

COMMON FALLACIES

An Annotated Guide

Formal and Informal Fallacies: A fallacy is an argument that seems to use good reasoning but actually contains an error in reasoning. Fallacies are categories of bad arguments that are so persuasive that they have been committed again and again since antiquity. In *De Sophistici Elenchi*, Aristotle identified 13 fallacies and many more have been added to the list since then. The classification of fallacies remains unsettled and arguably never can be completed. However, most logicians agree on the formal/informal distinction.

Technically, there are an infinite number of formal fallacies, so only a few are listed below. A formal fallacy can be detected by examining only the syntactical form of the argument. For example, “If beer is present, then laughter occurs, and therefore, if beer isn’t present, then laughter won’t occur.” is fallacious by its form alone (Fallacy of Conversion, i.e., treating a sufficient condition as a necessary condition). If we replace “beer” with “oxygen” and “laughter” with “combustion,” nothing changes—the argument is fallacious by its syntactical form, irrespective of semantic content. Informal fallacies can then be defined as all the rest, i.e., those that cannot be identified by syntactical form alone. This distinction is a practical one and there are several exceptions.

Formal Fallacies

Conditional Reasoning Fallacies – Reasoning involving the if-then conditional sentence form and its idiomatic variants is a common source of error even among educated writers and speakers. All of the errors involve conflating necessary with sufficient conditions. Mastering these fallacies requires understanding idiomatic conditional constructions such as “p if q,” “p only if q,” “p unless q,” “p is necessary for q,” “p is sufficient for q,” “p when q,” “In case p, q,” etc. Simply discussing the difference between necessary and sufficient conditions is a good starting place for most courses across the disciplines. See my [Understanding Conditional Statements](#).

1. **Fallacy of Affirming the Consequent** – treats the existence of a necessary condition (q) as proof of the existence of what it is necessary for (p).

Form:

Premise 1:	If p, then q
Premise 2:	q
Conclusion:	p

Example: “If you diet, then you’ll lose weight, and Bob is losing weight, so he must be dieting.”

2. **Fallacy of Denying the Antecedent** – treats the absence of a sufficient condition (p) as proof of the absence of what it is sufficient for (q).

Form:

Premise 1:	If p, then q
Premise 2:	Not p
Conclusion:	Not q

Example: “If the car starts, then there’s gas in the tank, but the car won’t start, so it must be out of gas.”

Example (tricky): “If you’re not losing weight, then you’re not dieting. Bob told me that he is losing weight, so he must be dieting.”

3. **Fallacy of Conversion** – treats a necessary condition (q) as if it were a sufficient condition, or alternatively stated, treats a sufficient condition (p) as if it were a necessary condition.

Form:

Premise 1:	If p, then q
Conclusion:	If q, then p

Example: “If we are going to retain poorly prepared students, then we must provide extensive remedial course work. It follows that if we provide that remediation, then we will retain those poorly prepared students.”

Example (tricky): “Mary will get an A in the course only if she does well on the final, so if she does well on the final, then she’ll get an A in the course.”

Informal Fallacies

Fallacies of Relevance

Genetic fallacies – All species of the Genetic Fallacy allege that an argument is weak or strong because of its source. Genetic fallacies appeal to human laziness because they replace difficult argument analysis with character judgments. It is no surprise that all of the named species of the genetic fallacy listed below are very common.

4. **Abusive *ad hominem*** – claims that the speaker’s argument is defective because the speaker is defective in some way (moral defects are popular). When someone attacks the person making an assertion rather than trying to refute the assertion itself, an *ad hominem* of some sort has occurred.

Example: “Liar!”

Example: “Reverend Smith’s clean energy arguments can obviously be dismissed. After all, what can you expect of an ex-priest with a felony conviction for armed robbery?”

Example: “I thought I was getting excellent help with my stats course until I heard through the grapevine that my tutor is the campus dope dealer!”

5. **Circumstantial *ad hominem*** -- charge of personal bias, i.e., the speaker’s argument is defective because the speaker is biased towards the truth of her conclusion.

Example: “Senator, your argument for cleaning up toxic waste sites to protect the health of children is absurd! After all, a toxic site in your own state would benefit from that legislation!”

6. ***Tu quoque ad hominem*** -- usually a charge of hypocrisy or inconsistency. Here, the speaker’s argument is alleged to fail because the speaker’s own conduct is inconsistent with the conclusion. A variant is known as “whataboutism.” Some regard *tu quoque* as a species of the Two Wrongs Make a Right Fallacy.

Example: “You say that I should stop smoking because it causes heart disease? Are you kidding me? You smoke two packs a day!”

Example: “Your argument that we should get out of Afghanistan is weak. After all, you were a long-time supporter of the war. [charge of hypocrisy] Why, you’re no better than those flip-flopper Presidential candidates!” [The last sentence is an abusive *ad hominem*.]

7. **Poisoning the Well** – species of *ad hominem* in which the speaker is discredited in advance of any argument or statement that he or she might produce.

Example: “Don’t listen to what she says. She works for the insurance company.”

8. **Appeal to Authority (*argumentum ad verecundiam*)** – the opposite of an *ad hominem* argument, viz., where an argument is alleged to be strong because of the admirable qualities of the speaker or because of the speaker’s expertise in some domain (actually unconnected to the speaker’s subject matter). Variations include Appeal to Tradition and Appeal to Popularity. Legal testimony under oath by experts or convicted perjurers may be treated as exceptions to the ban on appeals to authority and *ad hominem* reasoning, respectively. However, these exceptions are made under rigorously controlled conditions and jurors must often juggle conflicting expert testimony. In the academy, the determination of expertise is equally complex. The biology student may legitimately rely on the claims of the biology textbook author because the expertise is assumed to be well-grounded in fact, but those claims should not be assumed to be true merely because they were expressed by an expert.

Example: “My logic professor said that the spot price of silver is going to continue to rise for the next several months, so I’m putting my nest egg into silver.”

Example: “Scientology must have some genuine merit or else a famous actor like John Travolta wouldn’t be involved in the religion.”

9. **Appeal to Popularity (*argumentum ad populum*)** – Also called Appeal to the Authority of the Many. This fallacy has two different forms: concluding that a claim is true because many people believe that it is true; and attempting to gain the assent of “the people” to support a claim, especially through the use of propaganda and demagoguery. The Bandwagon Effect Fallacy has been extensively studied by social scientists, and extensively countered by Moms and Dads, e.g., “If Johnny and his friends wanted to jump off a bridge, would you jump, too?”

Example: “Sony. Ask anyone.”

Example: “Atheism is easily refuted by the facts: 90% of Americans believe in a higher power.”

Example: “Aren’t you a man? All the other Deke brothers drank a Power Hour on their 21st birthdays!”

Inductive Fallacies – Inductive reasoning is complex, involving argument by analogy and the empirical investigation of causes. Fallacious inductive reasoning thus forms a complex genus. It includes all False Analogy reasoning as well as errors in causal reasoning. While evaluating inductive reasoning is difficult, students can quickly learn to identify the most common errors.

10. **False Analogy** – Some may incorrectly consider argument by analogy to be a tool of certain domains, e.g., literary criticism, philosophy, history, etc., but all statistical reasoning is argument by analogy. False Analogy fallacies thus include many forms of poor inductive reasoning, viz., all fallacious statistical and probabilistic reasoning, as well as other nonspecific forms of analogical reasoning. A few of the most common statistical fallacies are listed below. “False analogy” should be charged where no specific named form applies to a faulty analogy.
11. **Fallacy of Biased Sample** – using a nonrandom sample to draw a conclusion about the population as a whole.
- Example:** “The request for additional funds for Meals on Wheels is unjustified. A poll of over 400 Kroger shoppers showed just 3% would request meal deliveries.”
12. **Cognitive Bias Fallacies** – a category of biased sample fallacies in which a person creates a biased sample (consciously or unconsciously). For example, **Confirmation Bias** is favoring information that supports one’s prior beliefs. Can often be a form of hasty generalization.
- Example:** “I’ll pass on the sushi. I’ve had some unhappy experiences eating fish.” [Speaker recalls getting sick as a child after eating seafood, but is known to regularly have a tuna sub for lunch.]
13. **Fallacy of False Equivalence** – Commonly known as “bothsidesism.” The fallacy involves treating two opposing views as having equal merit, regardless of disparities in evidence or credibility.
- Example:** Member of local school board: “It’s wrong to teach evolution in our biology curriculum without presenting creationism so that students can form their own opinions.”
14. **Hasty Generalization** -- fallacy of small sample, a variety of biased sample. Also known as Fallacy of Converse Accident.
- Example:** “I never eat at a McDonald’s. I went to one several years ago and the tables were filthy.”
15. **Sweeping Generalization** – known traditionally as the Fallacy of Accident, Sweeping Generalizations apply a general rule to a case that is in fact an exception to the rule.
- Example:** “Shooting a person with the intent to inflict bodily harm is a felony and that is exactly what Officer Smith did when she shot the armed robber. Smith should be prosecuted for assault with a deadly weapon.”
16. **Texas Sharp-Shooter Fallacy** – a variety of Biased Sample or Confirmation Bias—and often False Cause--that is very common in everyday reasoning. Named after the apocryphal Texan who fires several shots into the side of a barn. He then finds a tight cluster of bullet holes, draws a bull’s-eye circle around it, and proclaims himself a sharp-shooter. Human beings are inclined to mistakenly find patterns in random events. A species of cluster illusion.

Example: “There are 28 cases of birth defects on Mulberry Street, yet just two blocks south on Cranberry Street all the births have been normal. Something is very wrong on Mulberry Street.”

17. **Gambler’s Fallacy** – mistakenly treats independent events as being dependent. The Gambler’s Fallacy has several forms, e.g., “run of good/bad luck,” “The odds will catch up with you, sooner or later,” “hot hand” reasoning (cf. Gilovich, 1985), batting slumps, etc. The Inverse Gambler’s Fallacy argues from the occurrence of an improbable event to the existence of many allegedly dependent prior events, and is prominent in the Design Argument for the existence of God, the Anthropic Principle in cosmology, etc.

Example: “I’ve bought a lottery ticket every week for three years straight without a single win. The law of averages says that my chances this week are much better than before.”

Example: “That’s right, Bob! Nash is already two-for-two from the 3-point range. He has 12 points in the first six minutes, so he is the hot hand that the Suns need to go to tonight!”

Example: “The roulette wheel has been streaking on red for the past several spins. I’m moving to black. It’s overdue.”

18. **False Cause** (*post hoc, ergo propter hoc* [“After this, therefore because of this”], and *cum hoc, ergo propter hoc* [“With this, therefore because of this”]) – False Cause confuses correlation with causation. Just because A occurs before, or in conjunction with, B, does not provide *any* evidence that there is a causal connection between A and B (in either direction). Correlation is neither necessary nor sufficient for causation. False Cause is so widespread in contemporary thinking that it should be given special attention in both the sciences and in general education courses. It doesn’t help that careless science writing that uses causal language where no causal model has been developed reinforces the conflation of correlation with causation, e.g., “pomegranate juice slowed the rise in PSA levels” (*Harvard Men’s Health Watch*, April 2007). We can help students learn that causal mechanisms cannot be discovered with a pencil and a calculator, but only by detailed investigation of the physical world.

Example: “I recently read in the paper that a study shows canola oil to be associated with an elevated risk of prostate cancer. Both my brother and I have consequently decided not to use canola oil.”

Example: “Sleeping with the light on during infancy is a significant risk factor for myopia in later childhood, so we’ve decided to remove the night lights from the nursery.”

Example: “Every time we advertise our organic vegetable line, all of our retailers show increased sales in the organic vegetable displays. How could there be better proof? Advertising causes sales to increase.”

Other Fallacies of Relevance

19. **Appeal to Ignorance** (*argumentum ad ignorantiam*) – arguing that a statement is true because there is no evidence that it is false, or vice versa.

Example: “There is no evidence that there were weapons of mass destruction in post-invasion Iraq, so therefore there weren’t any WMDs there.”

20. **Aesthetic Fallacy** -- argument “from the gut”

Example: Barry Bond’s drug-using behavior just sickens me. I feel that he lied about using performance enhancers and I don’t care what his agent says. He ought to be banned from baseball!

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21. **Appeal to Force (*argumentum ad baculum*)** – literally, the argument of the club. Appeal to Force is very similar to Appeal to Fear, but requires the ability to actually cause harm.
- Example:** “Warrant schmarrant! Let me put it this way: we can detain you indefinitely without a hearing. Now, are you going to give us access to your e-mail backup tapes or not?”
22. **Appeal to Fear (*argumentum ad metum*)** – the appeal to fear is a major tool in marketing and in political propaganda.
- Example:** “Nobody ever got fired for buying IBM.”
- Example:** “If you’re going to complain about a little water-boarding, then the terrorists have already won the war!”
23. **Appeal to Pity (*argumentum ad misericordiam*)** – typically a variety of Special Pleading in which the speaker asks for sympathy in defense of a conclusion instead of providing evidence.
- Example:** “I studied so hard for the midterm and I just can’t believe that I did as badly as you say. I’m applying to grad school and you know how important the Fall semester of the senior year is. If I don’t get an A in the course, I might as well give up on getting into a first-tier school.”
24. **Begging the Question (*petitio principii*)** – any argument that assumes as a premise the very conclusion to be established. Oddly, question-begging arguments are always deductively valid, possibly sound, but worthless, since they make no progress in providing support for the conclusion.
- Example:** “God exists because the Bible tells us so, and we know that what the Bible tells us must be true because it is the revealed word of God” (Copi, *Introduction to Logic*, 7th ed.).
25. **Complex Question** -- leading question; a species of begging the question. Leading questions assume the truth of what is to be established by argument.
- Example:** “Have you stopped making sexual advances toward your students?”
26. **False Dilemma** – presents only two options to a dilemma when there are more. False Dilemma is also known as bifurcation, either/or fallacy, and black-or-white thinking.
- Example:** “You either oppose the war or you support the troops. Which is more important to you?”
- Example:** “We have a clear choice to make on Fidupity Mutual: either sell this dog or buy another 10,000 shares. Come on, people, think! Which is it?”
27. **Slippery Slope Fallacy** – the metaphor is that once you put your foot on a slippery slope, you will slide uncontrollably all the way to the bottom. Politicians seem particularly fond of this sort of reasoning. Slippery Slope also can be classified under “Ambiguity and Vagueness.”
- Example:** “If we let South Vietnam fall to the North, then Laos will fall, then Cambodia, then Thailand, and soon after, all of Southeast Asia will be under Communist control [the domino theory].”
- Example:** “No, thank you! I don’t want an aspirin for this headache. If I did, before long I’d be smoking dope, and everyone knows that that leads to crack, then meth, and then I’d be sleeping in a van down by the river!”
28. **Special Pleading** – an argument that appeals to a double standard, or claims an exception to a rule but without justification.
- Example:** “I don’t think that Vick should be expelled from the NFL. The Falcons need their star quarterback!”

29. **Straw Man Fallacy** – a relatively sophisticated—and hence, deliberate—diversionary argument in which the speaker constructs a successful refutation of a different claim than the one advanced by her opponent. The alternative claim is thus the “straw man” that is used as an easy target.

Example: “You say that the United States is ready for universal healthcare, but I say that socialism is not acceptable to most Americans.”

30. **Irrelevant Conclusion (*ignoratio elenchi*)** -- Irrelevant Conclusion is a catch-all term that may be used when a specific named fallacy of relevance is not evident. Also known as the Red Herring Fallacy.

Fallacies of Ambiguity and Vagueness

31. **Fallacy of Vagueness** – Vagueness is lack of clarity in meaning. Vague expressions plague reasoning of all sorts and are extensively exploited in advertising.

Example: “Capricorn: You’ll hear some surprising news at work, so use your skills in making a response. Tonight, the stars say “Romance!” so curb your goatish instincts.”

32. **Fallacy of Equivocation** – an ambiguous expression is one which has multiple meanings, and equivocation rides on those multiple meanings.

Example: ‘Who did you pass on the road?’ the King went on, holding out his hand to the Messenger for some more hay.

‘Nobody,’ said the Messenger.

‘Quite right,’ said the King: ‘this young lady saw him too. So of course Nobody walks slower than you.’

‘I do my best,’ the Messenger said in a sulky tone. ‘I’m sure nobody walks much faster than I do!’

‘He can’t do that,’ said the King, ‘or else he’d have been here first.’ (Carroll, *Through the Looking-Glass*)

33. **Fallacy of Composition** – an often subtle fallacy that takes a property of a part of some whole and then concludes that the whole must have that property, too.

Example: “Every state in the country has fewer than 50 million residents, so the population of the U. S. is less than 50 million.”

Example: “Seeing that eye and hand and foot and every one of our members has some obvious function, must we not believe that in like manner a human being has a function . . .?” (Aristotle, *Nicomachean Ethics*)

34. **Fallacy of Division** – the converse of the Fallacy of Composition, viz., where some property of the whole is attributed to a part of the whole.

Example: “You won’t need a jacket on the boat ride today. This is the warmest summer on record.”

See my [Critical Thinking Resources for Heidelberg Faculty](http://userpages.bright.net/~dclose/dcct.htm) at <http://userpages.bright.net/~dclose/dcct.htm> for more on informal logic and critical thinking.

A reliable quick link on fallacies: [Wikipedia List of Fallacies](https://en.wikipedia.org/wiki/List_of_fallacies)