

## Logical Fallacies

A logical fallacy is an argument that does not follow the rules of logic because it contains a flaw in structure or content. This flaw weakens the argument by breaking the connection between the starting point (the premise) and the end claim (the conclusion). This handout explains the two types of logical fallacies: formal and informal.

### Formal Logical Fallacies

Formal logical fallacies occur when the structure of the argument is flawed. There are many forms of formal logical fallacies. A couple of examples are included below:

**Affirming the Consequent:** This logical fallacy occurs when someone assumes a cause is true because the expected outcome – or consequence – is true.

**Example:** If I am in Virginia, then I am in the United States. I am in the United States; therefore, I must be in Virginia.

**Explanation:** It is correct that if I am in Virginia, I am in the United States; however, just because I am in the United States does not mean that I must be in Virginia.

**Denying the Antecedent:** This logical fallacy occurs when someone assumes that if an initial condition – or the antecedent – does not occur, then the expected outcome will not occur either.

**Example:** If it is raining, then the ground will be wet. It is not raining; therefore, the ground will not be wet.

**Explanation:** It is true that the ground will be wet if it is raining outside; however, it does not mean that if it is not raining, the ground outside cannot be wet. The ground could still be wet due to other conditions such as an activated sprinkler system.

### Informal Logical Fallacies

Informal logical fallacies occur when the content of the argument is flawed. There are many informal logical fallacies, and some examples are included below:

**A Slippery Slope:** This fallacy occurs when someone claims that a seemingly innocuous decision must lead to an obviously unacceptable consequence, and the initial decision must therefore also be considered unacceptable.

**Example:** If people participate in social media, then they will become addicted to the internet.

**Explanation:** There is no guarantee that social media engagement automatically causes internet addiction. Factors outside of social media participation may contribute to internet addiction.

A False Dilemma: This fallacy occurs when someone proposes that there are only two possible positions to take on a topic although other valid opinions may exist.

**Example:** One must believe that either all war is just or all war is unjust.

**Explanation:** It is possible to make sound arguments for a spectrum of views. In this example, one may make an argument that it is possible for some wars to be either just or unjust.

A Red Herring: This fallacy occurs when an argument lacks relevance to the debate.

**Example:** We should focus on improving education, not on debating gun control because education is the foundation of a strong society.

**Explanation:** If the arguments are not directly related, there is no logical link between the truth value of one argument and that of another. While education is important, it is not directly related to the topic of gun control.

Because the Red Herring logical fallacy is a broad definition, fallacies of relevance can be further labeled based on the traits that make them irrelevant. Some examples are included below:

Ad Hominem: This fallacy occurs when someone responds to an argument by attacking the opponent rather than the content of the argument. Ad hominem is Latin for “to the man.”

**Example:** Person A: “We need to reduce our carbon footprint.”

Person B: “You’re one to talk. You drive a gas-powered car!”

**Explanation:** Personal attacks are not relevant to the content of the argument; character traits are not arguments. Someone that the speaker perceives to have “bad” traits can make a good and logical argument whereas someone the speaker perceives to have “good” traits can make a bad and illogical argument.

Appeal to the Majority: This fallacy occurs when someone claims that something is true because a large percentage of the population believes it is true.

**Example:** 90% of viewers gave the movie a 5-star rating; therefore, the movie must be good.

**Explanation:** The fact that most viewers rated the movie highly does not mean it is objectively good; it only means that a significant number of viewers liked it. It is a fallacy to claim something as factual based on public opinion alone.

Straw Man: This fallacy occurs when someone exaggerates or oversimplifies the points of an opponent's argument and then attacks an argument that the opponent is not actually making.

**Example:** Person A: "Firefighting is dangerous."

Person B: "So, what? You think firefighting should be banned?"

**Explanation:** While person A stated that firefighting is a dangerous occupation, person A never mentioned that firefighting should be banned. Person B misrepresented person A's argument by insinuating so.

### Practice Problems

Identify the type of logical fallacy in each argument, and explain how the structure or logic is flawed.

1. A new diet is trending on social media, so it must be the most effective way to lose weight.
2. If I need to buy food, I will go to the store. I do not need to buy food; therefore, I will not go to the store.
3. If I am driving a car, then I am in a car. I am in a car; therefore, I am driving a car.
4. If small pets are allowed in an apartment now, then larger pets, or even any kind of pet, will have to be allowed in the future.

## **Solutions**

1. Red Herring (Appeal to the Majority): The number of people who believe or deny something does not make it true or untrue. What would support the argument would be the scientific evidence proving the diet was safe and effective.
2. Denying the Antecedent: It is true that if I need to buy food, then I will go to the store; however, just because I do not need to buy food does not mean that I will not go to the store. I may go to the store to pick up other goods such as clothing.
3. Affirming the Consequent: It is correct that if I am driving a car, then I am in a car; however, just because I am in a car does not mean that I am driving a car. I may be a passenger in the car rather than the driver.
4. Slippery Slope: While this chain of events is possible, there is no logical reason that it must occur.