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## 37. Logic: Recognizing Fallacies

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Sexy Technical  
Communication

Logic:  
Categorizing &  
Understanding  
Fallacies

Steve and Cherie Miller

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## Logic and Logical Fallacies

Taken with kind permission from the book *Why Brilliant People Believe Nonsense* by J. Steve Miller and Cherie K. Miller

*Brilliant People Believe Nonsense [because]...*

*They Either Fail To Recognize Fallacies, or Misapply The  
Ones They Know*

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*"Read not to contradict and confute; nor to believe and take for granted;  
nor to find talk and discourse, but to weigh and consider."*

— Francis Bacon, *Of Studies*

**WARNING:**

Learning fallacies can be fatal to your argumentation and detrimental to your relationships. For these reasons, I teach logical fallacies with a great deal of hesitation. It's a bit like selling firearms to a person with no training in how to use them. I'd hate to be known as one who arms Internet [trolls](#).\*



So before I present a large list of fallacies, I'll acquaint you with a particularly pernicious type of fallacious reasoning that's running rampant on the Internet, but which is strangely absent from lists of fallacies. I call it "The Fallacy Fallacy."

## The Fallacy Fallacy: Debunking Debunking

I often read comments on blog posts or articles or Facebook discussions which accuse the writer of committing a specific logical fallacy and thus declaring the argument thoroughly debunked, typically with an air of arrogant finality. While the debunker may feel quite smug, intelligent participants consider him quite [sophomoric](#).\* In reality, he's typically failed to even remotely understand the argument, much less apply the fallacy in a way that's relevant to the discussion.

Surely this fallacy deserves a proper name and should be listed with other fallacies. Thus I'll define "The Fallacy Fallacy" as "Improperly connecting a fallacy with an argument, so that the argument is errantly presumed to be debunked."<sup>1</sup>

Don't be a troll. Here are a few ways people misapply fallacies, thus committing "The Fallacy Fallacy":

### 1. They misunderstand the fallacy.

"YOU'RE ALWAYS ARGUING WITH JAMIE, WHICH IS OBVIOUSLY *AD HOMINEM*." (Trolls delight in using all caps, confusing *louder* with *smarter*.) If the person was actually arguing against Jamie's arguments, rather than putting Jamie down as a person, then the arguments weren't *ad hominem* at all.

### 2. They fail to appreciate nuance. (They understand the fallacy, but apply it errantly.)

Someone quotes Albert Einstein to bolster his argument. "THAT'S AN APPEAL TO

AUTHORITY!" shouts the troll. But citing authorities isn't always fallacious. If a person cites Einstein concerning a question of relativity theory, then Einstein is a legitimate authority. Thus, quoting him can be a legitimate part of an argument, although it's typically not a slam dunk in itself. While arguments concerning establishing facts should be argued on the basis of the evidence, in many cases citing authorities can help to substantiate the evidence.<sup>2</sup>



### 3. They assume a thorough debunking when there's typically more to the argument.

While trolls are celebrating their "brilliant" comments with a victory dance and a handful of Skittles, their opponents are often typing a clarification that makes the Trolls' comments irrelevant. We simply must take the time to thoroughly understand the arguments we're evaluating.

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## Making Arguments More Fruitful

For those who sincerely want to learn from one another by hashing out issues, consider this: Trolls "flame" opponents by either calling them morons or presenting their arguments dogmatically, as if they have crushed their opponents. If you're concerned about the truth, seek more to understand than to demonstrate your brilliance. To accomplish this, *suggest* rather than *slam*; express tentativeness rather than dogmatic finality; ask questions rather than accuse.



Does it in any way weaken a counter-argument to word it in a cautious, humble manner, such as: "At first glance your argument appears to be an unwarranted appeal to authority. Are you really saying that your position is correct solely because Einstein believes it as well?"

In this way, the opponent is more likely to respond in a reasonable manner and you save face in case you took the comment out of context or otherwise misunderstood it.

## Benjamin Franklin on Fruitful Argumentation

Franklin was one of the most influential people in American history. He learned a lesson early in life which he considered of such significance that he discussed it at some length in his autobiography. He describes learning Socratic argumentation, which he delighted to use in humiliating his opponents. (As an annoying ass during this phase of a few years, he was

a predecessor to the modern day Internet troll.)



But over time, he realized that this method failed to either persuade others or to help him learn from them. Rather, it disgusted people. So he changed his method of argumentation. In Franklin's own words, he discovered the value of:

"never using, when I advanced anything that may possibly be disputed, the words *certainly*, *undoubtedly*, or any other that give the air of positiveness [meaning "dogmatism"] to an opinion; but rather say, *I conceive or apprehend a thing to be so and so; it appears to me, or I should think it so or so, for such and such reasons; or I imagine it to be so; or it is so, if I am not mistaken.* This habit, I believe, has been of great

advantage to me when I have had occasion to inculcate my opinions, and persuade men into measures that I have been from time to time engaged in promoting." (italics his; brackets mine)<sup>3</sup>

As a result, Franklin became a skilled negotiator and persuader, allowing him to help start America's library system, organize firefighters, run a successful printing business, improve our postal service, negotiate with the French to aid us in the Revolutionary War, and assist in finalizing and adopting the Declaration of Independence, just to name a few of an astonishing array of accomplishments.<sup>4</sup>

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## Some Helpful Ways to Organize Fallacies

The plethora of known fallacies can be quite unwieldy, so let's first of all look at some helpful ways of classifying them. In this way, when you sense an argument is invalid but can't remember the name of the specific fallacy, at least you might be able to identify the category in order to better evaluate or research it.

(Example: "That sounds like a fallacy of definition.") Although no single categorization scheme has become standard, you'll find some of the categories (such as "formal" and "informal") used widely.<sup>5</sup>

### Aristotle

Aristotle was perhaps the first to categorize logical fallacies in his *De Sophisticis Elenchis* ([Sophistical Refutations](#)). He lists 13 fallacies under two categories: **Verbal** (those depending on language) and **Material** (those not depending on language). In

modern times, those building on Aristotle's two divisions often add a third: **Logical or Formal**—fallacies that violate the formal rules of the syllogism.

## Philosopher J. L. Mackie

Mackie divided fallacies into:

### Fallacies in a Strict Sense

*invalid forms of deductive reasoning; the conclusion doesn't logically follow from the premises.*

**Formal Fallacies** - The conclusion is invalid because of the argument's form. Example: Exerting the consequent—If there are too many cooks, there's chaos in the kitchen. There's chaos in the kitchen, therefore there are too many cooks. (If p then q. q, therefore p)

**Informal Fallacies** - The conclusion is invalid for reasons other than its form. (Example: Using vague or ambiguous terms.)

### Fallacies in Non-deductive Reasoning and in Observation

*errors in inductively reasoning from evidence to a conclusion or hypothesis.*

**Induction and Confirmation** - example: *post hoc ergo propter hoc* - the fact that event "b" followed event "a" doesn't absolutely prove that event "a" caused event "b".

**Analogy** - A weak analogy, one that has few or trivial points of resemblance, may have no evidential value at all.

**Classification** - Example: A company may argue that all people classified as autistic are unemployable. Yet, autistic people vary greatly in their skills, so that highly functioning autistics, or those wrongly categorized, may be overlooked.

**Statistics** - Example: If students from City High School outperform students from County High School on standardized tests, this doesn't necessarily imply City High School has better teachers. Perhaps administrators skew the scores, or one district has more high risk students.

**Probability** - Example: Although the probability of flipping a coin five times and getting heads every time is low, that doesn't mean that if you got heads four times in a row, it's very unlikely that you'll get heads in the next flip. The odds are still 50/50.

**Observation** - Example: Often what we observe is skewed by what we want or

expect to observe.

## Fallacies in Discourse

*The argument fails because of some reason other than invalid deductive reasoning or arguing from evidence.*

**Inconsistency**- You can't have it both ways. "***Petitio Principii***" - Including your conclusion in your premises (aka begging the question or arguing in a circle).

**A Priori Fallacies** - Bringing to the argument unfounded preconceptions that influence the conclusion.

**"Ignoratio Elenchi"** - Missing the point: An argument concerning something that was never meant, in the context of the argument, to be proven.

**Fallacies of Interrogation** - Demanding a narrow and specific answer to questions that demand broader answers. Example: "Answer yes or no: Have you stopped beating your wife?"

**Fallacies in Explanation and Definition** - Example: using the same word in two different ways in an argument, thus invalidating the argument.<sup>6</sup>

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## Historian David Hackett Fischer

In Fischer's instructive and delightful book, *Historians' Fallacies*,<sup>7</sup> he discusses 112 fallacies under 11 categories. Note that these apply far beyond professional historians. Whenever we blog about an event, summarize our family vacation on Facebook, or write that first high school paper on "What I Did for My Summer Vacation," we're telling history, and risk committing these fallacies. Here are Fischer's categories:

**Question-framing** - Historians begin their research by asking one or more questions. If these questions are vague or ill-conceived, they will yield the wrong answers. Example: asking a complex question and expecting a simple answer.

**Factual Verification** - Failure to rigorously employ the best methods for verifying historical data.

**Factual Significance** - Historians can't report every fact from a period of history; they must be selective. If they select based on the wrong criteria, their conclusions will likely be wrong as well.

**Generalization** - Improper statistical reasoning from historical data. Example: Drawing a

general conclusion from an insufficient sampling of data.

**Narration** - Historians gather threads of historical data and weave them into stories. Yet, "nothing but the facts" is often at odds with great storytelling, which assigns feelings and even time sequences that may not be warranted by the historical data.

**Causation** - Example: The reductive fallacy reduces a complex historical cause to a simplistic one.

**Motivation** - Historians often assign motives without sufficient evidence; for example, assuming that a Roman Emperor thinks, reacts, and is motivated by the same things that motivate a middle-aged academic historian at Berkeley.

**Composition** - Historians tend to study and write about groups, or individuals as part of groups, whether the groups be social, religious, national, ideological, cliques, castes or economic. One fallacy of composition is assuming that the character of one member is shared by the rest of the group.

**False Analogy** - Example: People often reason from a partial analogy to declare there's an exact correspondence; but in reality, analogies are seldom exactly parallel.

**Semantical Distortion** - Problems with unclear or imprecise prose. For example, the failure to clarify definitions of terms.

**Substantive Distraction** - The argument shifts the reader's attention to issues that are irrelevant to the discussion.

While categorization schemes are helpful for getting an overview of types of fallacies, none seem to be without their downsides. For example, some fallacies seem to fit snugly into multiple categories.

## **A Great Big List of Fallacies**

In my first Appendix, I list a great number of fallacies. I don't recommend trying to memorize them. Rather, familiarize yourself with each of them so that in the future, when you run across an argument that doesn't sound quite right, you can return to the list to search for a fallacy that might apply. If you're reading this for a class, your teacher or professor may single out certain fallacies that they deem the most important or the most frequently abused in literature and the media.

## **Conclusion**

There are many ways to go wrong in our arguments. Some are a bit technical. But by familiarizing ourselves with fallacies, learning to apply them correctly, and discussing disagreements in a civil and humble manner, we can learn from each other and mutually



come closer to the truth.

## Matching Exercises



### match the historians' fallacy to its meaning

**Match the items.**

- a. interpreting or prioritizing facts by their value as a part of a story.
- b. extrapolating data (estimating facts beyond what the evidence can prove).
- c. relying on data which is not relevant to the matter at hand.
- d. shifting the focus to irrelevant issues (a red herring)
- e. a lack of clarity or consistency in the use of terms or concepts.
- f. assuming why something happened rather than giving all possible reasons.
- g. framing the initial concept in a misleading way or a way designed to weight the outcome.
- h. using uncertain or erroneous data.
- i. assuming that one can understand the reasons for the behavior of someone from a different culture, time, place, etc.
- j. grouping people together and assigning them the same motivations, ideology, character, etc.

1. Question-framing

2. Factual Verification

3. Factual Significance

4. Generalization

5. Narration

6. Causation

7. Motivation

a ▾

8. Composition

a ▾

9. Semantical Distortion

a ▾

10. Substantive Distraction

a ▾

•

## match Mackie's fallacy to its example

### Match the items.

- a. My school outranks yours in test scores, so clearly we have smarter students.
- b. Job hunting is like riding a bike -- even if you haven't done it in 20 years, you don't need to learn all over again.
- c. All generalizations are false.
- d. All used cars are damaged, so you shouldn't buy one.
- e. I have lost every time I have played the lottery so far, so my time has to be coming soon.
- f. You claiming that you didn't fart proves that you are the one who did it!
- g. "Answer yes or no: Have you stopped beating your wife?"
- h. "You need to stop stealing my lunch."  
"Well, you shouldn't leave it in the kitchen."
- i. Love is important because all people need to get valentines' day cards.

1. Analogy

a ▾

2. Classification

a ▾

3. Statistics

a ▾

4. Probability

a ▾

5. Inconsistency

6. A Priori

7. "Ignoratio Elenchi"

8. Interrogation

9. Explanation and Definition

**Check Answer**

## match the broad categories of fallacies to their definitions

### Match the items.

- a. Invalid forms of deductive reasoning; the conclusion doesn't logically follow from the premises.
- b. The structure of the argument is sound but the individual parts are invalid.
- c. The argument fails because of some reason other than invalid deductive reasoning or arguing from evidence.
- d. Errors in inductively reasoning from evidence to a conclusion or hypothesis.
- e. The structure of the argument is invalid.

1. Fallacies in a Strict Sense

2. Fallacies in Non-deductive Reasoning and in Observation

3. Fallacies in Discourse

4. Formal Fallacies

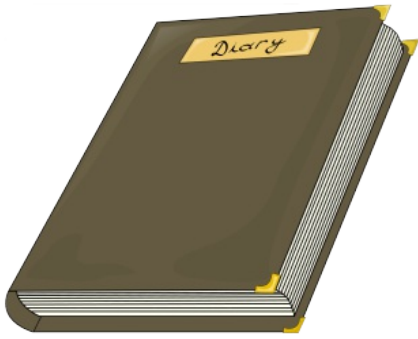
5. Informal Fallacies

**Check Answer**

### **Flex Your Neurons! Pursuing the Point of Know Return**

1. What do you think motivates trolls to flame people in social media or to start arguments in social settings?
2. How do trolls hinder the process of finding truth?
3. How can we keep from behaving like trolls?
4. Write your own examples (lines of reasoning that contain the fallacy) of five fallacies (from the list in the appendix) that especially interest you.

# Making It More Personal Practical Takeaways



## Self Check



What are one or more ideas provoked by this chapter that you can apply to help you think more critically?

A large, empty rectangular box with a thin black border. A diagonal line runs from the bottom-left corner to the top-right corner, dividing the box into two triangles. This is a common design for a writing area in educational materials.

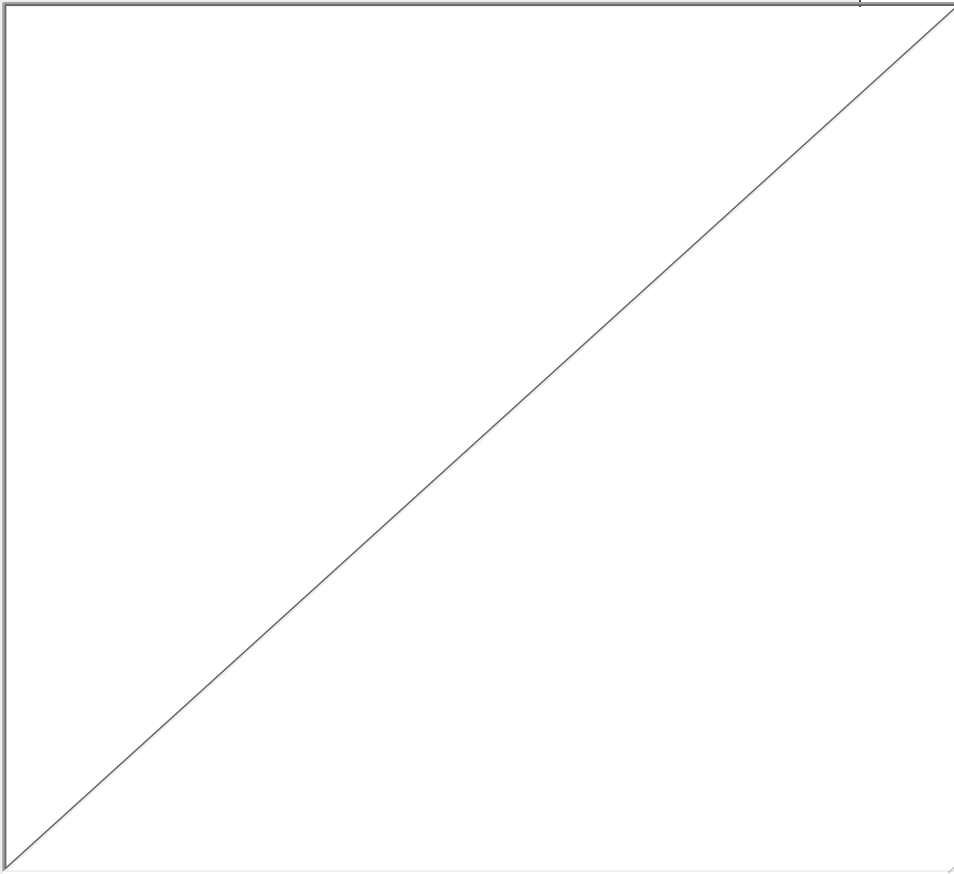
## Self Check



What are one or more ideas that you can apply to help you think more creatively?

A large, empty rectangular box with a thin black border. A diagonal line runs from the bottom-left corner to the top-right corner, dividing the box into two triangles. This box is intended for the user to write their answer to the question above.

What else do you want to make sure you don't forget?



## Recommended Trail For the Incurably Curious and Adventurous

For any fallacies that seem unclear or are of special interest to you, Google them to find other explanations and illustrations.

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## End Notes

Chapter 12: They Either Fail to Recognize Fallacies, or Misapply The Ones They Know

1. Aristotle was the first I'm aware of to discuss examples. Apparently, back in 350 BCE, Greek predecessors to today's trolls strolled about annoying the great philosophers,

imagining that they were spouting profundities. Thus, Aristotle wrote a work about "Sophistical Refutations," which he defined as "what appear to be refutations but are really fallacies instead." While mainly writing about logical fallacies, he also spoke of assigning fallacies incorrectly. See Aristotle, *Sophistical Refutations*, written c. 350 B.C.E., translated by W. A. Pickard-Cambridge, available digitally here: [http://classics.mit.edu/Aristotle/sophist\\_refut.1.1.html](http://classics.mit.edu/Aristotle/sophist_refut.1.1.html).

2. Aristotle describes this issue: "By a sophistical refutation and syllogism I mean not only a syllogism or refutation which appears to be valid but is not, but also one which, *though it is valid, only appears to be appropriate to the thing in question.*" (Italics mine, Part Eight, *Sophistical Refutations*.)
3. Benjamin Franklin, *The Autobiography of Benjamin Franklin* (New York: Dover Publications, 1996), p. 13.
4. Tetlock, in his respected work, *Expert Political Judgment*, suggests that those who use more temperate language tend to be more accurate in their predictions. He brings together a wealth of research showing that the foxes (who know many little things) predict better than the hedgehogs (who know one niche area in depth), although the latter are typically considered the experts and practically everyone (e.g., news sources) wants to hear from them. Those who speak in terms of "perhaps," and "possibly" are far better predictors than the dogmatic, assured experts. Philip E. Tetlock, *Expert Political Judgment* (Princeton, New Jersey: Princeton University Press, 2005, 2006).
5. Many such schemes of categorization have been proposed through the centuries. For example, John Stewart Mill proposed five general categories: Fallacies of Simple Inspection (or *A Priori* Fallacies), of Observation, of Generalization, of Ratiocination, of Confusion. *A System Of Logic, Ratiocinative And Inductive* (New York: Harper & Brothers, Publishers, 1882, available digitally at Project Gutenberg). According to Mackie, "Of other classifications of fallacies in general the most famous are those of Francis Bacon and J.S. Mill." See "Fallacies" in *The Encyclopedia of Philosophy* (Vol. 3), pp. 169-179.
6. *Encyclopaedia Britannica*, 1910 edition, see the article entitled *Fallacy*.
7. From his article "Fallacies," op. cit.
8. David Hackett Fischer, *Historians' Fallacies* (New York: Harper & Row, 1970).

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[a participant in social media who delights in haughtily slamming other people's positions before fully understanding either their position or the context of the discussion.](#)

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[a statement that is immature and poorly informed, but is spoken with overconfidence and conceit. The word is a composite of two Greek words meaning "wise" and "fool."](#)

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