

# A Little Logic

*The central problem of logic is the classification of arguments, so that all those that are bad are thrown into one division, and those which are good into another.*

— Charles Sanders Peirce



**P**hilosophy consists of ideas, grand theories, and visions, articulated in speech or in writing and presented in the clearest way possible. In the presentation, therefore, it is crucial to give **reasons** for your ideas, to *support* your theories with a variety of examples and considerations that will show that your philosophy is more persuasive than its alternatives (or at least as persuasive). Accordingly, the key to good philosophical presentation development is what we call an **argument**. In ordinary language, we sometimes think of an argument as a violent quarrel, filled with hostility and mutual resentment. This need not be the case, however; an argument is nothing more than the process of supporting what you believe with reasons. “I know that I am not dreaming right now because I never dream this vividly, I just pinched myself, and besides, if I were dreaming I’d probably be snoring right now.” An argument ties your belief to other beliefs and helps persuade someone else to accept what you believe. A good argument can be presented in a perfectly coolheaded and amiable manner. Indeed, the best arguments are always defined by a process of careful thinking that we call **logic**, often described as the “science (and the process) of proper reasoning.”

Philosophers use a variety of arguments and argument types. So, of course, do politicians, salespeople, television talk show hosts, and each of us, every time we are trying to convince someone of something we believe or trying to think something through for ourselves. There are arguments by **example** (“Let’s look at a particular case,”) and arguments by **analogy** (“Life is like a novel. There is a beginning and an end; it can be dull or exciting; there will surely be conflicts and bad scenes; there is suspense; the plot thickens. Therefore, the most important thing in life is to live an interesting life, develop your character, and don’t just play it safe.”). There are arguments based on extensive scientific research, and there are arguments that are very abstract and largely verbal (concerned more with the words used to describe a phenomenon than with the phenomenon itself). There are arguments based on nothing more than a vicious attack on one’s opponents, and there are arguments that—despite their appearance—are not really arguments at all. In general, we might divide arguments into two classes—good arguments and bad arguments—depending on the *relations* between various statements. (*Truth* and *falsity*, on the other hand, apply to the statements themselves, never to the arguments.)

What counts as a good or a bad argument depends on what kind of an argument it is. As a useful way to understand arguments and what it is that makes them good or bad, it is convenient to divide them into two very general categories, to which philosophers and logicians (that is, those who study logic as their essential interest) apply the names **deduction** and **induction**.

## Deduction



In a deductive argument, one argues for the truth of a conclusion by deducing a statement from a number of others. An example that might be familiar to you is any proof of a theorem you learned to formulate in high school geometry. Some statements are assumed to be true from the outset (for example, statements that are true by definition and statements so obviously true that they need not be proved at all, called **axioms**). Then, new statements are **deduced**, or **inferred**, by means of a number of established **rules of inference**—that is, the laws of thought, such as “A statement cannot be both true and false at the same time” or “If either *A* or *B*, but not *A*, then *B*.” A deductive argument is thus a progression from one true statement to another. The second statement is established as true, too; in fact, a deductive argument is sometimes defined as an argument whose final statement—or **conclusion**—is guaranteed to be true by the truth of the previous statements—or **premises**.

The best known deductive arguments are called **sylogisms**. An example of a syllogism is:

All philosophers are wise.  
Socrates is a philosopher.

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Therefore, Socrates is wise.

What is important in such arguments is the form of the component statements:

All Ps are Qs.  
S is a P.

---

Therefore, S is a Q.

When a deductive argument proceeds correctly according to this form, we say that it is **deductively valid**, or simply **valid**. Arguments that are not valid are **invalid**. Deduction guarantees that our conclusions will be at least as certain as the premises. If the premises are certainly true, then the conclusions will certainly be true as well. But it is important to emphasize that an argument can be

valid even if its premises and conclusion are false. For example, the following syllogism correctly follows the above form and is therefore valid:

All cows are purple.  
Socrates is a cow.

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Therefore, Socrates is purple.

This is a valid argument, even though both the premises and the conclusion are false. But without true premises, even a valid argument cannot guarantee true conclusions. A good deductive argument must also have premises that are agreed to be true. Notice that, contrary to common usage, philosophers restrict their use of the words *valid* and *invalid* to talking about correct and incorrect arguments; the words *true* and *false* apply to the various statements that one makes in an argument—its premises and its conclusion. Thus, the claim that “ $3 + 2 = 8$ ” is false, not invalid; and the argument “If Socrates is a man and all goats eat cabbage, then Socrates is a goat” is invalid, not false (whether or not its premises or conclusion are false). When an argument is both valid and has true premises (a good argument, in other words), it is called a **sound** argument. An argument is **unsound** (a bad deductive argument) if one or more of its premises are false, or if it is invalid. A good deductive argument, then, has two essential features:

1. It is a valid argument.
2. Its premises are true.

A detailed discussion of valid argument forms can be found in Appendix B.

## Induction



**Inductive arguments**, on the other hand, do not guarantee the truth of their conclusions, even if all the premises are agreed to be true. The most familiar form of **induction** is **generalization** from a number of particular cases—for example, noting that every animal we have seen with sharp front teeth eats meat and concluding that *all* animals with sharp front teeth eat meat. But notice that although we might be absolutely sure that we are correct about the particular cases—that every such animal we have seen does in fact eat meat—we might still be wrong in our generalization, our conclusion that *all* such animals are meat eaters. Thus, it is essential in any inductive argument to begin with a well-chosen number of particular cases and to make sure that they are as varied as possible (that is, to approximate what social scientists call a random sample). Inductive arguments can be **strong** or **weak**, depending on the weight of the evidence for the conclusion, the quality of the sample, and the plausibility of the generalization. Inductive

arguments are not evaluated as valid or invalid; in fact, given the definition of validity as the guarantee that the conclusion is true if the premises are true, *no* inductive argument is ever deductively valid. (That is not a mark against it, of course. Inductive arguments have other functions; they are not supposed to be deductively valid.)

### Deductive and Inductive Logic

**Deductive logic** guarantees the truth of the conclusion, *if* the premises are true.

*Example:* If Moriarty didn't do it, then the Spiderwoman did. We know that Moriarty was in prison at the time, so the Spiderwoman must have done it. (Premises: "If M didn't do it, S did," and "M was in prison at the time.")

**Inductive logic** does not guarantee the truth of the conclusion, but only makes it more reasonable for us to believe the conclusion (compared with other possible conclusions).

*Example:* The pipe tobacco is the same kind he uses, and the footprints match his shoes. He was seen in the neighborhood only an hour before the crime, and he was heard to say, "I'm going to get even with her if it's the last thing I do." The best explanation of the evidence in this case seems to be the conclusion that he is guilty.

Although generalization is the most familiar example of induction, inductive arguments can be used to support virtually every statement of fact. For example, if you believe that Julius Caesar was murdered in Rome on March 15, 44 BCE, that is a statement of fact that you cannot directly observe today. The argument for its truth must therefore be inductive, based on information you have read in history books, colored by imagery from a play by Shakespeare, to be further verified—if you are curious—by an investigation into the **evidence** available in chronicles of the period, records of Roman politics, and perhaps a few relics from the times. In such inductive arguments, it is the **coherence** of the evidence that provides the argument—that is, the various elements of the argument fit together well. In a criminal trial, for instance, evidence is presented in favor of two contradictory statements of fact ("The defendant is guilty" versus "The defendant is not guilty"). The inductive question in the minds of the judge and the jury—and probably earlier in the minds of the detectives who worked on the case, too—is whether the evidence for conviction is more coherent than the evidence against. It is worth noting that what Sherlock Holmes and Dr. Watson continuously point to as Holmes's "amazing powers of deduction" are for the most part powers of

**inductive reasoning**, drawing factual conclusions from scattered and sometimes barely noticeable evidence.

One of the most important ingredients in inductive reasoning is the **hypothesis**, the statement that an experiment is supposed to prove or disprove. You are probably familiar with hypotheses in science, but we use hypotheses throughout our lives. Induction would be a waste of time if we did not have some hypothesis in mind. Just as scientists try to organize their research around a particular topic and a specific claim, we organize our attention around particular concerns and specific hypotheses. “Who killed the judge? It must have been either Freddy or the thug. Which hypothesis is the more plausible?” Not only science but almost everything we know and want to know depends on hypotheses and inductive reasoning, from looking for the car keys in the morning (“Now, I probably left them somewhere near my books”) to speculating on the existence and the nature of black holes in space.

From the preceding discussion, it should be clear that much of what passes for argument is not that at all. For example, many people seem to think that simply stating and restating their opinion—forcefully and with conviction—is the same thing as supporting it with arguments. It is not. Stating your opinion clearly is the essential preliminary to formulating an argument, but it is not the same thing. An argument goes beyond the opinion itself; it involves supporting the opinion by deduction from other statements or with evidence based on experience. Some people seem to think that a single example will serve as a complete argument, but, at most, a single example serves as *part* of an argument. Most inductive arguments require many examples, and they must deal with examples that *don't* fit the hypothesis, too. Every argument is bound to meet up with several counterarguments and objections, so even a single argument is rarely enough to make one's case.

Similarly, many people seem to think that an appeal to **authority** will settle the case, but in most philosophical disputes, it is the nature of authority itself that is in question. If someone insists that God exists because it says so in the Bible, the question immediately shifts to the authority of the Bible. (A person who does not believe in God will probably not accept the authority of the Bible either.) If someone defends a political position because his mother said so or, for that matter, because Thomas Jefferson said so, the question then moves to the authority of the arguer's mother or Jefferson. One of the main functions of philosophy is to let us question authority and see for ourselves what we should believe or not believe. Appeal to authority does not necessarily show respect for that authority, but it does show disrespect for ourselves. **Legitimate** authority has to be earned as well as respected.

## Critiquing Arguments



One of the most crucial philosophical activities—but by no means the only one—is **criticism**. Criticism does not necessarily mean—as in everyday life—negative remarks about someone or something; it means carefully examining a

statement, testing it out, seeing if in fact the arguments for it are good ones. But this does mean that, whether it is our own statements or other people's statements that are being examined, it is important to find out what is *wrong* with them so that they can be corrected or strengthened. One way to criticize a deductive argument, for example, is simply to show that its premises are not true; if it is an inductive argument, one can do so by showing that the evidence on which it is based is false or distorted.

Another way to criticize an argument is to show that it consists of invalid deductive arguments or weak **inductive generalizations**. A particularly powerful way to do this is by the use of **counterexamples**. For instance, if someone claims, "All American men love football," he or she can be refuted if we can find a single American man who does not like football. Any claim that takes the form "All X's are Y's" or "No A's are B's" can be refuted if we can point out a single counterexample—that is, a single X that is not Y, or a single A that is a B. If a philosophy student says, "No one knows anything for certain," a familiar response might be to hold up your hand, stick out your thumb, and say, "Here is a thumb: I know *that* for certain." This may not be the end of the argument, but it is through such general claims and counterexamples to them that philosophical arguments are made more precise.

Even if all of its arguments seem to be sound, a philosophy can be shown to be in trouble if it is **inconsistent**, that is, if the conclusions of its different arguments **contradict** one another. In the same way, one can raise doubts about a philosophy's acceptability if it can be shown that it results in paradox and consequently must be thoroughly reexamined. For example, suppose a philosopher argues that God can do absolutely anything. For instance, God can create a mountain. He can move a mountain. But now a critical listener asks, "Can God create a mountain so large that even he can't move it?"—and we have a paradox. Either God can create such a mountain but then can't move it (and so cannot do everything) or God cannot create such a mountain (and so cannot do everything). The paradox forces us to reexamine the original claim that God can do

## Paradox

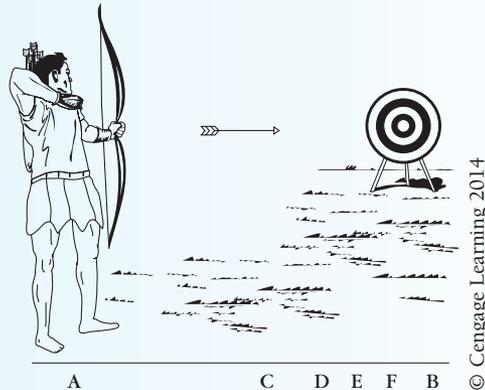
A **paradox** is a **self-contradictory** or seemingly absurd conclusion based on apparently good arguments. Sometimes the paradox is merely apparent and requires restating; on occasion a well-formulated paradox has brought about the total rethinking of the whole of a branch of science, philosophy, religion, or mathematics. Some examples of paradoxical statements are:

"This sentence is false." (If that is true, then it is false.)

"There is a barber who shaves everyone in town who does not shave himself." (Does he shave himself?)

“God is all-powerful, so he could create a mountain so huge that even he could not move it.”

If Achilles shoots an arrow from point  $A$  toward point  $B$ , it first must cover distance  $A-C$ , which is half of  $A-B$ ; then it must cover distance  $C-D$ , which is half of  $C-B$ , and then  $D-E$ , which is half of  $D-B$ , and so on, each moment covering half the distance it has covered in the moment before. The paradox is that if the arrow keeps moving forever, it will never reach point  $B$ .



absolutely anything. (Perhaps it can be revised to say something like, “God can do anything that is logically possible.”) Notice that the argument just given is takes the form of what is called *reductio ad absurdum*, Latin for a reduction to absurdity, in which a position is rejected because it results in a paradox.

A philosophy that does not contain outright inconsistencies or lead to paradoxes may still be unsuccessful, however, if it is **incoherent**. This means that the various claims have virtually nothing to do with each other, or mean very little, or can be interpreted only in an absurd way. A philosophy can be accused of **begging the question**, repeating as a supposed solution the very problem that it is attempting to resolve. An example of begging the question is the argument, “Other people exist. I know because I’ve talked to them.” And a philosophy can be accused of being silly or trivial, which is just about the most offensive thing you can say, indicating that it is not even worth your time to investigate it further. It is much better to say something false but interesting than to say what is silly or trivial. (A common way in which philosophical claims can turn out to be trivial is when they express what logicians call *tautologies*: for example, “ $A$  is  $A$ .” A **tautology** is a statement that is so necessarily true, so obviously correct that a statement claiming the opposite would be self-contradictory.) An argument can be **ad hominem** (Latin, “to the man,” or “to the person,” from the phrase *argumentatum ad hominem*) (or **ad feminam**, “to the woman,” when referring to a woman), aimed at discrediting the person but ignoring the issue completely. Accusing

### The Basic Concepts of Logic

An *argument* is a sequence of assertions, or statements, to back up a viewpoint or idea. The *conclusion* is an assertion that is supported by all the other assertions. These assertions are thus the *reasons* for accepting the conclusion. The assertions that are assumed to be true (for the sake of that argument) are called *premises*. Arguments can be either *deductive* or *inductive*: Deductive arguments *guarantee* the truth of their conclusion if they are both valid and have all true premises; inductive arguments do not guarantee the truth of their conclusions, no matter how impressive the evidence. Deductive arguments are said to be *valid* or *invalid*. (Arguments are never true or false.) Invalid arguments are also called *fallacies*. Individual assertions or statements are *true* or *false*. (They are never said to be valid or invalid.) A deductive argument that is both valid and has true premises is said to be *sound*. (Otherwise, it is *unsound*.) An inductive argument that is well supported by its evidence is called *strong*; a poorly supported argument is called *weak*. *Logic* is the use and the study of good arguments and the means of differentiating these from bad arguments.

someone who disagrees of being an atheist, a communist, or a Nazi is an all-too-familiar example of an ad hominem argument. Such bad arguments, in general, are called **fallacies**, whether or not they are formally invalid. (A *formal* fallacy is one that violates the proper rules of inference. An *informal* fallacy may not break the rules of inference but “cheats” by sneaking in ambiguous terminology, biased language, evasion of the facts, and distraction.) A list and discussion of such fallacies can be found in Appendix C.

In emphasizing criticism, it is important to point out, as a matter of balance, that philosophy is nevertheless an especially *cooperative* enterprise. Argumentation and criticism are not hostile or defensive. They are ways of making your ideas and their implications clear—clear to yourself as well as to other people. Socrates used to say that his truest friends were also his best critics. Indeed, we would distrust a friend who was never critical and never argued. (“If you were really my friend, you would have told me!”) Arguments and objections take place within an arena of shared interest and with a common concern for reaching the truth. But, just as important, arguments and objections and mutual respect between people who disagree are absolutely essential in a pluralistic democracy such as our own, in which everyone’s opinion is respected and it is most unlikely that we will all agree. But to say that everyone’s opinion is respected is not to say that everyone’s opinion is of equal value; the depth

### Tautology

A **tautology** is a trivially true statement. Some examples:

A man is free if he is free.

You can't know anything unless you know something.

I wouldn't be here if I hadn't arrived.

What about the following? Are they tautologies?

Business is business.

Boys will be boys.

"A rose is a rose is a rose." (Gertrude Stein)

"Become who you are." (Friedrich Nietzsche)

of thinking and the quality of argument make some opinions better and more plausible than others. At the same time, cooperative respect, mutual concern for the importance of argument, and honest disagreement are indispensable to life as we want to live it.

In developing your own thoughts about the various questions of philosophy, you will inevitably find yourself using both deductive and inductive arguments, and it is perfectly normal to catch yourself—or your friends—using some incorrect arguments as well. What is important, however, is that you can recognize these forms when they appear and that you are aware—even if only in a preliminary way—of what you are doing when you argue for a position or an idea. Arguments aren't the whole of philosophy; an argument can't be interesting if the statements it is intended to support are trivial or uninteresting. But the best ideas in the world can be rendered ineffective and unheeded if there are no good arguments used to present them.

## Closing Questions

Examine the following arguments. Are they inductive or deductive arguments? Are they valid and sound? If they are invalid or unsound, why? Is there anything else wrong with them? (You may want to consult Appendixes B and C.)

1. The philosopher from northern Greece is a well-known homosexual. Therefore, his claim that the universe is ultimately made up of atoms should be ignored.

2. Every event in the world is caused by other events. Human actions and decisions are events in the world. Therefore, every human action and decision is caused by other events.
3. If God exists, then life has meaning. God does not exist. Therefore, life has no meaning.
4. All cows are purple. Socrates is purple. Therefore, Socrates is a cow.
5. William James and John Dewey both called themselves pragmatists. They are the leading American philosophers. Therefore, all American philosophers are pragmatists.
6. Believing in God makes people moral—that is, believers tend to do good and avoid evil.
7. If I try to doubt that I exist, I realize that I must exist if I am doing the doubting. Therefore, I must exist.
8. We haven't seen a fox all day. Therefore, there must be no foxes in the area.
9. If you don't agree with me, I'm going to hit you.
10. God must exist; the Bible says so.
11. He must be guilty; he has a criminal face.
12. If she were innocent, she would loudly proclaim her innocence. She is loudly proclaiming her innocence. Therefore, she must be innocent.
13. "The state is like a man writ large." (Plato)
14. "I have terrible news for you. Mary is going out with Frank. I called Mary on Saturday night, and she wasn't home. Then I tried to call Frank, and *he* wasn't home, either!"

## Suggested Readings

Three good introductions to logic are Robert J. Fogelin and Walter Sinnott-Armstrong, *Understanding Arguments*, 7th ed. (Wadsworth, 2005); Patrick J. Hurley and Joseph P. DeMarco, *Learning Fallacies and Arguments* (Wadsworth, 2001); and Patrick J. Hurley, *A Concise Introduction to Logic*, 10th ed. (Wadsworth, 2007). The standard introductions to symbolic logic are Irving Copi, *Introduction to Logic*, 12th ed. (Pearson Education, 1961) and W. V. O. Quine, *Methods of Logic*, 4th ed. (Harvard University Press, 2006). A good and very practical book, with many good examples, is Merrilee Salmon, *Introduction to Logic*

# Appendix B

## Deductive Logic Valid Argument Forms

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In “A Little Logic,” we introduced the distinction between the truth (or falsity) of a statement and the validity (or invalidity) of a deductive argument. It is possible for an argument to be valid even if its premises and conclusion are false. For example:

All dogs are green  
Socrates is a dog  
—————  
Therefore, Socrates is green.

This is a valid argument, even though both the premises and the conclusion are false. For a deductive argument to guarantee the truth of its conclusion, the premises must be true *and* the argument must be valid. Here we will say a little bit more about what it means for an argument to be valid.

A valid argument has the right *form*; invalid arguments do not. The right form of an argument is based on a list of basic rules of inference, such as the following:

The syllogistic form

All Ps are Qs.  
S is a P.  
—————  
Therefore, S is a Q.

is a valid form, as we saw above. But

All Ps are Qs.  
S is a Q.  
—————  
Therefore, S is a P.

is not. How do we know? Because the definition of a (valid) deductive argument is that the truth of the premises guarantees the truth of the conclusion, we try to find an argument that fits the form that does indeed have true premises and a false conclusion. If there is no such argument, the form is a valid argument form.

If there is *any* such argument, then it is not a valid argument form. So, we know that the above form is invalid because we can make up an example such as:

All lemons are yellow.  
 Sam (the canary) is yellow.  


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 Therefore, Sam is a lemon.

When you suspect that an argument in philosophy is invalid, translate the argument into formal symbolism (“All Ps are Ss . . .”) and then find another argument with true premises and a false conclusion that fits the form (“That’s like arguing that . . .”). If even one such instance of an argument form is invalid, then the form itself is not a valid argument form.

The most familiar form of deductive argument, the form illustrated above, is the *categorical syllogism*. A syllogism consists of three lines—two premises and a conclusion—and contains three terms or categories. (The term that appears in both premises is called the middle term.) The form of the statements themselves is quantitative, preceded by “all,” “some,” “no . . .,” and “not all . . .”

But not all deductive arguments are syllogisms; others involve a variety of inferences and complexities. Two of the most frequently used and best-known have the Latin names *modus ponens* and *modus tollens*. Modus ponens has the form:

If P then Q.  
 P.  


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 Therefore, Q.

For example:

If Socrates keeps annoying people, he'll get in trouble.  
 Socrates won't stop annoying people.  


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 Therefore, he'll get in trouble.

*Modus tollens* has the form:

If P then Q.  
 Not Q.  


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 Therefore, not P.

For example:

If you care enough, you'll send the very best.  
 You are not sending the very best.  


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 Therefore, you do not care enough.

Although any argument that fits one of these forms is valid, whether or not it is also sound depends on the truth of its premises.

There are two arguments that superficially look like modus ponens and modus tollens but are in fact invalid. They are:

If P then Q. Q.	If P then Q. Not P.
—————	—————
Therefore, P.	Therefore, not Q.

For example,

If you stay up too late, you'll miss breakfast.  
You missed breakfast.  
—————  
Therefore, you stayed up too late.

If you stay up too late, you'll miss breakfast.  
You didn't stay up too late.  
—————  
Therefore, you didn't miss breakfast.

These two fallacies are called the *fallacy of affirming the consequent* and the *fallacy of denying the antecedent*. They must always be avoided!

One type of argument, which is really a kind of modus tollens, is of special use in philosophy. It is called the *reductio ad absurdum* or “reduction to absurdity.” One philosopher argues that P (for example, “Justice is whatever the strongest person insists on.”). Her opponent argues that if P, then Q (for example, “If justice is the will of the strongest, then it is just for the strongest to be unjust.”). But Q in this case is obviously absurd and therefore false—so the original claim P must be false as well. (The example is a famous argument by Socrates.) One good way to attack a philosophical position is to show that regardless of the apparent logic, its consequences are absurd.

### Hating Logic

*There is one danger that we must guard against, Socrates said.*

*What sort of danger? I asked.*

*Of becoming misologic [hating logic], he said, in the sense that people become misanthropic. No greater misfortune could happen to anyone than that of developing a dislike for argument. Misology and misanthropy arise in just the same way. Misanthropy is induced by believing in somebody quite uncritically. You assume that a person is absolutely truthful and*

(continues)

### Hating Logic (continued)

*sincere and reliable, and a little later you find that he is shoddy and unreliable. Then the same thing happens again. After repeated disappointments at the hands of the very people who might be supposed to be your nearest and most intimate friends, constant irritation ends by making you dislike everybody and suppose that there is no sincerity to be found anywhere . . .*

*The resemblance between arguments and human beings lies in this: that when one believes that an argument is true without reference to the art of logic, and then a little later decides rightly or wrongly that it is false, and the same thing happens again and again . . . they end by believing that they are wiser than anyone else, because they alone have discovered that there is nothing stable or dependable either in facts or in arguments, and that everything fluctuates just like the water in a tidal channel, and never stays at any point for any time . . .*

*But suppose that there is an argument which is true and valid but someone spent his life loathing arguments and so missed the chance of knowing the truth about reality—would that not be a deplorable thing?*

—Plato, *Phaedo* 89d–90e, fourth century BCE

From: Tredennick, Hugh. *The Last Days of Socrates*. (Harmondsworth, UK: Penguin, 1954).

### Rules of Inference

$\supset$  = if, then

$\sim$  = not

$\cdot$  = and

$\vee$  = or

$\therefore$  = therefore

#### 1. Modus Ponens (M.P.)

$p \supset q$

$p$

$\therefore q$

#### 2. Modus Tollens (M.T.)

$p \supset q$

$\sim q$

$\therefore \sim p$

**3. Hypothetical Syllogism (H.S.)** $p \supset q$  $q \supset r$  $\therefore p \supset r$ **5. Constructive Dilemma (C.D.)** $(p \supset q) \cdot (r \supset s)$  $p \vee r$  $\therefore q \vee s$ **7. Simplification (Simp.)** $p \cdot q$  $\therefore p$ **10. Addition (Add.)** $p$  $\therefore p \vee q$ **4. Disjunctive Syllogism (D.S.)** $p \vee q$  $\sim p$  $\therefore q$ **6. Absorption (Abs.)** $p \supset q$  $\therefore p \supset (p \cdot q)$ **8. Conjunction (Conj.)** $p$  $q$  $\therefore p \cdot q$ 

Irving Copi, *Introduction to Logic*. 7th ed. New York: Macmillan, 1986.  
311–12.



# Appendix C

## Common Informal Fallacies

### Informal Fallacies



Many intended arguments are fallacious even though they are, formally, valid arguments; that is, they do not violate the rules of inference and the proper forms of deductive argument. They are nevertheless bad arguments. A tautology, for example, is a straightforwardly valid argument (“If P, then P”). But obviously such an argument, in the context of a discussion or a philosophy paper, does nothing to further the point to be made. The following is a list of often-made but almost always bad informal fallacies:

#### *Mere Assertion*

The fact that you accept a position is not sufficient for anyone else to believe it. Stating your view is not an argument for it, and unless you are just answering a public opinion survey, every opinion always deserves a supporting argument. There are statements, of course, that everyone would accept at face value, and you need not argue those. But that does not mean that they cannot be argued, for even the most obvious facts of common sense must be argued when challenged—this is what much of philosophy is about.

#### *Begging the Question*

Another fallacy is something that looks like an argument but simply accepts as a premise what is supposed to be argued for as a conclusion. For example, suppose you are arguing that one ought to be a Christian and your reason is that the Bible tells you so. This may in fact be conclusive for you, but if you are trying to convince someone who doesn't believe in Christ, he or she will probably not believe what the Bible says either. As an argument for becoming a Christian, therefore, referring to the Bible begs the question because it assumes the authority of the Bible, when this is in fact part of what you are trying to prove (the truth of Christianity and its sacred scripture). Question begging often consists of a reworded conclusion, as in “this book will improve your grades because it will help you to do better in your courses.”

## Vicious Circle

Begging the question is similar to another error, which is often called arguing in a vicious circle. Consider a more elaborate version of the above fallacy. A person claims to know God exists because she has had a religious vision. Asked how she knows that the vision was religious rather than just the effect of something she ate, she replies that such an elaborate and powerful experience could not have been caused by anyone or anything but God. Asked how she knows this, she replies that God himself told her—in the vision. Or another example: “He must be guilty because of the look on his face.” “How do you know that he looks guilty rather than frightened or sad?” “Because he’s the one who did it, that’s why!” If you argue *A* because of *B*, and *B* because of *C*, but then *C* because of *A*, you have argued in a vicious circle. It is vicious because, as in begging the question, you have assumed just what you want to prove.

But this is worth remembering: ultimately, all positions may come full circle, depending on certain beliefs that can be defended only if you accept the rest of a great many beliefs. Debates between religious people and atheists are often like this or arguments between free marketers and Marxists, where many hours of argument show quite clearly that each person accepts a large system of beliefs, all of which depend on the others. Some logicians call this a virtuous circle, but this does not mean that there are no vicious circles. A virtuous circle is the development of an entire worldview, and it requires a great deal of thinking and organizing. Vicious circles, like begging the question, are usually shortcuts to nowhere that result from careless thinking.

## Irrelevancies

You have seen people who argue a point by arguing everything else, throwing up charts of statistics and complaining about the state of the universe and telling jokes—everything but getting to the point. This may be a technique of wearing out your opponent; it is not a way of persuading him or her to agree with you. No matter how brilliant an argument may be, it is no good to you unless it is relevant to the point you want to defend.

## *Ad Hominem* Arguments

The most distasteful kind of irrelevancy is an attack on your opponent personally instead of arguing against his or her position. It may well be that the person you are arguing against is a liar, a sloppy dresser, ugly, too young to vote, or too old to work, but the only question is whether what he or she says is to be accepted. Harping on the appearance, reputation, manners, intelligence, friends, or possessions of your opponent may sometimes give your readers insight into why he or she holds a certain position, but it does not prove or disprove the position itself. As insight into an opponent’s motives or personal considerations may, in small doses, be appropriate. But more than a very small dose is usually

offensive, and it will usually weigh more against you than against your opponent. Whenever possible, avoid this kind of argument completely. It usually indicates that you don't have any good arguments yourself.

### Unclear or Shifting Conclusions

One of the most frustrating arguments to read is an argument that has a vague conclusion or that shifts conclusions with every paragraph. If something is worth defending at all, it is worth stating clearly and sticking with. If you argue that drug users should be punished but aren't clear about whether you mean people who traffic in heroin or people who take aspirin, you are not worth listening to. If you say that you mean illegal drug offenders, don't argue that "drugs" are bad for your body because this term applies to both legal and illegal drugs. If you say that you mean amphetamine users, then don't switch to talking about "illegal drugs" when someone explains to you the several medical uses of amphetamines. Know what you are arguing, or your arguments will have no point.

### Changing Meanings

It is easy to miss a fallacy when the words seem to form a valid argument. For example, consider this:

People are free as long as they can think for themselves.

Prisoners in jail are free to think for themselves.

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Therefore, prisoners in jail are free.

This paradoxical conclusion is due to the ambiguity of *free*, first used to refer to a kind of mental freedom, second to refer to physical freedom. An interesting example is the argument often attributed to the British philosopher John Stuart Mill: "Whatever people desire, that is what is desirable." But notice that this argument plays with an ambiguity in the English language. Not everything that is in fact desired (for example, alcohol by alcoholics) *should* be desired. (Mill makes the case, however, that the only evidence that *x* is desirable is that people in fact desire it.) Be careful that the key terms in your argument keep the same meaning throughout.

### Distraction

Another familiar form of fallacy is the "red herring," the sometimes long-winded pursuit of an argument leading away from the point at issue. For example, in the middle of an argument about the relation between the mind and the brain, a neurologist may well enjoy telling you, in impressive detail, any number of odd facts about neurology, about brain operations he or she has performed,

about silly theories that neurology-ignorant philosophers have defended in the past. But if these do not bear on the issue at hand, they are only pleasant ways of spending the afternoon, not steps to settling a difference of opinion. Distraction is a fallacy that is especially advantageous when the time for argument is limited. (For this reason, it is particularly prevalent in the classroom.)

### *Pseudoquestions*

Sometimes fallacious reasoning begins with the very question being asked. For example, some philosophers have argued that asking such questions as “How is the mind related to the body?” or “Could God create a mountain so heavy that even he could not move it?” are pseudoquestions. In other words, they look like real questions—even profound questions—but are ultimately unanswerable because they are based on some hidden piece of nonsense. (In the first of these cases, it has been suggested that there is no legitimate distinction between mind and body, and therefore any question about how they are “related” is pointless; the second question presumes that God is omnipotent in the sense that he can do the logically impossible, which is absurd.) Pseudoquestions, like distractions, lead us down a lengthy path going nowhere, except that, with pseudoquestions, we start from nowhere as well.

### *Dubious Authority*

We mentioned earlier that modern philosophy is based on the assumption that we have a right—and sometimes a duty—to question authority. Yet, most of our knowledge and opinions are based on appeals to authorities—whether scientists or “the people” are particularly wise or not. It would be extremely foolish, if not fatal, not to appeal to authorities, especially in a world that has grown so technologically and socially complicated. We ask an economist what will happen if interest rates fall. We ask Miss Manners which fork to use for the salad. The fallacy of dubious authority arises when we ask the wrong person, when we appeal to an expert who is not in fact an expert in the area of concern. For example, when physicians are asked questions about nuclear policy or physicists are asked questions about high school education, their expertise in one field does not necessarily transfer to the other. The authority behind opinions in books and newspapers depends on the expertise of the authors and publications in question. What is in print is not necessarily authoritative.

### *Slippery Slope*

Metaphors often pervade arguments. One of the more common metaphors is the slippery slope, the greased incline that once trod inevitably carries us to the bottom. (In politics, it is sometimes called “the chilling effect” or “the domino theory.”) For example, it is argued that any interference with free speech whatsoever, even forbidding someone to scream “Fire!” in a crowded auditorium, will

sooner or later lead to the eradication of free speech of every kind, including informed, responsible political discussion. But is it the case that, by attacking an extreme instance, we thereby endanger an entire institution? Sometimes, this may be so. But more often than not, the slippery slope metaphor leads us to think that there is such inevitability when in fact there is no such thing.

### *Attacking a Straw Man*

Real opponents with real arguments and objections are sometimes difficult to refute, and so the easy way out is to attack an unreal opponent with easily refutable arguments and objections. This is called attacking a straw man. For example, French existentialist Jean-Paul Sartre argued that human beings have absolute freedom, meaning that they could always find some alternative way of dealing with a difficult situation. But unsympathetic critics quickly interpreted his claim to mean that a person can do absolutely anything he wants to do—for example, fly to the moon by flapping his ears—believing they had refuted Sartre with such silly examples.

### *Pity (and Other Emotional Appeals)*

Some forms of fallacy appeal to the better parts of us, even as they challenge our fragile logical abilities. The appeal to pity has always been such an argument. Photographs of suffering people may well be an incentive to social action, but the connection between our pity—which is an undeniable virtue—and the social action in question is not yet an argument. The appeal to pity—and all appeals to emotion—have a perfectly legitimate place in philosophical discussion, but such appeals are not themselves arguments for any particular position. An orator may make us angry, but what we are to do about the problem must be the product of further argument.

### *Appeal to Force*

Physical might never makes philosophical right. Sometimes a person can be intimidated, but he or she is not thus refuted. Sometimes one has to back up a philosophical conviction with force, but it is never the force that justifies the conviction.

### *Inappropriate Arguments*

The last fallacy we mention has to do with choice of methods. To insist on deductive arguments when there are powerful inductive arguments against you is a fallacy, too—not a fallacious argument, perhaps, but a mistake in logic all the same. For example, if you are arguing deductively that there cannot be any torture going on in a certain country because Mr. Q rules the country and Mr. Q

is a good man (where the implicit premise is that “good men don’t allow torture in their country”), you had better be willing to give up the argument when dozens of trustworthy eyewitnesses publicly describe the tortures they have seen or experienced. To continue with your deduction in the face of such information is foolish. This may not tell you where your argument has gone wrong: Perhaps Mr. Q is not such a good man. Or perhaps he has been overpowered. Or perhaps good men can’t prevent torture if they aren’t told about it. But in any case, the argument must now be given up.

The same may be true the other way around. Certain abstract questions seem to be answerable only by deduction. When arguing about religious questions, for example, looking for evidence on which to build an inductive argument may be foolish. Evidence, in the sense of looking around for pertinent facts, may be irrelevant. What is at stake are your basic concepts of religion and their implications. Very abstract questions often require deductive arguments only.

To be caught in one of these fallacies is almost always embarrassing and damaging to your overall argument. If you have a case to make, then make it in the most powerfully persuasive way. An intelligent combination of deductive and inductive arguments, coupled with analogies and proper criticisms of alternative positions, is the most effective persuasion available. If you think your opinions are important, then they deserve nothing less than the best supporting arguments you can put together.

### Informal Fallacy Examples

Changing meaning:

Power tends to corrupt (Lord Acton).

Knowledge is power (Francis Bacon).

Therefore knowledge tends to corrupt.

Begging the question:

*She says that she loves me,  
and she must be telling the truth,  
because she certainly wouldn’t lie to someone she loves.*

Pity and other emotional appeals:

*Mr. Scrooge, I certainly deserve a raise in pay. I can hardly manage to feed my children on what you are paying me. And my youngest child, Tim, needs an operation if he is ever to walk without crutches.*

Irving M. Copi, *Informal Logic*. 7th ed. New York: Macmillan, 1986