Formal and Informal Fallacies

I: Formal Fallacies (Non Sequiturs): Fallacies pertaining to reasoning and affecting an argument's validity

Affirming the consequent

If A is true, then B is true.
B is true.
Therefore, A is true.

Ex.
If Fluffbutt is a cat, then Fluffbutt is an animal.
Fluffbutt is a animal.
Therefore, Fluffbutt is a cat.

Denying the Antecedent

If A is true, then B is true.
A is false.
Therefore, B is false.

Ex.
If Fluffbutt is tabby, then Fluffbutt is a cat.
Fluffbutt is not a tabby.
Therefore, Fluffbutt isn't a cat.

Affirming a disjunct

A is true or B is true.
B is true.
Therefore, A is not true.

Ex.
To be on the cover of "Cat Fancy Magazine," a cat must be a celebrity or pretty.
This month's cover cat was the celebrated Fluffbutt.
Therefore, Fluffbutt isn't pretty.

Denying a conjunct

It is not the case that both A is true and B is true.
B is not true.
Therefore, A is true.

Ex.

Fluffbutt can't both be at the vet and be at home.
Fluffbutt isn't at home.
Therefore, Fluffbutt is at the vet.

Fallacy of the undistributed middle

All A is B.
C is B.
Therefore, C is a A.

Ex.
All dogs are furry.
Fluffbutt is furry.
Therefore, Fluffbutt is a dog.

Illicit Major

All A are B
No C are A
Therefore, no C are B.

Ex.
All cats are mammals.
No dogs are cats.
Therefore, no dogs are mammals.

Illicit minor

All A are B.
All A are C.
Therefore, all C are B.

Ex.
All cats are felines.
All cats are mammals.
Therefore, all mammals are felines.

Fallacy of four terms

All A are B.
C is A.
Therefore, D is B.

Ex.
Cats have fur.
Fluffbutt is a cat.
Therefore, dogs have fur.

A syllogism in which a term has a different sense in each of the premises such that four terms are in play rather than three -- a fallacy of equivocation (see below) -- results in a fallacy of four terms. Ex.

Fluffbutt likes to eat mice. [here, "mice" refers to rodents]
Mice need batteries to work. [here, "mice" refers to computer mice]
Therefore, Fluffbutt likes to eat things that need batteries to work.

II: Informal Fallacies: Fallacies pertaining to content and context and affecting an argument's soundness

Fallacy of equivocation

This type of fallacy concerns ambiguity of a term or phrase which has occurred at least twice in the argument. Ex.

The end of life is death. ["end" here means "purpose"]
Happiness is the end of life. ["end" here means "finish"]
So, death is happiness.

Fallacy of amphiboly

This type of fallacy stems from amibguous word meanings, bad grammar, or faulty sentence structure.

Ex. "I'm against fascism, so of course I am for Antifa!"
Ex. The extraneous commas in this sentence: "The panda eats, shoots, and leaves."
Ex. "One morning I shot an elephant in my pajamas. How he got into my pajamas I'll never know."

Fallacies of composition and division

This type of fallacy occurs when it's assumed that the qualities of parts and whole are the same.

Ex. Fallacy of composition: Each ingredient of the pizza was tasty. Those ingredients were lemon slices, bits of cake, salmon, and green beans. Because each ingredient was fresh and tasty in themselves, the pizza tasted good.

Ex. Fallacy of division: The cake was great! It was made of flour, cocoa, sugar, and baking soda. Therefore, a big teaspoon of baking soda or flour should taste good.

Complex question

This type of fallacy is associated with questioning, wherein the question asked presumes an answer already assumed.

Ex. "Have you stopped beating your wife?" [assumes the respondent beats his wife]

Post hoc ergo propter hoc (“after this, therefore because of this”)

This type of fallacy wrongly ascribes a causal relationship between two states or events on the basis of temporal succession.

Ex. "After Biden took office, the weather got sunnier. He's such a great president."
Ex. The cock crows, then the sun rises. That’s one powerful rooster!

Cum hoc, ergo propter hoc ("with this, therefore because of this")

This type of fallacy wrongly ascribes a causal relationship between two states or events on the basis of their being observed together or otherwise associated with each other.

Ex. “Almost all the people in cemeteries are dead. Cemeteries must be dangerous.”
Ex. Teenagers eat a lot of french fries, and teenagers often have acne. French fries must cause acne.

Reductive Fallacy: Causal reductionism

This fallacy is based on the false assumption that a phenomenon has only one cause.

Ex. “I don’t want to hear about how her parents were alcoholics, her grandparents were alcoholics, all her friends in school drank,that her parents split up when she was 6, or that her best friend killed himself at college. She’s an alcoholic because she likes to drink.”

Ignoratio elenchi: Irrelevant conclusion

This type of fallacy involves an argument that may have true premises or a true conclusion, but is irrelevant.

Ex. Cats are so cute. They can’t possibly cause allergic reactions.
Ex. Ellen doesn’t deserve that award. I don’t like her.
Ex. He’s so handsome and so smart. He’s got to be a good mayor.

Types of ignoratio elenchi fallacies:

Red Herring: the use of misdirection in order to derail an argument

Ex. I I know he’s mean, but so is she!
Ex. You’re always going on against abortion. What about gun control?

Ex. They shouldn't have charged Clinton with perjury; the economy was doing so well when he was President.

Straw Man: mischaracterizing an argument so as to make it easier to refute

Ex. "I believe in God." "So, you think magical sky fairies control everything?"
Ex. "I'm against the push for equality of outcome." "So what you're saying is that you don't care if people are poor."

False Dilemma

This fallacy falsely assumes there are only two options available when there are actually more than two.

Ex. "You either voted for Biden or you're a fascist!"
Ex. "If you're not for the Paris Accord Agreement, you don't care about the environment."

Denying the Correlative

This fallacy is the opposite of the false dilemma fallacy in that it attempts to introduce options that don't exist.

Ex. "Did you kill your wife or not?" "I fought with her."

Argumentum ad temperantiam ("argument to moderation"): Middle ground fallacy

This fallacy is the idea that the truth is a compromise between two opposing positions.

Ex. "20 million people died in that war." "No, it was 10 million." "OK then, it must have been 15 million."

Begging the question: Circular reasoning

This fallacy assumes the very thing it is trying to prove.

Ex. I believe in the Bible because the Bible says it's true.
Ex. Everyone watches that show because it's so popular!

Ad verecundiam fallacy ("appeal to authority or expertise")

This is the fallacy of accepting as evidence for a proposition the pronouncement of someone who is taken to be an authority but *is not really an authority*.

Ex. The Qur'an says that Jesus was just a prophet.
Ex. My plumber advised me to have the operation, so I'm going to.

Argumentam ad populam ("appeal to popularity")

This fallacy is based on asserting something is so because many people think so.

Ex. “Mom, I should get to because all my friends are doing it!”
Ex. “That restaurant has to be good; so many people love it.”

Ad baculum fallacy (“appeal to the stick”)

This fallacy appeals to violence.

Ex. You should vote for Biden or else we’ll burn your store down.

Argumentum ad lapidem ("appeal to the stone")

This fallacy dismissess an argument as untrue or absurd because it sounds untrue or absurd.

Ex. “I know ghosts are real bec ause I saw one in my bathtub lastnight.” “That’s ridiculous! It’s can’t be true.

Ad misericordiam fallacy (“appeal to pity”)

This fallacy appeals to pity.

Ex. “You won’t vote for Biden? But think of the children!”
Ex. “There’s no way she’s guilty; just look at that sad face!”
Ex. “This bill must pass! If it saves just one life, it will be worth it!”

Ad hominem (“against the man”)

This fallacy involves bringing up irrelevant, negative things about the person making an argument.

Ex. “I don’t agree with her; she spent some time in jail a few years ago.”

Types of ad hominen fallacies:

Circumstantial ad hominem: a fallacy in which, given the circumstances in which the arguer finds himself, it is alleged that his position is supported by self-interest rather than by good evidence.

Ex. “That study can’t possibly be true; it was done by the tobacco company.”

Tu quoque: a fallacy that rejects an argument because the arguer himself doesn’t follow its recommendations.

Ex. “Why should I stop smoking when you still smoke?”

Argumentum ad ignorantiam (“appeal to ignorance”)

This fallacy asserts that a proposition is true because it has not yet been proven false, or that a proposition is false because it has not yet been proven true.

Ex. “There’s no evidence that he did it, so he didn’t.
Ex. “Angels don’t exist because their existence hasn’t been proved.”

A dicto simpliciter ad dictum secundum quid ("destroying the exception"): Fallacy of the accident

This fallacy involves arguing from a general to a particular case, without recognizing qualifying factors and exceptions.

Ex. People who cut others with knives are bad. Surgeons cut people with knives, so surgeons are bad.

Faulty analogy

This fallacy involves making a comparison between two things that are too disparate to be compared, and making an argument from that comparison.

Ex. If a child gets a new toy he or she will want to play with it; so, if a nation gets new weapons, it will want to use them.

Slippery slope

This fallacy takes the form that from a given starting premise followed by a series of incremental steps, an undesirable conclusion will be arrived at so, therefore, the starting premise should be rejected. Slippery slope arguments are not necessarily fallacious; they're only fallacious if one or more of the premises is untrue.

Ex. "If we go to California, we'll probably experience an earthquake, and if that happens, I'll lose my mind because I'm scared of earthquakes. So I'd have to to quit my job. And if we lose my income, we'll be living on the streets."

False Equivalence

This is a fallacy in which a false equivalence is made between two things based on faulty reasoning.

Ex. “You’re a vegetarian? Hitler was a vegetarian! Get away from me, fascist!”

No True Scotsman

This is the fallacy of trying to maintain the integrity of a generalization by excluding a counterexample.

Ex. "No Scotsman puts sugar on his porridge."
"But my uncle Angus is a Scotsman and he puts sugar on his porridge."
"But no true Scotsman puts sugar on his porridge."

Fallacy of incomplete evidence: Cherry picking

This fallacy consists of pointing to individual cases or data that seem to confirm a particular position while ignoring a significant portion of related and similar cases or data that may contradict that position.

Ex. “You’re wrong about this city being dangerous. We asked all the rich people on the nice side of town if they’ve experienced any crime, and they all said no.”

Genetic Fallacy

This fallacy is based on the source or origin of something rather than on the thing itself.

Ex. Hitler invented the Vokswagen, so Volkswagens are bad cars to get.

Affective Fallacy

This fallacy consists of refusing an argument because it makes someone uncomfortable, angry, upset, etc.

Ex. “So you’re saying most men are stronger than most women? Nonsense! That’s unfair and makes me so mad!”