

Logical Fallacies

An Encyclopedia of Errors of Reasoning

The ability to identify logical fallacies in the arguments of others, and to avoid them in one's own arguments, is both valuable and increasingly rare. Fallacious reasoning keeps us from knowing the truth, and the inability to think critically makes us vulnerable to manipulation by those skilled in the art of rhetoric.

What is a Logical Fallacy?

A logical fallacy is, roughly speaking, an error of reasoning. When someone adopts a position, or tries to persuade someone else to adopt a position, based on a bad piece of reasoning, they commit a fallacy. I say "roughly speaking" because this definition has a few problems, the most important of which are outlined below. Some logical fallacies are more common than others, and so have been named and defined. When people speak of logical fallacies they often mean to refer to this collection of well-known errors of reasoning, rather than to fallacies in the broader, more technical sense given above.

Formal and Informal Fallacies

There are several different ways in which fallacies may be categorized. It's possible, for instance, to distinguish between formal fallacies and informal fallacies.

Formal Fallacies (Deductive Fallacies)

Philosophers distinguish between two types of argument: deductive and inductive. For each type of argument, there is a different understanding of what counts as a fallacy.

Deductive arguments are supposed to be water-tight. For a deductive argument to be a good one (to be "valid") it must be absolutely impossible for both its premises to be true and its conclusion to be false. With a good deductive argument, that simply cannot happen; the truth of the premises entails the truth of the conclusion.

The classic example of a deductively valid argument is:

- (1) All men are mortal.
 - (2) Socrates is a man.
- Therefore:
- (3) Socrates is mortal.

It is simply not possible that both (1) and (2) are true and (3) is false, so this argument is deductively valid.

Any deductive argument that fails to meet this (very high) standard commits a logical error, and so, technically, is fallacious. This includes many arguments that we would usually accept as good arguments, arguments that make their conclusions highly probable, but not certain. Arguments of this kind, arguments that aren't deductively valid, are said to commit a "formal fallacy".

Informal Fallacies

Inductive arguments needn't be as rigorous as deductive arguments in order to be good arguments. Good inductive arguments lend support to their conclusions, but even if their premises are true then that doesn't establish with 100% certainty that their conclusions are true. Even a good inductive argument with true premises might have a false conclusion; that the argument is a good one and that its premises are true only establishes that its conclusion is probably true.

All inductive arguments, even good ones, are therefore deductively invalid, and so "fallacious" in the strictest sense. The premises of an inductive argument do not, and are not intended to, entail the truth of the argument's conclusion, and so even the best inductive argument falls short of deductive validity.

Because all inductive arguments are technically invalid, different terminology is needed to distinguish good and bad inductive arguments than is used to distinguish good and bad deductive arguments (else every inductive argument would be given the bad label: "invalid"). The terms most often used to distinguish good and bad inductive arguments are "strong" and "weak".

An example of a strong inductive argument would be:

(1) Every day to date the law of gravity has held.

Therefore:

(2) The law of gravity will hold tomorrow.

Arguments that fail to meet the standards required of inductive arguments commit fallacies in addition to formal fallacies. It is these "informal fallacies" that are most often described by guides to good thinking, and that are the primary concern of most critical thinking courses and of this site.

Logical and Factual Errors

Arguments consist of premises, inferences, and conclusions. Arguments containing bad inferences, i.e. inferences where the premises don't give adequate support for the conclusion drawn, can certainly be called fallacious. What is less clear is whether arguments containing false premises but which are otherwise fine should be called fallacious.

If a fallacy is an error of reasoning, then strictly speaking such arguments are not fallacious; their reasoning, their logic, is sound. However, many of the traditional fallacies are of just this kind.

It's therefore best to define fallacy in a way that includes them; this site will therefore use the word fallacy in a broad sense, including both formal and informal fallacies, and both logical and factual errors.

Ad Hominem (Personal Attack)

Explanation

It is important to note that the label "ad hominem" is ambiguous, and that not every kind of ad hominem argument is fallacious. In one sense, an ad hominem argument is an argument in which you offer premises that you the arguer don't accept, but which you know the listener does accept, in order to show that his position is incoherent (as in, for example, the [Euthyphro dilemma](#)). There is nothing wrong with this type of argument ad hominem.

The other type of ad hominem argument is a form of [genetic fallacy](#). Arguments of this kind focus not on the evidence for a view but on the character of the person advancing it; they seek to discredit positions by discrediting those who hold them. It is always important to attack arguments, rather than arguers, and this is where arguments that commit the ad hominem fallacy fall down.

Example

(1) William Dembski argues that modern biology supports the idea that there is an intelligent designer who created life.

(2) Dembski would say that because he's religious.

Therefore:

(3) Modern biology doesn't support intelligent design.

This argument rejects the view that intelligent design is supported by modern science based on a remark about the person advancing the view, not by engaging with modern biology. It ignores the argument, focusing only on the arguer; it is therefore a fallacious argument ad hominem.

Bandwagon Fallacy

Explanation

The bandwagon fallacy is committed by arguments that appeal to the growing popularity of an idea as a reason for accepting it as true. They take the mere fact that an idea suddenly attracting adherents as a reason for us to join in with the trend and become adherents of the idea ourselves.

This is a fallacy because there are many other features of ideas than truth that can lead to a rapid increase in popularity. Peer pressure, tangible benefits, or even mass stupidity could lead to a

false idea being adopted by lots of people. A rise in the popularity of an idea, then, is no guarantee of its truth.

The bandwagon fallacy is closely related to the [appeal to popularity](#); the difference between the two is that the bandwagon fallacy places an emphasis on current fads and trends, on the growing support for an idea, whereas the appeal to popularity does not.

Example

(1) Increasingly, people are coming to believe that Eastern religions help us to get in touch with our true inner being.

Therefore:

(2) Eastern religions help us to get in touch with our true inner being.

This argument commits the bandwagon fallacy because it appeals to the mere fact that an idea is fashionable as evidence that the idea is true. Mere trends in thought are not reliable guides to truth, though; the fact that Eastern religions are becoming more fashionable does not imply that they are true.

Appeal to Authority

Explanation

An appeal to authority is an argument from the fact that a person judged to be an authority affirms a proposition to the claim that the proposition is true.

Appeals to authority are always deductively fallacious; even a legitimate authority speaking on his area of expertise may affirm a falsehood, so no testimony of any authority is guaranteed to be true.

However, the informal fallacy occurs only when the authority cited either (a) is not an authority, or (b) is not an authority on the subject on which he is being cited. If someone either isn't an authority at all, or isn't an authority on the subject about which they're speaking, then that undermines the value of their testimony.

Example

(1) Marilyn vos Savant says that no philosopher has ever successfully resolved the problem of evil.

Therefore:

(2) No philosopher has ever successfully resolved the problem of evil.

This argument is fallacious because Marilyn vos Savant, though arguably an authority, is not an authority on the philosophy of religion. Her judgement that no philosopher has ever successfully

resolved the problem of evil therefore carries little evidential weight; if there were a philosopher somewhere that had successfully resolved the problem then there's a good chance that Marilyn vos Savant wouldn't know about it. Her testimony is therefore insufficient to establish the conclusion of the argument.

Appeal to Antiquity / Tradition

Explanation

An appeal to antiquity is the opposite of an [appeal to novelty](#). Appeals to antiquity assume that older ideas are better, that the fact that an idea has been around for a while implies that it is true. This, of course, is not the case; old ideas can be bad ideas, and new ideas can be good ideas. We therefore can't learn anything about the truth of an idea just by considering how old it is.

Example

(1) Religion dates back many thousands of years (whereas atheism is a relatively recent development).

Therefore:

(2) Some form of religion is true.

This argument is an appeal to antiquity because the only evidence that it offers in favour of religion is its age. There are many old ideas, of course, that are known to be false: e.g. that the Earth is flat, or that it is the still centre of the solar system. It therefore could be the case that the premise of this argument is true (that religion is older than atheism) but that its conclusion is nevertheless false (that no religion is true). We need a lot more evidence about religion (or any other theory) than how old it is before we can be justified in accepting it as true. Appeals to antiquity are therefore fallacious.

Appeal to Consequences

Explanation

An appeal to consequences is an attempt to motivate belief with an appeal either to the good consequences of believing or the bad consequences of disbelieving. This may or may not involve an [appeal to force](#). Such arguments are clearly fallacious. There is no guarantee, or even likelihood, that the world is the way that it is best for us for it to be. Belief that the world is the way that it is best for us for it to be, absent other evidence, is therefore just as likely to be false as true.

Examples

Appeal to Good Consequences:

(1) If believe in God then you'll find a kind of fulfilment in life that you've never felt before.

Therefore:

(2) God exists.

Appeal to Bad Consequences:

(1') If you don't believe in God then you'll be miserable, thinking that life doesn't have any meaning.

Therefore:

(2) God exists.

Both of these arguments are fallacious because they provide no evidence for their conclusions; all they do is appeal to the consequences of belief in God. In the case of the first argument, the positive consequences of belief in God are cited as evidence that God exists. In the case of the second argument, the negative consequences of disbelief in God are cited as evidence that God exists. Neither argument, though, provides any evidence for Santa's existence. The consequences of a belief are rarely a good guide to its truth. Both arguments are therefore fallacious.

Real-World Examples

Each of the arguments above features in real-world discussions of God's existence. In fact, they have been developed into an argument called [Pascal's Wager](#), which openly advocates belief in God based on its good consequences, rather than on evidence that it is true.

Another example occurs in the film *The Matrix*. There Neo is asked whether he believes in fate; he says that he doesn't. He is then asked why, and replies, "I don't like the thought that I'm not in control." This is not an appeal to evidence, but to the unpleasantness of believing in fate: Fate would imply that the world is a way that I don't want it to be, therefore there is no such thing.

Appeal to Force

Explanation

An appeal to force is an attempt to persuade using threats. Its Latin name, "argumentum ad baculum", literally means "argument with a cudgel". Disbelief, such arguments go, will be met with sanctions, perhaps physical abuse; therefore, you'd better believe.

Appeals to force are thus a particularly cynical type of [appeal to consequences](#), where the unpleasant consequences of disbelief are deliberately inflicted by the arguer.

Of course, the mere fact that disbelief will be met with sanctions is only a pragmatic justification of belief; it is not evidence that the resultant belief will be true. Appeals to force are therefore fallacious.

Example

(1) If you don't accept that the Sun orbits the Earth, rather than the other way around, then you'll be excommunicated from the Church.

Therefore:

(2) The Sun orbits the Earth, rather than the other way around.

This argument, if it can properly be called an argument, makes no attempt to provide evidence for its conclusion; whether or not you'll be excommunicated for disbelieving the geocentric model has no bearing on whether the geocentric model is true. The argument therefore commits the appeal to force fallacy.

Appeal to Pity

Explanation

An appeal to pity attempts to persuade using emotion—specifically, sympathy—rather than evidence. Playing on the pity that someone feels for an individual or group can certainly affect what that person thinks about the group; this is a highly effective, and so quite common, fallacy.

This type of argument is fallacious because our emotional responses are not always a good guide to truth; emotions can cloud, rather than clarify, issues. We should base our beliefs upon reason, rather than on emotion, if we want our beliefs to be true.

Examples

Pro-life campaigners have recently adopted a strategy that capitalises on the strength of appeals to pity. By showing images of aborted fetuses, anti-abortion materials seek to disgust people, and so turn them against the practice of abortion.

A BBC News article, [Jurors shown graphic 9/11 images](#), gives another clear example of an appeal to pity:

“A US jury has been shown graphic images of people burned to death in the 11 September 2001 attack on the Pentagon. The jurors will decide whether al-Qaeda plotter Zacarias Moussaoui should be executed or jailed for life... Prosecutors hope such emotional evidence will persuade the jury to opt for the death penalty.”

Moralistic Fallacy

Explanation

The moralistic fallacy is the opposite of the [naturalistic fallacy](#). The naturalistic fallacy moves from descriptions of how things are to statements of how things ought to be, the moralistic fallacy does the reverse. The moralistic fallacy moves from statements about how things ought to be to statements about how things are; it assumes that the world is as it should be. This, sadly, is a fallacy; sometimes things aren't as they ought to be.

Examples

Have you ever crossed a one-way street without looking in both directions? If you have, reasoning that people shouldn't be driving the wrong way up a one way street so there's no risk of being run over from that direction, then you've committed the moralistic fallacy. Sometimes things aren't as they ought to be. Sometimes people drive in directions that they shouldn't.

Naturalistic Fallacy

Explanation

There are two fundamentally different types of statement: statements of fact which describe the way that the world is, and statements of value which describe the way that the world ought to be. The naturalistic fallacy is the alleged fallacy of inferring a statement of the latter kind from a statement of the former kind.

Arguments cannot introduce completely new terms in their conclusions. The argument, “(1) All men are mortal, (2) Socrates is a man, therefore (3) Socrates is a philosopher” is clearly invalid; the conclusion obviously doesn't follow from the premises. This is because the conclusion contains an idea—that of being a philosopher—that isn't contained in the premises; the premises say nothing about being a philosopher, and so cannot establish a conclusion about being a philosopher.

Arguments that commit the naturalistic fallacy are arguably flawed in exactly the same way. An argument whose premises merely describe the way that the world is, but whose conclusion describes the way that the world ought to be, introduce a new term in the conclusion in just the same way as the above example. If the premises merely describe the way that the world is then they say nothing about the way that the world ought to be. Such factual premises cannot establish any value judgement; you can't get an 'ought' from an 'is'.

Examples

(1) Feeling envy is only natural.

Therefore:

(2) There's nothing wrong with feeling envy.

This argument moves from a statement of fact to a value judgement, and therefore commits the naturalistic fallacy. The argument's premise simply describes the way that the world is, asserting that it is natural to feel envious. To describe the way that the world is, though, is to say nothing of the way that it ought to be. The argument's conclusion, then, which is value judgement, cannot be supported by its premises.

It is important to note that much respectable moral argument commits the naturalistic fallacy. Whether arguments of the form described here are fallacious is controversial. If they are, then the vast majority of moral philosophy commits a basic logical error.

Red Herring

Explanation

The red herring is as much a debate tactic as it is a logical fallacy. It is a fallacy of distraction, and is committed when a listener attempts to divert an arguer from his argument by introducing another topic. This can be one of the most frustrating, and effective, fallacies to observe.

The fallacy gets its name from fox hunting, specifically from the practice of using smoked herrings, which are red, to distract hounds from the scent of their quarry. Just as a hound may be prevented from catching a fox by distracting it with a red herring, so an arguer may be prevented from proving his point by distracting him with a tangential issue.

Example

Many of the [fallacies of relevance](#) can take red herring form. An [appeal to pity](#), for example, can be used to distract from the issue at hand:

“You may think that he cheated on the test, but look at the poor little thing! How would he feel if you made him sit it again?”

Weak Analogy

Explanation

Arguments by analogy rest on a comparison. Their logical structure is this:

- (1) A and B are similar.
 - (2) A has a certain characteristic.
- Therefore:
- (3) B must have that characteristic too.

For example, William Paley's [argument from design](#) suggests that a watch and the universe are similar (both display order and complexity), and therefore infers from the fact that watches are the product of intelligent design that the universe must be a product of intelligent design too.

An argument by analogy is only as strong as the comparison on which it rests. The weak analogy fallacy (or “false analogy”, or “questionable analogy”) is committed when the comparison is not strong enough.

Example

The example of an argument by analogy given above is controversial, but is arguably an example of a weak analogy. Are the similarities in the kind and degree of order exhibited by watches and the universe sufficient to support an inference to a similarity in their origins?

Begging the Question / Circular Reasoning

Explanation

An argument is circular if its conclusion is among its premises, if it assumes (either explicitly or not) what it is trying to prove. Such arguments are said to beg the question. A circular argument fails as a proof because it will only be judged to be sound by those who already accept its conclusion.

Anyone who rejects the argument's conclusion should also reject at least one of its premises (the one that is the same as its conclusion), and so should reject the argument as a whole. Anyone who accepts all of the argument's premises already accepts the argument's conclusion, so can't be said to have been persuaded by the argument. In neither case, then, will the argument be successful.

Example

- (1) The Bible affirms that it is inerrant.
 - (2) Whatever the Bible says is true.
- Therefore:
- (3) The Bible is inerrant.

This argument is circular because its conclusion—The Bible is inerrant—is the same as its second premise—Whatever the Bible says is true. Anyone who would reject the argument's conclusion should also reject its second premise, and, along with it, the argument as a whole.

Real-World Examples

The above argument is a straightforward, real-world example of a circular argument. Other examples can be a little more subtle.

Typical examples of circular arguments include rights-claims: e.g., “I have a right to say what I want, therefore you shouldn’t try to silence me”; “Women have a right to choose whether to have an abortion or not, therefore abortion should be allowed”; “The unborn has a right to life, therefore abortion is immoral”.

Having a right to X is the same as other people having an obligation to allow you to have X, so each of these arguments begs the question, assuming exactly what it is trying to prove.

False Dilemma / Bifurcation Fallacy

Explanation

The bifurcation fallacy is committed when a false dilemma is presented, i.e. when someone is asked to choose between two options when there is at least one other option available. Of course, arguments that restrict the options to more than two but less than there really are are similarly fallacious.

Examples

(1) Either a Creator brought the universe into existence, or the universe came into existence out of nothing.

(2) The universe didn’t come into existence out of nothing (because nothing comes from nothing).

Therefore:

(3) A Creator brought the universe into existence.

The first premise of this argument presents a false dilemma; it might be thought that the universe neither was brought into existence by a Creator nor came into existence out of nothing, because it existed from eternity.

Another example emerged when George W Bush launched the war on terror, insisting that other nations were either for or against America in her campaign, excluding the quite real possibility of neutrality.

Straw Man Fallacy

Explanation

A straw man argument is one that misrepresents a position in order to make it appear weaker than it actually is, refutes this misrepresentation of the position, and then concludes that the real position has been refuted. This, of course, is a fallacy, because the position that has been claimed to be refuted is different to that which has actually been refuted; the real target of the argument is untouched by it.

Example

- (1) Trinitarianism holds that three equals one.
 - (2) Three does not equal one.
- Therefore:
- (3) Trinitarianism is false.

This is an example of a straw man argument because its first premise misrepresents trinitarianism, its second premise attacks this misrepresentation of trinitarianism, and its conclusion states that trinitarianism is false. Trinitarianism, of course, does not hold that three equals one, and so this argument demonstrates nothing concerning its truth.

Post Hoc Fallacy

Explanation

The Latin phrase “post hoc ergo propter hoc” means, literally, “after this therefore because of this.” The post hoc fallacy is committed when it is assumed that because one thing occurred after another, it must have occurred as a result of it. Mere temporal succession, however, does not entail causal succession. Just because one thing follows another does not mean that it was caused by it. This fallacy is closely related to the [cum hoc](#) fallacy.

Example

- (1) Most people who are read the last rites die shortly afterwards.
- Therefore:
- (2) Priests are going around killing people with magic words!

This argument commits the post hoc fallacy because it infers a causal connection based solely on temporal order.

Real-World Examples

One example of the post hoc fallacy is the evidence often given for the efficacy of prayer. When someone reasons that as they prayed for something and it then happened, it therefore must have happened because they prayed for it, they commit the post hoc fallacy. The correlation between the prayer and the event could result from coincidence, rather than cause, so does not prove that prayer works.

Superstitions often arise from people committing the post hoc fallacy. Consider, for example, a sportsman who adopts a pre-match ritual because one time he did something before a game he got a good result. The reasoning here is presumably that on the first occasion the activity preceded the success, so the activity must have contributed to the success, so repeating the activity is likely to lead to a recurrence of the success. This is a classic example of the post hoc fallacy in action.

Slippery Slope Fallacy

Explanation

Slippery slope arguments falsely assume that one thing must lead to another. They begin by suggesting that if we do one thing then that will lead to another, and before we know it we'll be doing something that we don't want to do. They conclude that we therefore shouldn't do the first thing. The problem with these arguments is that it is possible to do the first thing that they mention without going on to do the other things; restraint is possible.

Example

(1) If you buy a Green Day album, then next you'll be buying Buzzcocks albums, and before you know it you'll be a punk with green hair and everything.

(2) You don't want to become a punk.

Therefore:

(3) You shouldn't buy a Green Day album.

This argument commits the slippery slope fallacy because it is perfectly possible to buy a Green Day album without going on to become a punk; we could buy the album and then stop there. The conclusion therefore hasn't been proven, because the argument's first premise is false.

Subjectivist Fallacy

Explanation

There are two types of claim: objective and subjective.

Objective claims have the same truth-value for everyone. For example, the claim that the Earth is cuboid is an objective claim; it's either true for everyone or false for everyone. It isn't possible for the Earth to be cuboid for me, spherical for you, but flat for everyone else, because whatever shape the Earth is it is only one shape.

Subjective claims can have different truth-values for different people. For example, the claim that running a marathon takes more than three hours is a subjective claim: for many people it is true, but for a good number of runners it is false.

The subjectivist fallacy is committed when someone resists the conclusion of an argument not by questioning whether the argument's premises support its conclusion, but by treating the conclusion as subjective when it is in fact objective. Typically this is done by labelling the arguer's conclusion as just an "opinion", a "perspective", a "point of view", or similar.

This is one of those cases where the objectionable logic is so underdeveloped that it is difficult to pin down precisely what is wrong with it. Someone who just grunts "that's just your opinion" is clearly trying to imply something, but their reasoning isn't explicit.

They might have in mind something like the following:

(1) Your argument concludes that p is objectively true.

(2) P is subjective.

Therefore:

(3) Your argument fails.

This argument is fine as long as its premises are true, but where (2) is false it commits the subjectivist fallacy.

Alternatively, they might mean something like this:

(1) Your argument concludes that p is true.

(2) Many people don't accept that p is true.

Therefore:

(3) Your argument fails.

This argument doesn't commit the subjectivist fallacy; it has nothing to do with objectivity and subjectivity. Instead it is an example of an [appeal to popularity](#), giving far too much weight to the opinion of those who don't accept the conclusion of the argument, failing to recognise that even an argument for a conclusion that many people don't accept can be sound.

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