# An Introduction to Fallacies

In this lesson, we’ll be changing gears a bit. By now, you should already be familiar with the basics of arguments. In particular, you’ll remember that (1) arguments are defined by the fact that there is claimed *inferential link* between the premises and conclusions, (2) depending on how strong this inferential link is, we can classify the argument as *deductive* or *inductive,* and finally (3) in order to evaluate the success of a given argument you need to consider BOTH the structure/form of the argument AND the truth of the premises. In the end, there are exactly two ways of making a good argument: you can make a sound deductive argument (valid with true premises) or a cogent inductive argument (strong with false premises). By contrast, there are all sorts of ways that arguments could go wrong: deductive arguments might be invalid, inductive arguments might be weak, or the premises of any argument might be false.

With this background, we can now start talking about how to recognize some of the most common sorts of bad arguments, which we’ll *fallacies.* Some questions we’ll be looking in this lesson include the following:

1. What is a **fallacy**? What is the relationship between fallacious reasoning and the concepts of validity, soundness, strength, and cogency?
2. What is a **formal fallacy**? When do formal fallacies commonly occur?
3. What is an **informal fallacy**? How can you tell whether an informal fallacy has occurred?
4. Can you explain the differences between fallacies of **presumption, ambiguity,** and **grammatical analogy** (or **mereology)**? What are some examples of each type of fallacy?

A **fallacy** is a defective argument or way of reasoning. Fallacies can be valid or invalid, or strong or weak. They are never sound or cogent. Fallacies often occur at the level of thought, and not just in speech or writing. For example, many of us have a (fallacious) tendency to dismiss the arguments of people whom we dislike. The **principle of charity** requires that we always *attempt* to represent other peoples’ arguments so that they do not contain fallacious reasoning. So, accusing someone of committing a fallacy should be a last resort, not an opening move. Psychological research has consistently shown that people are much, much better at detecting the fallacies of *other* people than they are at detecting their own fallacious reasoning. So be careful!

## Formal vs. Informal Fallacies

A **formal fallacy** is an instance of an argument that is DEDUCTIVE BUT INVALID**,** and it can be detected merely by considering the argument’s logical form. I’ve included a few famous examples here (which college students back in the Middle Ages would have had to memorize!). These are important primarily because they look fairly similar to certain valid argument forms, which can lead to confusion.

Example 1: Fallacy of **denying the antecedent.** If X then Y. Not X. Therefore, not Y.

* “If Liz is a spy, then she sometimes tell lies. Liz is not a spy. Therefore, Liz never lies.” (Why is this a fallacy? Because the mere fact that Liz isn’t a spy doesn’t mean she doesn’t lie!).
* This fallacy is called “denying the antecedent” because one of the premises involves asserting that the antecedent of a conditional (in the other premise) is false. The conclusion then says that the consequent of this conditional is false.

Example 2: Fallacy of **affirming the consequent.** If X then Y. Y. Therefore, X.

* “If Larry is a spy, he likes to ask people strange questions. Since Larry likes to ask people strange questions, we can conclude that Larry is a spy”
* If you haven’t guessed, the fallacy here involves saying that since the consequent of a conditional is true, its antecedent must be true as well.

Example 3: Fallacy of **illicit major (or minor).** All Ys are Xs. No Ys are Zs. So, no Xs are Zs.

* “All assassins are humans. No assassins are philosophy professors. So, no humans are philosophy professors.”
* While you don’t need to worry too much about the name of the fallacy, the basic idea here is that the conclusion contain two terms: “philosophy professors” and “humans.” This fallacy occurs because the conclusion asserts a claim about *every single human* (that none of them are philosophy professors!) without also having a premise that makes a claim about every human. In a categorical syllogism, this sort of things doesn’t work.

There are many more formal fallacies than just these ones. In fact, if we define all invalid deductive arguments as formal fallacies, there will be an *infinite* number of fallacies (though there will also be an infinite number of valid deductive arguments…). You can learn to identify these fallacies by studying formal deductive logic (such as categorical logic or propositional logic).

An **informal fallacy,** in contrast to a formal fallacy,is a defective argument that can only be detected by examining the argument’s content. They can deductive or inductive, and either strong/weak or valid/invalid. (The only thing they can’t be is cogent or sound). For example, any inductive argument that **suppresses evidence** commits an informal fallacy. For example,

* “The Earth does not appear to be round to people who are walking on it. [No scientific evidence concerning the shape of the earth is mentioned.] So, the Earth is probably not round.”
* While this clearly is a bad argument, we can’t tell that it is bad *merely by looking at the form of the argument.* The only reason that we know it is bad is because we have some background knowledge on the topic of this argument (e.g., regarding the shape of the Earth). This contrasts with formal fallacies, which can be identified without any knowledge of what the argument is “about.”

## A Warning: Conditional Statements Can be Strange

Many formal fallacies involve conditional statements. It’s important to remember that the *only* time a conditional is false is when the antecedent is TRUE and the consequent is FALSE. On the other hand, all conditionals with false antecedents are true, as are all of those with true consequents. Some weird examples of conditional statements:

* If Batman lives next door to Donald Trump, Donald Trump is at least seven feet tall. (Since there is a false antecedent, the conditional statement as a whole is true. So would “If Barack Obama lives next door to Batman, the moon is made of green cheese.”)
* If the sun exploded this morning, then the average temperature on earth is currently below 200 degrees. (Since there is a true consequent, the whole thing is true).

## Fallacies of Presumption

**Fallacies of presumption** are informal fallacies involving premises that would likely be unacceptable to anyone initially suspicious of the conclusion. The basic idea is that you commit this fallacy when you make an argument which “assumes” the truth of the conclusion that you were supposed to be providing (independent) evidence for. These arguments can be either deductive or inductive, and are often strong or valid. The problem in these argument concerns the acceptability of the *premises* (so, they are uncogent or unsound)*.*

**Begging the question (circular argument):** A, B, and C [C is often implicit]. Therefore, C.

This fallacy occurs when one or more of the premises (it might be an implicit one) is too “close” to the conclusion. Making an argument of this sort should cause someone initially suspicious of the conclusion to ask the question “And why should I accept that premise?” (Hence, the name “beg the question.”). It’s important to note that what counts as “begging the question” might depend on who you are arguing with. So, for example, it might be perfectly legitimate to include a premise appealing to the truth of a certain religious text if you are talking to someone who shares your general religious beliefs. However, it would NOT be OK to do this when arguing with someone who didn’t share this background with you.

* Example “Since abortion violates a fetus’s right to life, it is morally wrong. [Implicit premise: Fetuses have a right to life.]”
* Example: “Everyone knows that women have a right to their own bodies, just like men. So, women clearly have a right to get an abortion. [Implicit premise: A woman’s right to her body means she has a right to get an abortion]

Both of these examples are both deductive, valid arguments! The only problem is that one of the premises is a non-starter, at least if you are trying to talk to someone who isn’t convinced about the truth of your conclusion. (For similar reasons, this would be a bad way of reasoning for someone who was trying to figure what his/her position on abortion should be in the first place.)

In many cases, “Begging the Question” involves thinking about what sorts of premises *other* people are likely to accept. For example “You obviously want to make America great again, so you must love Donald Trump” or “You seem to care about women’s success, you must have voted for Clinton” are both question-begging arguments, since the premises they assume (implicitly) are NOT the sort of premises you can count on others to accept.

**False dichotomy:** A or B [leaves out plausible options C, D, E, etc.]. Not B. So, A.

This fallacy occurs when there is an “either-or” premise that leaves out some viable option. While this can occur in a variety of contexts, it often happens because we are simply *convinced* that our view is the right one, and that the only alternatives are obviously crazy or false ones. So, for example, in politics: “You can either vote for Democrats or you can vote for the woman-hating rich guys” or “You can either vote for the Republicans or you can vote for the party that hates freedom and God.” As with begging the question, the premise in question often “feels” true to the person that is making the argument. However, this doesn’t make it a good premise in an argument intended to convince *other* people. (And again, we should also try to avoid reasoning this way when we are trying to make up our minds initially.)

* Example: “Either Karl Marx was entirely right about economics or Adam Smith was. Since Adam Smith was not entirely right, Karl Marx was right.” (alternate version: ”Since Marx isn’t entirely right, Smith must be)
* Again, the two versions of this argument are both deductive and valid (it’s a type of *disjunctive syllogism*). However, the premise saying that either Marx was entirely right or that Smith was obviously leaves out a number of options (among others, it leaves out the possibilities that they both were partially right, or that they both were entirely wrong, etc.)

The fallacy of **complex question** often occurs when someone is (perhaps unconsciously) trying to set up a fallacious argument. It is closely related to begging the question. The fallacy involves asking a question that (illicitly) presumes some condition is true. After the person answers, the arguer than constructs an argument for that very presumption.

* A: “So what did you after you ate all of my Taco John’s leftovers?”
* B: “Nothing”
* A: “You say that you did nothing after eating my leftovers. But this implies that you *did* eat them. I knew you were a thief!”

In this case, the fair thing for A to do would be to ask TWO questions: “Did you eat my leftovers?” and “What did you afterward?” As you might have noticed, this “fallacy” isn’t actually an explicit argument. However, it counts as a fallacy because the questioner clearly has an argument (and more specifically, a particular conclusion to an argument) in mind when they ask this sort of question.

**A General Note on Fallacies of Presumption.** In real life, the fallacies listed above almost never work to “win” arguments—instead, they frequently lead to a breakdown in communication, as the person you are trying to argue with either gets angry (because they think you are misrepresenting their view) or ignoring you. The problem with these fallacies is that we often don’t realize we’ve made them until after the fact—after all, the premises seemed to true to us! To avoid these fallacies requires thinking hard (*before* making an argument) about where the other person is coming from, and which sorts of premises he/she might be open to accepting.

## Fallacies of Ambiguity and Illicit Transference

**Fallacies of ambiguity** are informal fallacies that occur when a key term means something different in the conclusion from what it does in the premise. These arguments are often deductive (since they rely on *definitions*), but they are either invalid OR have a false premise (so, they are unsound either way). Some examples include:

**Fallacy of equivocation:** “A” (where “A” does not mean X). Therefore, C (where C depends on “A” meaning X).

* “I have a right to a divorce. Therefore, I have every right to divorce my spouse to marry someone hotter and richer. [Premise describes legal right; conclusion depends on moral right].”
* This equivocates on the word “right.”

**Amphiboly:** Person P claimed “A” (where A does not mean X). So, P is committed to X.

* “Natalie has repeatedly said that she supports animal rights. So, Natalie must be in favor of allowing earthworms to vote.”
* This misinterprets what Natalie meant when she said she was in favor of “animal rights.”

These fallacies can sometimes be difficult to tell apart. As a rule of thumb, the fallacy of equivocation occurs when a person uses the same word (at least) twice during an argument, but it changes meaning over the course of the argument. By contrast, amphiboly occurs when the argument rests on a misinterpretation of what *someone else* said.

**Mereological fallacies** (sometimes called **fallacies of illicit transference**) involve illicit inferences concerning parts and wholes.

**Fallacy of composition:** Each part of W has property P. So, W has property P.

* “Every U.S. citizen has a unique DNA sequence. So, the U.S. as a whole has a unique DNA sequence.”
* “An individual can save money by spending less. Therefore, the economy as a whole would have much more money if everyone stopped spending so much.” (in economics, this is called the *paradox of thrift,* and it says that if everyone starts saving their money, the economy as a whole will actually shrink, and not increase.)
* “Link can’t defeat Ganon with just a sword. He also can’t defeat Ganon with just a shield. So, Link can’t defeat Ganon with both a sword and a shield.” (The problem: it could be that the combination really does allow Link to defeat Gannon).

**Fallacy of division:** W has property P. So, each part of W has property P.

* “The U.S. government has the right to punish criminals. So, each individual U.S. citizen has the right to punish criminals.”
* “A bird can fly. Therefore, each individual body part of the bird can also fly (if detached from the bird).”
* “Water is healthy to drink, and it is made partially of hydrogen. So, hydrogen is healthy to drink.”

Mereological fallacies are sometimes called **“fallacies of grammatical analogy”** since there are perfectly good arguments that look exactly like these fallacies. For example, suppose we know that the population of Minnesota is 6 million, and the population of Wisconsin is 5 million. We can conclude that the combined population of both states is 11 million without any problem. (This is because population is the sort of property that allows us to go from parts to wholes. This isn’t true of every property, however).

## Solved Problems: Formal and Informal Fallacies

Determine which fallacy is committed by the following passages, if any.

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| Passage | Analysis |
| All Capulets are enemies of the Montagues. Some enemies of the Montagues are pirates. So, some Capulets are pirates. | This is a formal fallacy (the **fallacy of undistributed middle)**. It is a deductive argument, but isn’t valid, since the conclusion doesn’t *necessarily* follow from the premises. |
| Juliet, you obviously should not marry Romeo, because both your father and I disagree. I’m sure you’ll agree that parents always know better than children about things like this. | While this argument would need to be spelled out a little, it looks like it is an instance of begging the question (an informal fallacy). After all, why should Juliet accept the premise about parents always being right? |
| If someone insults your honor, there only two choices: challenge them to a duel, or live forever in shame. Since Mercutio insulted your honor, you don’t want to live forever in shame, you should definitely challenge him to a duel. | This is a false dichotomy,since it assumes there are only two options—duel or live forever in shame. (In real life false dilemmas, the person making the argument often “feels” these are the only two choices, even though the evidence doesn’t support this). |
| Romeo’s friends would be happy if he married Rosaline. His friends would also be happy if he married Juliet. So, his friends would be even happier if he married BOTH Rosaline and Juliet. | This commits the fallacy of composition (obviously, the friends would not suddenly become twice as happy if Romeo secretly had two marriages, and two wives). |
| If Juliet got an A in logic class, then Shakespeare wrote *Romeo and Juliet.* | This is a conditional statement, and not an argument at all! It is also guaranteed to be a TRUE conditional statement, since we know that the consequent is true (since Shakespeare really did write R and J). This means the whole statment would be true REGARDLESS of what the antecedent was (“If Juliet got a D…”, “If she never took logic class..,”). |
| All Venetians are Italians. All Italians are Europeans. So, all Venetians are Europeans. | This is NOT a fallacy. |
| It is impossible for Juliet to confess her love to Romeo using any single word. So, it is impossible for Juliet to confess her love to Romeo using any combination of words. | This is an informal fallacy concerning wholes (sentences, paragraphs) and their parts (words). It looks like a fallacy of composition, since the premises concern parts and the conclusions concerns the whole. |
| Since you don’t like Shakespeare, you clearly have bad taste in literature. | This begs the question, since the implicit premise (“Everyone with a good taste in literature likes Shakespeare”) would be unacceptable to anyone to whom this argument was addressed. |
| Romeo just compared Juliet to the sun. He obviously thinks she is made of very hot gas, just like the real sun. | OK, so this is a bit ridiculous, but it is an example of amphiboly (an informal fallacy). More seriously, though, amphiboly often happens when someone tries to make an analogy, and people respond by misinterpreting this analogy in uncharitable ways. |
| If Juliet marries Romeo, she doesn’t marry Paris. Juliet doesn’t marry Paris, so she must marry Romeo. | Even though the conclusion here is true (Juliet does marry Romeo in the play), this commits a formal fallacy, since it uses an invalid form of deductive reasoning (affirming the consequent). |
| Why do English teachers like to torture their students by making them read Shakespeare? | This is an example of a complex questions, since it assumes that English teachers do, in fact, like to torture their students. |

## REview Problems

1. Determine whether the following commit formal or informal fallacies, and say what type they are:
   1. If Secretariat won the triple crown, then he won at least three races in a year. Secretariat won at least three races in a year. So, he won the triple crown.
   2. 51% of Americans are female. Tracy is an American. Therefore, Tracy is 51% female.
   3. A peanut butter sandwich is better than nothing, and nothing is better than ice cream. We can conclude that a peanut butter sandwich is better than ice cream.
   4. We can either institute a law banning all private gun ownership, or we can allow people to buy their own private tanks. But we clearly can’t allow people to buy their own private tanks. So, we should ban all private gun ownership.
   5. Some people use handguns to protect themselves from violent crime, which is clearly a good thing. So, the government should not restrict handgun ownership.
   6. All humans are mortal, and all mortal beings die. Therefore, there will someday be no humans left, since they all will dead.
2. **Challenge.** You are shown four cards with values 5, 10, D, A. Which card(s) do you need to turn over to determine the truth of the conditional statement “if a card has an even number on one side, it will have a vowel on the other?”