



Reasoning Fallacies Across the Inquiry Journey

Errors in Logic and Argumentation that weaken *Inquiry*

Reasoning fallacies are not psychological biases. They are **faulty patterns of argument** that make a claim appear convincing even when the reasoning is weak, irrelevant, incomplete, or invalid. During inquiry, they may distort questions, misuse evidence, oversimplify explanations, weaken arguments, and produce unjustified knowledge claims.

1. Straw Person Fallacy



Definition

The Straw Person Fallacy occurs when someone misrepresents, weakens, or oversimplifies another person's argument so that it becomes easier to attack.

Example

Claim: "Schools should teach students how to use AI responsibly."

Distortion: "So you want AI to do all the students' work."

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Am I evaluating the actual argument, or a weaker version that I have created?

2. Red Herring



Definition

A Red Herring introduces irrelevant information that distracts attention from the real inquiry question or argument.

Example

Question: “Does excessive homework affect student wellbeing?”

Response: “Our school has excellent sports facilities.”

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Does this information directly address the inquiry, or is it pulling attention away from the real issue?

3. False Dilemma



Definition

A False Dilemma presents only two possible choices or explanations when other possibilities exist.

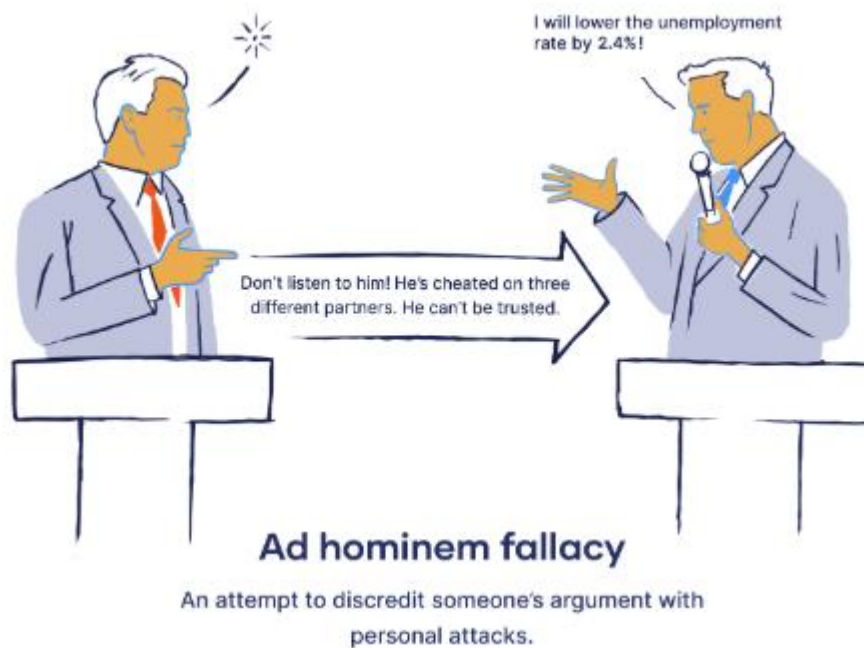
Example

“Either students memorise everything, or they learn nothing.”

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Am I reducing a complex issue to only two options?

4. Ad Hominem Fallacy



Definition

Ad Hominem occurs when someone attacks the person making an argument rather than evaluating the argument itself.

Example

“Her argument about climate policy cannot be trusted because she is only a student.”

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Am I judging the reasoning, or attacking the person presenting it?

5. Post Hoc Ergo Propter Hoc Fallacy



Post hoc fallacy

(post hoc ergo propter hoc)

The assumption that because one event preceded another event, they must be causally related.



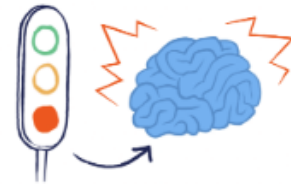
This:

I crossed at a red light.



Then this:

I got a headache.



Therefore:

Crossing at red lights cause headaches.

Definition

This fallacy assumes that because one event happened before another, the first event caused the second.

Example

“The school introduced tablets, and examination results improved. Therefore, the tablets caused the improvement.”

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Does the evidence establish causation, or only sequence?

6. False Cause Fallacy



FALSE CAUSE

A false cause is a logical fallacy that incorrectly assumes a causal relationship between two events or phenomena based on mere correlation or coincidence.

OVERVIEW

False cause occurs when a cause-and-effect relationship is erroneously assumed between two events solely because one follows the other. This fallacy disregards other potential factors and fails to establish a valid causal connection. It often stems from a misunderstanding of statistical correlation or a desire to find simple explanations in complex situations.

EXAMPLE

- **Superstition:** Believing that wearing a specific lucky charm caused a successful outcome in a sports game, ignoring the skills and strategies of the players involved.
- **Rooster's crowing and sunrise:** Assuming that a rooster crowing causes the sun to rise, rather than realizing that the fact the causation is the inverse.

Definition

False Cause occurs when a causal relationship is claimed without sufficient evidence.

Example

“Students who read more often achieve higher grades, so reading alone must cause academic success.”

Other factors may contribute, such as motivation, family support, or prior achievement.

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What evidence shows that this factor actually caused the outcome?

7. Correlation–Causation Fallacy



We really need to talk about

Correlation vs. Causation

If you don't want to click through these slides, please just remember this:



Definition

This fallacy assumes that because two variables are related, one must cause the other.

Example

“Students who carry more books achieve higher marks; therefore, carrying books improves achievement.”

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Could both variables be influenced by another factor?

8. Circular Reasoning



Circular reasoning fallacy

Instead of offering evidence, the argument simply repeats the conclusion, rendering it logically incoherent.



Definition

Circular Reasoning occurs when the conclusion is repeated as its own evidence.

Example

“This source is trustworthy because it provides reliable information, and the information is reliable because the source is trustworthy.”

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Have I provided independent evidence, or simply repeated my claim?

9. Slippery Slope



The slippery slope fallacy

An argument that claims an initial action will trigger a series of other events leading to an extreme or undesirable outcome



Definition

A Slippery Slope argument assumes that one small action will inevitably lead to a chain of extreme consequences without sufficient evidence.

Example

“If students are allowed to use AI for brainstorming, soon they will stop thinking altogether.”

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Is there evidence that each step in this predicted chain will actually occur?

10. Hasty Generalisation Fallacy



The Hasty Generalization Fallacy

A hasty generalization is a conclusion that is not logically justified by sufficient (or sufficiently unbiased) evidence.



Definition

Hasty Generalisation occurs when a broad conclusion is drawn from too few or unrepresentative examples.

Example

“Two students disliked online learning, so online learning is ineffective.”

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Is my evidence large and representative enough to support this conclusion?

11. Sweeping Generalisation Fallacy



Sweeping Generalizations

A sweeping generalization applies a general statement too broadly. If one takes a general rule, and applies it to a case to which, due to the specific features of the case, the rule does not apply, then one commits the sweeping generalization fallacy. This fallacy is the reverse of a hasty generalization, which infers a general rule from a specific case.

Definition

A Sweeping Generalisation applies a general rule to every case without considering exceptions or context.

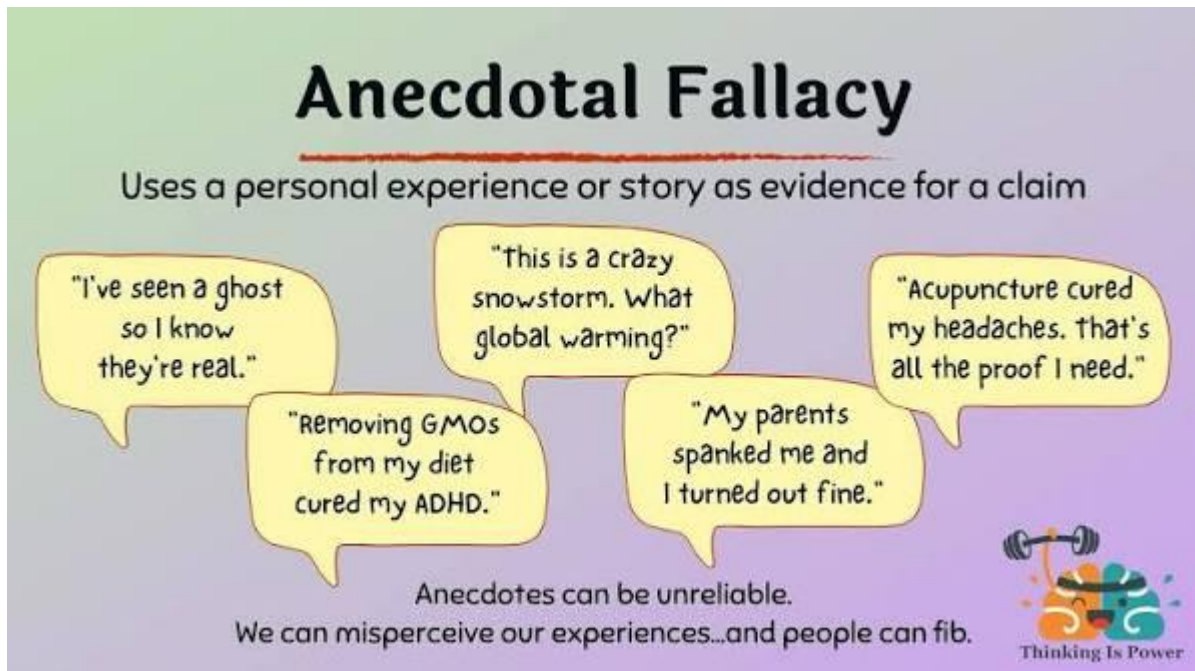
Example

“Group work always improves learning.”

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Does this general claim apply in every context, or are there important exceptions?

12. Anecdotal Fallacy



Definition

The Anecdotal Fallacy uses one personal story or isolated example as proof of a broad claim.

Example

"My grandfather smoked and lived to ninety, so smoking cannot be harmful."

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Is this individual example representative of the wider evidence?

13. Appeal to Authority Fallacy



APPEAL TO AUTHORITY

Claiming something must be true simply because an authority figure said so—even when that authority has no evidence.



Definition

Appeal to Authority occurs when a claim is accepted merely because an expert, celebrity, teacher, institution, or AI stated it.

Example

“This diet must work because a famous actor recommends it.”

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Is the claim supported by evidence, and is the authority qualified in this specific field?

14. Appeal to Popularity Fallacy



Appeal to Popularity

Using the popularity of a premise or proposition as evidence for its truthfulness. This is a fallacy which is very difficult to spot because our "common sense" tells us that if something is popular, it must be good/true/valid, but this is not so, especially in a society where clever marketing, social and political weight, and money can buy popularity.

Definition

Appeal to Popularity assumes that a claim is true because many people believe or support it.

Example

"Millions of people shared this post, so it must be accurate."

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Is this claim supported by evidence, or merely by widespread agreement?

15. Appeal to Emotion Fallacy

Appeal to emotion fallacy

Someone tries to convince another person by evoking their feelings rather than providing evidence.





Definition

Appeal to Emotion attempts to persuade through fear, pity, anger, guilt, pride, or excitement instead of evidence and reasoning.

Example

“You must support this policy because caring people would never oppose it.”

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Is emotion replacing evidence in this argument?

16. Appeal to Fear Fallacy



A fallacy in which a person attempts to create support for an idea by using deception and propaganda in attempts to increase fear and prejudice toward a competitor.

Definition

Appeal to Fear persuades people by presenting frightening consequences without adequately proving that those consequences are likely.

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Example

“If schools do not ban phones immediately, education will collapse.”

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Is the predicted danger supported by evidence, or designed mainly to frighten me?

17. Appeal to Ignorance Fallacy

APPEAL TO IGNORANCE FALLACY

An appeal to ignorance fallacy will state that if something cannot be conclusively proven then the opposite must be true.

DEFINITION	EXAMPLE
The structure of appeal to ignorance arguments will look something like this: 1. X is false because it cannot be proven that it is true, or 2. X is true because it cannot be proven that it is false.	The most common example of the appeal to ignorance fallacy is in religious arguments: 1. The theist: because we cannot prove that god does not exist, then god must exist; or similarly, 2. The atheist: because we cannot prove that god does exist, then god must not exist.

Definition

Appeal to Ignorance claims that something is true because it has not been proven false, or false because it has not been proven true.

Example

“No one has proved that this technology is harmful, so it must be completely safe.”

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Is absence of evidence being wrongly treated as evidence?



18. Burden of Proof Fallacy

Burden of Proof Fallacy

Someone makes a claim that requires evidence, then shifts the burden of proof onto another to prove it wrong

"Climate change is a conspiracy. Go look it up."

"Vaccines change our DNA. Prove they don't."

"The election was stolen. Prove me wrong."

Tips: Extraordinary claims require extraordinary evidence. Claims made without evidence can be dismissed without evidence.

Thinking Is Power

Definition

The Burden of Proof Fallacy occurs when the person making a claim demands that others disprove it instead of providing evidence for it.

Example

"Prove that aliens are not visiting Earth."

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Who is responsible for providing evidence for this claim?

19. Moving the Goalposts



Definition

Moving the Goalposts occurs when the standard of proof is repeatedly changed after evidence has already been provided.

Example

A learner asks for one reliable study, then dismisses it and demands ten, and later says that no number of studies would be sufficient.

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Am I applying a fair and consistent standard of evidence?

20. No True Scotsman Fallacy



No true scotsman fallacy

"no true scotsman eats his porridge with sugar. If you did your not a true scotsman."

Definition

This fallacy protects a general claim from counterexamples by redefining the group whenever contradictory evidence appears.

Example

"No responsible student uses AI."

When shown a responsible student using AI thoughtfully:

"Well, no truly responsible student would use it."

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Am I changing the definition simply to protect my original claim?

21. Begging the Question



Begging the question fallacy

An attempt to prove something is true while simultaneously taking that same thing for granted.



Definition

Begging the Question occurs when an argument assumes the truth of the very claim it is supposed to prove.

Example

“Standardised testing is fair because it provides a fair measure of achievement.”

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Have I assumed my conclusion inside my premises?

22. Equivocation Fallacy



EQUIVOCATION FALLACY

DEFINITION

The Equivocation Fallacy occurs when a key term or phrase in an argument is used in an ambiguous way, with one meaning in one portion of the argument and another meaning in another portion. This ambiguity can lead to a conclusion that is misleading or unsound.

EXAMPLE

Bat Example: Someone might argue, "A bat is a mammal; therefore, baseball players use mammals to hit baseballs," equivocating on the word "bat" which can mean both a flying mammal and a piece of sports equipment.

Definition

Equivocation occurs when the meaning of an important word changes during an argument.

Example

"Evolution is only a theory. A theory is just a guess. Therefore, evolution is only a guess."

Here, the scientific meaning of *theory* is replaced by its everyday meaning.

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Is this key term being used with the same meaning throughout the argument?

23. Ambiguity Fallacy



Ambiguity Fallacy

When an unclear phrase with multiple definitions is used within the argument; therefore, does not support the conclusion. Some will say single words count for the ambiguity fallacy, which is really a specific form of a fallacy known as equivocation.

Definition

The Ambiguity Fallacy occurs when unclear or vague language makes an argument appear stronger than it is.

Example

“Technology improves learning.”

The words *technology*, *improves*, and *learning* have not been clearly defined.

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Are the central terms clear, specific, and consistently defined?

24. Composition Fallacy



FALLACY OF COMPOSITION

DEFINITION

The fallacy of composition arises when one assumes that what is true for individual parts will also be true for the whole. Just because a characteristic applies to members of a group individually, it doesn't mean the entire group or system will exhibit that same characteristic.

EXAMPLES

- **Athletic Teams:** Just because each player on a team is outstanding doesn't mean the team as a whole will be unbeatable.
- **Healthy Foods:** Eating a food that's good for you in moderation doesn't mean consuming it in large quantities will be even more beneficial.

Definition

The Composition Fallacy assumes that what is true of individual parts must also be true of the whole.

Example

“Every member of the research team is highly skilled, so the team must work effectively together.”

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Does what is true of each part necessarily apply to the entire system?

25. Division Fallacy



Division Fallacy

The Division Fallacy is a type of logical fallacy that occurs when someone incorrectly assumes that what is true for a whole or a group must also be true for its individual parts or members. In other words, it involves making a generalization about individual components based on the characteristics of the collective or system.



Definition

The Division Fallacy assumes that what is true of the whole must be true of every individual part.

Example

“This is a high-performing school, so every student in it must be a high performer.”

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Does a characteristic of the whole necessarily apply to every member?

26. Genetic Fallacy



GENETIC FALLACY

DEFINITION

The genetic fallacy is a logical error in which a claim or argument is accepted or rejected based solely on its origin or source, rather than its actual merit or substance. It's an attempt to invalidate or validate the truth of a statement by tracing it to its source or origin. Just because something comes from a particular source does not inherently make it true or false.

EXAMPLES

- **Origin of Ideas:** Dismissing a person's argument on climate change because they aren't a climate scientist.
- **Book Authenticity:** Rejecting the insights of a self-help book solely because it was written by a celebrity with no formal psychology training.

Definition

The Genetic Fallacy judges a claim as true or false based only on where it originated rather than on its evidence.

Example

"This idea began on social media, so it must be false."

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Am I evaluating the claim itself, or only its origin?

27. Tu Quoque Fallacy



Tu Quoque Fallacy

The Tu Quoque Fallacy, also known as the "appeal to hypocrisy" or "you too" fallacy, occurs when an argument's validity is questioned by pointing out the opponent's hypocrisy or inconsistency, rather than addressing the actual argument itself. It suggests that if the opponent has not followed their own advice or has acted inconsistently with their beliefs, their argument is automatically invalid.



Definition

Tu Quoque dismisses criticism by accusing the critic of behaving inconsistently instead of addressing the argument.

Example

"You cannot criticise excessive screen use because you also use your phone frequently."

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Does the other person's behaviour actually disprove their argument?

28. Whataboutism



Whataboutism

This defective tactic involves responding to criticism or accusations by pointing out a similar issue in an attempt to divert attention from the original topic. It is often used to shift blame or scrutiny away from the original issue.



Definition

Whataboutism avoids an issue by shifting attention to another person's wrongdoing or another unrelated problem.

Example

“Why discuss air pollution when water pollution is also serious?”

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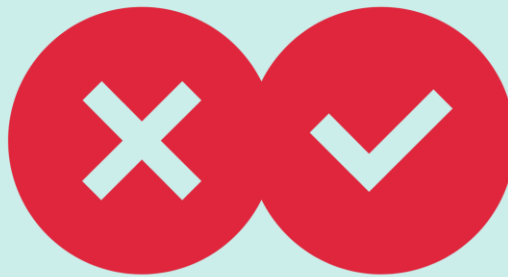
Am I answering the original question, or diverting attention to another issue?

29. False Equivalence



False Equivalence Fallacy

The False Equivalence Fallacy is an informal fallacy that occurs when two or more situations, events, or ideas are compared or equated as if they are fundamentally similar or equivalent when, in reality, they are not. It implies that because two things share some superficial similarities, they must be equal in all aspects or equally valid. This fallacy overlooks critical differences between the compared elements.



Definition

False Equivalence treats two situations, claims, or pieces of evidence as equally valid when important differences exist.

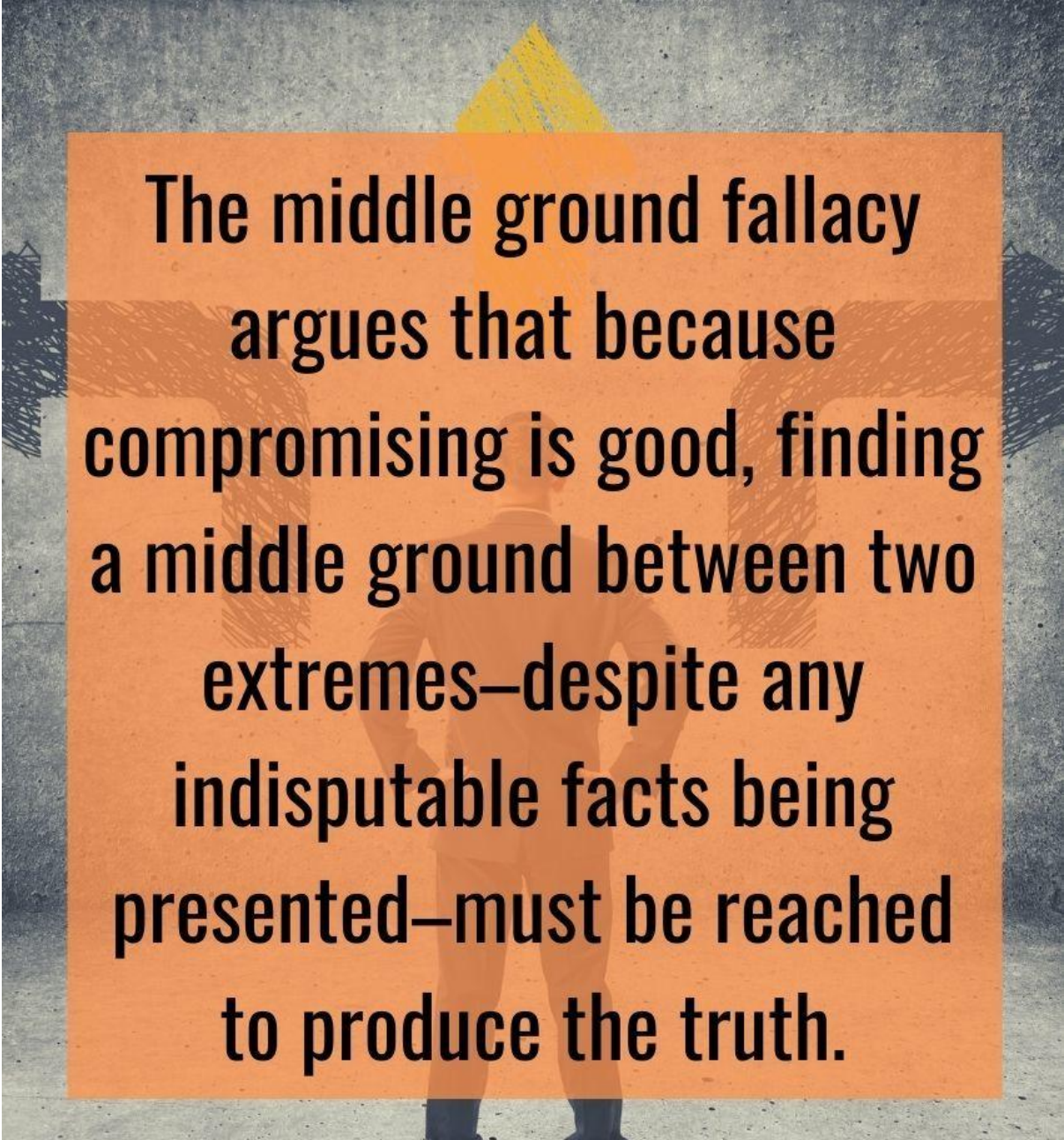
Example

“A personal blog and a peer-reviewed study are both written sources, so they are equally reliable.”

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Are these sources or situations genuinely comparable in quality and relevance?

30. Middle-Ground Fallacy



The middle ground fallacy
argues that because
compromising is good, finding
a middle ground between two
extremes—despite any
indisputable facts being
presented—must be reached
to produce the truth.

Definition

The Middle-Ground Fallacy assumes that the truth must lie exactly between two opposing positions.

Example

“One person says Earth is spherical and another says it is flat, so the truth must be somewhere in between.”

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Is the compromise supported by evidence, or am I assuming the middle position must be correct?

31. Nirvana Fallacy



Definition

The Nirvana Fallacy rejects a realistic solution because it is not perfect.

Example

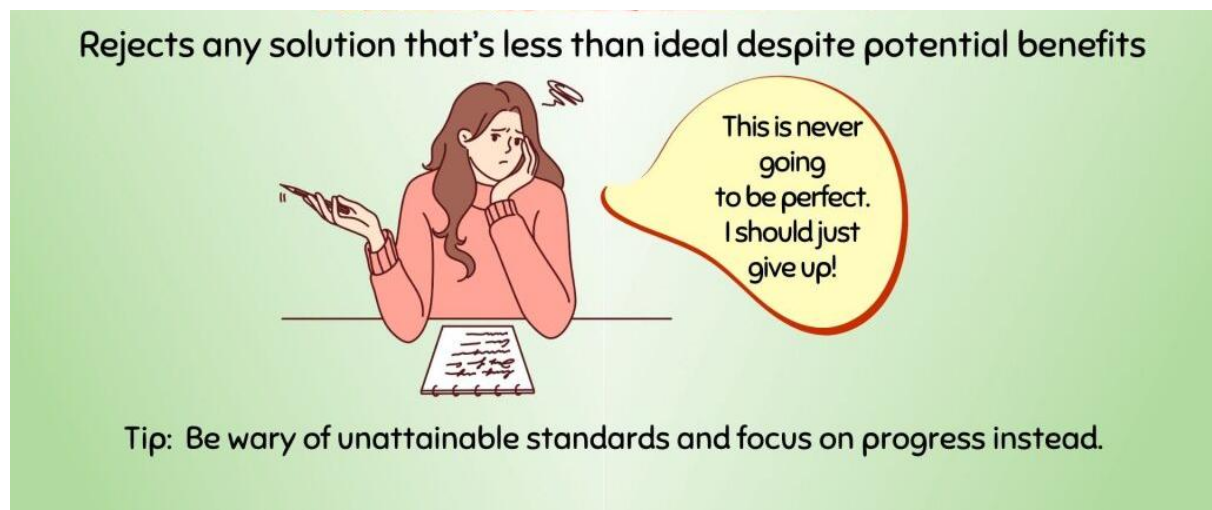


“Renewable energy cannot solve every environmental problem, so it is not worth developing.”

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Am I rejecting a useful solution merely because it is imperfect?

32. Perfect Solution Fallacy



Definition

The Perfect Solution Fallacy assumes that a proposal is worthless unless it solves the entire problem.

Example

“This anti-bullying programme cannot stop every incident, so it has failed.”

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Does the solution need to be perfect to produce meaningful improvement?

33. Single-Cause Fallacy



Definition

The Single-Cause Fallacy explains a complex outcome through only one cause while ignoring other contributing factors.

Example

“Students experience stress only because of examinations.”

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What other interacting causes may contribute to this outcome?

34. Oversimplification Fallacy



OVERSIMPLIFICATION

DEFINITION

Oversimplification is the act of reducing the complexity of a subject or issue to the point where essential details are lost. It can lead to misunderstandings or misrepresentations by presenting a topic as simpler than it truly is. While it can make information more accessible, it risks omitting critical aspects of the subject.

EXAMPLES

"Money can't buy happiness."

"People are either introverts or extroverts."

"All politicians are corrupt."

"Depression is just about feeling sad."

"Success is solely a result of hard work."

Definition

Oversimplification reduces a complex issue to an explanation that ignores context, systems, interactions, and uncertainty.

Example

"Poverty exists because people do not work hard enough."

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Have I reduced a complex issue to an explanation that is too simple?

35. Non Sequitur Fallacy



NON SEQUITUR FALLACY

DEFINITION

The term 'non sequitur' comes from Latin and translates as "does not follow." A non sequitur occurs if the premises don't justify the conclusion.

EXAMPLE

1. All trees are tall.
2. All tall things are yellow.
3. Therefore, all trees are green.

Definition

A Non Sequitur occurs when the conclusion does not logically follow from the premises.

Example

"She is an excellent scientist, so she must also be an excellent political leader."

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Does my conclusion logically follow from the evidence and reasons provided?

36. Suppressed Evidence Fallacy



Suppressed Evidence: Definition

- Ignores some important piece of evidence that:
 - 1) outweighs the presented evidence
 - 2) entails a very different conclusion.
- Difficult to detect because you must know about the details of the case.

Definition

Suppressed Evidence occurs when important evidence that weakens a claim is deliberately or carelessly omitted.

Example

A learner argues that a programme was successful but fails to mention that half the participants dropped out.

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What relevant evidence has been omitted from this argument?

37. Loaded Question Fallacy



Loaded Question ?

Example

"So you are going to vote for that incompetent candidate?"

Definition

A question containing an implicit assumption that is unverified or controversial.

Definition

A Loaded Question contains an unproven assumption that pressures the respondent to accept it.

Example

"Why are schools failing to teach students properly?"

The question assumes that schools are failing before this has been established.

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What hidden assumption has been built into this question?

38. Hasty generalisation



Hasty Generalization

a type of informal fallacy that occurs when someone generalizes an experience from examples, not evidence

Example

I saw a basketball player sneeze; thus, all basketball players have allergies.

Definition

Hasty generalisation applies when someone generalises an experience from a specific example

Example

“I have been seeing my neighbour’s kids eating junkie snacks every evening; hence, all children love junk.”

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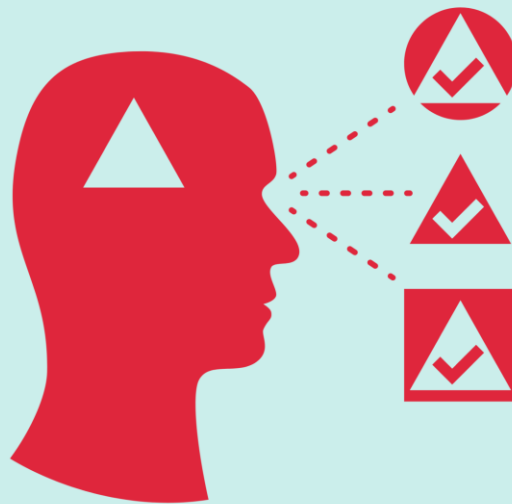
Isn’t my sample size too small to generalise the concept?

39. Texas Sharpshooter Fallacy



Texas Sharpshooter Fallacy

The Texas Sharpshooter Fallacy is a cognitive bias where an individual or group selectively focuses on specific data, events, or patterns after they have occurred and draws unwarranted conclusions or perceives significance where none exists.



Definition

The Texas Sharpshooter Fallacy occurs when patterns are selected from data after the fact while contradictory data is ignored.

Example

A learner examines a large dataset, notices one unusual cluster, and presents it as meaningful without testing whether it arose by chance.

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Did I predict this pattern before examining the data, or select it only after noticing it?

40. Appeal to Tradition



Appeal to Tradition

The Appeal to Tradition is a logical fallacy that occurs when an argument asserts that something is right, good, or valid solely because it has been practiced or accepted for a long time, adhering to traditional customs, beliefs, or practices. This fallacy assumes that the mere fact of tradition makes something inherently valuable or correct.



Definition

Appeal to Tradition assumes that something is correct or superior because it has always been done that way.

Example

“Examinations are the best form of assessment because schools have used them for generations.”

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Is this practice supported by current evidence, or only by familiarity and tradition?

41. Appeal to Novelty



Appeal to Novelty

Definition

Claiming that something, such as a product or idea, must be good or superior simply because it is "new".

Example

"Keeping up with the latest trends is always an excellent idea."

Definition

Appeal to Novelty assumes that something is better simply because it is new.

Example

"This AI platform must improve learning because it uses the latest technology."

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Is this approach genuinely effective, or merely new?

42. Is-Ought Fallacy



The “Is-Ought Fallacy”

- Ethical Egoism: Bentham argues that because it is in our nature to seek pleasure, that is what we morally “ought” (moral obligation/duty) to do.
- Problem? Logical Fallacy
- The reasoner tries unjustifiably to derive a moral “ought” from an “is” (action) of experience.
- Example: it *is* true that people lie and kill, but, we cannot conclude solely on the basis that they *should* or *ought* to do so for obvious reasons.
- What is, should not necessarily be.

Definition

The Is–Ought Fallacy moves from a statement about how reality currently is to a claim about how it morally should be, without providing ethical reasoning.

Example

“Competition exists naturally, so education ought to be highly competitive.”

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Have I provided an ethical justification for moving from what is to what ought to be?