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The process of thinking about something, in a rational manner, so as to draw valid conclusions, is known as Reasoning. It is a daily activity that we use to make decisions, which involves the construction of thoughts and converting them into a proposition to give reasons on why we have opted for a particular alternative over the other. Reasoning (logic) can take two forms - inductive reasoning or deductive reasoning. The inductive reasoning follows a particular flow or behaviour so as to make inferences. Conversely, deductive reasoning uses available information, facts or premises to arrive at a conclusion. These two logics are exactly opposite to each other. Still, they are often juxtaposed due to lack of adequate information. In this article, we are going to tell you the basic differences between inductive and deductive reasoning, which will help you to understand them better.

Content: Inductive Reasoning Vs Deductive Reasoning Comparison Chart Definition Key Differences Video Conclusion Comparison Chart Basis for Comparison Inductive Reasoning Deductive Reasoning Meaning Inductive Reasoning connects the argument in which the premises give reasons in support of the probable truth of the conjecture. Deductive reasoning is the fundamental form of valid reasoning, wherein the premises give guarantee of the truth of conjecture. Approach Bottom-up approach Top-down approach Starting point Conclusion Premises Based on Patterns or trends Facts, truths and rules Process Observation > Pattern > Tentative Hypothesis > Theory Theory > Hypothesis > Observation > Confirmation Argument May or may not be strong May or may not be valid. Structure Goes from specific to general Goes from general to specific Draws inferences with Probability Certainty Definition of Inductive Reasoning In research, inductive reasoning alludes to the logical process, in which specific instances or situations are observed or analysed to establish general principles. In this process, the multiple propositions are believed to provide strong evidence, for the truth of the conclusion. It is used to develop an understanding, on the basis of observing regularities, to ascertain how something works. These are uncertain arguments; that describes the extent to which the conclusions drawn on the basis of premises, are credible. In inductive reasoning, there are certain possibilities that the conclusion drawn can be false, even if the all the assumptions are true. The reasoning vests on experience and observations that support the apparent truth of the conclusion. Further, the argument can be strong or weak, as it only describes the likelihood of the inference, to be true. Definition of Deductive Reasoning Deductive Reasoning means a form of logic in which specific inferences are drawn from multiple premises (general statements). It establishes the relationship between the proposition and conclusion. When all the proposed statements are true, then the rules of deduction are applied and the result obtained is inevitably true. Deductive logic is based on the fundamental law of reasoning, i.e. if X then Y. It implies the direct application of available information or facts, to come up with new information or facts. In this, the researcher takes into account a theory and generates a hypothesis, which can be tested, after that the observation are recorded, which leads to particular data, which is nothing but the confirmation of validity. The points provided below, clarifies the difference between inductive and deductive reasoning in detail: The argument in which the premises give reasons in support of the probable truth of the conjecture is inductive reasoning. The elementary form of valid reasoning, wherein the proposition provide the guarantee of the truth of conjecture, is deductive reasoning. While inductive reasoning uses the bottom-up approach, deductive reasoning uses a top-down approach. The initial point of inductive reasoning is the conclusion. On the other hand, deductive reasoning starts with premises. The basis of inductive reasoning is behaviour or pattern. Conversely, deductive reasoning depends on facts and rules. Inductive reasoning begins with a small observation, that determines the pattern and develops a theory by working on related issues and establish the hypothesis. In contrast, deductive reasoning begins with a general statement, i.e. theory which is turned to the hypothesis, and then some evidence or observations are examined to reach the final conclusion. In inductive reasoning, the argument supporting the conclusion, may or may not be strong. On the contrary, in deductive reasoning, the argument can be proved valid or invalid. Inductive reasoning moves from specific to general. Unlike, deductive reasoning moves from general to particular. In inductive reasoning, the inferences drawn are probabilistic. As opposed, in deductive reasoning, the generalisation made are necessarily true, if the premises are correct. Video: Inductive Vs Deductive Reasoning Conclusion To sum up, inductive and deductive reasoning are the two kinds of logic, which are used in the field of research to develop the hypothesis, so as to arrive at a conclusion, on the basis of information, which is believed to be true. Inductive reasoning considers events for making the generalization. In contrast, deductive reasoning takes general statements as a base to arrive at an particular conclusion. FAQs Deductive reasoning involves drawing specific conclusions based on general principles or premises that are accepted to be true. For example, all pigs have snouts. Hamlet is a pig. Therefore, Hamlet has a snout. Inductive reasoning, on the other hand, involves reaching general conclusions based on specific observations. An example of inductive logic is the first two pigs in the barn are pink, therefore, all pigs in the barn are pink. How can trial and error be used effectively for problem-solving? Trial and error can be an effective problem-solving strategy when you're dealing with unknown variables. Without any systematic approach, one can arbitrarily test different variables or conditions and observe patterns or results that may lead to a solution. For example, someone could arbitrarily listen to different types of music to determine one they might enjoy. What is the role of algorithms in problem-solving? An algorithm is a step-by-step procedure to solve a problem or complete a task. An algorithm might be a series of tests or procedures applied systematically. Using an algorithm may help to ensure consistent results and reduces the likelihood of missing critical information or making errors in the identification process. How can functional fixedness and mental set hinder problem-solving? Functional fixedness is the inability to see alternative uses for an object or tool, while mental set is the tendency to continue solving a problem using a familiar approach even when it's no longer the most efficient or effective method. Both of these cognitive biases can hinder problem-solving by limiting creativity and flexibility in approaching new challenges or unfamiliar scenarios. Overcoming functional fixedness and mental set involves practicing divergent thinking, considering different perspectives, and remaining open to alternative solutions and ideas. Skip to main content Reddit and its partners use cookies and similar technologies to provide you with a better experience. By accepting all cookies, you agree to our use of cookies to deliver and maintain our services and site, improve the quality of Reddit, personalize Reddit content and advertising, and measure the effectiveness of advertising. By rejecting non-essential cookies, Reddit may still use certain cookies to ensure the proper functionality of our platform. For more information, please see our Cookie Notice and our Privacy Policy. Have you enjoyed detective shows? You may have noticed how detectives analyze evidence to identify suspects, using logical reasoning. In science, we also use logical reasoning to explain natural phenomena. So, what's the contrast between deductive and inductive reasoning? Read on to discover the key differences. Scientists Use Logical Reasoning Scientists utilize careful planning, creative thought, and logical deduction to explore and understand natural occurrences. The scientific method encompasses several steps, including observation, problem identification, hypothesis formulation, experimental testing, and concluding. These findings are then communicated within the scientific community, with hypotheses that withstand testing potentially evolving into theories. Logical reasoning plays a crucial role throughout this process, guiding scientists in their quest for knowledge and understanding. Through rigorous experimentation and analysis, scientists aim to uncover the underlying mechanisms behind natural phenomena. As data is collected and theories refined, the scientific community collectively advances its understanding of the world. Logical reasoning serves as the backbone of scientific inquiry, facilitating the formulation of hypotheses, interpretation of results, and refinement of theories over time. READ ALSO: How To Tell Time Without Using Clocks Deductive Vs. Inductive Reasoning There are two different types of logical reasoning, namely deductive and inductive reasoning. Deductive Reasoning Deductive reasoning, or deduction, relies on general principles to derive specific conclusions. When the premise is true—such as “all spiders have eight legs”—deductive reasoning leads to valid conclusions. For instance, because tarantulas belong to the spider family, deducing that they also possess eight legs is logical. In the scientific method, deduction is crucial for testing hypotheses and theories, which make predictions based on established principles. Sylvia Wassertheil-Smoller, a researcher at Albert Einstein College of Medicine, explains that scientists move from theories to observations, building upon existing knowledge to formulate hypotheses and theories, which are then subjected to empirical testing. Deductive reasoning typically follows a structured format, often employing syllogisms where two premises—major and minor—lead to a logical conclusion. However, the reliability of deductive conclusions hinges on the accuracy of the premises; if the premises are false, the deductions will be inaccurate, as demonstrated by examples like “All bald men are grandfathers. Harold is bald. Therefore, Harold is a grandfather.” Inductive Reasoning Inductive reasoning, also known as inductive logic or inference, extrapolates general conclusions from specific observations. Unlike deductive reasoning, which starts from a general premise to arrive at a specific conclusion, inductive reasoning operates in reverse, building hypotheses from observed patterns. In science, researchers employ both inductive and deductive reasoning to gradually approach verifiable truths. Inductive reasoning involves making numerous observations, identifying patterns, and formulating generalizations or theories. However, the reliability of conclusions drawn through inductive reasoning depends on the comprehensiveness of the observations; for example, inferring that all coins in a bag are pennies based on a few observations may not hold if additional coins turn out to be different denominations. Despite its potential limitations, inductive reasoning plays a crucial role in the scientific method by generating hypotheses and theories. Scientists then use deductive reasoning to apply these theories to specific contexts, ensuring a systematic approach to scientific inquiry. RELATED ARTICLE: Basic Logic Help Monkeys in Decision Making, According to Study Check out more news and information on Human Behavior in Science Times. Home | Biology | Inductive vs Deductive Reasoning: What's the Difference? August 24, 2023 The main difference between inductive and deductive reasoning is the direction of the inference. Inductive reasoning moves from specific observations to a general conclusion, while deductive reasoning moves from a general rule to a specific conclusion. Also learn Examples of Deductive Reasoning & Examples of Inductive Reasoning Here are the main differences between Inductive And Deductive Reasoning: Inductive Reasoning Deductive Reasoning Moves from specific observations to a general conclusion. Moves from a general rule to a specific conclusion. The conclusion is probable, not certain. The conclusion is certain if the premises are true. Often used in science to make generalizations. Often used in mathematics and logic to prove theorems. Here's a simple way to remember the difference between inductive and deductive reasoning: "IN-ductive goes from specific to general, like zooming OUT. DE-ductive goes from general to specific, like zooming DOWN." To break it down: Inductive: "IN" -> Think of "zooming out" from specific observations to a general conclusion. Deductive: "DE" -> Think of "zooming down" from a general rule to a specific conclusion. "IN-ductive goes from specific to general, like zooming OUT. Example: You notice several swans, all white. You conclude: All swans might be white. (Specific observations -> General conclusion) DE-ductive goes from general to specific, like zooming DOWN. Example: All mammals have fur. Dolphins are mammals. You conclude: Dolphins must have fur. (General rule -> Specific conclusion)" Inductive Reasoning Premise: Every swan I have seen is white. Conclusion: Therefore, all swans are white. This is an example of inductive reasoning because it moves from specific observations (all the swans I have seen are white) to a general conclusion (all swans are white). The conclusion is probable, not certain, because it is possible that I have not seen all the swans in the world. Deductive Reasoning Premise: All triangles have three sides. Premise: This shape has three sides. Conclusion: Therefore, this shape is a triangle. This is an example of deductive reasoning because it moves from a general rule (all triangles have three sides) to a specific conclusion (this shape is a triangle). The conclusion is certain because it follows logically from the premises. Difference Between In Biology Skip to main content Reddit and its partners use cookies and similar technologies to provide you with a better experience. By accepting all cookies, you agree to our use of cookies to deliver and maintain our services and site, improve the quality of Reddit, personalize Reddit content and advertising, and measure the effectiveness of advertising. By rejecting non-essential cookies, Reddit may still use certain cookies to ensure the proper functionality of our platform. For more information, please see our Cookie Notice and our Privacy Policy. Whether you realize it or not, you make about a gazillion decisions a day. Do you need a coat today? What should you make for dinner? How should you respond to that text message? Does it even need a response? Thankfully, our brains are problem-solving machines. They take in information, store it and use it later to help you make (mostly) reasonable decisions. Over and over and over again. All day. Every day. Our brains come to decisions using several different forms of logic, including two of the most well-known types of reasoning: inductive and deductive. They're thought patterns that help us make sense of the world and take action accordingly. But it's not always a perfect system. Because we humans aren't perfect beings (though the perfectionists among us may not like to admit it.) What's the difference between inductive vs. deductive reasoning? And what do they have to do with your well-being? Health psychologist Grace Tworek, PsyD, explains the ways our reasoning can lead us to some less-than-reasonable conclusions. Inductive vs. deductive reasoning Logic and reasoning are core parts of the human experience. And how people make decisions and come to conclusions are complex and individualized processes. Some experts describe a handful of different types of reasonings. Others theorize there are dozens of ways that people come to make decisions. Two of the most basic forms of reasoning are inductive and deductive. And they can play a big part in constructing your worldview and influencing the choices you make. What's the difference between inductive and deductive reasoning? At their core: Inductive reasoning: Allows you to reach a conclusion based on a specific observation. Deductive reasoning: Allows you to reach a conclusion based on a generalized premise. We all use inductive and deductive reasoning all the time. There's nothing "wrong" with either. Neither is "better" than the other. But when your reasoning is based on shaky foundations, your conclusions are more likely to lead you to less-than-fully-formed decisions. And that can impact your physical and mental well-being. Let's look at some examples to better understand inductive and deductive reasoning. How inductive reasoning works Conclusion based on a specific observation: "When you use inductive reasoning, you're essentially making an educated guess," Dr. Tworek shares. "You're using your past experiences and knowledge to predict what's likely to happen and take action based on that prediction." Consider these examples: Observation: The weather app says it's going to be 20 degrees Fahrenheit (-7 degrees Celsius) today. Reasoning: I've experienced that temperature before. I know that's cold. Conclusion: I'll wear a coat today to keep comfortable. Observation: My phone bill is due today. Reasoning: Last time I didn't pay the bill on time, I had to pay a late fee. Conclusion: I'm going to pay the bill right now so I don't have to pay extra. Observation: I have an appointment tomorrow at 9 a.m. across town. Reasoning: I've driven that way at that time before and the traffic is heavy. Conclusion: I'll leave early so I won't be late. In each example, there's a problem to be solved. You have experience with that problem. And inductive reasoning helped to reach a well-thought-out solution. Inductive reasoning downsides But there can be a downside when your brain gets ... overzealous, so to speak, with inductive reasoning. That is, it can lead to you making decisions even when you don't have enough information to reach a fully reasonable conclusion. For example: If you got bit by a dog, inductive reasoning could lead you to the conclusion that dogs are vicious and should be avoided. Probably an overreaction. If you had a lucky roll at the craps table, inductive reasoning could keep you throwing those dice longer. A recipe for big losses. If your kid and their friends go on an ill-advised helmet-free bike ride. No one gets hurt (thankfully). But they come to the conclusion that you're being overprotective when you insist they wear proper head protection. In reality, they don't know the dangers like you do because they're working from limited experience. "Your worldview can become impacted when we follow theories based off of our own specific experiences," Dr. Tworek notes. "Someone who has the tendency to have positive takeaways from experiences may go into new experiences anticipating a positive outcome — a glass-half-full perspective. And vice versa. Negative experiences can lead to a mindset where poor outcomes are what's expected." How deductive reasoning works Conclusion based on a generalized premise When you use deductive reasoning, you start with a big-picture idea and then reason out a conclusion based on that framework. "Deductive reasoning is almost like building with blocks," Dr. Tworek illustrates. "You have the beginnings of a structure built with blocks — a premise. So, you rationalize when another block belongs within that structure." Consider these examples: Observation: I'm going to visit a friend in Seattle. Premise: It rains a lot in Seattle. Conclusion: It's going to rain while I'm there. I'll pack an umbrella. Observation: This ice cream has dairy. Premise: Dairy upset my stomach. Conclusion: This ice cream will give me a stomachache. I'm not going to eat it. Observation: I'm running low on clean underwear. Premise: I need to do laundry to have clean clothes. Conclusion: It's time to do laundry. Like inductive reasoning, deductive reasoning isn't something you necessarily realize you're doing. Because your brain is moving rapid-fire to assess the situation at hand and offer up a solution. Deductive reasoning downsides Relying on deductive reasoning in the wrong situations or applying a not-fully-formed premise to a situation at hand can lead to forming conclusions that don't serve you well. "Maybe you made a mistake on a challenging project at work and received negative feedback from your manager," Dr. Tworek poses. "Now, you're beginning a new project and feel challenged again. But the feedback from that other project has led you to believe that you don't have the skills to complete this project, even if that's not accurate. You conclude that you won't do a good job on the task at hand, based on the (likely wrong) premise that you're not good at your job." What to do about unhealthy reasoning It's only natural that you'll use inductive and deductive reasoning (and other thought processes) day in and day out. Your brain is constantly in motion as you make decisions. But the conclusions you come to don't have to be on autopilot. Because, left unchecked, our reasoning isn't always going to benefit us. "There are times when our reasoning processes can make you feel limited, or it can perpetuate negative self-talk — meaning that you find you are not speaking kindly to yourself, or are even limiting yourself — as a result of the reasoning you are using," Dr. Tworek shares. Pausing to consider how you're reacting to situations or why you've come to certain decisions can help you stop unhealthy thought patterns from taking over. "Perhaps we were taught growing up that we can't draw conclusions based on our own experiences, but that we must gather a large amount of information before coming to an answer. Or maybe we were raised in a way where one person's experience created a set of rules or guidelines to follow," she points out. "That can impact the types of reasoning that we default to and the situations that we use them in." What's more, certain health conditions can affect your ability to reason logically. That includes ones like ADHD, brain tumors, mental health disorders and sleep disorders. Recognizing unhealthy reasoning in yourself and reconsidering the premises that it's based on can be tough. After all, they're your thoughts. Your experiences. They live in your mind. So, it can be a challenge to step out of that construct. Regardless of how unhelpful that reasoning process actually is. Engaging with a mental health professional can help. Because an outside perspective can help challenge unhealthy premises and help you find new strategies that can serve you better. "A licensed mental health professional can assist in identifying thought patterns, understanding how we may be drawing certain conclusions or using certain methods of reasoning, and providing appropriate interventions," Dr. Tworek reassures. The Critical Analysis and Reasoning Skills (CARS) section of the MCAT is often the most intimidating section for students. Unlike the sciences, there is no shelter of content to feel safe with, no set of content you can simply master in order to improve. However, there is a set of predictable, learnable skills which will enable you to score highly on the CARS section. Practice with these skills will ensure you can answer even tough skill 2 and skill 3 questions which require you to read between the lines of the passage. These skills are two types of logical reasoning – Deductive and Inductive reasoning. Deductive Reasoning Deductive reasoning is where one begins with an accepted principle and seeks to prove another statement based on previously "known" information. For example, if a physician walks into the exam room with the premise that there has been a recent spread of MRSA, the new patient is likely another infection so she gathers information — blood tests, cultures, a physical exam — and narrows the scope of that available information until MRSA (her principle) is the only logical conclusion remaining. This is the kind of logic that, many physicians may use: they have a diagnosis in mind based on previously available information that is not necessarily related to the new patient, and then they seek out evidence to prove that diagnosis. The MCAT will ask you to do this in questions that require you to find evidence that supports or weakens a passage argument, or when they ask you to identify assumptions in passage arguments. Inductive Reasoning Inductive reasoning, conversely, allows physicians to extrapolate from the information gleaned from patient interaction in order to arrive at a diagnosis about a disease that has not been observed. This type of reasoning was made famous by Sherlock Holmes and his medical counterpart, Dr. Gregory House. Here, the irascible Dr. House will enter the exam room a blank slate; he has no pre-supposed ideas about a diagnosis. Maybe the patient has lupus, maybe they have rheumatism, and maybe it is some environmental toxin. House does not know. So his team investigates and performs tests. There's a positive antinuclear antibody test result, no one else in her home or work is sick so she could not have been exposed to a toxin. There's the inflammation, but that could be rheumatoid arthritis. Does she have any CNS issues? Any histone antibodies? House continues to gather information until he arrives at a conclusion (which was often incorrect for the first few tries). More patient information will come until House is quite sure he's arrived at the right diagnosis. This is a much more common method of medical practice and the test makers will also test your ability to do this kind of reasoning in questions that require you to reach conclusions based on presented evidence, or to guess at the author's opinions or intentions given what they have written in the text. In practice In all MCAT questions, we can rest assured that there is only 1 correct answer, and the other 3 are literally written to be wrong. Most MCAT arguments will contain 2 parts that are provided and 2 that are asked for. Evidence and conclusions (premises) are in the text, while the questions will ask you to identify assumptions and inferences implied by the passage. A good rule of thumb to use is that valid assumptions are those that are necessary to the opinions (i.e. premises) in the passage. On the MCAT, correct inferences are logical conclusions which must be true if the passage arguments are true. We do not need to go hunting for information; it will always be provided to us in the text, or the questions themselves. You too can master the art of MCAT logic. Try to identify the logic in the three examples below: Most government officials just want to raise my taxes. At least most of the politicians I have voted for. Amy needs psychiatric treatment. After all, she is homeless. The news about Nia is that she's recovering from surgery and has decided to attend physical therapy. Check your answers below, and be sure to jump into CARS practice right away, as there is no prerequisite knowledge. Dr. Anthony LaFond, Former Director of MCAT Content Answer Key: Inductive logic - note keyword of "most" and projection of personal experiences. Deductive logic - note that the premise "All homeless are mentally unstable" is implied. This is not an MCAT argument - there is no conclusion