# Logical Fallacies



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## 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 categorised. 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.

## Taxonomy of Fallacies

Once it has been decided what is to count as a logical fallacy, the question remains as to how the various fallacies are to be categorised. The most common classification of fallacies groups fallacies of relevance, of

ambiguity, and of presumption.

Arguments that commit fallacies of relevance rely on premises that aren't relevant to the truth of the conclusion. The various irrelevant appeals are all fallacies of relevance, as are ad hominems.

Arguments that commit fallacies of ambiguity, such as equivocation or the straw man fallacy, manipulate language in misleading ways.

Arguments that commit fallacies of presumption contain false premises, and so fail to establish their conclusion. For example, arguments based on a false dilemma or circular arguments both commit fallacies of presumption.

These categories have to be treated quite loosely. Some fallacies are difficult to place in any category; others belong in two or three. The 'No True Scotsman' fallacy, for example, could be classified either as a fallacy of ambiguity (an attempt to switch definitions of "Scotsman") or as a fallacy of presumption (it begs the question, reinterpreting the evidence to fit its conclusion rather than forming its conclusion on the basis of the evidence).

## Fallacies of Relevance

- Ad Hominem (Personal Attack)
- Bandwagon Fallacy
- Fallacist's Fallacy
- Fallacy of Composition
- Fallacy of Division
- Gambler's Fallacy
- Genetic Fallacy
- Irrelevant Appeals
    - Appeal to Antiquity / Tradition
    - Appeal to Authority
    - Appeal to Consequences
    - Appeal to Force
    - Appeal to Novelty
    - Appeal to Pity
    - Appeal to Popularity
    - Appeal to Poverty

    - Appeal to Wealth
- Moralistic Fallacy
- Naturalistic Fallacy
- Red Herring
- Weak Analogy

### Fallacies of Ambiguity

- Accent Fallacies
- Equivocation Fallacy
- Straw Man Fallacy

### Fallacies of Presumption

- Affirming the Consequent
- Arguing from Ignorance
- Begging the Question / Circular Reasoning
- Complex Question Fallacy
- Cum Hoc Fallacy
- False Dilemma / Bifurcation Fallacy
- Hasty Generalisation Fallacy
- 'No True Scotsman' Fallacy
- Post Hoc Fallacy
- Slippery Slope Fallacy
- Sweeping Generalisation Fallacy
- Subjectivist Fallacy
- Tu Quoque Fallacy