Chapter 7: Inductive Fallacies

Please read through the following passage: "First you arrange things into groups. Of course one pile may be enough, depending on how much there is to do; but some things definitely need to be separated from the others. A mistake here can be expensive; it is better to do too few things at once than too many. The procedure does not take long; when it is finished, you arrange the things into different groups again, so that they can be put away where they belong."

This is an account of doing laundry. I'm guessing for most, if not all of you, it didn't click while you were reading the passage. Either way, what happened when your mind went from not knowing what was going on in the passage to knowing, that is an example of *understanding*. I am telling you this because if you can get the fallacies to click in the same way, you will be in good shape for the assessment. When you look at and practice with enough fallacies (as I hope you will have done after doing the homework), eventually they should start to click.

Recall that we just finished discussing relevance fallacies, in which the premise is not relevant to the conclusion. Now we are discussing inductive fallacies, in which the premise does not adequately support the conclusion, though it may still be relevant. But before getting into the specific inductive fallacies, a word of caution.

A Word of Caution

The assessment will contain questions on both relevance and inductive fallacies. However, as is the case on the homework, the passages in some questions may not contain any fallacies. It's therefore important for you to be able to see the difference between a fallacy and an argument. But remember, the difference between a fallacy and an argument can sometimes be subtle. For example, if I feel pity for

someone's situation, it might be seen as a justification for being nicer to that person; that would be an argument. But if my feeling pity for someone leads me to conclude that they are good at something or right about something, then that is *not* an argument. Pity might be relevant to my treatment of another person, but not to quality or truth. Make sure you appreciate subtleties like this for the assessment.

Hasty Generalization

I already covered the hasty generalization in chapter 4, but let's look at it again and in more depth. Hasty generalizations are basically bad sample arguments. If I take one rotten apple out of a barrel of 100 apples, and I conclude that the last 99 are rotten too, that might be seen as a hasty generalization. I didn't take enough apples out of the barrel to draw such a confident conclusion about the rest of the apples. But if I take 50 apples out of the barrel, and I conclude the last 50 are rotten, then my sample size is large enough to support my conclusion (remember that a good inductive argument doesn't have to prove the conclusion, just support it). So a hasty generalization basically contains a *small sample*.

A variation on this fallacy is *anecdotal evidence*. This one can be counterintuitive, because personal stories can be very powerful. But we can't forget that a personal story is just that: a single, isolated story. One person's story may not match the experiences of other people and may therefore not be generalizable. Again, though, it really comes down to the conclusion one draws from the premises. If the conclusion is overdrawn, it's a fallacy. It not, it might still be an argument.

People often draw conclusions from religious/spiritual experiences. But what conclusions do they draw? If my friend tells me that he just meditated in the forest for a week straight and that the experience showed him that Allah (the Muslim God) is the one true God, then he

has committed the anecdotal evidence fallacy. His conclusion is not proportional to the evidence, since he is suggesting that something is *actually the case* (that God *actually exists*) as a result of only his personal story. But, if his conclusion from his spiritual experience is only that he learned a lot about himself, then this is more reasonable, though we might still say his argument is weak and ask for clarification of his premises.

It's instructive to consider that, when something really matters to us, we want more than anecdotal evidence. If I want to know whether Big Foot really exists, I'm going to need more than a few personal stories from Big Foot enthusiasts. If I want to know whether broccoli is good for me, I better have scientific studies, not just my cousin's experience eating broccoli. Although, as noted below, even scientific studies can lead us to fallacious reasoning in some cases.

Generalization from an Exceptional Case

Whereas a hasty generalization uses a *small sample* to draw a conclusion, a generalization from an exceptional case uses a *biased sample*. If I want to be a famous rapper, I might cite the case of someone like Eminem as evidence that I can succeed. After all, I might argue, *he* succeeded, so why can't I? He went from rags to riches, so why can't I? There's nothing wrong with being confident in one's abilities, but we should also be honest about the conclusions we're drawing (if we want to be good critical thinkers). Eminem's case is an exception, it's unusual. Statistically speaking, most people do not go from rags to riches. So using Eminem's case as a premise in my argument is in fact not an argument at all, but the exceptional case fallacy.

A variation on this fallacy is *self-selection*. Sometimes news organizations fall prey to this sort of bad reasoning. In chapter 5, I

provided evidence that the media is biased on all sides. That being said, sometimes Fox News has particularly poignant examples of bias. During the 2008 Vice Presidential Debate between Sarah Palin and Joe Biden, Fox News had a viewer opinion poll on who was winning the debate. Unsurprisingly, according to the Fox News poll, over 3/4 of viewers thought Palin was winning (in contrast to just about every other opinion poll out there at the time).[1] Fox News already leans to the political right, so this is a self-selection fallacy—they selected a sample for their poll that would concur with the opinion they wanted. Of course Fox viewers would think the Republican candidate Palin was winning, but that doesn't mean that she *was* winning, or even that most Americans thought she was winning.

Similarities Between Hasty Generalization and the Exceptional Case

After reading about the previous two fallacies some of you have likely noted that they are pretty similar, making it confusing to tell the difference between the two. This confusion is heightened by the fact that there are variations to each fallacy. And to add insult to injury, sometimes a passage can be characterized as *both* a generalization from an exceptional case and a hasty generalization. For example, if I use one rotten apple to draw a conclusion about the entire barrel of apples, not only is the sample biased (since it's rotten) but it's also too small (since it's only one apple).

Thankfully, I will not be grading you on your understanding of the specific differences between these two fallacies when you explain your answers on the assessment. As long as you recognize that there is some error in generalizing and you explain your answer well, you will get the

[1] It's interesting to note that even many Trump supporters believed that he lost most of the 2016 presidential debates to Hilary Clinton. Nevertheless, apparently that loss didn't persuade these supporters to vote for Clinton.

full points. That being said, you should understand the *basic* difference between the hasty generalization (too small) and the exceptional case (too biased).

Accident

The accident fallacy is kind of the opposite of the generalization from an exceptional case. The accident happens when we assume that a general claim might apply to a specific, unusual case to which it doesn't apply. So rather than generalize inappropriately, the accident specifies inappropriately. The 2nd Amendment grants Americans the right to bear arms. But if I take that general right and use it as a justification for a specific action to which it doesn't apply, then it's an accident fallacy. Imagine, for example, that I say the following: "I have the right to bear arms. So if I want to point a gun at a police officer, I should have the right to do so." It should be obvious that pointing a gun at a police officer is not implied by our right to bear arms. In the passage I took a general principle and applied it inappropriately to a specific case.

Weak Analogy

Have you ever heard someone make a ridiculous comparison between two things that you felt the need to challenge? Maybe your friend unfairly compared the work you do at your job to the work she does at her job, or maybe in a political discussion your friend compared Obama or Trump to Hitler. Sometimes people compare things that, really, aren't comparable. As you know, the point of a good argument by analogy is to make an adequate or good comparison between two things. But if that comparison is not good enough, then you have a weak analogy fallacy on your hands.

Let's take an obvious example to make this as clear as possible. Consider the following passage: "Going to Southwestern College is like being in prison. After all, both the campus and the prison are buildings

constructed by humans." This failed argument might as well have said that both the campus and the prison exist on earth—this similarity and the one given in the passage are so inadequate that they tell us nothing about the things being compared. So the passage is a weak analogy.

But do note that the strength of some arguments by analogy is highly debatable: in chapter 4, I gave the example of the argument by design, which many theologians continue to use, and many others continue to critique. Recall that David Hume critiques the argument because, among other things, he doesn't think God-creation and human-creation can be legitimately compared. In other words, Hume considers the argument to be a weak analogy.

Untestable Explanation

In both chapters 1 and 4, I mentioned that some claims are difficult to assess in that they require clearer definitions of terms or clearer formulations of ideas (terms like "God," for example, are not always clearly defined). If someone attempts to present an argument where the terms and ideas are not clear enough, it might be an untestable explanation. Consider the following passage: "Charlene is good at helping people because she gives off such good vibes." What are "good vibes?" If we don't know what the speaker means by "good vibes," (or even "helping people") it's hard to know how we could ever know if the claim in the passage is true. Ergo, it's an untestable explanation. What would it take to make the passage testable? Well, if we defined "good vibes" as particular physiological markers in Charlene's body chemistry, then we'd be on the right track.

Equivocation

Continuing with the theme of unclear language, we now turn to the equivocation fallacy. This fallacy happens when a speaker uses a term two times in their argument, but slides from one definition of that same term to another. Since the speaker truly uses two definitions, but they claim to be using one, their argument becomes fallacious once the

disparity in definition is brought to light. For example, I was at an academic senate meeting once where we were discussing the topic of discrimination in hiring practices. Naturally, most agreed that discriminating against people for the wrong reasons (like sex or race) is wrong. But one senator argued that discrimination is ok, because, after all, when we hire someone, we "discriminate" against those without the right job qualifications. What this senator didn't make clear in his argument is that he was sliding from *unfair discrimination* to *fair discrimination*—that is, he was using the equivocation fallacy by not adequately defining the term "discrimination" in his argument.

Another common example of this fallacy revolves around the word "theory." Consider the following attempted argument: "I don't know why they say we should believe the theory of evolution. After all, it's only a theory." The speaker here slides between the definition of theory in science and the common definition of theory. A theory in science requires rigorous testing, peer review, and more. But a common theory only requires, for example, one person's non-expert opinion. Thus, to dismiss evolution as a theory equivocates on the very definition of that term.

Slippery Slope

My father told me once about something my grandmother (his mother) used to do when he was growing up. Anytime one of her sons would catch a cold, she'd assume the worst. She'd say, "Now that Bobby's got a cold, he's going to get pneumonia, then he's going to go to the hospital, then we'll be attending his funeral." Now this is my interpretation of what my father told me, but the point is that my grandmother always thought one thing would lead to another, and that thing would lead to a worse thing, and so forth.

This sort of thinking is what's known as a slippery slope fallacy. It's a fallacy because there is usually no reason to think that the chain of events given will occur. Typically, the first event is something simple, but then the ending event is something drastic: "If you start smoking,

then you're going to start drinking. If you start drinking, then you're going to get into harder drugs. If you get into harder drugs, you're going to get into heroine. If you get into heroine, then you'll be addict and you won't be able to function in society."

Notice that, in some cases, there are reasons to accept that one event will lead to another. So the form of the typical slippery slope is not always a fallacy; it's the content that makes it a fallacy. If I told you that eating too much sugar might lead you to get diabetes, that is not a slippery slope fallacy since there *is* a connection between high sugar consumption and diabetes.

Notice also that the slippery slope seems to have a deductive form. After all, it says that if A leads to B, and B leads to C, then A will lead to C. But remember that part of determining whether an argument is inductive or deductive comes down to the intentions of the speaker. Thus, we are assuming that with the slippery slope fallacy, the speaker is not intending to prove her conclusion; instead, she is stipulating that there is a highly likely relationship between the events being described. For these reasons, the slippery slope is still classified as an inductive fallacy.

False Cause (or correlation is not causation)

I'm going to begin the discussion of this very, very common fallacy with an important point: as humans, we suck at understanding causes. Whether we use the term "cause" or not, our daily lives are filled with claims about causality. I might wonder why my friend is being so rude today; is it because she had another fight with her significant other? I might wonder why my stomach hurts; is it because of the fish I ate last night? I might wonder why I didn't do as well as I wanted on my philosophy assessment; is it because I didn't study enough, or because the material is difficult?

Often we assign a cause in cases where we can't possibly be sure what the cause is, or where there may be multiple causes of a given phenomenon. For example, I might conclude that the fish is what caused

my stomach to hurt, but for all I know it was the fish *and* the four beers I had at dinner *and* the fact that I didn't sleep much.

Sometimes we assume that one thing caused another simply because they happen around the same time, or simply because the two things are correlated in some way. But *correlation is not causation*, which is the broad fallacy being discussed here, also known as the false cause. It's important to note that correlation can *imply* causation. Many scientific experiments are based on correlations between variables (known as correlational experiments).[2] If two variables are correlated again and again in experiment after experiment, it's reasonable to suggest that they may be causally related. However, there *are* experiments that explicitly try to establish causation that are *not* correlational; these are randomized, controlled experiments, where not only are subjects in the study randomized, but all other variables aside from the one being tested are controlled (meaning that they can't influence the variable being tested).[3]

Many of the debates in health, even among experts, come down to differing interpretations of studies and their methodologies. Don't forget that correlations can imply causation, but they can never establish/prove causation. Some science journalists like Gary Taubes argue that much of the health research we currently accept to be true is based on shoddy research, sometimes on correlations alone.[4] For example, an oft-cited study on the supposed detrimental effects of meat eating is The China Study.[5] However, there are more recent studies suggesting that it's not red meat per say that's the problem, but *processed* red meat.[6] The

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[2] For an overview of how correlational studies work, see: Cherry, K. (2016, May 11). Correlational studies [from *Verywell*]. Retrieved from https://www.verywell.com/correlational-research-2795774.

[3] For an overview of how controlled experiments work, see the Wikipedia entry: Randomized control trials. (n. d.). In *Wikipedia*. Retrieved July 19, 2016, from https://en.wikipedia.org/wiki/Randomized_controlled_trial

[4] Taubes, G. (2011). *Why We Get Fat*. New York, NY: Anchor.

[5] The study is recounted and elaborated on by the original authors in their book: Campbell, T., & Campbell, T. C. (2006). *The China Study*. Dallas, TX: BenBella Books.

[6] Binnie, M. A., Barlow, K., Johnson, V., & Harrison, C. (2014). Red meat: Time for a paradigm shift in dietary advice. *Meat Studies, 98*(3), 445-451.

situation with health is complicated, and the more we conduct research the more we learn. So with health especially, it is worth keeping an open mind and being opened to changing our minds as new research comes in.

But anyway, the correlation is not causation fallacy is only a fallacy if we say that correlation *establishes* causation, it's not a fallacy if we say that a correlation *implies* causation. Sometimes this fallacy gets divided up into two major areas, designated by the Latin phrases *post hoc, ergo propter hoc* and *cum hoc, ergo propter hoc*. The former suggests that just because two things happen around the same time, it does not mean one caused the other; while the latter suggests that just because one thing happened before the other, it does not mean one caused the other. For the purposes of this class, I will refer to both of these under the general fallacy of false cause/correlation is not causation. Still, there are additional variations on this fallacy. There are a few specific ways that we can fail to see that one thing did or does not necessarily cause the other.

Regression to the Mean

Anyone who studies statistics knows that with a given set of data, averages (or means) emerge. To just take one area in which statistics are important, these averages are what distinguish the best players in sports. Lebron James is seen as one of the greatest basketball players of all time, in part due to his impressive averages regarding defense and offense.

Let's say Lebron has a bad game where he doesn't perform very well. Let's say that after the game, the coach gives him a pep talk about his performance. And let's say that in the next game Lebron's performance improves significantly. If this happens, the coach might conclude that his pep talk is what caused Lebron to improve. But the coach would be overlooking a possible regression to the mean. Since Lebron did poorly the game before, statistically speaking he was likely to do better and "regress" to his mean/average performance. The pep talk, in fact, may have had no effect whatsoever.

Overlooking Random Variation

Just as individual performances fluctuate above and below the mean, sometimes events simply fluctuate randomly. If we assign a cause to some event when it was likely just a random variation, then we have committed this fallacy. Consider the following passage: "Jason did really bad on his last math test. But then I gave him this energy drink and he got a B on the next test. Must be the energy drink." Or, it could have simply been random variation.

Overlooking a Common Cause

Sometimes causal chains of events are complicated. We might think that one thing caused another thing, when in fact we are overlooking a deeper, common cause of both events. Consider the following passage: "Every time my mother yells at my father, there are empty wine bottles in the recycling bin. It must be that my father gets angry that there are so many bottles, and consequently yells at my mom." Or, there is a common cause: the speaker's father's drunkenness was the cause of the empty bottles *and* his yelling.

Overlooking Coincidence

Consider the following passage: "After Janet acted like a bitch to me she got a speeding ticket. Karma." Or, there is no causal relation, and her getting a ticket is just a coincidence.

Appeal to Authority

When we discussed credibility, we talked a bit about authority. As always, it's important to be able to see the difference between a legitimate use of authority and an illegitimate use. As you can guess, it's a fallacy when the use is not legitimate.

If I am giving a lecture on theoretical physics, and I cite Stephen Hawking to support one of my points about, say, black holes, then that is a legitimate use of the authority of Stephen Hawking. Why? Because the

topic under discussion is directly relevant to Hawking's area of expertise. But if I were giving a debate on Christian theology, and I cited Hawking, then this would be an appeal to authority fallacy. Hawking has no expertise in Christian theology. The authority we cite must be relevant to the topic we are discussing.

Of course there are even more egregious appeals to authority. Sometimes pride or personal connections get in the way. Someone might assume that his father, whom that person greatly respects, is an authority on everything. But no single person can be an authority on everything. And as we learned from Socrates, true wisdom comes from admitting the things we do not know, not from claiming to know it all.

Sources can also be inappropriately appealed to for authority. In chapter 4, I mentioned that the Bible may or may not be an authoritative source, depending on the question being asked. To take a similar example, consider the following passage: "The great Buddhist text, the Lotus Sutra, claims that anyone can become enlightened. So anyone can, in fact, become enlightened." In the same way that appealing to the Bible as support for Jesus being the son of God is an appeal to authority fallacy, this passage appeals inappropriately to a Buddhist holy book. Just as the writers of the Bible already believed in the divinity of Jesus, the writers of the Lotus Sutra already believed that anyone can be enlightened. If they are interested parties to this extent, then their sources cannot be legitimately authoritative.

Appeal to Popularity

Many of us are familiar with the phrase: "If everyone jumped off of a bridge, would you?" Typically, parents give this line to their kids when their kids say things like, "Everyone else at school has got the Nintendo Switch, so why can't I have it?" With the bridge statement, the parent is saying that the fact that everyone does something doesn't mean you should do it. This is essentially the popularity fallacy, which happens when we accept a claim just because everyone else accepts it. It's pretty clear why this is a fallacy. It was once widely accepted that the earth is

the center of the solar system. The fact that many people believed it did not make it true.

Major Ideas for Inductive Fallacies

Although anything from the readings or homework might appear on the assessments, the following **major ideas** should be clearly understood. In this case, the major ideas are fallacies with their specific variations included, if any.

- Hasty generalization
    - Anecdotal evidence
- Generalization from an exceptional case
    - Self-selection fallacy
- Accident
- Weak analogy
- Equivocation
- Untestable explanation
- Slippery slope
- False cause (correlation is not causation)
    - Regression to the mean
    - Overlooking random variation
    - Overlooking a common cause
    - Overlooking coincidence
- Appeal to authority
- Appeal to popularity