

Critical Thinking: Analysis and Evaluation of Argument

Version 2

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Introduction

Critical Thinking is something most professionals in Higher Education are in favor of teaching, and most students say they are eager to learn. But it is not clear there is a common meaning for the term “critical thinking” underlying this wide enthusiasm.

This text is intended for classes offered in the discipline of Philosophy, as it has developed within the European intellectual tradition. Critical Thinking classes in Philosophy evolved from the 1970s onward, slowly morphing from classes in formal or symbolic logic to new classes in *applied* symbolic logic. Applied logic gave way to Informal Logic classes, and from there to Critical Thinking. In the Philosophy tradition, critical thinking still uses the vocabulary and techniques from logic proper. Some of this vocabulary is shared with other disciplines in Higher Education – especially Argumentative Writing (in Composition or Rhetoric departments) and Speech or Debate classes (From Communication.) But the common vocabulary can mask underlying differences in emphasis. Critical Thinking in the tradition of logic is focused less on persuading, and more on reliability of thinking.

This focus on reliability creates links between critical thinking in the field of philosophy and the empirical work being done in social science on cognitive bias and errors. However, the vocabulary of social science differs in many ways from the traditional terminology of logic. The study of bias or heuristics in social science replaces concern with fallacies and sources of invalidity of inference from the field of logic.

Looking for a way to bridge some of these differences underlying cross-discipline interests in improved critical thinking skills, we started this text with the definition of *critical thinking* created through the American Association of Colleges and Universities in their [LEAP initiative](#). We also relied on the LEAP rubric, used to assess student learning outcomes in the [Multi-State Collaborative project](#). This project brought faculty from 59 institutions, across 9 states, to assess 7,000 artifacts from different disciplines in its first year, using the faculty-created VALUE rubrics. The goal was to develop a learning outcome assessment process with validity across disciplines and institutions to serve as an alternative to stand-alone high stakes standardized tests. Portland Community College was one of the original participants in this exciting project. The VALUE rubrics and AACU project on critical thinking has shaped this text in many ways. It is our hope that the successful student who completes a class using all or some of this text will have improved skills with application inside the discipline of philosophy, but also with application to work in other disciplines within Academia. Our ultimate goal, however, is to help people develop techniques which support curiosity, open-mindedness, and an ability to collaborate successfully with others, across differences of experiences and background. Our dream is to help people “put their heads together.” s



There is no shortage of pressing problems facing humanity at this point in time, needing the skills of critical thinking.

Chapter One: What is Critical Thinking?

Learning Outcomes

After this chapter, the successful student will be able to:

1. Define “critical thinking” as it is commonly used in academic contexts
2. Define and give examples of “fast thinking” (or “opinions of the moment”) and “slow thinking” (or “reflective opinions”)
3. List some basic assumptions of the field of logic

1.1 What is critical thinking?

Critical thinking is one of those things that most people are in favor of – especially in colleges and universities. But people in different fields and traditions have varying definitions, and it is not obvious that all in favor of the same thing. How should we decide on a definition?

Many people from Higher Education came together from 2007-2009 to talk through the issue: is there a common, central meaning to the phrase “critical thinking?” as part of the LEAP initiative of the American Association of Colleges and Universities. They came up with a definition we can use as good starting place.

“Critical Thinking is a habit of mind characterized by the comprehensive exploration of issues, ideas and artifacts before accepting or formulating an opinion or conclusion.”

Here are a few things to notice about this definition as we start our work.

- Critical thinking is characterized as *a habit of mind*. One college class is not enough to develop a habit, so one college class is not going to create “critical thinkers.” Instead, this class will introduce you to some component skills of the habit. Your routine and daily decisions will determine whether you develop (or deepen) the habit -- or leave what you learn in this term behind as you go on about your life.
- We assume that the people coming into this class will be variable with respect to critical thinking habits. Some people will come in already practiced and quite skilled. For them, the lessons will offer ways to think about and double-check their current habits. Others



will enter the class *believing* they are already critical thinkers -- already skilled in the habits of thoughtfulness -- but will be exposed to vocabulary and ideas that challenge that pre-existing belief. It might be interesting to you to rate your sense of yourself as a thinker against the technical definitions you will come across in this class. **To what extent does this class reinforce what you already do, and where does this class suggest to you that your thinking has not been as good as you thought?**

- The definition of critical thinking from the AAC&U offers us an implicit contrast between different ways of formulating opinions. I have lots of opinions on lots of issues, and they can be categorized by how much of my life's energy I have devoted to investigating and thinking. I toss out some opinions with little to no energy devoted to creating them. (Do you like walnuts or hazelnuts better? -- Hazelnuts!) These might be called **opinions of the moment**. The contrast is with opinions I have regarding issues I have thought a lot about, and discussed over time with people who have presented me with a variety of points of view. The opinions formed in a process of this sort are sometimes referred to as "considered" or reflective opinions. The basic value judgment involved in critical thinking, as this field has grown out of the European philosophical tradition, is this: when issues are important, reflective opinions are more valuable than opinions of the moment. It follows from this that when an issue is important, it is worthwhile to have the skills available to think deeply and well. Those are the skills we will be focusing on in this class.
- The definition of critical thinking doesn't state it, but there is a value judgment implicit in the attention within colleges and university to critical thinking. The assumption is that it is good to be reasonable and bad to be unreasonable. Intellectual history suggests that this has been a foundational assumption of much of the European cultural tradition since the Enlightenment. As a critical thinker, one issue you will be asked to confront over and over in this class: IS CRITICAL THINKING SO IMPORTANT AS TO WARRANT ALL THIS ATTENTION AND ENTHUSIASM? Since critical thinking is so widely embraced as important and good, it is difficult to find anyone willing to share the opinion that it is just plain overrated. Still, someone with a habit of critical thinking will consider options, including the option that critical thinking isn't as good as most people think. Just because an idea is popular doesn't mean it's correct. So it goes with the popularity of critical thinking itself. As you get increasingly clear about what critical thinking looks like (in academia), you will be able to think more clearly about the value assumption. Is it worth all the work?

1.2 Thinking Fast and Slow

We are approaching the study of critical thinking from the tradition of Western Philosophy. This tradition includes a branch called "logic," devoted to developing and applying rules for



separating good (reliable) from bad (unreliable) reasoning. But it is also possible to study human reasoning from the disciplines of social science, especially psychology, social psychology and cognitive science. One way of thinking about thinking, coming from a cognitive science perspective, has brought attention to the fact that humans have [two different ways of arriving at beliefs or opinions](#). Similar to the contrast between *opinions of the moment* and *reflective or deliberative opinions*, one method is FAST and easy (but less reliable) and the other is SLOW and takes lots of hard work (but is more reliable.) In the discipline of logic, reasoning is judged **better** if it is **more reliable**. But from an evolutionary perspective, there are times when “jumping to a conclusion” is better than taking the time to reflect and deliberate, even if it is less reliable. If a dangerous predator is coming your way, moving to safety FAST will keep you alive. It may be that you will jump and run for cover in situations where there is no real danger. But better to be wrong and alive, according to the people doing evolutionary psychology.

We all come up against all sorts of occasions in our lives requiring fast action, with no time to deliberate. But the skills we will practice in this class all take time. They are for when you can think ahead OR you have lived through a fast decision and want to think critically about the decision you made, keeping open that you might well have done something else if you had the luxury of time to reflect. A process like this has been developed and routinely [used by the U.S. military](#). The idea is not to point fingers at people who had to choose fast, and whose decisions in hindsight can be seen clearly to not have been the best. Instead the point of an *after action review* is to take time, after the fact of action, to reflect to think over the available options and the pros and cons of each choice with the intention to deepen our learning in preparation for future contexts requiring fast choice. Much of what we will be doing in the class is like an after action review.

Before we get started, here is a self-test for you to take, to compare your “fast thinking” against some of what we will cover slowly as the term unfolds. There is an answer key, with some suggestions of “coming attractions.” No points, but a way for you to get curious about the current state of your “slow thinking” skills.

1.3 Pre-test

Please rate the following thinking as reliable or unreliable.

1. If I had gone to the party, I would have been exposed to the flu bug that’s going around and would have gotten sick like you. Luckily I decided to miss that party, to stay home and study. So I am not going to get it after all.
2. Credit unions are member-owned and local, so they are a more ethical choice than any of the large corporate banks for anyone who cares about the ethics of business.
3. The Black Lives Matter movement is not biased against white people in the way many of their critics claim. Empathy and Loving Engagement are two of the founding principles of



the movement. No movement with empathy as a founding principle could be biased against an entire group of people.

4. We can tell that climate change is real. Just look at the average temperatures in summer for the last few years! It is getting hotter and hotter.
5. Saturday has more traffic accidents than any other day. My cousin was hit on her bike on a Saturday evening when she was riding home from work in the evening.
6. We can approach this problem either rationally or emotionally. Since you are being emotional, clearly you can't be rational about this problem.
7. According to some theorists in evolutionary psychology, belief in a god is the result of the human tendency to assume agency --- that the things they observe around them result from actions of conscious beings. For example, hearing a sound behind them, humans are likely to think someone is there. I think this is a plausible explanation for religious belief, so I reject a belief in god or gods as unreasonable.

Key (including concepts to be covered in this text):

1. Formal Fallacy of denying the antecedent where it is hard to detect the problem.
2. The argument has a missing premise and is invalid unless it is stated.
3. Valid argument to a controversial conclusion.
4. Non-sequitur with all statements plausible.
5. Collection of statements with no reasoning.
6. Formal fallacy of asserting a disjunct.
7. Causal explanation of belief, but no argument.

1.4 Assumptions

Like any human activity, the practice of critical thinking (as it has developed within the European tradition of logic) requires several assumptions to make sense. For people who don't share the assumptions, the whole process can be experienced as confusing or nonsensical. Here is a partial list of assumptions that sometimes cause trouble for people new to this discipline.

- 1) Logic is evaluative. (An **evaluation** is a statement that compares what is the case to a standard about how things should be.) Logic requires people to make lots of judgments about good and bad, right and wrong, what we should or shouldn't do. The **standard of evaluation** used in logic to evaluate reasoning is reliability. Good reasoning is reliable, and bad reasoning is unreliable.
- 2) In logic, both individual evaluations ("You should recycle your aluminum!") and collective evaluations ("We should abolish the death penalty!") are treated as statements that can be supported by reasons, and the reasons can be evaluated as better or worse using the



tools laid out in this text.

- 3) In logic, truth is treated as absolute -- not partial, changing, or relative to different points of view.
- 4) The ultimate “should” in the discipline of logic is this: **you should not contradict yourself**. There are other “should” statements, but they are all based on this idea that self-contradiction is bad. **Contradictory statements**, by definition, cannot all be true, and by (3) above that means they can’t be partly true, or true to some people but not others. A statement that is self-contradictory is absolutely, eternally, necessarily and inevitably not true.

If you don’t agree with one or more of the above assumptions, expect some trouble even understanding what is going on in this text. The following are offered not to convince you to accept any of these assumptions or to “prove” them in formal (logic) sense, but just to offer a bit more about what is assumed in this field.

There is another assumption to look at, but this is one that is NOT shared in the discipline of logic:

People shouldn’t judge other people’s opinions.

Logic requires energetically judging other people’s opinions (along with our own!) – not in isolation, but in relation to each other. That is, the discipline of logic requires asking if the reason given to support or back up an opinion is a good one. If no good reason can be found to support an opinion, that opinion is treated as unsupported or unproved. Generally, from the point of view of logic, opinions are better if proved, and not as good if unproved. By extension, there is a preference for reflective opinions (arrived at through slow thinking) and opinions of the moment (which are formed in fast thinking.)

The idea that people shouldn’t judge other people’s opinions is an example of a statement that generates contradiction. If I believe (for example) that we SHOULD judge other people’s opinions, then anyone who says that we shouldn’t is judging my opinion – which contradicts the idea that we shouldn’t judge.



Chapter 2: Argument

Learning Outcomes

After this chapter, the successful student will be able to:

1. define and recognize examples of arguments, as that term is used in logic and critical thinking
2. Distinguish statements from other grammatically correct sentence types
3. Define the term inference, as that term is used in logic and critical thinking
4. Increase awareness of personal tendencies toward dogmatism and open-mindedness

2.1 What is an argument

The basic unit of reasoning is an *argument*. The word argument used outside of the context of logic or critical thinking often refers to a heated discussion or “fight” between family members, friends, neighbors, or even strangers. In this meaning, an argument is a discussion that takes a negative turn. People who are fighting often resort to insults and yelling, or to more subtle methods of influencing what others think and do. “You don’t care about anything or anyone, you might as well just not exist!” Or “If you really loved me you would never say a thing like that!” On the other hand, for people who have taken a debate class or have been involved in a debate club, you may think that an *argument* means to defeat your opponent’s position at all costs (much like the political debates that we see aired on television). Neither of those meanings of *argument* are what we use in a philosophy context. You are welcome to do a search to find ways the term is defined in logic, but here is the definition we will be using in this class:

An argument is the linguistic representation of a thinking “step” or act (called the inference), whereby someone comes to accept a statement as true (the conclusion) on the basis of accepting other statements as true (the premise or premises.)

All arguments are composed of *statements* serving as premises and conclusions, along with the mental action of coming to accept the conclusion as true. This is called the *inference*. The thinking step is organized to answer a question, which is called the *issue*.

Reasoning begins in uncertainty. A reasoning process gets started when we don’t know something we feel the need to know. Reasoning is used to resolve this uncertainty or doubt. This means a successful reasoning process starts with something you feel confident about. It will serve as a basis for resolving the uncertainty. This information is extended through a reasoning process (the inference) to resolve the uncertainty and land on a conclusion.

Here is an example -- boring, mundane, and ordinary. I have been invited to attend a dinner with



friends, which is an event I would like to attend. Before I commit I must figure out if I have any competing activities scheduled. I try to think about what I have scheduled for that date and time, but I discover I just can't remember clearly, so I pull out my phone with my calendar on it. Here is my reasoning, in standard form (see chapter 3):

Issue: Do I have any competing activities for the day and time of the dinner?

P1) My calendar doesn't have anything listed on the day and time as the dinner.

P2) If there is nothing listed, I don't have any competing activities scheduled.

SO I don't have any competing activities that day and time.

We think so fast that the argument above is likely to run directly on to this one.

Issue: Should I commit to attending the dinner?

P1) I don't have any competing activities that day and time.

P2) If I don't have any competing activities scheduled, I can attend and should commit it.

SO I can attend and will commit to it!

In these examples, the issue is the question which starts off the reasoning process. The conclusion is an answer to that question, and the premises are the information I rely on in coming to my decision about how to answer the question.

What do you think? Label each passage as an argument or not. If you label a passage as an argument, underline the issue (if it present) or write it out (if it is unstated).

1. About 75% of adults in the United States describe themselves as religious according to research by the PEW research center. But the percentage is much lower among members of the Millennial generation.
2. Should I take Arabic or Spanish next year? Spanish would be easier to learn, but the challenge of learning Arabic appeals to me. Still, the deciding factor for me is whether I will get to use the language. Since I have a job offer in Southern California after I graduate, Spanish would be more useful.
3. I have friends who refuse to shop at Wal-Mart because of their employment practices, but I really like the low prices.
4. The Farmer's Almanac says summer this year is going to be hotter than normal, but I don't know if that is a trustworthy source.
5. Ground squirrels have body stripes like chipmunks, but no stripes on the head. So this must be a ground squirrel, since there are no head stripes.

2.2 Statements



A **statement** is a sentence that can be meaningfully evaluated as true or false. All statements are sentences. However, not all sentences are statements. Commands such as “Watch out!” or “Please, be quiet,” are not statements because we cannot meaningfully evaluate them as true or false. Like commands, exclamations can be grammatically correct sentences, but they are not statements. Examples are: O, No! Yikes! Wow! Likewise, any question (unless it is a rhetorical question) is not classified as a statement— “How are you?” or “When are we going to get there?” On the other hand, rhetorical questions oftentimes, if not always, express statements. Some examples might be: “Boy, isn’t it hot today?” or “How could you have ever thought that was the best choice to make?” These examples imply that “It is hot today,” and “You made a bad choice.” It is not always an easy task to distinguish between rhetorical questions and authenticate questions, and even harder if English is not your native language.

We don’t need to know if a statement is actually true or false in order to be able to recognize it as a statement. We just know that the statement can be meaningfully evaluated as true or false. A statement’s actual truth value can be undetermined.

Consider these examples.

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- A) *The college bookstore sells books*
- B) *Snakes have legs.*
- C) *No other planets in our galaxy have ever hosted intelligent life.*

The first statement is true (at least on our college campus today), and the second is false. But the third example, C, is harder to determine. If we say it is true or false, then we must be presuming that we have enough of the knowledge of our entire galaxy to be able to decide on the issue. But modern science has only just begun to create technology needed to explore beyond our solar system. There are likely millions of other solar systems in our galaxy. Also, the grammatical form of the sentence refers to past intelligent life, along with present conditions. How could we know, or gain information about possible past intelligent life that could have existed millions or possibly even a billion or more years ago? Given these considerations, some people would treat this statement as having an *undetermined* truth value. That means a sentence can be classified as a statement, even if you are not certain what that truth value is. The process of trying to determine if a statement is true is called *verification*.

A statement with an *undetermined* truth value right now could be verified later. And statements considered true at one time and place in human history can be rejected as false later. A well-known example is the widely held belief that the earth was the center of the universe. This was considered true for thousands of years until Copernicus, and later Galileo, showed that this statement was false. Particularly in the sciences, statements/theories/hypotheses/models widely accepted as true can be uprooted due to new and better evidence.



We will be working later on how to tell if a statement is true or false. This is a central question in logic and critical thinking. For the moment, please be careful to distinguish the idea that a statement has a truth value (true or false) from *knowing* or *believing* that a statement is true or false. For our purposes, to say a statement is true is different from saying someone believes it to be true. If this distinction doesn't make sense to you, please bring your concerns up in class.

What do you think? For each collection of words, decide if it is a statement. Make a note of your reasons for each decision.

1. I don't like tapioca – it is so slimy.
2. Don't wake me up until after 10 tomorrow morning.
3. Future wars are going to be about access to clean water.
4. 9 is a prime number.
5. Do you have any dark beer, like a Porter?
6. Most people think the word "argument" means a verbal fight.
7. I can't believe you are going to Disneyland!
8. Don't you think logic class is interesting?
9. Can I have seconds of the salad, please?
10. I have three classes back-to-back on Tuesdays.

2.3 Combining statements to make arguments

Arguments can be simple or complex in structure. For now, we will just look at the structure of this most basic kind of argument, Basic arguments are very simple, meaning they only need two statements -- at least one **premise** and at most one **conclusion**. In later chapters, you will become familiar with different kinds of arguments, as well as more complex structures commonly found in traditional media sources (especially op-eds), academic journals, textbooks, etc. We will focus on arguments as they appear in social media, as well.

The **premise of an argument is a statement which is used or offered as a reason for accepting another statement as true**. While arguments need only to have one premise and a conclusion to be classified as an argument, most have more than one premise and some have more than one conclusion. An argument with multiple conclusions is called an *extended* argument.

The **conclusion of an argument is a statement that answers the issue**.

Now, let's try to apply these rough distinctions about a premise and a conclusion to some very basic arguments.

Examples:

- My tooth has been hurting for a few days. So, I need to go to the dentist. (Issue: Do I need to go to the dentist?)
- The play starts at 8pm and the doors close at 7:50 pm. Therefore, we need to be there



at least by 7:45pm to make sure we don't miss it. (Issue: What time do we need to be to the play?)

- There is no street parking near the office building. Consequently, you will need to park in a garage or take public transportation. (Issue: How should I get there?)
- Part of your grade for this course is based on attendance and participation. Thus, if you miss more than 2 days of class your grade will suffer. (Issue: Will be grade suffer if I miss more than 2 days?)
- I have noticed that the weather in Portland has been more and more erratic than 10 years ago, and I think it is due to a changing climate. So I suspect that it will continue to be unpredictable for years to come. (Issue: Will Portland weather be more erratic than 10 years ago?)

Though the statements comprising an argument can occur in any order, in each of the simplified examples above, the premise(s) are found in the first sentence and the conclusion is the second sentence. In these examples, we are given some knowledge about a situation or circumstance in the premise and the conclusion extends that knowledge to possible courses of action or outcomes. Many of the other examples you will find in this text and the exercises will be more complex. There will be more premises, or the conclusions will be stated first with premises following. For additional challenge, an argument can be found in a longer passage, with many of the statements serving as context or background -- and serving neither as premise nor as conclusion. And for added complexity, most arguments are not complete in the way we think or present them, leading to the idea of an "implicit premise." For now, we are focused only on how to identify premises and conclusions in simplified arguments.

What do you think? Each of the following passages can be understood as arguments.

Underline the conclusion in each, making a note of any questions or doubts that come up.

1. Eastern Standard Time is three hours ahead of Pacific time, so 8:00 pm in New York is 5 pm in Seattle.
2. If you leave bananas in a plastic produce bag, the heat will make them ripen fast. Since you don't want to eat the bananas until Wednesday, you should take them out of the bag or they will over-ripen.
3. No one likes a liar, so stop lying to me.
4. The moon is 238, 900 miles from earth. Traveling at a steady 65 miles per hour, it would take about 153 days to get there, or a bit over 5 months.
5. Citizens of democracies have a duty to other citizens – present and future – to participate in the governing process, so you should vote in every election.

2.4 Inference

An Inference is a cognitive action. *It is the action of reasoning from one thought A, to another, thought B, in such a way to diminish or eliminate doubt about thought B.* This is a cumbersome



way to express this aspect of thinking, but you do this all the time throughout your daily life. In the morning when you wake-up you look outside or check the weather forecast to decide what kind of clothes to wear, or whether you should take an umbrella. Checking the weather forecast (if you believe it is accurate) is thought A, and the decision on what to wear or bring based on that information is thought B. Or, you come home to see your child or partner crying and infer that something bad or upsetting happened. An inference is just one step in a longer thinking process, though. When you get more information or background, you may change your mind. An inference works to resolve doubt, at least for a time. But the issue may come up again

Inferences are evaluated in logic as reliable or unreliable. While humans tend to think in inferential steps naturally, we often stay in fast thinking mode. Analyzing arguments (which is our focus in chapter 3) is a process that slows us down, and gives a chance to decide whether an inference which worked psychologically to resolve or settle a doubt was reliable logically. An argument is a linguistic representation of an inference – an actual or possible thinking step in the mind of some sentient being. Logic tends to focus on argument, however, instead of inference. An argument is composed of statements, which are a kind of sentence, and sentences are part of a language system. This suggests that all thinking is linguistic, or can be represented in language. When we think fast, we may not actually be thinking in words, however. And some living beings who do not appear to use language are nonetheless clearly capable of thought including inference. The actual relation between language and thought is a broad and interesting issue in biology and psychology. We will not be exploring it, however. For practical reasons, we will be interested in the linguistic counterpart to inferences -- the arguments.

A reliable inference is **truth preserving**. This means if the premises are true (see “true statement” above) then it is either impossible for the conclusion to be false (called a “valid inference”) or highly unlikely the conclusion will be false (called “a strong inference.”) Please note that an inference can be evaluated as good or bad independent of the actual truth of the premises.

2.6 What is it to be dogmatic or open-minded?

One definition of “dogmatic” comes from Merriam-Webster:

dogmatic: expressing personal opinions or beliefs as if they are certainly correct and cannot be doubted. (<https://www.merriam-webster.com/dictionary/dogmatic>, retrieved 6/2/2017)

If we think in terms of **dogmatic** thinking, to be dogmatic is to refuse to fully consider a reasoning process that leads to a conclusion we have already rejected. The impulse to protect current beliefs from revision is called **confirmation bias**. Often the resistance is not consciously



thought through or deliberative – it is an instance of “fast” thinking. We react to what we have read or heard with a quick rejection. “No! That can’t be right!”

Many people believe that we are more likely to be dogmatic if we are emotionally attached to an idea. If someone is trying to have a rational and calm dialogue with you, but you react with anger, fear, or resentment, you might have some unreasonable attachment to your beliefs/ideas that you don’t know how to defend with a counter-argument. It is, however, also possible to calmly and unemotionally refuse to consider someone’s argument, and in that way provoke a reaction of anger or passion. We will not treat “emotion” and “reason” as exclusive states in this work. It is possible to feel a strong emotion and think well, just as it is possible to be calm and cool and refuse to consider new ideas.

For our purposes, the primary way for us each to resist dogmatic refusal to consider the arguments that contradict existing beliefs is to slow ourselves down. When we move from fast and reactive thinking, and use the techniques of critical thinking, we are less likely to be susceptible to unconscious confirmation bias, and hence less reactively dogmatic. A willingness to think slowly about reasoning, whether it matches or contradicts current beliefs, is the essence of being *open minded* in the field of critical thinking.

What do you think? The habit of critical thinking helps build self-knowledge – you become familiar with where you are most likely to dismiss an idea or opinion without deliberation AND where you are most likely to accept an idea or opinion without further reflection. Here is a chance to start in on that kind of self-understanding.

- 1) List 5 ideas that you are completely certain are true and find yourself unable to even imagine being false.
- 2) List 5 ideas that you believe are obviously and certainly false and are unable to induce even a small amount of doubt.
- 3) List 10 ideas that you are uncertain of at this moment in your life – you are open-minded about them, thinking they might be true or they might be false.



Chapter 3: The Process of Argument Analysis

Learning Outcomes

After this chapter, the successful student will be able to:

- Use indicator words to identify arguments
- Use indicator words to separate premises and conclusions of an argument
- Reorganize prose arguments into standard form
- Define and provide examples of deductive and inductive arguments
- Classify arguments in standard form as deductive or inductive
- Distinguish arguments from reports of arguments and explanations

In Chapter 2 we looked over basic vocabulary of critical thinking: issues, arguments, inferences, premises, and conclusions. In this chapter, we will look at the essential critical thinking tool for moving from fast to slow thinking: argument analysis.

3.1 Is it an argument?

Arguments are made up of statements organized around the act of inference with the background purpose of providing an answer to an issue. This means that all arguments involve collections of statements. But not all collections of statements are arguments. Much of what is read these days, or listened to, is not an argument in the critical thinking sense. A news report on television or in a traditional newspaper is usually just that, a report or description of information that is meant to describe what has happened, where and when. Sometimes reporters provide their own perspective on the story, or an analysis of events, and these activities could be considered to be presenting an argument. The defining factor is whether reasons are being provided to answer a question in a particular way. In a traditional newspaper, the op-ed section is where you are most likely to find some kind of argument, although sometimes writer's simply express an opinion (without offering reasons) or take the opportunity to rant. Beyond the news outlets we are constantly bombarded by arguments, with one advertising as one common source.

One way to determine if a passage contains an argument is to look for an issue and conclusion. Is there a question being addressed? It might be stated, or unstated, but if you can identify an issue, you have a strong clue there is an argument. Here is a passage with the conclusion underlined, and the issue in italics:

Doomsday preppers expect the infrastructure of contemporary life to be compromised or destroyed through catastrophe in the near future. *Is it rational to be a prepper?* One key issue in the ongoing debate is how likely a doomsday scenario is. It is irrational to use finite resources to prepare for an emergency that is extremely unlikely. On the other



hand, it is irrational to refuse to prepare for emergencies that are very likely to happen. Given the many ways our infrastructure can crash – conventional or nuclear war, coordinated terrorist attacks, catastrophic weather events, infrastructure fragility, etc -- I think an emergency is very likely to happen in the near future. That's why I think prepping makes sense.

A second way to decide if a passage contains an argument is to look for **indicator words (markers)**--words or phrases which indicate that a person is using a statement as either a premise OR a conclusion?

Premise indicators are **followed by sentences functioning as premises**. Common premise indicators are:

because
 since
 for
 provided that
 implies (that)
 for the reason that
 assuming that
 inasmuch as

The premise follows a premise indicator word or phrase and the conclusion often precedes the indicator.

Conclusion indicators are **followed by sentences functioning as the conclusion**. Common conclusion indicators are:

so
 thus
 hence
 therefore
 it follows (that)
 consequently
 supports (that)
 suggests (that)
 we may conclude (that)
 for this reason
 implies that
 means that



The conclusion FOLLOWS the conclusion indicator word or phrase, and the premises often precede the indicators.

The listed indicator words are not exhaustive, meaning there are more indicators than those listed here. Also, some of these words or phrases can have other uses. For this reason, they can only be treated as offering clues or hints. You can combine the hunt for indicator words with the first method – looking for an issue and conclusion. If find what you think is a conclusion and then find or articulate the issue it relates to, you have good reason for thinking you have located an argument. You then need to examine if there is at least one premise that is used to provide support for the conclusion. Ask yourself, “Does the author/speaker give any reason why they think this way?” If no easily identifiable reason is given, then it is most likely not an argument.

One key feature of fast-thinking mode is this: people EVALUATE reasoning they encounter before they ANALYZE it. If we slow ourselves down, we reverse this order. We want to make sure we understand what someone’s thinking IS before we decide if it is good or bad.

(Your own reasoning as it passes through your consciousness might feel convincing. Or it might trip a feeling of doubt. Either way, if the matter is important, you might want to move into slow-thinking mode and analyze your own reasoning as a way of double-checking.)

What do you think? Argument or Not? If you think there is an argument, underline the conclusion. If you spot any premise or conclusion indicators, circle them. If you decide a passage does not contain an argument, label it as no argument. (Beware! Some of the passages have word listed as premise or conclusion indicators BUT they are being used in a different way!)

1. Democrats and Republicans have ended another Congressional session in gridlock.
2. I think the new Wonder Woman movie must be really good since it got rave reviews in the New York Times.
3. The transit tracker lists the #4 bus as “arriving” so I think it should be here any minute.
4. The real problem with trying to stop Islamic terrorism is that you must fight an ideology that is not based on reason, but rather on faith.
5. Since I was a little girl, my dad always brought me chocolate bars when he came home from being gone on business trips. Now, since he died, I notice I have strong chocolate cravings whenever I most miss his presence in my life.
6. I can’t remember my password, so I can’t get into my account and set up the bill pay for the electricity company.
7. I just can’t stand my new roommate, he never cleans up after himself.



8. The latest train derailment was caused by a faulty brake system and the emergency system also failed.
9. Most people are afraid of snakes, so there is nothing weird about my fear at all.
10. “Mom, all of my friends are going to the party, and Sara’s parents will be there to make sure nothing bad happens. Can I go?”
11. His last vehicle was a Toyota and it lasted for 300,000 miles, so this Toyota should also last a very long time.
12. I have heard that life is unfair, but it was only after my best friend’s brother was killed for no reason – just in the wrong place at the wrong time – that I really understood what that means.
13. Money can’t buy happiness, but poverty can sure destroy it.
14. This tub is labeled as guacamole, but it doesn’t even have any avocado in it, according to the ingredients list. Can something be guacamole without avocado as an ingredient?
15. I think I am going to get a promotion because my boss said he wants to talk about my future with the company tomorrow after my shift is over.
16. Is a good night’s sleep even possible for me? My doctor sent me to a sleep specialist who told me that regular hours getting in and out of bed, no caffeine after noon, darkening the room, and staying away from screens at least two hours before bedtime would help me sleep better. I am willing to give it a try.
17. I had \$500 in my account and then got about \$40 cash on a purchase of \$15.00, so there should be at least \$400 in the account.

3.2 Standard Argument Form

To analyze an argument is to do an “active listening” step. The point is to make sure you understand what the argument actually *is* before turning to the evaluative question: is it a good argument?

Standard argument form is a graphical method for displaying arguments, making plain the purpose of a statement by its placement. Premises are separated and numbered, and placed above a line, and the conclusion is placed below the line. The act of inference is represented with three dots (or the word “so”) placed next to the conclusion.

1)

2)

SO

Some cases are straightforward. Here is a passage, followed by the analysis into standard form.

I have a dental cleaning scheduled for the June fourth. Wow, since today is the third, I guess



that means the appointment is for tomorrow.

Issue: Is my dental cleaning tomorrow?

- 1) My dental cleaning is scheduled for the fourth.
- 2) Today is the third.

SO: my dental cleaning is tomorrow.

The explicit indicator word is “since.” The premise follows that indicator. The conclusion is in the clause following the comma. If we straightened the sentence, it would read:

The appoint is for tomorrow, *since* today is the third.

This follows a classic pattern:

(Conclusion) *since* (premise.)

Note: in the analysis, the words “I guess” were left out. These words signal a thinking process is happening, and can also signal how much convince the thinker has in his/her own thinking. “I guess” signals a lack of confidence. If the passage had said, “that means my appointment must be tomorrow,” a higher degree of confidence would be signaled. In general, these confidence-signaling words and phrases are not themselves part of the argument.

Here is another example.

If we want to increase defense spending, we would have to either cut domestic programs or raise taxes. You know when conservatives are in control, they aren’t going to raise taxes. So, the increase in defense spending means a cut to domestic programs, for sure.

Issue: Will increased defense spending mean a cut to domestic programs?

- 1) To increase defense spending requires cutting domestic spending or increasing taxes.
- 2) Conservatives are in control.
- 3) Taxes won’t be increased when conservatives are in control.

SO Increase in defense spending means a cut to domestic programs.

This analysis is more complicated, but the first step is spotting the indicator word “so.” This gives us a clue that the last sentence is the conclusion. We then articulate the issue by putting the conclusion in the form of a question. The statements preceding the conclusion indicator are premises.

We could treat this passage as listing only two premises, since the premises are presented in



two separate sentences. But for purposes of evaluation, it is better to list more instead of fewer premises. It allows a greater chance for finding common ground among people coming to an issue from different points of view. (More later, in chapters 5 and 6.)

Note: the phrase “for sure” in the original passage signals the thinker has a high degree of confidence in their thinking. That was left out when putting the argument into standard form.

What do you think? Here are some prose passages. They can all be interpreted as containing arguments. Use indicator words and your sense of issues and conclusions to put them into standard form. Please leave out any words signaling the thinker’s level of confidence is their own thinking.

1. Most people don’t like to be lied to. So, if you lie to someone, and they find out, they are probably not going to like it.
2. Since I have already had 3 years of High School Spanish, I think I can test into junior year Spanish when I transfer out of the community college.
3. I am working full time and going to school full time, so you know I don’t get enough sleep!
4. I believe God loves us all. So I believe God loves even those who don’t love God. (Hint: be careful thinking about the issue here!)
5. Gerrymandering is almost impossible to eliminate. Consequently, the current polarization of our political system is going to continue.
6. By definition, insects have 6 legs. Since spiders have 8 legs, they can’t possibly be insects.
7. He is going to arrive at the airport by 8pm tonight, provided the plane leaves Dallas on time.
8. Everyone on my mom’s side of the family supported Hillary Clinton, and everyone on my dad’s side of the family supported Trump. You know when all the relatives get together for my baby sister’s wedding, the conversations are going to be volatile!
9. If it rains one more day this winter, we would have had the wettest winter in the recorded history of this city. Luckily winter is over tomorrow, which is predicted to be clear and sunny. So we probably won’t get to break that record, after all.
10. One of the laws of chemical combinations state that under same conditions of temperature and pressure, equal volume of all the gases contain equal number of molecules. This implies that 2 litres of hydrogen will have the same number of molecules as 2 litres of oxygen given that both the gases are at same temperature and pressure. (retrieved from <http://byjus.com/chemistry/laws-of-chemical-combination-for-elements-and-compounds/>, June 1, 2017)



3.3 Kinds of arguments

Contemporary Western philosophy treats arguments as coming in two main types, deductive and inductive. Both kinds of reasoning will be discussed in much further detail in subsequent chapters, but a basic distinction and difference will be mentioned here.

Deductive arguments are arguments in which the premises (if true) *guarantee the truth* of the conclusion. The conclusion of a successful deductive argument cannot possibly be false, assuming its' premises are true. This is what it means to label an argument as "valid" in logic. The form or structure of a deductive argument is the essential aspect to consider. Somewhat counter-intuitively, the premises do not need to be true for the conclusion to be true. (This will be explained more clearly in the chapter on Deductive Arguments).

Arguments are a linguistic representation of an inference. So, using slightly different terminology, we can define *deductive inferences*. In a successful deductive inference, the premises and the denial of the conclusion constitute an inconsistent set of statements. An alternative way to describe the same relation: in a successful deductive inference, the truth of the premises makes the falsity of the conclusion logically impossible. A successful deductive inference is *valid*.

Deductive Example

- P 1) All dogs are mammals.
P 2) All mammals breathe air.

SO All dogs breathe air.

Inductive arguments are arguments with premises which make it likely that the conclusion is true but *don't absolutely guarantee its truth*. Inductive arguments are by far the most common type of argument we see in our daily lives. We can assess inductive arguments along a spectrum of successful (stronger) to unsuccessful (weaker). The more successful (stronger) argument means that the premises mean the conclusion is probably true, with a high degree of likelihood. It is important to remember that inductive arguments can never fully guarantee the truth of the conclusion.

Using slightly different terminology, we can consider Inductive inferences, referring to the actual thinking process in someone's mind. In a successful inductive inference, the truth of the premises makes the falsity of the conclusion possible, but unlikely. Inductive inferences can be evaluated as "stronger" or "weaker" depending on the probability.

Inductive Example

- P 1) The Interstate Bridge is regularly inspected by qualified engineers.
P 2) Vehicles have been driving over it for years.



SO) It will be safe to drive over it tomorrow

One thing that makes applying the distinction between deductive and inductive arguments a bit tricky is this: we can't look only at the premises OR only at the conclusion. Instead, we need to focus on the *relationship* between the premise(s) and the conclusion to tell what kind of argument we have. A further contributor to trickiness: we can't be distracted by the question of whether the statements are true or false. To classify an argument as deductive or inductive, we need to grant that the premises are true in a hypothetical way. We have to ask the question, "If those premises were true, would it would be IMPOSSIBLE for the conclusion to be false?" (If so, it is a deductive argument). Or "If those premises were true, would it would be UNLIKELY, but still possible, that the conclusion is false? (If so, it is an inductive argument.)

As an example, consider this valid deductive argument:

- 1) All clouds are made out of spun sugar.
- 2) Anything made out of spun sugar is high in calories.

SO all clouds are high in calories.

This argument is deductively successful because the truth of the premises would make the falsity of the conclusion impossible. (Odd, isn't it?)

What do you think?

Part One: Label the following arguments as deductive or inductive. It is a good idea to put the arguments in standard form first, so you are clear about the relation between premises and conclusion. If you are unclear as to how to classify a passage, please make a note of your thinking.

1. Dogs are carnivores, and carnivores need to eat meat to be healthy. So I think this new trend toward forcing dogs to be vegetarian is going to really compromise their health.
2. The most significant factor for living a happy life is full, intimate, and caring relationships. People with addiction problems usually sacrifice their relationships in the course of satisfying the addictive cravings. This why I think many people who struggle with addictions are likely to have a difficult time constructing a satisfying life, even if they find ways to successfully manage the addictions. Restoring the relationships might even be harder than breaking away from the addictive substance.
3. Homelessness is on the rise, which means the petty crimes associated with homelessness – vandalism, public indecency, petty theft – will be on the rise, too.
4. I think that was the state line! If we crossed the state line, we must be in Idaho now.



5. If carbon emissions were taxed, business would have a financial incentive to reduce reliance on energy sources with high carbon use. But, realistically, there is no way the U.S. is ever going to get a carbon tax through the legislature. So now the financial incentives for business is to stay with high carbon energy sources.

Part two: Create an example, in standard form, of a successful deductive argument with all false premises. Next create an example of an inductive argument, in standard form, with a conclusion you judge to be obviously false.

3.4 Explanations and Argument-reports

The “reason” aspect of determining whether some passage is or contains an argument is crucial. For example, pick up any newspaper or online news source that has an op-ed section. If you peruse through the articles you might at first think that every article contains an argument, or is an argument. However, when you carefully apply the two steps above, you should begin to realize that sometimes the opinion is simply just an unsupported fast thinking opinion (and sometimes it’s a full-on rant). The author makes a statement that seems like a conclusion (i.e., they take a stance on something), but they fail to provide any support or reasoning as to why they have that opinion or thought. Again, ask yourself, “Are there any reasons given as to why they think this way?”

There are two other common cases that at first appear to be arguments, but in fact are not considered “original” arguments:

Reported arguments are statements that say that so-and-so argued in a certain way. These kinds of arguments are simply a report (like a book report) of someone else’s argument. It could be analyzed as an argument, but it is possible something was omitted or added by the person who did the reporting.

Explanations can be hard to distinguish from arguments because they attempt to show why or how something happens (or has happened). Put more succinctly **an explanation is a statement or statements offered in answer to the question “why did that event occur?”** Explanations can be in the form of cause/effect relationships, natural laws, functions or underlying mechanisms (from Stephen Carey’s *Beginners Guide to the Scientific Method*). These are not arguments in the sense we are using the word because there is little if any reason to doubt the truth of the conclusion. With this in mind, the vast majority of reports about scientific studies or discoveries are simply explanations of the findings. There may be a latent argument about how the study or discovery could be applied to society or the world, but this is usually at the end of the report.



What do you think: Reported Argument, Explanation, or Original Argument?

1. Smoking cigarettes can cause lung cancer due to the tar that tobacco naturally contains.
2. Jessica informed her that it wasn't a difficult decision to make. The benefits package was better than her former place of employment, even though the salary was the same.
3. The doctor suggested to continue taking the prescription rather than having surgery because she doesn't want to have to operate if there is a decent chance of recovery with the prescription.
4. Before you book airline tickets online, you should always check to make sure that the price listed includes the taxes and other fees. Many websites lure you in by advertising cheap airfares, but when you purchase the ticket your total price can be substantially higher.



Chapter 4: Mapping the Argument Structure

Learning Outcomes

After this chapter, the successful student will be able to:

- Describe and apply two principles for argument analysis
- Put complex arguments into standard form following these two principles
- Use an intuitive method for identifying missing argument parts
- Confidently set aside parts of a passage as context when analyzing an argument
- Paraphrase unclear language when analyzing an argument, following the two principles
- Diagram the relationships among statements in extended arguments

4.1 How do the pieces fit?

Once we suspect we have found an argument in what we have read or heard, the next step is to make sure we understand what the argument is. To analyze an argument is to make the argument's structure clear. There are two main tools used to clarify an argument structure:

- putting an argument in standard form, and
- diagramming an argument's structure.

Putting reasoning into standard form is sometimes referred to as *standardizing the argument*. Standard form isolates an inferential step in a thinking process and allows us to focus on that step alone. Standard form is commonly used in analytic philosophical writing. Knowing how it is done can be of enormous help in reading work by analytic philosophers. It is also needed for the kind of careful thinking used to form "reflective opinions." You met the basics of standard form in an earlier chapter, and will get more detail and chances to practice in this unit.

The second tool is the diagram, which is a graphical depiction of the parts of the argument and their relationship to each other. The diagram provides a way to manage an **extended argument**. A diagram is helpful to show where a particular component fits into a larger reasoning process. It allows isolation of the parts from the context in which they are embedded and shows the relations of parts to one another. The major limitation of diagramming is that it quickly becomes unwieldy when working with a particularly complex argument. We will look at one widely used diagram technique at the end of this chapter.

4.2 Complexities and Principles

In analyzing an argument, whether using the tool of standard form or an argument diagram, we seek to make sure we understand what someone's reasoning is before moving to evaluating the reasoning as reliable or unreliable. However, arguments as they are presented in normal



conversation, including social media, are *messy*. When an argument is complicated and messy, and its presentation somewhat causal, it can be hard to be sure you have understood it correctly.

There are three main complexities you will confront:

- **Complexity of MISSING PIECES:** Often when people offer arguments, they leave out parts.
- **Complexity of TOO MANY WORDS:** Often when people offer arguments, they add in lots of words that are not actually part of the argument – such as context, background, duplicate statements, exclamations or declarations of the importance of the issue, and personal asides of all sorts.
- **Complexity of UNCLEAR LANGUAGE:** Often when people offer arguments, they use language that is not clear, and to understand their thinking we will have to paraphrase.

Here is an example of an argument with all three complexities:

I wanted to go up to Seattle next weekend, and was trying to decide if it would be cheaper to drive or take the train. My car gets about 27 mpg on the highway, which makes it easy to figure out approximately how much the gas it would cost. But when I looked for the price of a train ticket online, I couldn't tell what the price would be. I filled in the information in the search tool – where I was leaving from, where I was going, and the date of travel. But then the system would come up with different prices of tickets. The tickets with the best prices were listed as limited. According to the website, there were only “only 2 tickets left” at the best price. Would they even be there when I wanted to buy? The information didn't really help since I didn't want to buy a ticket right that second. I got really frustrated. Doesn't Amtrak have standard prices anymore?

Looking through this passage, there is only one indicator word -- “since.” That word marks the statement that follows it as a premise, and the sentence that preceded as the conclusion. Putting this much in standard form, we get:

P1) I didn't want to buy a ticket right that second, but just compare the cost to driving.

SO That information didn't help.



UNCLEAR LANGUAGE: In the conclusion of the argument, as we pulled it into standard form, we find the pronoun “that.” We can tell what the “that” means in context of the full passage, but it loses its meaning once we pull it out. To deal with this, we can paraphrase – say what we think is meant. While we are at it, we can also clarify what sort of ticket is mentioned in the given premise. Changed language appears in italics.

1) I didn’t want to buy an *Amtrak train* ticket right that second, but just compare the cost to driving.

SO: The pricing information available from the Amtrak website didn’t help.

TOO MANY WORDS: In the full passage, we get a sense of the main issue – is it cheaper to drive or take the train to Seattle? But instead of resolving that issue through a thinking process, this person has decided she can’t get some information needed to answer that question. A secondary issue then took the place of the main one – Does the information from the Amtrak website help decide whether it is cheaper to drive or take the train? Our thinker decides the answer to that issue is “No!” Once we focus on this smaller question, much of the passage turns into context or background – neither premise nor conclusion. Background is left behind when we go into standard form – though we use it to help us find acceptable paraphrases if language is unclear. Once we decide on the issue, our work in standard form looks like this:

Issue: Does the information from the Amtrak website help decide whether it is cheaper to drive or take the train?

P1) I didn’t want to buy an Amtrak ticket right that second, but just compare the cost to driving.

SO: *The pricing information available from the Amtrak website* didn’t help.

Everything else is left out!

MISSING PIECES: Focusing closely on this one inferential step reveals something characteristic of nearly all fast thinking – we leave premises unarticulated when we think quickly. When we put arguments into standard form, and slow our thinking down, we will fill these missing pieces in. It is (of course!) tricky to say confidently that we know what someone was thinking when they didn’t say it. Indeed, concern over how to tell what someone meant but didn’t articulate will lead us to the two principles for argument analysis we will examine next. For the



moment, here is the missing piece filled in:

Issue: Does the information from the Amtrak website help decide whether it is cheaper to drive or take the train?

P1) I didn't want to buy an Amtrak ticket right that second, but just compare the cost to driving.

P2) To be of help, I would need to know the price of a ticket later (not right that second.)

(implicit)

SO: *The pricing information available from the Amtrak website didn't help.*

The parenthetical descriptor “(implicit)” marks the second premise as something added by the person analyzing the argument, and not found in the original. Some texts prefer the device of using [square brackets] to mark off parts that have been added.

Deciding when and how to add parts of an argument when analyzing is tricky! We will return to this process later in this chapter, and it will be a major focus of the next chapter.

Principles of Argument Analysis

When a passage presents complexities, putting the argument in standard form requires “judgment calls.” Different people might analyze the same messy argument differently. But that doesn't mean the process is just a matter of (pure) opinion. When trying to decide if an analysis is adequate or good, we will use two principles. These principles of analysis are connected to our basic reason for engaging in critical thinking – to resolve issues by figuring out what is true.

***Principle of Sympathetic Interpretation:* An argument is analyzed sympathetically if the analysis makes it successful – deductively valid with plausible premises (see chapter 5) or inductively strong with plausible premises (see chapter 6)**

***Principle of Faithful Interpretation:* An argument is analyzed faithfully when decisions in the analysis – especially paraphrases and additions – appear to match what the thinker most likely had in mind, given the context of the argument and other things we know about the thinker's beliefs and experiences.**

Not everyone uses these two principles when exchanging thinking. They make sense



only in contexts of mutual deliberation and thoughtfulness. By way of contrast, if someone is debating an opponent, questions of interpretation might be settled by the goal of “winning” the debate. To win, it might make sense to paraphrase an opponent’s argument in ways that would make it easier to mock or counter.

Even if they don’t aim to “win an argument,” some people think it best to adopt the principle that if it is not clear what someone’s meaning is, you just stop and wait for the other person to make their meaning clear. This is an especially good idea if you are in a face-to-face conversation.

The approach we are offering, however, is useful for trying to follow thinking presented in written form. It is both practical and principled. Instead of letting the messiness stop us in our deliberation, we will try to interpret UP –give the argument as presented the best chance possible to be successful in resolving the issue, while sticking as close as we can to any clues about the thinker’s intentions. We will be adding details to this idea of interpreting to make an argument the best it can be when we turn our attention from analyzing an argument to the tasks of evaluation.

4.3 Standard Form and the Complexity of MISSING PIECES

As we noted, when people present arguments in fast thinking mode, they almost always leave out some needed premises. In chapter 5 we will have two methods for identifying these missing or *assumed premises*. In this chapter, you will have an opportunity to test your *intuitions* before learning those methods.

Here is an example of an argument with a missing premise (or an *enthymeme*.)

I decided I should start reading [Yes Magazine](#), because I need something that will give me at least some hope for our nation.

The “because” is an indicator word, and it is our clue that some reasoning is happening here. If we put the argument in standard form using that indicator, we get:

Issue: Should I start reading *Yes Magazine*?



1) I need something to give me some hope for our nation.

SO I should start reading *Yes Magazine*.

This argument is missing a statement that links up the publication this thinker is citing in the conclusion with the idea put forward in the premise – needing something to provide hope. Although it is not stated, the premise that would add that link is very straightforward.

Reading *Yes Magazine* will give me at least some hope for our nation.

Notice that if we don't add in this premise, the original argument is what is known as a *non-sequitur*. The premise and conclusion have nothing to do with each other. Adding it in shows the relevance of the explicit premise to the conclusion, and in that way makes the argument better than it would be without it. This means it is following the principle of sympathetic interpretation. (To decide if it meets the principle, we would also have to look at the plausibility of the added premise – something we will consider later.) So we can't say that adding this premise made the argument perfect -- there may still be problems. But the principle is satisfied if it allows us to continue the critical thinking process.

When we add in a part of an argument through analysis, we should do something to remind ourselves which parts of the argument appeared in the original, and which part(s) we added in. As mentioned above, the use of square brackets and the parenthetical “(implicit)” are two techniques often used to mark added or assumed premises. So, the argument above would appear as:

Issue: Should I start reading *Yes Magazine*?

- 1. I need something to give me some hope for our nation.**
- 2. [Reading *Yes Magazine* will give me at least some hope for our nation.] (implicit)**

SO I should start reading *Yes Magazine*.^[1]



Although less frequent, people sometimes leave a conclusion unstated. Here is an example.

Honey, I already told you that if you don't clean up your room, you are not going to the soccer practice. And you don't want to miss that practice, right?

In standard form:

Issue: Should you clean up your room?

1. **If you don't clean up my room, you can't go to soccer practice.**
2. **You want to go to soccer practice.**

SO [You should clean up your room.] (implicit).

If there is a piece missing that is to be filled in, the piece introduced should exactly fit the hole in the argument. That is, it should match the language used, and not go beyond what was stated in the argument. If the author is making an assumption, the expression of that assumption should fit with everything that was explicitly stated. We should never add in new ideas or concepts, but just link up ideas in the original.



4.3 Missing Pieces

What do you think? Use your intuition to fix the following examples of non-sequiturs. First use any indicator words to put each argument in standard form. Then add in a premise to link up the ideas you found in the other pieces. Some of these will require some basic paraphrase. Try it now if you want!

1. **We need to go to the store before our guests arrive, because we are out of dark beer.**
2. **I think Buster must have fleas, since he has started to scratch.**
3. **Tomorrow will be the 24th, since today is the 23rd.**
4. **We better dig up that back patch since we have these zinnia seeds to plant.**
5. **Cats are easier to take care of than dogs, so we decided we should get a cat.**
6. **This painting has small brush strokes and a certain way of depicting light, so I think it must have been done by an impressionist.**
7. **He is a pretty fair grader, since he always lets us know exactly what will be on the quizzes and exams.**
8. **The western division of the NBA has had much better teams than the eastern division for a long time, but the NBA championship title series is always between the winners of the eastern and western divisions. That's why I think some of the recent championships haven't been between the two best teams.**
9. **Maggots of the green bottle flies are known to lay eggs in cadaver tissue in the wild within hours after death, so the developmental stage of their larvae in the cadaver can be used for accurate determination of the time of death. (from https://en.wikipedia.org/wiki/Green_bottle_fly retrieved 6/2107)**
10. **You should think about looking for a new job in network security now that the unemployment rate has gone down. Employers are more willing to hire people without experience when the job market it tight. (Note: there is no indicator word here. What do you think the issue is?)**



The AACU definition of critical thinking uses a student's ability to recognize assumptions as part of evaluating the student's skill level. Here are the 4 demarcations of skill[2]:

Level 4 (most skilled): Thoroughly (systematically and methodically) analyzes own and others assumptions.

Level 3: Identifies own and other assumptions.

Level 2: More aware of others' assumptions than one's own. Questions some assumptions.

Level 1: Shows an emerging awareness of present assumptions; sometimes labels assertions as assumptions.

4.4 Standard Form and the Complexity of UNCLEAR LANGUAGE

In putting an argument into standard form, one key skill is that of paraphrasing. Paraphrasing is restating a piece of writing in a way that clarifies it. When someone writes an argument in English, the author uses conventions of the English language, which allow use of clauses and other structures like pronouns that eliminate repeated or redundant words. (Other languages may pose other kinds of challenges to understanding meaning.) Paraphrasing is a way to maintain or even enhance clarity on the content of the argument.

The simplest piece of paraphrasing, and often one of the most crucial, is being sure that all pronouns are replaced with the appropriate nouns in all statements within an argument. As soon as a statement is removed from its initial context, it becomes impossible to tell what a pronoun is referencing. Paraphrasing does not always make an argument shorter. In order to be understood, the paraphrase of an argument may end up longer than the original. For instance, "It is finished" may become "The process by which the airplane was analyzed is finished."



Another important piece of paraphrasing is putting in the parts of a sentence missing when a clause is separated from its original context. “Which is blue” means nothing. “The car is blue” is a sentence that can then be placed appropriately into the standard form.

Once pronouns and clauses have been dealt with, then the rest of the argument should be considered. When working with an argument in standard form, we want the argument to be clear and concise. Revising the language so that it is straightforward and easily understood by is helpful paraphrasing. At the same time, the original meaning must be preserved. For instance, it is common to paraphrase a technical term with an ordinary term, and, most of the time, that is acceptable. But if the argument is about aspects of the technology, the term may need to be retained.

When evaluating a paraphrase, use the principles of sympathetic and faithful interpretation. The original words should be preserved, along with the original meaning, unless they present a problem. Where there is a need to paraphrase by changing words, the goal is that the author of the argument will be able to recognize and claim the paraphrased argument as their own – and perhaps would even say your paraphrase has improved on the original!



4.4 Paraphrase

What do you think? Please put the following arguments in standard form, paraphrasing so all sentences make sense when listed out of context.

1. Tom needs to take his relationship more seriously. If he keeps putting in 60+ hours at work every week, Bob is going to leave him.
2. Most people don't care about politics. Only 55.4% of eligible voters actually voted in 2016. That's down from 60% in 2012.
3. Climbing hydrangea is a great choice to plant next to a north-facing fence because they are evergreen climbers with beautiful flowers and thrive in low or indirect light.
4. Jorge Ramos – who is one of the most successful and visible Hispanic journalist in the U.S. of this era – has won 8 Emmy Awards as of 2016, which shows how good he is.
5. No one can tell for sure if God exists, so I think both atheists and theists make the same mistake of intellectual arrogance.

4.5 Diagrams

A diagram is more useful than standard form when trying to understand how the pieces fit in an **extended argument**. The steps to diagramming an argument are not difficult, as long as the parts of the argument can be separated from other aspects of a piece of writing, such as explanations, illustrations, and reporting about arguments.



The basic steps to diagramming are as follows:

- Identify the conclusion of the argument and the premises, along with intermediate/sub-conclusions found in the argument. Intermediate or sub-conclusions function as conclusions to an argument embedded in the larger argument, and serve as premises for some other argument. If you think something may be part of the argument, but are not sure, keep it until you have completed the diagram.
- Number the statements consecutively as they appear in the original piece of writing; do not number any statement that is not going to be included in the diagram.
- Arrange the numbers so that numbers for the premises are above the numbers of the related conclusions, whether intermediate or final. All premises for a given conclusion should be on the same line.
- For arguments where two or more premises must be present together to lead to a particular conclusion, use + to show they are connected as reasons.
- For statements you are not sure are part of the argument, try them out and ask yourself:
 - “Is the problem that this statement is not part of the argument?”
 - Or is the problem that there is a piece missing from the argument?” If that seems to be the problem, hold onto the statement and put it in the diagram – at a later step, you can work to identify the missing or implicit connector statement.
 - If, on the other hand, the statement does not lead to or follow from some other part of the argument, eliminate it.
 - If it seems to be a part, but you aren’t sure where or how, try it out in different roles in the argument. Where does it fit best in creating a coherent argument?
 - Draw an arrow from each premise or group of premises to indicate these are the statements that lead to the conclusion.

Diagramming a simple argument

A simple argument has only one layer of premises which lead to a single conclusion. The premises may work together, or a premise may be independent of other premises as a reason to accept the conclusion. For that reason, simple arguments are usually easy to identify and diagram. (If the premises work together to support the conclusion, we could choose to use standard form.)

For example, someone might say:

“There is only one pregnant female cat in the house, and those appear to be new-born kittens. So, it is highly probable the cat has given birth.” This is a simple argument.

To diagram the argument, recognize, based on the indicator word, that “It is highly probably the



cat has given birth” is the conclusion to the argument. There are two other statements, each of which appears to be a premise.

Next take these three statements and number them in the order they appeared originally:

1. There is only one pregnant female cat in the house.
2. Those appear to be new-born kittens.
3. It is highly probably the cat has given birth.

Taking the number for the statements, I will put 1 and 2 on the line above 3. And because both statements together lead to the conclusion, I will put a + between them. Taking the final step, I will put in an arrow to show that these two statements lead to the conclusion.

$$\begin{array}{c} 1 + 2 \\ \$ \\ 3 \end{array}$$

You will notice that in this simple example, there was no question about whether a particular statement belonged in the argument. That is not always the case with more complicated arguments. Often, we must deal with the complexity of statements that set background, context, etc.

If you have a simple argument where the premise(s) are not connected, the results would be similar to the following example.

“I think the kittens got into the bathroom again. Not only are the clean towels knocked onto the floor, the toilet paper has been pulled off the roll and shredded.”

Here, again there is a conclusion, although without any indicator word. The conclusion is: The kittens probably got into the bathroom again.[3] (The next two statements are the premises in this case, and they are independent of each other: knocking towels down and attacking toilet paper are separate actions and separate pieces of evidence.

Putting the statements into the order they appeared originally gives:

1. The kittens probably got into the bathroom again.
2. There are clean towels knocked onto the floor.
3. The toilet paper has been pulled off the roll and shredded.

The diagram for this argument is similar to the prior one, but there is no joining of statements. Instead, there is an arrow from each premise number to the conclusion. And since the conclusion came first, number 1 is at the lowest level of the diagram.



2 3
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 1

It is possible to have a simple argument with two or more groupings of connected and independent premises. Simple does not mean few premises, but only a single conclusion. If we used standard form to understand the structure of this argument, we would need to separate inferential steps. Compare:

Issue: Did the kittens get into the bathroom?

P1) There are clean towels knocked onto the floor.

P2) [If there are clean towels knocked to the floor, the kittens probably got into the bathroom.]

SO The kittens probably got into the bathroom

Issue: Did the kittens get into the bathroom?

P1) The toilet paper has been knocked off the roll and shredded.

P2) [If the toilet paper was knocked off the roll and shredded, the kittens probably got into the bathroom.]

SO The kittens probably got into the bathroom

Diagramming a complex argument

The process for diagramming a complex argument is similar to that of a simple argument. The difference comes in the fact that there will be intermediate or sub-conclusions in the argument, so instead of two levels of statements, there will be a minimum of three. Otherwise, the process is the same.

A very basic complex argument can have only three statements: a premise, an intermediate or sub-conclusion, and a final conclusion. For instance, consider this argument:

“I will be gone next weekend, so I cannot host guests. Therefore, my mother should not come to visit me at home.”

Analyzing the argument, there are three statements, two of which have indicator words for



premises. This suggests one is an intermediate/sub-conclusion. And given the sentence structure, the best candidate is “I cannot host guests.” In addition, logically, saying one cannot host guests leads to a statement about a particular guest, rather than the other way around.

Putting the statements into order and assigning a number to each, gives:

1. I will be gone next weekend.
2. I cannot host guests
3. My mother should not come to visit me at home.

And then, drawing the diagram gives:

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1
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      2
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3

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Most complex arguments will contain more premises than this particular example, but remember that there is no rule about how an argument is constructed, beyond the need for there to be a premise and a conclusion.

You will notice that diagramming only makes use of what is given in the argument. But there are often pieces missing from an argument, which, when made evident, will help with evaluating the argument. Those pieces are generally added when the standard form of the argument is set out.



4.5 Diagrams and Standard Form

What do you think? Here are some arguments. Please put the simple arguments in standard form, and diagram the extended arguments.

1. I'm sure George is on campus. His car is here, and his backpack was in its usual spot in the library.
2. No one majoring in welding likes ballet. Andre is studying welding. So Andre doesn't like ballet.
3. Don't copy Lulu's homework. She is one of the worst students in class. My roommate told me she's not received credit for a single assignment all term.
4. This is either my tablet or it's Sandi's. If it is my tablet, my password will work to open it. But my password isn't working, so it must be Sandi's.
5. Only three people could have eaten the cake: Danni, Stu or Pat. But Stu couldn't have eaten the cake because he was out at the skate park. Pat couldn't have eaten the cake because she was at a friend's house. Therefore, Danni must have eaten the cake.
6. Something is a square only if it is a rectangle. But this isn't a rectangle. Do you see that it only has three sides, and some of the sides aren't even straight? So this can't be a square.
7. Merit speaks fluent Norwegian. Given that, Merit was probably born in Norway. Anyone born in Norway is a Norwegian citizen. Thus, Merit is likely a Norwegian citizen. Citizens of Norway are entitled to European Union travel privileges. So Merit is probably entitled to travel privileges in the European Union.
8. If Ann isn't dating Sid, she's dating Mike or Dave. Ann isn't dating Sid because she doesn't date anyone who smokes, and Sid is always puffing on a cigar. So Ann is dating Mike or Dave. Ann won't date anyone who doesn't run cross country, nor will she date anyone who isn't a math whiz. Both Mike and Dave are great at math, but Dave isn't a runner. Consequently, Ann isn't dating Steve. We can logically deduce, therefore, that Ann is dating Mike.
9. I wish we could go to Hawaii for vacation, but we just don't have the money. Besides, I read that the tourist trade is causing extensive environmental damage to



sensitive parts of the ecosystem. I don't want us to be part of that kind trouble.

10. I think we should all be reading Al Jazeera news now that they created a North American edition, because I think it is important for people in the U.S. to get perspectives from outside the US/European Union frame of reference. And I read a review of their news service that said they have seriously high-quality reporting. That's another good reason for subscribing.

11. Portland has a professional women's soccer team, The Thorns. I haven't been to any of their games yet, but I am thinking about going. I read this article about how women soccer players make lots less money than the men. It seems like another example of unequal pay for equal work, and that makes me mad. But the owners say it is just basic economics. They sell a lot more tickets to the men's games than to the women's, which means they have more money to pay the men. So we might actually be able to make a difference for this inequality just by going and enjoying ourselves at a local soccer game! But the lower attendance also means the games will be less crowded, so we will have shorter waits in line to get in and get concessions. I think there are lots of reasons we should start going to Thorns games.

Chapter 4: Mapping the Argument Structure

Learning Outcomes

After this chapter, the successful student will be able to:

- Describe and apply two principles for argument analysis
- Put complex arguments into standard form following these two principles
- Use an intuitive method for identifying missing argument parts
- Confidently set aside parts of a passage as context when analyzing an argument



- Paraphrase unclear language when analyzing an argument, following the two principles
- Diagram the relationships among statements in extended arguments

4.1 How do the pieces fit?

Once we suspect we have found an argument in what we have read or heard, the next step is to make sure we understand what the argument is. To analyze an argument is to make the argument's structure clear. There are two main tools used to clarify an argument structure:

- putting an argument in standard form, and
- diagramming an argument's structure.

Putting reasoning into standard form is sometimes referred to as *standardizing the argument*. Standard form isolates an inferential step in a thinking process and allows us to focus on that step alone. Standard form is commonly used in analytic philosophical writing. Knowing how it is done can be of enormous help in reading work by analytic philosophers. It is also needed for the kind of careful thinking used to form "reflective opinions." You met the basics of standard form in an earlier chapter, and will get more detail and chances to practice in this unit.

The second tool is the diagram, which is a graphical depiction of the parts of the argument and their relationship to each other. The diagram provides a way to manage an **extended argument**. A diagram is helpful to show where a particular component fits into a larger reasoning process. It allows isolation of the parts from the context in which they are embedded and shows the relations of parts to one another. The major limitation of diagramming is that it quickly becomes unwieldy when working with a particularly complex argument. We will look at one widely used diagram technique at the end of this chapter.

4.2 Complexities and Principles

In analyzing an argument, whether using the tool of standard form or an argument diagram, we seek to make sure we understand what someone's reasoning is before moving to evaluating the reasoning as reliable or unreliable. However, arguments as they are presented in normal conversation, including social media, are *messy*. When an argument is complicated and messy, and its presentation somewhat causal, it can be hard to be sure you have understood it correctly.

There are three main complexities you will confront:

- **Complexity of MISSING PIECES: Often when people offer arguments, they**



leave out parts.

- **Complexity of TOO MANY WORDS:** Often when people offer arguments, they add in lots of words that are not actually part of the argument – such as context, background, duplicate statements, exclamations or declarations of the importance of the issue, and personal asides of all sorts.
- **Complexity of UNCLEAR LANGUAGE:** Often when people offer arguments, they use language that is not clear, and to understand their thinking we will have to paraphrase.

Here is an example of an argument with all three complexities:

I wanted to go up to Seattle next weekend, and was trying to decide if it would be cheaper to drive or take the train. My car gets about 27 mpg on the highway, which makes it easy to figure out approximately how much the gas it would cost. But when I looked for the price of a train ticket online, I couldn't tell what the price would be. I filled in the information in the search tool – where I was leaving from, where I was going, and the date of travel. But then the system would come up with different prices of tickets. The tickets with the best prices were listed as limited. According to the website, there were only “only 2 tickets left” at the best price. Would they even be there when I wanted to buy? The information didn't really help since I didn't want to buy a ticket right that second. I got really frustrated. Doesn't Amtrak have standard prices anymore?

Looking through this passage, there is only one indicator word -- “since.” That word marks the statement that follows it as a premise, and the sentence that preceded as the conclusion. Putting this much in standard form, we get:

P1) I didn't want to buy a ticket right that second, but just compare the cost to driving.

SO That information didn't help.

UNCLEAR LANGUAGE: In the conclusion of the argument, as we pulled it into standard form, we find the pronoun “that.” We can tell what the “that” means in context of the full passage, but it loses its meaning once we pull it out. To deal with this, we can paraphrase – say what we think is meant. While we are at it, we can also clarify what sort of ticket is mentioned in the given premise. Changed language appears in italics.

1) I didn't want to buy an *Amtrak train* ticket right that second, but just compare the cost to driving.



SO: The pricing information available from the Amtrak website didn't help.

TOO MANY WORDS: In the full passage, we get a sense of the main issue – is it cheaper to drive or take the train to Seattle? But instead of resolving that issue through a thinking process, this person has decided she can't get some information needed to answer that question. A secondary issue then took the place of the main one – Does the information from the Amtrak website help decide whether it is cheaper to drive or take the train? Our thinker decides the answer to that issue is "No!" Once we focus on this smaller question, much of the passage turns into context or background – neither premise nor conclusion. Background is left behind when we go into standard form – though we use it to help us find acceptable paraphrases if language is unclear. Once we decide on the issue, our work in standard form looks like this:

Issue: Does the information from the Amtrak website help decide whether it is cheaper to drive or take the train?

P1) I didn't want to buy an Amtrak ticket right that second, but just compare the cost to driving.

SO: The pricing information available from the Amtrak website didn't help.

Everything else is left out!

MISSING PIECES: Focusing closely on this one inferential step reveals something characteristic of nearly all fast thinking – we leave premises unarticulated when we think quickly. When we put arguments into standard form, and slow our thinking down, we will fill these missing pieces in. It is (of course!) tricky to say confidently that we know what someone was thinking when they didn't say it. Indeed, concern over how to tell what someone meant but didn't articulate will lead us to the two principles for argument analysis we will examine next. For the moment, here is the missing piece filled in:

Issue: Does the information from the Amtrak website help decide whether it is cheaper to drive or take the train?

P1) I didn't want to buy an Amtrak ticket right that second, but just compare the cost to driving.

P2) To be of help, I would need to know the price of a ticket later (not right that second.)
(implicit)

SO: *The pricing information available from the Amtrak website didn't help.*



The parenthetical descriptor “(implicit)” marks the second premise as something added by the person analyzing the argument, and not found in the original. Some texts prefer the device of using [square brackets] to mark off parts that have been added.

Deciding when and how to add parts of an argument when analyzing is tricky! We will return to this process later in this chapter, and it will be a major focus of the next chapter.

Principles of Argument Analysis

When a passage presents complexities, putting the argument in standard form requires “judgment calls.” Different people might analyze the same messy argument differently. But that doesn’t mean the process is just a matter of (pure) opinion. When trying to decide if an analysis is adequate or good, we will use two principles. These principles of analysis are connected to our basic reason for engaging in critical thinking – to resolve issues by figuring out what is true.

***Principle of Sympathetic Interpretation:* An argument is analyzed sympathetically if the analysis makes it successful – deductively valid with plausible premises (see chapter 5) or inductively strong with plausible premises (see chapter 6)**

***Principle of Faithful Interpretation:* An argument is analyzed faithfully when decisions in the analysis – especially paraphrases and additions – appear to match what the thinker most likely had in mind, given the context of the argument and other things we know about the thinker’s beliefs and experiences.**

Not everyone uses these two principles when exchanging thinking. They make sense only in contexts of mutual deliberation and thoughtfulness. By way of contrast, if someone is debating an opponent, questions of interpretation might be settled by the goal of “winning” the debate. To win, it might make sense to paraphrase an opponent’s argument in ways that would make it easier to mock or counter.

Even if they don’t aim to “win an argument,” some people think it best to adopt the principle that if it is not clear what someone’s meaning is, you just stop and wait for the other person to make their meaning clear. This is an especially good idea if you are in a



face-to-face conversation.

The approach we are offering, however, is useful for trying to follow thinking presented in written form. It is both practical and principled. Instead of letting the messiness stop us in our deliberation, we will try to interpret UP –give the argument as presented the best chance possible to be successful in resolving the issue, while sticking as close as we can to any clues about the thinker’s intentions. We will be adding details to this idea of interpreting to make an argument the best it can be when we turn our attention from analyzing an argument to the tasks of evaluation.

4.3 Standard Form and the Complexity of MISSING PIECES

As we noted, when people present arguments in fast thinking mode, they almost always leave out some needed premises. In chapter 5 we will have two methods for identifying these missing or *assumed premises*. In this chapter, you will have an opportunity to test your *intuitions* before learning those methods.

Here is an example of an argument with a missing premise (or an *enthymeme*.)

I decided I should start reading [Yes Magazine](#), because I need something that will give me at least some hope for our nation.

The “because” is an indicator word, and it is our clue that some reasoning is happening here. If we put the argument in standard form using that indicator, we get:

Issue: Should I start reading *Yes Magazine*?

1) I need something to give me some hope for our nation.

SO I should start reading *Yes Magazine*.

This argument is missing a statement that links up the publication this thinker is citing in the conclusion with the idea put forward in the premise – needing something to provide hope. Although it is not stated, the premise that would add that link is very straightforward.



Reading *Yes Magazine* will give me at least some hope for our nation.

Notice that if we don't add in this premise, the original argument is what is known as a *non-sequitur*. The premise and conclusion have nothing to do with each other. Adding it in shows the relevance of the explicit premise to the conclusion, and in that way makes the argument better than it would be without it. This means it is following the principle of sympathetic interpretation. (To decide if it meets the principle, we would also have to look at the plausibility of the added premise – something we will consider later.) So we can't say that adding this premise made the argument perfect -- there may still be problems. But the principle is satisfied if it allows us to continue the critical thinking process.

When we add in a part of an argument through analysis, we should do something to remind ourselves which parts of the argument appeared in the original, and which part(s) we added in. As mentioned above, the use of square brackets and the parenthetical “(implicit)” are two techniques often used to mark added or assumed premises. So, the argument above would appear as:

Issue: Should I start reading *Yes Magazine*?

1. I need something to give me some hope for our nation.
2. [Reading *Yes Magazine* will give me at least some hope for our nation.] (implicit)

SO I should start reading *Yes Magazine*.^[1]

Although less frequent, people sometimes leave a conclusion unstated. Here is an example.

Honey, I already told you that if you don't clean up your room, you are not going to the soccer practice. And you don't want to miss that practice, right?

In standard form:

Issue: Should you clean up your room?



1. **If you don't clean up my room, you can't go to soccer practice.**
 2. **You want to go to soccer practice.**
- SO [You should clean up your room.] (implicit).**

If there is a piece missing that is to be filled in, the piece introduced should exactly fit the hole in the argument. That is, it should match the language used, and not go beyond what was stated in the argument. If the author is making an assumption, the expression of that assumption should fit with everything that was explicitly stated. We should never add in new ideas or concepts, but just link up ideas in the original.



4.3 Missing Pieces

What do you think? Use your intuition to fix the following examples of non-sequiturs. First use any indicator words to put each argument in standard form. Then add in a premise to link up the ideas you found in the other pieces. Some of these will require some basic paraphrase. Try it now if you want!

1. **We need to go to the store before our guests arrive, because we are out of dark beer.**
2. **I think Buster must have fleas, since he has started to scratch.**
3. **Tomorrow will be the 24th, since today is the 23rd.**
4. **We better dig up that back patch since we have these zinnia seeds to plant.**
5. **Cats are easier to take care of than dogs, so we decided we should get a cat.**
6. **This painting has small brush strokes and a certain way of depicting light, so I think it must have been done by an impressionist.**
7. **He is a pretty fair grader, since he always lets us know exactly what will be on the quizzes and exams.**
8. **The western division of the NBA has had much better teams than the eastern division for a long time, but the NBA championship title series is always between the winners of the eastern and western divisions. That's why I think some of the recent championships haven't been between the two best teams.**
9. **Maggots of the green bottle flies are known to lay eggs in cadaver tissue in the wild within hours after death, so the developmental stage of their larvae in the cadaver can be used for accurate determination of the time of death. (from https://en.wikipedia.org/wiki/Green_bottle_fly retrieved 6/2107)**
10. **You should think about looking for a new job in network security now that the unemployment rate has gone down. Employers are more willing to hire people without experience when the job market it tight. (Note: there is no indicator word here. What do you think the issue is?)**



The AACU definition of critical thinking uses a student's ability to recognize assumptions as part of evaluating the student's skill level. Here are the 4 demarcations of skill[2]:

Level 4 (most skilled): Thoroughly (systematically and methodically) analyzes own and others assumptions.

Level 3: Identifies own and other assumptions.

Level 2: More aware of others' assumptions than one's own. Questions some assumptions.

Level 1: Shows an emerging awareness of present assumptions; sometimes labels assertions as assumptions.

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In putting an argument into standard form, one key skill is that of paraphrasing. Paraphrasing is restating a piece of writing in a way that clarifies it. When someone writes an argument in English, the author uses conventions of the English language, which allow use of clauses and other structures like pronouns that eliminate repeated or redundant words. (Other languages may pose other kinds of challenges to understanding meaning.) Paraphrasing is a way to maintain or even enhance clarity on the content of the argument.

The simplest piece of paraphrasing, and often one of the most crucial, is being sure that all pronouns are replaced with the appropriate nouns in all statements within an argument. As soon as a statement is removed from its initial context, it becomes impossible to tell what a pronoun is referencing. Paraphrasing does not always make an argument shorter. In order to be understood, the paraphrase of an argument may end up longer than the original. For instance, "It is finished" may become "The process by which the airplane was analyzed is finished."



Another important piece of paraphrasing is putting in the parts of a sentence missing when a clause is separated from its original context. “Which is blue” means nothing. “The car is blue” is a sentence that can then be placed appropriately into the standard form.

Once pronouns and clauses have been dealt with, then the rest of the argument should be considered. When working with an argument in standard form, we want the argument to be clear and concise. Revising the language so that it is straightforward and easily understood by is helpful paraphrasing. At the same time, the original meaning must be preserved. For instance, it is common to paraphrase a technical term with an ordinary term, and, most of the time, that is acceptable. But if the argument is about aspects of the technology, the term may need to be retained.

When evaluating a paraphrase, use the principles of sympathetic and faithful interpretation. The original words should be preserved, along with the original meaning, unless they present a problem. Where there is a need to paraphrase by changing words, the goal is that the author of the argument will be able to recognize and claim the paraphrased argument as their own – and perhaps would even say your paraphrase has improved on the original!



4.4 Paraphrase

What do you think? Please put the following arguments in standard form, paraphrasing so all sentences make sense when listed out of context.

1. Tom needs to take his relationship more seriously. If he keeps putting in 60+ hours at work every week, Bob is going to leave him.
2. Most people don't care about politics. Only 55.4% of eligible voters actually voted in 2016. That's down from 60% in 2012.
3. Climbing hydrangea is a great choice to plant next to a north-facing fence because they are evergreen climbers with beautiful flowers and thrive in low or indirect light.
4. Jorge Ramos – who is one of the most successful and visible Hispanic journalist in the U.S. of this era – has won 8 Emmy Awards as of 2016, which shows how good he is.
5. No one can tell for sure if God exists, so I think both atheists and theists make the same mistake of intellectual arrogance.

4.5 Diagrams

A diagram is more useful than standard form when trying to understand how the pieces fit in an **extended argument**. The steps to diagramming an argument are not difficult, as long as the parts of the argument can be separated from other aspects of a piece of writing, such as explanations, illustrations, and reporting about arguments.



The basic steps to diagramming are as follows:

- Identify the conclusion of the argument and the premises, along with intermediate/sub-conclusions found in the argument. Intermediate or sub-conclusions function as conclusions to an argument embedded in the larger argument, and serve as premises for some other argument. If you think something may be part of the argument, but are not sure, keep it until you have completed the diagram.
- Number the statements consecutively as they appear in the original piece of writing; do not number any statement that is not going to be included in the diagram.
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- For arguments where two or more premises must be present together to lead to a particular conclusion, use + to show they are connected as reasons.
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 - “Is the problem that this statement is not part of the argument?”
 - Or is the problem that there is a piece missing from the argument?” If that seems to be the problem, hold onto the statement and put it in the diagram – at a later step, you can work to identify the missing or implicit connector statement.
 - If, on the other hand, the statement does not lead to or follow from some other part of the argument, eliminate it.
 - If it seems to be a part, but you aren’t sure where or how, try it out in different roles in the argument. Where does it fit best in creating a coherent argument?
 - Draw an arrow from each premise or group of premises to indicate these are the statements that lead to the conclusion.

Diagramming a simple argument

A simple argument has only one layer of premises which lead to a single conclusion. The premises may work together, or a premise may be independent of other premises as a reason to accept the conclusion. For that reason, simple arguments are usually easy to identify and diagram. (If the premises work together to support the conclusion, we could choose to use standard form.)

For example, someone might say:

“There is only one pregnant female cat in the house, and those appear to be new-born kittens. So, it is highly probable the cat has given birth.” This is a simple argument.

To diagram the argument, recognize, based on the indicator word, that “It is highly probably the



cat has given birth” is the conclusion to the argument. There are two other statements, each of which appears to be a premise.

Next take these three statements and number them in the order they appeared originally:

1. There is only one pregnant female cat in the house.
2. Those appear to be new-born kittens.
3. It is highly probably the cat has given birth.

Taking the number for the statements, I will put 1 and 2 on the line above 3. And because both statements together lead to the conclusion, I will put a + between them. Taking the final step, I will put in an arrow to show that these two statements lead to the conclusion.

$$\begin{array}{c} 1 + 2 \\ \$ \\ 3 \end{array}$$

You will notice that in this simple example, there was no question about whether a particular statement belonged in the argument. That is not always the case with more complicated arguments. Often, we must deal with the complexity of statements that set background, context, etc.

If you have a simple argument where the premise(s) are not connected, the results would be similar to the following example.

“I think the kittens got into the bathroom again. Not only are the clean towels knocked onto the floor, the toilet paper has been pulled off the roll and shredded.”

Here, again there is a conclusion, although without any indicator word. The conclusion is: The kittens probably got into the bathroom again.[3] (The next two statements are the premises in this case, and they are independent of each other: knocking towels down and attacking toilet paper are separate actions and separate pieces of evidence.

Putting the statements into the order they appeared originally gives:

1. The kittens probably got into the bathroom again.
2. There are clean towels knocked onto the floor.
3. The toilet paper has been pulled off the roll and shredded.

The diagram for this argument is similar to the prior one, but there is no joining of statements. Instead, there is an arrow from each premise number to the conclusion. And since the conclusion came first, number 1 is at the lowest level of the diagram.



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It is possible to have a simple argument with two or more groupings of connected and independent premises. Simple does not mean few premises, but only a single conclusion. If we used standard form to understand the structure of this argument, we would need to separate inferential steps. Compare:

Issue: Did the kittens get into the bathroom?

P1) There are clean towels knocked onto the floor.

P2) [If there are clean towels knocked to the floor, the kittens probably got into the bathroom.]

SO The kittens probably got into the bathroom

Issue: Did the kittens get into the bathroom?

P1) The toilet paper has been knocked off the roll and shredded.

P2) [If the toilet paper was knocked off the roll and shredded, the kittens probably got into the bathroom.]

SO The kittens probably got into the bathroom

Diagramming a complex argument

The process for diagramming a complex argument is similar to that of a simple argument. The difference comes in the fact that there will be intermediate or sub-conclusions in the argument, so instead of two levels of statements, there will be a minimum of three. Otherwise, the process is the same.

A very basic complex argument can have only three statements: a premise, an intermediate or sub-conclusion, and a final conclusion. For instance, consider this argument:

“I will be gone next weekend, so I cannot host guests. Therefore, my mother should not come to visit me at home.”

Analyzing the argument, there are three statements, two of which have indicator words for



premises. This suggests one is an intermediate/sub-conclusion. And given the sentence structure, the best candidate is “I cannot host guests.” In addition, logically, saying one cannot host guests leads to a statement about a particular guest, rather than the other way around.

Putting the statements into order and assigning a number to each, gives:

1. I will be gone next weekend.
2. I cannot host guests
3. My mother should not come to visit me at home.

And then, drawing the diagram gives:

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    2
    $
    3
  
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Most complex arguments will contain more premises than this particular example, but remember that there is no rule about how an argument is constructed, beyond the need for there to be a premise and a conclusion.

You will notice that diagramming only makes use of what is given in the argument. But there are often pieces missing from an argument, which, when made evident, will help with evaluating the argument. Those pieces are generally added when the standard form of the argument is set out.



4.5 Diagrams and Standard Form

What do you think? Here are some arguments. Please put the simple arguments in standard form, and diagram the extended arguments.

1. I'm sure George is on campus. His car is here, and his backpack was in its usual spot in the library.
2. No one majoring in welding likes ballet. Andre is studying welding. So Andre doesn't like ballet.
3. Don't copy Lulu's homework. She is one of the worst students in class. My roommate told me she's not received credit for a single assignment all term.
4. This is either my tablet or it's Sandi's. If it is my tablet, my password will work to open it. But my password isn't working, so it must be Sandi's.
5. Only three people could have eaten the cake: Danni, Stu or Pat. But Stu couldn't have eaten the cake because he was out at the skate park. Pat couldn't have eaten the cake because she was at a friend's house. Therefore, Danni must have eaten the cake.
6. Something is a square only if it is a rectangle. But this isn't a rectangle. Do you see that it only has three sides, and some of the sides aren't even straight? So this can't be a square.
7. Merit speaks fluent Norwegian. Given that, Merit was probably born in Norway. Anyone born in Norway is a Norwegian citizen. Thus, Merit is likely a Norwegian citizen. Citizens of Norway are entitled to European Union travel privileges. So Merit is probably entitled to travel privileges in the European Union.
8. If Ann isn't dating Sid, she's dating Mike or Dave. Ann isn't dating Sid because she doesn't date anyone who smokes, and Sid is always puffing on a cigar. So Ann is dating Mike or Dave. Ann won't date anyone who doesn't run cross country, nor will she date anyone who isn't a math whiz. Both Mike and Dave are great at math, but Dave isn't a runner. Consequently, Ann isn't dating Steve. We can logically deduce, therefore, that Ann is dating Mike.
9. I wish we could go to Hawaii for vacation, but we just don't have the money. Besides, I read that the tourist trade is causing extensive environmental damage to



sensitive parts of the ecosystem. I don't want us to be part of that kind trouble.

10. I think we should all be reading Al Jazeera news now that they created a North American edition, because I think it is important for people in the U.S. to get perspectives from outside the US/European Union frame of reference. And I read a review of their news service that said they have seriously high-quality reporting. That's another good reason for subscribing.

11. Portland has a professional women's soccer team, The Thorns. I haven't been to any of their games yet, but I am thinking about going. I read this article about how women soccer players make lots less money than the men. It seems like another example of unequal pay for equal work, and that makes me mad. But the owners say it is just basic economics. They sell a lot more tickets to the men's games than to the women's, which means they have more money to pay the men. So we might actually be able to make a difference for this inequality just by going and enjoying ourselves at a local soccer game! But the lower attendance also means the games will be less crowded, so we will have shorter waits in line to get in and get concessions. I think there are lots of reasons we should start going to Thorns games.

[1] When we deal with deductive validity, this argument will be paraphrased as:
 P1) If reading Yes magazine would give me hope for our nation, I should start reading it. P2) Reading Yes magazine would give me hope for our nation. SO I should start reading Yes magazine.

[2] See <https://www.aacu.org/value/rubrics/critical-thinking>

[3] Note that the original statement is "I think the kittens got into the background. To diagram the argument, we changed the statement to "The kittens got into the bathroom." Note that the person presenting the reasoning is not trying to prove THAT she thinks the kittens have gotten into the bathroom – rather, she is giving reasons for answering "yes" the question, "Did the



kittens get into the bathroom?” Considering the principle of faithful interpretation, however, we have paraphrased the conclusion to include a “probably.” In many contexts, people say “I think” as a contrast to “I know” – signaling the difference between strength of inference, which is coming up in the next two chapters!
alternatives and reasons for them.

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