

Chapter 7: Induction Fallacies

Fallacies of induction: arguments that are supposed to raise the probability of their conclusion, but are so weak as to fail almost entirely to do so.

Generalizations

Generalizing from too few cases (Hasty Generalizations): Arriving at a general statement or conclusion by citing too few supporting cases.

Example: "The food in Toronto is lousy, judging from this meal"

Example: "The hotels in New York are dirty, mine certainly was."

- A single or too few examples shouldn't be used to come to a general statement.
- Just because one meal was bad or that one hotel was dirty doesn't mean that it is like that throughout the whole city.

Another variation of the hasty generalization is called the **fallacy of the lonely fact**.

Example: "The police stopped me for driving five miles over the speed limit. Around here, they'll stop you for anything"

- Just because the police stopped you for driving five miles over the limit isn't sufficient evidence that they will stop everyone for every infraction. You need more than 1 example to come to a conclusion like this.

Another variation of hasty generalization is called **argument by anecdote**. An anecdote is a story.

Example: "Did you read where Nick walked into class and fell asleep right in front of the prof? That's the thing with these white people. They think they can just do whatever they want."

- **A story about Nick is only a story about Nick.** You can't come to the conclusion that all white people think they can just do whatever they want just because of a story about Nick.

Hasty generalization frequently occurs when someone tries to come up with a statement about **all or most members of a population** by offering a statement about a tiny sample of the population.

Example: "People who live in Cincinnati don't know who Akron is; I didn't when I lived there."

- You can't come to a general conclusion about the whole population of Cincinnati just from your experience.

Generalizing from exceptional cases

This is when someone comes to a general statement or conclusion by citing a specific case.

Example: “The police don’t need a warrant if they arrest a suspect during a robbery and search him for a weapon. Therefore, they shouldn’t need a warrant for any kind of search.”

- This person is generalizing about all police searches from a specific case.

Example: “Animals will live longer if they are on a calorie restricted diet. This has been proven with rats.”

- Just because this argument holds with rats, doesn’t mean it’s applicable to every animal. We need more testing to come to such a conclusion.

Another variation of this is called **the fallacy of biased sample** which happens when someone bases a generalization about a large population from a specific or skewed sample.

Example: “Almost everyone in Eric’s math class thinks math sucks. Therefore, most Canadians think math class sucks.”

- The problem isn’t the size of the math class. He could have a class of 100 000 students, but the problem is that people in his class will have their own opinion and their opinion doesn’t reflect all of Canada’s opinion.

Example: “Judging from what car dealers say, most business people now think the economy is improving.”

- You can’t generalize a statement about all business people from what car dealers say. They see the economy from their own perspective, so do bakers and lawyers and construction workers. This would be a biased sample because not one profession reflects the opinion of every profession.

Another variation of this fallacy is **the self selection fallacy** which happens when someone generalizes from a **self selected sample**. A sample whose members are included by their own selection.

Example: “Most people have a favorable view of the president as a person, judging from an online survey conducted by CNN”

- The opinions of people who responded to this survey represents a skewed sample because these people made the decision to participate in the survey. The people who didn’t get a chance to participate in this survey don’t have a voice in this sample.

The fallacy of accident: happens when someone assumes that a general statement applies to a specific case.

Example: “Everyone should have a chance to access a college education. Therefore, anyone who applies to Harvard should be admitted to Harvard.”

Example: “In this country we have the right to free speech. Therefore, if I want to threaten the mayor, it is my right.”

Example: “Ottawa has a very high crime rate, therefore, it will be dangerous to shop in Orleans”

Weak analogy (False analogy): a weak argument based on debatable or unimportant similarities between two or more things.

“My mom is just like Adolf Hitler. I doubt she will let me go out with you guys.”

- There aren’t many similarities between her mom and Adolf Hitler. Just because she won’t let her go out, doesn’t mean she’s a ruthless sociopathic dictator.

“If you knife someone to death, you will be charged with murder. Therefore, if a surgeon kills someone, he should be charged with murder.”

- The difference here is that the surgeon’s error is accidental. If it isn’t, the he/she should be charged with murder.

Fallacious appeal to authority: when someone tries to support an argument by offering as evidence the opinion of the wrong authority.

“My doctor thinks my car has leaking valves. Therefore, my car has leaking valves.”

- What the doctor thinks about cars is irrelevant unless he/she is also a mechanic. If not, we are citing the wrong authority.

Fallacious appeal to common belief: when someone treats an issue that can’t be settled by public opinion as if it can.

Example: “Honda has great mileage. Everyone knows that.”

- To determine if Honda has great mileage, you have to run tests, not ask people what they think.

Example: “Iran has nuclear weapons. Everyone in the world knows this.”

- Whether or not Iran has nuclear weapons can’t be decided by the public. There are organizations that can determine whether or not countries have nuclear weapons but they don’t go around asking for the public’s opinion.

Fallacious appeal to common practice: a variant of the fallacious appeal to popularity.

“This is the right way; it’s the way it’s always been done.”

- If tradition by itself truly justified a practice, then slavery, burning people, hanging people and any other deplorable behavior would have been justified.

Bandwagon fallacy: When someone uses phrases such as “everyone thinks” and other phrases as a psychological ploy to get others to believe what they’re saying.

Example: “Rand Paul has earned your support. Everyone is endorsing him.”

- The speaker wants us to jump on the bandwagon. They’re not actually showing that Rand Paul has earned our support.

Example: “You shouldn’t shop at Walmart. None of us do that.”

- The person isn’t telling us why we shouldn’t shop at Walmart, instead they’re trying to get us to not shop there because nobody shops there.”

Fallacies related to cause and effect

Post Hoc, Ergo Propter Hoc (Post Hoc)

“After this, therefore because of it.”

- We commit this fallacy when we assume that the fact that one event came after another establishes that it was caused by the other.

“After I took Zicam, my cold went away fast. Therefore taking Zicam caused my cold to go away fast.”

Correlation does not prove causation

Overlooking the possibility of coincidence

“After Susan threw out the chain letter, she was in an automobile accident. Therefore throwing out the chain letter caused her to get in an automobile accident.”

- The person is overlooking the fact that this could be a coincidence.

Overlooking a possible common cause

“After I left the lights on when I went to bed, I got a headache the next morning. Therefore, leaving the lights on caused a headache.”

- The person overlooked the possibility of leaving the lights on and waking up with a headache could each be the effects of a common cause, such as having gone to bed unusually tired or intoxicated.

Overlooking the possibility of random variation

If we overlook the fact that values of variables fluctuate randomly then we are committing this fallacy.

- For example, the average distance that one group of men can throw a football varies randomly from the average distance another randomly selected group of men can throw a football. It could even vary from the same group if we run the test for a second try.

Example: “We ran a test where we got 5 men to hit a golf ball as far as possible. We then got them to take their socks off on the second try and on their second try, the men hit the ball 15 yards further than their first try. Therefore, playing golf with your socks off will increase the distance of your hit.”

- By saying that, we are committing this fallacy. Data varies randomly and we have to take that in

Overlooking the possibility of regression

We make this mistake when we ignore the fact that **if the average value of a variable is atypical on one measurement, it is likely to be less atypical on a subsequent measurement.**

- If the average distance that the 5 men hit on the first try is distant from the average, it is most likely going to be closer to the average on the second try.

Example: “The girls shot way below the average last game. So I made them do 100 pushups and their average was much better the next game.”

- Even if the coach had given them ice cream, their numbers would improve the next game because the results approach the average the more they play.

Let's say the girls shot 60% from the free throw line and their average is usually 70%. The average is bound to go up because 60% is atypical. That doesn't mean they're gonna shoot 70% right away on their next try. They could shoot 63%, 64% even 77% because data varies randomly but the more times they shoot, the closer the average reaches 70% which is the typical average.

Cum Hoc, Ergo Propter Hoc (Cum Hoc)

“With this, therefore because of it.”

- This fallacy is committed when we assume that because two events happen at the same time establishes that one caused the other.

“John had a heart attack while he was saying a prayer. Therefore the prayer caused the heart attack.”

- Just because two unusual events happened at about the same time doesn't mean that one caused the other.

Always remember that correlation does not prove causation.

Overlooking the possibility of coincidence

Simply ignoring the fact that two things happening at the same time may be coincidental

“I got cancer when I lived under a high-voltage power line. Therefore the high-voltage power line caused my cancer.”

Overlooking a possible common cause

“Chimney fires and long underwear purchases increase in frequency at the very same time. Therefore chimney fires cause people to buy long underwear.”

- We're ignoring that these two events could very well be the effects of a common cause, the weather turning colder.

Overlooking the possibility of reversed causation

Example: "Successful businesspeople often drive expensive cars."

- Therefore driving an expensive car will help make you a successful businessperson.

The person has overlooked the fact that driving an expensive car is the **result** of being successful, not a **cause** of it.

Argument by anecdote

Trying to support or disprove a cause and effect claim by telling a story.

"Doctors claim that eating red meat daily increases your risk of heart disease but I don't believe it. My uncle was a rancher who ate meat 3 times a day. He didn't die of a heart attack. He died when he fell down a well."

- A single story like this doesn't establish the presence or absence of causation.

Slippery slope

An argument that rests on an unsupported warning that is controversial and tendentious, to the effect that something will progress by degrees to an undesirable outcome.

Example: "We should not require gun owners to carry liability insurance, because if we do that, before long they will repeal the Second Amendment."

"Electing that man to be president will bankrupt the country within two years."

Untestable Explanation

When someone offers an explanation that could not be tested even in principle, he or she is said to commit this fallacy.

"He has had heart issues because of the sins he has done in a previous life."

- There is no way to test this.

"The crime rate has gone up because of general moral decay."

- This argument can't be tested and it is too vague. We don't know what moral decay is.

Chapter 8: Formal Fallacies and Fallacies of Language

Affirming the consequent

General form of this type of argument

If P then Q

Q

Therefore, P

P is the **antecedent**

Q is the **consequent**

When we assume the consequent, we are committing this fallacy.

Example: If this dog is pregnant, then it is a female

The dog is female

Therefore, the dog is pregnant

This here is an invalid argument.

Denying the antecedent

If P then Q

Not P

Therefore, not Q

Example: If Sandy passed the final, then she passed the course.

Sandy did not pass the final.

Therefore, Sandy did not pass the course.

The Undistributed middle

This happens when someone assumes that 2 things related to a 3rd thing are also related to each other.

“All cats are mammals

All dogs are mammals

Therefore all cats are dogs.”

X is a Z

Y is a Z

Therefore X is a Y

Equivocation (makes use of semantic ambiguity) occurs when a sentence contains a word or phrase that is open to more than one interpretation (bank).

Example: All banks are alongside rivers, and the place where I keep my money is a bank.

Therefore the place where I keep my money is alongside a river.

Amphiboly (makes use of syntactic ambiguity)

Example: If you want to take the motor out of the car, I'll sell it to you cheap.

- The sentences structure does not make it clear enough whether “it” refers to the motor or the car.

Composition occurs when a feature of the parts of something is wrongly attributed to the whole.

Example: The public thinks highly of Obama. Therefore, the public thinks highly of the white house as a whole.

Division is the same as composition but going the other direction.

Example: "During the recent recovery my financial portfolio gained considerably in value. Therefore microsoft stock, which is my portfolio, gained considerably in value."

- Just because your portfolio as a whole did well, doesn't mean that the Microsoft stock itself did well

Confusing explanations with excuses

A pair of claims that are exact opposites of each other are **contradictories**.

Two claims that cannot both be true but can both be false are not exact opposites are **contraries**.

Consistency and inconsistency: consistency in one's belief is a requirement of rationality, but the inconsistency of a person (in changing from one belief to another inconsistent with the first) does not impugn either the previously held belief or the current one.

Incorrectly combining probabilities: failing to realize that the probability of several independent events is determined by multiplying the probabilities of the various events.

Example: Since there are six sides on a die, the chances of rolling a 1 are 1 in 6. Therefore, the chances of rolling two of them in a row are 1 in 36.

Gamblers Fallacy: believing that past performance of independent events will have an effect on future events.

Example: The last three coin flips have been heads, so the next flip is more likely to come up tails.

$\frac{1}{2} \frac{1}{2} \frac{1}{2}$ keep in mind that there's a 50% chance that the coin could land on any side so the last 3 coin flips have nothing to do with the next one. The odds are still $\frac{1}{2}$.

Overlooking prior probabilities: failing to take into consideration the likelihood of an event all other things being equal, that is, its likelihood apart from any outside influences.

Example: Bill is the best football player in our high school, and Hal is the best hockey player in our high school. So it appears that Bills chances of becoming a professional football player and Hals chances of becoming a pro hockey player are equally good.

- What is overlooked is the prior probability of someone's becoming a professional football player is much greater than the prior probability of someone becoming a pro hockey player.

Overlooking false positives: when deriving the proportion of Xs, failing to take into consideration the proportion of non Ys that are Xs.

Example: Ten percent of the people living in Hayfork have come down with a stomach ailment, and most of these people ate vegetables from Olsen's stand in the public market. It seems wise to steer clear of Olsen's stand.

- He is overlooking the percentage of people who did not fall ill who ate from Olsen's stand.