which the conclusions do not follow from the premises. Formal fallacies are identified by critically examining the structure of the argument exclusive of the individual statements. As you read through the following types of formal fallacies and examples, this definition will become more clear.

bad reasons fallacy (argumentum ad logicam)

In this fallacy, the conclusion is assumed to be bad because the arguments are bad. In practice, a premise of the argument is bad and therefore the conclusion is bad or invalid. This fallacy is seen often in debate or argumentation. We summarize the fallacy as: He gave bad reasons for his argument; therefore, his argument is bad. Consider the following claim:



The new employee is too quiet and has no sense of style. We should fire him.

The problem here should be obvious. To be a good employee does not

require a certain look or the ability to put together interesting outfits. (Just look around your campus or workplace and you'll probably see how true this is.) As such, the reasons for concluding the new faculty member should be fired are bad. We commit a fallacy if the conclusion to fire him is also bad or wrong. While the given reasons don't necessarily support the conclusion, there may be others that do.

Bad reasoning as well as good reasoning is possible; and this fact is the foundation of the practical side of logic.

~ Charles Sanders

Peirce

masked man fallacy (intensional fallacy)

The masked man fallacy involves a substitution of parties. If the two things we substitute are identical, then the argument is valid:

Rosamond Smith wrote the book Nemesis.

Rosamond Smith is an alias for Joyce Carol Oates.

Joyce Carol Oates wrote the book Nemesis.

This argument is valid because Rosamond Smith is in fact an alias for Joyce Carol Oates, so there is no flaw in the structure of the argument.

Consider the following example:

Chris told police that a red-haired woman stole her car.

Ginny is a red-haired woman.

Therefore, Chris told police that Ginny stole her car.

The fallacy in this example occurs between the second premise and the conclusion. Looking at each premise individually, we can see that each is true. However, simply because each premise is true doesn't mean the

conclusion is necessarily true. Even if Ginny did steal Chris's car, this fact doesn't make the conclusion true. The existence of this fact cannot be presumed to change what Chris told the police.



fallacy of quantitative logic

Fallacies of quantitative logic revolve around the grammatical structure of the proposition. The focus is on the use of some sort of quantifying word such as "all" or "some." Consider this example:

All philosophers are wise.

We can show the flaw in this statement by simply finding a counter-example. And since the fact of being wise is abstract, how do we truly know if one is wise or not? Consider how the statement changes with the use of a different quantifier:

Some philosophers are wise.

This statement is stronger because it allows for the possibility there are counter-examples. However, the error arises from the fact that it is not a known quantity. We must infer from the statement that some philosophers are not wise.

Let's look at another example:

All conservatives are Republicans.

Therefore, all Republicans are conservatives.

Without thinking too hard you can probably think of one counter-example. Let's try one more:

*Some doctors are not MDs.
Therefore, some MDs are not doctors.*

While the first premise is true (there are other types of doctors), the second is clearly not true.



informal fallacies

An informal fallacy occurs because of an error in reasoning. Unlike formal fallacies which are identified through examining the structure of the argument, informal fallacies are identified through analysis of the content of the premises. In this group of fallacies, the premises fail to provide adequate reasons for believing the truth of the conclusion. There are numerous different types of informal fallacies. In the following, we consider some of the more common types.

accident

(sweeping generalization)

A fallacy by accident occurs when a generally true statement is applied to a specific case that is somehow unusual or exceptional. The fallacy looks like this:

Xs are normally Ys. Z is an (abnormal) X. Therefore, Z is an Y.

Let's look at a specific example to see how this fallacy can easily occur:

*Dogs are good pets.
Coyotes are dogs.
Therefore, coyotes are good pets.*



The fallacy here should be clear. I love dogs and coyotes, but I don't know that I would want a coyote for a pet. The fallacy in this case could be easily fixed with the use of a simple qualifier such as the word "some." If we changed the first premise to read "Some dogs make good pets," then we can see how even if the second premise is true it doesn't automatically lead to the stated conclusion. The basic problem here is that a sometimes true statement is assumed to be universally true.

I do personal attacks only on people who specialize in personal attacks.

~ Al Franken

genetic fallacy (ad hominem)

The ad hominem fallacy occurs when we shift our focus from the premises and conclusions of the argument and focus instead on the individual making the argument. An easy way to remember this fallacy is to think of it as the personal attack fallacy. It is the weak form of arguing that many of us employed on our elementary school playgrounds such as this exchange:

Bill: I think we should go back to class now.

Jane: I don't think we need to worry about it.

Bill: Well, the bell rang a few minutes ago. We're going to be late.

Jane: Well, you're a big jerk and don't know anything, so we don't have to go back to class.

If we examine this exchange we can see that Bill's arguments are sound and supported by what appears to be good evidence. However, Jane ignores these and focuses on Bill's supposed character – he's a big jerk. The fallacy happens when we connect the truth of a proposition to the person asserting it.



Let's consider a more serious example that we see in many political campaigns. We can map out the fallacy as follows:

*My opponent has trait X.
Therefore, she is not qualified to do the job.*

The focus here is on the individual's trait, even when the trait in question has nothing to do with the job. We saw this fallacy in play in the early days of the 2012 U.S. presidential campaign:

We will never get out of debt if we allow a Democrat to remain as president.

The focus here has nothing to do with any individual candidate's skills, experience, or abilities. The focus is solely on their political affiliation.

There is no greater impediment to the advancement of knowledge than the ambiguity of words.

~ Thomas Reid

ambiguity (equivocation)

Fallacies caused by ambiguity occur, not surprisingly, when some ambiguous term is used in the argument. An ambiguous term is one that has more than one meaning. The structure of the argument may be clear, and there may be solid evidence supporting the propositions. The problem arises from having nothing solid on which to base our conclusion. We saw this fallacy in play during the Clinton/Lewinsky investigations. If you recall, when questioned about his relationship with Monica Lewinsky, President Clinton responded that he never had “sexual relations” with that woman. The phrase “sexual relations” can include a whole range of sexual behaviors.

Let’s look at a more recent example:

We won’t be safe until we win the war on terrorism.



Can you spot the ambiguity? Actually there are two: safe and terrorism. What is safe to one person is much less so to another. Likewise, behaviors that appear terrorist-like to one person are simply impassioned acts to another.

An appeal to the reason of the people has never been known to fail in the long run.

~ James Russell Lowell

fallacies of appeal

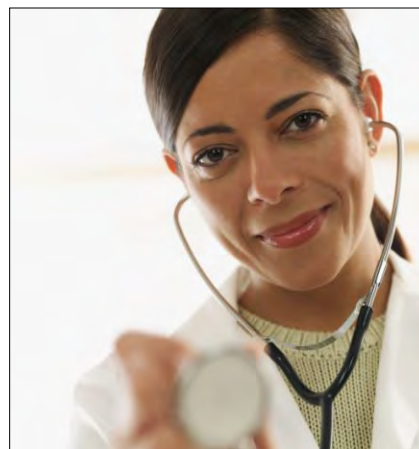
This type of fallacy is actually a group of fallacies. At its most basic, the truth of the argument rests on reference to some outside source or force. We will consider four of the most popular appeal fallacies – appeals to authority, emotion, ignorance, and pity.

appeal to authority (ad vericundiam)

When we appeal to authority we claim the truth of a proposition is guaranteed because of the opinion of a famous person. Appeals to authority look like this:

*Authority figure X says Y.
Therefore, Y is true.*

We see this fallacy in play regularly in commercials or other advertisements featuring a doctor, lawyer, or other professional. Think about, for example, ads for the latest weight loss supplement. A doctor will discuss the science of the supplement. At times she will mention that she used the supplement and successfully lost weight. Even though we do learn something about the specifics of the supplement, the focus is on the doctor and her implied authoritative knowledge. We are to infer that the supplement will work because the doctor says it will work.



The fallacy in this type of reasoning occurs when we confuse the truth of the

proposition with the person stating it. Instead of considering the strength of the argument and any evidence associated with it, we focus solely on the individual.

It can be easy to fall into the trap of this fallacy. For many of your speeches, you will be asked to research the issue at hand and present supporting evidence. This is a prime place for the fallacy to occur. While it is important to support your arguments with outside research, it is also important to critically evaluate all aspects of the information. Remember the example of Shonda’s speech that opened this chapter? Her blind reliance on the research of Dr. Gray is an example of the appeal to authority fallacy.

Anyone who conducts an argument by appealing to authority is not using his intelligence; he is just using his memory.

~ Leonardo da Vinci

appeal to emotion

This fallacy occurs with the use of highly emotive or charged language. The force of the fallacy lies in its ability to motivate the audience to accept the truth of the proposition based solely on their visceral response to the words used. In a sense, the audience is manipulated or forced into accepting the truth of the stated conclusions. Consider the following example:

Any campus member who thinks clearly should agree that Dr. Lenick is a flaming, radical, feminist, liberal. Dr. Lenick has made it clear she believes that equal rights should be granted to everyone without regard to the traditions and history of this campus or this country. Therefore, Dr. Lenick is a bad teacher and should be fired immediately.



The thrust of this argument revolves around two interrelated components – Dr. Lenick’s advocacy of equal rights for all and her alleged disregard for tradition and history. The emotional appeal rests in the phrase “flaming, radical, feminist, liberal” – words that indicate ideological beliefs, usually beliefs that are strongly held by both sides. Additionally, hot button words like these tend to evoke a visceral response rather than a logical, reasoned response.

The highest form of ignorance is when you reject something you don't know anything about.

~ Wayne Dyer

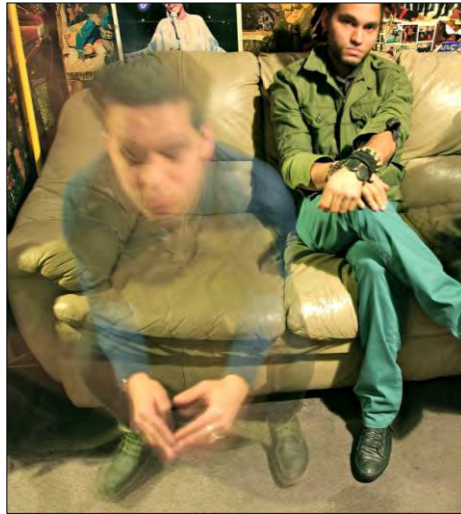
appeal to Ignorance (argumentum ad ignorantiam)

When we appeal to ignorance, we argue that the proposition must be accepted unless someone can prove otherwise. The argument rests not on any evidence but on a lack of evidence. We are to believe the truth of the argument because no one has disproven it. Let’s look at an example to see how appeals to ignorance can develop:

People have been seeing ghosts for hundreds of years. No one has been able to prove

definitively that ghosts don’t exist. Therefore, ghosts are real.

Though rather simplistic, this example makes clear the thrust of this fallacy. The focus is not on supporting evidence, but on a blatant lack of evidence. While ghosts may exist, we don’t know for sure they do – or don’t for that matter. As such, we could also argue that because we can’t prove that ghosts are real they must not exist.

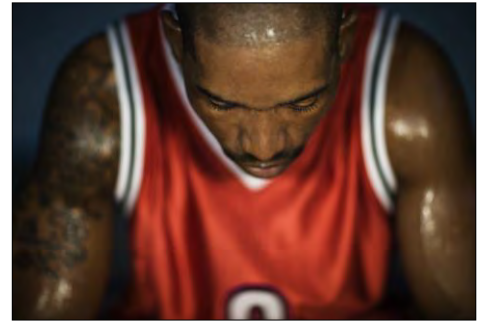


appeal to pity (argumentum ad misericordium)

Appeals to pity are another form of pulling on the emotions of the audience. In the appeal to pity, the argument attempts to win acceptance by pointing out the unfortunate consequences that will fall upon the speaker. In effect, the goal is to make us feel sorry for the speaker and ignore contradictory evidence. This form of fallacy is used often by students. Consider this message a professor recently received at the end of the semester:

I know I have not done all the work for the semester and have been absent a lot. However, I am the key point guard for the basketball team. If I get any grade lower than a C, I will not be able to play basketball next

semester. If I don’t play, the team will lose. Will you please make sure that you give me at least a C for my final grade?



The student here acknowledges he does not deserve a grade of C or higher. He has missed assignments, failed the midterm, and accrued a number of absences. His argument asks the professor to ignore these facts, though, and focus on the fact that without him the team would lose. In other words, he hopes the professor will feel sorry for him and ignore the evidence.

begging the question (petitio principii)

A begging the question fallacy is a form of circular reasoning that occurs when the conclusion of the argument is used as one of the premises of the argument. Arguments composed in this way will only be considered sound or strong by those who already accept their conclusion.

*Dilbert: And we know mass creates gravity because more dense planets have more gravity.
Dogbert: How do we know which planets are more dense?
Dilbert: They have more gravity.*

To see how begging the question develops as a fallacy, let’s turn to standard arguments in the abortion debate. One of the common arguments made by those who oppose legalized abortion is the following:

*Murder is morally wrong.
Abortion is murder.
Therefore, abortion is morally wrong.*

Most people would agree with the first premise that murder is morally wrong. The problem, then rests in the second premise. Not all individuals would agree that abortion is murder. However, as presented, the premise creates a presumption it is valid in all cases.

Those who advocate for legalized abortion are not immune from this fallacy. One of their standard arguments is:

*The Constitution guarantees Americans the right to control their bodies.
Abortion is a choice affecting women's bodies.
Therefore, abortion is a constitutional right.*

Like the previous example, the second premise generates a potential stopping point. While the choice to have or not have an abortion does clearly impact a woman's body, many individuals would argue this impact is not a deciding issue.



black-or-white Fallacy (bifurcation)

This fallacy is also known as an Either/or fallacy or False Dichotomy. The thrust of the fallacy occurs when we are only given the choice between

two possible alternatives, when in fact more than two exist.

Returning to the abortion debates, we can see a form of this fallacy in play by simply looking at the way each side refers to itself. Those who oppose legalized abortion are Pro-Life. The implication here is that if you are for abortion then you are against life. The fallacy in this case is easy to figure out – there are many facets of life, not just abortion. Those who favor legalized abortion are Pro-Choice. The implication here is that if you are against abortion, then you are against choices. Again, the reasoning is faulty.

*There is no black-and-white situation. It's all part of life.
Highs, lows, middles.*

~ Van Morrison

Let's look at another hot button topic to see how this fallacy develops in action. In recent years many family advocacy groups have argued that, what they call, the "liberal media" has caused the rapid moral decline of America. They usually ask questions like: Do you support families or moral depravity? This question ignores the whole range of choices between the two extremes.

composition

This fallacy occurs when we assume that if all the parts have a given quality, then the whole of the parts will have it as well. We jump to a conclusion without concrete evidence. We see this fallacy at work in the following example:

*All of the basketball team's players are fast runners, high jumpers, and winners.
Therefore, the team is a winner.*

The problem here is the individuals must work together to make the team a winner. This might very well happen, but it might not.



To make this fallacy more clear, let's look at a humorous, though not so appetizing example:

I like smoothies for breakfast because I can drink them on the run. My favorite breakfast foods are scrambled eggs, fresh fruit, bagels with cream cheese, soy sausage links, cottage cheese, oatmeal, cold pizza, and triple espressos. Therefore, I would like a breakfast smoothie made of scrambled eggs, fresh fruit, bagels with cream cheese, soy sausage links, cottage cheese, oatmeal, cold pizza, and triple espressos.

If you're not feeling too nauseated to keep reading, you should be able to see the composition fallacy here. While each of these breakfast items may be appetizing individually, they become much less so when dropped into a blender and pureed together.

division

The opposite of the composition fallacy, a division fallacy occurs when we think the parts of the whole contain the same quality as the whole. Let's turn to another food-based example to see how this fallacy occurs:

Blueberry muffins taste good. Therefore, the individual ingredients comprising blueberry muffins also taste good.



On the surface, this argument may not appear to be problematic. However, think about the individual ingredients: blueberries, raw eggs, flour, sugar, salt, baking soda, oil, and vanilla. Of these, blueberries are the only items that generally taste good on their own. I don't know about you, but sitting down to a bowl of baking soda doesn't sound too appetizing.

Here's one more example to make the fallacy clearer:

Women in general make less money than men. Therefore, Brenda Barnes, CEO of the Sara Lee company, makes less money than the male delivery drivers who work for the company.

Common sense will tell you the CEO of a company makes more money than the hourly delivery drivers. Additionally, a few quick minutes of research will confirm this inference.

false cause (non causa, pro causa)

Sometimes called a Questionable Cause fallacy, this occurs when there exists a flawed causal connection between events. The fallacy is not just a bad inference about connection between cause and effect, but one that violates the cannons of reasoning about causation. We see two primary types of this fallacy:

Accidental or coincidental connection occurs when we assume a connection where one might or might not exist. We say event C caused event E when we have no clear proof. Here's an example:

Yesterday Jen went out in the rain and got soaked. The next day she was in bed with the flu. Therefore, the rain caused her to get sick.

Most of us probably grew up hearing statements like this without ever realizing we were being exposed to a logical fallacy in action. Flu is caused by exposure to a virus, not to bad weather.

The other type of causal fallacy occurs with a general causation between types of events. For example, we know that drinking excessive amounts of alcohol leads to alcoholism and cirrhosis of the liver. However, not every individual who drinks excessively develops either of these diseases. In other words, there is a possibility the disease will occur as a result of excessive drinking, but it is not an absolute.



red herring (Irrelevant thesis)

This fallacy occurs when we introduce an irrelevant issue into the argument. The phrase "red herring" comes from the supposed fox hunting

practice of dragging a dried smoke herring across the trail so as to throw off the hound from the scent. In logical reasoning, the red herring fallacy works in much the same way. No, this doesn't mean you make the argument while smelling like an old fish. What it does mean is that we attempt to distract the audience by introducing some irrelevant point, such as this:

Each year thousands of people die in car accident across the country. Why should we worry about endangered animals?

This argument is trying to get us to focus on dead people instead of animals. While car accidents and the deaths resulting from them are a serious issue, this fact does not lessen the



importance of worrying about endangered animals. The two issues are not equated with each other.

Political campaigns are a fertile ground for growing red herring fallacies. If you think back to the 2004 Presidential campaign you will find a number of red herrings. For example, at one point we were inundated with ads reminding us that John Kerry's wife was heir to the Heinz ketchup fortune. The implication was that by extension John Kerry was a rich elitist incapable of understanding the plight of working class and middle class individuals.

slippery slope

This fallacy occurs when we assume one action will initiate a chain of events culminating in an undesirable event later. It makes it seem like the final

event, the bottom of the slope, is an inevitability. Arguments falling prey to the slippery slope fallacy ignore the fact there are probably a number of other things that can happen between the initial event and the bottom of the slope.

We hear examples of the slippery slope fallacy all around us:

If we teach sex education in school, then students will have more sex. If students have more sex, we will have a rash of unplanned pregnancies and sexually transmitted diseases. Students will be forced to drop out of school and will never have the chance to succeed in life.

Clearly, just learning about sex doesn't automatically mean that you will engage in sex. Even more unlikely is the fact that merely learning about sex will force you to drop out of school.

strawman

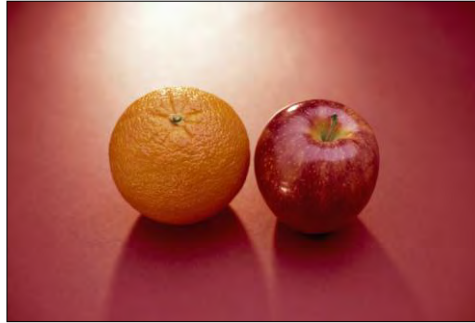
This fallacy occurs when the actual argument appears to be refuted, but in reality a related point is addressed. The individual using a strawman argument will appear to be refuting the original point made but will actually be arguing a point not made in the original. The best strawman arguments will argue the new point to a conclusion that appears solid; however, because their point is not the original point, it is still a fallacy.

Examples of the strawman fallacy are everywhere and can appear to be quite persuasive:

President Obama cannot truly have American interests in mind because he's not truly American but Muslim.

Statements similar to this were quite prevalent during the 2008 Presidential election and still appear on occasion. The assumption here is that if a person

follows Islam and identifies as Muslim they clearly can't be American or interested in America. While there are many potential flaws in this argument as presented, for our purpose the most obvious is that there are many Americans who are Muslim and who are quite interested and concerned about America.



false analogy

When we use analogies in our reasoning, we are comparing things. A fallacy of weak analogy occurs when there exists a poor connection between examples. Structurally, the fallacy looks like this:

*A and B are similar.
A has characteristic X.
Therefore, B has characteristic X.*

This fallacy often occurs when we try to compare two things that on the surface appear similar. For example:

*Humans and animals are both living, breathing beings.
Humans have civil rights.
Therefore, animals have civil rights.*

The problem in this argument is that while humans and animals are alike in their living and breathing status, there are numerous other ways they differ. We commit a fallacy when we infer that based on this initial similarity, they are similar in all other ways as well.

The other day while looking at houses, I heard another version of this argument from a real estate agent. The

house I was looking at was an older house needing some TLC. I asked how old the roof was and the real estate agent responded:

I don't know for sure, but it's either 10 or 20 years old. You know, though, I put a roof on a house similar to this when I was younger and we haven't had to worry about it. It's been over 20 years now.

Ignoring for the moment that there's a big difference between a 10-year-old roof and a 20-year-old roof, the real estate agent mistakenly assumes that his roof and the roof of the TLC house are the same. They both provide a covering for the home, but that's about where their similarities end.

conclusion

In this chapter we have examined what critical thinking is and how it involves more than simply being critical. Understanding critical thinking helps in formulating and studying arguments. We see arguments every day in advertising, use arguments to persuade others, and we use them to benefit us. The overview of fallacies showed not all arguments are valid or even logical. Always critically think and examine any argument you confront, and remember that if it sounds too good to be true, it probably is a fallacious argument.

We practice critical thinking on a daily basis, often without any extra effort. Now that you know a bit more about how to do these things better, you should find that you can put together more persuasive arguments that avoid the pitfalls of fallacious thinking. More importantly, when you hear a statement such as, "You should drink at least four glasses of wine per day," you'll know that something isn't right. And if you do hear a statement like this, you will be prepared to think critically about the statement, and will be in a position to make a more educated decision about the information.

chapter review questions and activities

review questions

1. Explain the difference between critical thinking and being critical. Why should we care?
2. Explain how listening differs from hearing and why listening is the first component of practicing critical thinking.
3. List and discuss at least three ways that we use logic and argumentation in our daily lives.
4. If I say, “There is plenty of pasta, so you should have some more,” am I implying or inferring that you have not eaten enough?
5. What are a fallacies and why is it important that we study them?
6. Television commercials that use pictures of starving children and sad music as a way to get you to donate money are an example of what type of fallacy?
7. Name, define, and give examples of three different fallacies you have heard recently.

activities

1. Throughout this chapter, we have turned to the abortion debates for examples. In order to practice critical thinking in action, spend some time researching the major arguments each side uses. Because the debates in this area are so complex, you might want to narrow your focus just a bit. For example, you could focus on the issue of minors consenting to abortion or abortion in the case of rape or other sexual assault. Compile a list of the most common arguments used by each side. Your list should include: any evidence used to support claims, a list of the major claims, any conclusions. Return to the core critical thinking skills and critically evaluate how each side forms arguments and uses evidence. How do your own biases and thoughts on the issue of abortion influence your evaluation? If you were an advisor, what advisee would you give to each side to make their arguments stronger and more logically sound?
2. Your local newspaper’s Letters to the Editor section is a prime spot to find logical fallacies in action. For several days, read the Letters to the Editor and identify all of the fallacies you find. Keep a log of the specific fallacies you find, dividing them by type. Once you have compiled a variety of example, take a step back and evaluate them. Questions that you might want to ask include: what fallacy or fallacies seem to be most popular? Why do you think this is? Pick a few of the most egregious fallacies and rewrite them correcting for the flaw in reasoning.
3. Throughout this chapter, we have studied arguments by looking at their various parts. In practice, arguments occur as part of larger statements or speeches making their analysis a bit more complicated. To understand the ways arguments occur in daily life, visit the American Rhetoric page (www.americanrhetoric.com). On this page you will find a number of political, activist, movie, and other speeches. Pick one and try to identify the major arguments that are set forth. What are the main claims? What are the sub-claims? What sorts of evidence or support are provided? Are there any fallacies present in the argument? If you were a speech writer, what advice would you give to improve the argument?

glossary

Accident Fallacy

A fallacy that occurs when a generally true statement is applied to a specific case that is unusual.

Ambiguity Fallacy

A fallacy that occurs when a word having more than one meaning appears in the argument.

Analysis

The process of asking what is happening in a message through breaking it into its individual components and asking questions of each section.

Appeal to Authority

A fallacy that occurs when the truth of a proposition is thought to rest in the opinion of a famous other or authority.

Appeal to Ignorance

A fallacy that occurs when we argue something must be accepted because it cannot be proven otherwise.

Appeal to Pity

A fallacy that occurs when an argument attempts to win acceptance by focusing on the unfortunate consequences that will occur if it is not accepted.

Argument

Statements that combine reasoning with evidence to support an assertion.

Bad Reasons Fallacy:

A fallacy that occurs when then we assume the conclusion of an argument to be bad because a part of the argument is bad.

Begging the Question:

A fallacy that occurs when the conclusion of the argument is also used as one of the premises.

Black and White Fallacy

A fallacy that occurs when the audience is only given two choices.

Composition Fallacy

A fallacy that occurs when we assume that traits inherent in the parts are also present when the parts are combined into a whole.

Critical Thinking

Active thinking in which we evaluate and analyze information in order to determine the best course of action.

Deduction

An argument in which the truth of the premises of the argument guarantee the truth of its conclusion.

Division

A fallacy that occurs when we assume that the trait of a whole occurs when the whole is divided into its parts.

Evaluation

The process of assessing the various claims and premises of an argument to determine their validity.

Evidence

Research, claims, or anything else that is used to support the validity of an assertion.

Fallacy:

A flaw or error in reasoning.

Fallacy of Quantitative Logic:

A fallacy that occurs when we misuse quantifying words such as “all” or “some.”

False Analogy

A fallacy that occurs when there exists a poor connection between two examples used in an argument.

False Cause:

A fallacy that occurs when there exists a flawed connection between two events.

Genetic Fallacy:

A fallacy that occurs when the individual is attacked.

Hearing:

The physiological process of receiving noise and sounds.

Imply:

To suggest or convey an idea.

Induction:

An argument in which the truth of its propositions lend support to the conclusion.

Infer:

To draw a conclusion that rests outside the message.

Interpretation:

Explaining and extrapolating the conclusions that we draw from a statement.

Listening:

The psychological process of attaching meaning to the sounds and noises we hear.

Masked Man Fallacy:

A fallacy that occurs when we substitute parties that are not identical within an argument.

Non sequitor

An argument where the conclusion may be true or false, but in which there exists a disconnect within the argument itself.

Premise

A proposition (statement) supporting or helping to support a conclusion; an assumption that something is true

Red Herring Fallacy

A fallacy that occurs when an irrelevant issue is introduced into the argument.

Self-regulation

The process of reflecting on our pre-existing thoughts and biases and how they may influence what we think about an assertion.

Slippery Slope Fallacy

A fallacy that occurs when we assume one action will initiate a chain of events that culminate in an undesirable event.

Strawman Fallacy

A fallacy that occurs when the actual argument appears to be refuted, but in reality a related point is addressed.

Syllogism

A form of deductive argument in which the conclusion is inferred from the premises. Most syllogisms contain a major premise, a minor premise, and a conclusion.

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