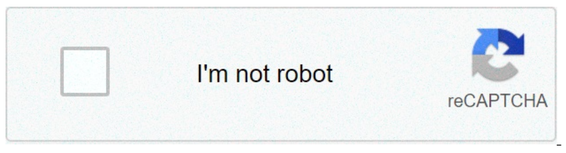

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Similarities of inductive and deductive argument

Deductive vs Inductive Arguments Deductive and inductive arguments are two types of arguments which are related to logical and analytical thinking. Deductive argument Deductive thinking is reasoning from abstract, general principles to a specific hypothesis that follows from these principles. The arguments resulting from such thinking are called deductive arguments. For instance: Sylvia owns only white shirts and blue shirts. Sylvia is wearing a shirt today. So Sylvia is wearing either a white shirt or a blue shirt today. This is an example of a deductive argument. It is so because the two premises or the supportive evidence are the first and the second statements are proven to be true. If the premises are true, then the conclusion or the deduction from the two will definitely be true. Such statements are logically correct. In deductive arguments, the supportive evidence guarantees a sure, truthful conclusion. In these statements, the premises provide a strong support to the argument. And if the premises are correct, then it is impossible for the conclusion to be wrong. In a deductive argument, the inference or the conclusion is certain. The conclusion is valid if the evidence is true, and the inference will be invalid if the evidence is false because of the relationship which is established between the evidence and the conclusion. Inductive arguments Inductive thinking involves a complementary process of observing a number of specific events or instances and interfering with an abstract, general principle to explain those instances. The arguments resulting from such thinking are called inductive arguments. For instance: The first cat is white. The second cat is white. The third cat is white. The fourth cat is white. So, all cats are white. This is an example of an inductive statement. An inductive argument is based on more of the observation of the supportive evidence. The inference or the conclusion derived in an inductive argument is only a probable truth. The conclusion is induced in these types of statements. In inductive arguments, the inference is dependent on the evidence. The result will be correct and true if the evidence is true. The inference, however, may also be true if the evidence is false. For example: All reptiles are mammals. All snakes are reptiles. All snakes are mammals. Here the evidence is true and so is the induced inference. Considering the next example: All humans are reptiles. All reptiles have hair. All humans have hair. Here the evidence is false, but the induced inference is still certain and accurate. So it may be noted that the inference is certain even if some or all of the evidence is false and the conclusion can still be true. Summary: 1.In deductive arguments, the conclusion is certain while in inductive arguments, the inference is probable. 2.The deductive arguments are logical while the inductive statements are based more on observation. 3.In inductive argument the inference may be true even if some of the evidence is false; however, in a deductive argument, if the evidence is false, it will lead to a false inference. Custom Search Help us improve. Rate this post! (1 votes, average: 2.00 out of 5)Loading... Email This Post : If you like this article or our site. Please spread the word. Share it with your friends/family. Most everyone who thinks about how to solve problems in a formal way has run across the concepts of deductive and inductive reasoning. Both deduction and induction help us navigate real-world problems, such as who committed a crime, the most likely cause of an accident, or how many planets might contain life in the Milky Way galaxy.But while they're both practical tools for practical problems, but they approach problem-solving in opposite ways.Both deduction and induction are a type of inference, which means reaching a conclusion based on evidence and reasoning.Deduction moves from idea to observation, while induction moves from observation to idea.Deduction is idea-first, followed by observations and a conclusion. Induction is observation first, followed by an idea that could explain what's been seen.The other big difference is that deduction's conclusions are bulletproof assuming you don't make a mistake along the way. The conclusion is always true as long as the premises are true. With induction you don't get absolute certainty; the quality of the idea or model or theory depends on the quality of the observations and analysis.ExamplesAll men are mortal. Harold is a man. Therefore, Harold is mortal.DeductionThis third sentence is absolutely true because the first two sentences are true.I have a bag of many coins, and I've pulled 10 at random and they've all been pennies, therefore this is probably a bag full of pennies.InductionThis gives some measure of support for the argument that the bag only has pennies in it, but it's not complete support like we see with deduction.Further clarificationDeduction has theories that predict an outcome, which are tested by experiments. Induction makes observations that lead to generalizations for how that thing works.If the premises are true in deduction, the conclusion is definitely true. If the premises are true in induction, the conclusion is only probably true—depending on how good the evidence is.There's another type of reasoning called Abductive Reasoning, where you take a set of observations and simply take the most likely explanation given the evidence you have.Deduction is hard to use in everyday life because it requires a sequential set of facts that are known to be true. Induction is used all the time in everyday life because most of the world is based on partial knowledge, probabilities, and the usefulness of a theory as opposed to its absolute validity.Deduction is more precise and quantitative, while induction is more general and qualitative.More examplesIf A = B and B = C, then A = C.DeductionSince all squares are rectangles, and all rectangles have four sides, so all squares have four sides.DeductionAll cats have a keen sense of smell. Fluffy is a cat, so Fluffy has a keen sense of smell.DeductionEvery time you eat peanuts, your throat swells up and you can't breathe. This is a symptom of people who are allergic to peanuts. So, you are allergic to peanuts.InductionRay is a football player. All football players weigh more than 170 pounds. Ray weighs more than 170 pounds.DeductionAll cars in this town drive on the right side of the street. Therefore, all cars in all towns drive on the right side of the street.InductionWe can see here that deduction is a nice-to-have. It's clean. But life is seldom clean enough to be able to apply it perfectly.Most real problems and questions deal more in the realm of induction, where you might have some observations—and those observations might be able to take you to some sort of generalization or theory—but you can't necessarily say for sure that you're right. It's about working as best you can within a world where knowledge is usually incomplete.Summary Deduction gets you to a perfect conclusion—but only if all your premises are 100% correct.Deduction moves from theory to experiment to validation, where induction moves from observation to generalization to theory.Deduction is harder to use outside of lab/science settings because it's often hard to find a set of fully agreed-upon facts to structure the argument.Induction is used constantly because it's a great tool for everyday problems that deal with partial information about our world, and coming up with usable conclusions that may not be right in all cases.Be willing to use both types of reasoning to solve problems, and know that they can often be used together cyclically as a pair, e.g., use induction to come up with a theory, and then use deduction to determine if it's actually true.The main thing to avoid with these two is arguing with the force of deduction (guaranteed to be true) while actually using induction (probability based on strength of evidence). You can't prove truth, but using deductive and inductive reasoning, you can get close. Learn the difference between the two types of reasoning and how to use them when evaluating facts and arguments. In this article we'll cover: Ok, let's dig in and see what we can learn. *** What Makes Something True? As odd as it sounds, in science, law, and many other fields, there is no such thing as proof — there are only conclusions drawn from facts and observations. Scientists cannot prove a hypothesis, but they can collect evidence that points to its being true. Lawyers cannot prove that something happened (or didn't), but they can provide evidence that seems irrefutable. The question of what makes something true is more relevant than ever in this era of alternative facts and fake news. This article explores truth — what it means and how we establish it. We'll dive into inductive and deductive reasoning as well as a bit of history. — Lewis Carroll, Through the Looking-Glass The essence of reasoning is a search for truth. Yet truth isn't always as simple as we'd like to believe it is. For as far back as we can imagine, philosophers have debated whether absolute truth exists. Although we're still waiting for an answer, this doesn't have to stop us from improving how we think by understanding a little more. In general, we can consider something to be true if the available evidence seems to verify it. The more evidence we have, the stronger our conclusion can be. When it comes to samples, size matters. As my friend Peter Kaufman says: What are the three largest, most relevant sample sizes for identifying universal principles? Bucket number one is inorganic systems, which are 13.7 billion years in size. It's all the laws of math and physics, the entire physical universe. Bucket number two is organic systems, 3.5 billion years of biology on Earth. And bucket number three is human history…. In some areas, it is necessary to accept that truth is subjective. For example, ethicists accept that it is difficult to establish absolute truths concerning whether something is right or wrong, as standards change over time and vary around the world. When it comes to reasoning, a correctly phrased statement can be considered to have objective truth. Some statements have an objective truth that we cannot ascertain at present. For example, we do not have proof for the existence or non-existence of aliens, although proof does exist somewhere. Deductive and inductive reasoning are both based on evidence. Several types of evidence are used in reasoning to point to a truth: Direct or experimental evidence — This relies on observations and experiments, which should be repeatable with consistent results. Anecdotal or circumstantial evidence — Overreliance on anecdotal evidence can be a logical fallacy because it is based on the assumption that two coexisting factors are linked even though alternative explanations have not been explored. The main use of anecdotal evidence is for forming hypotheses which can then be tested with experimental evidence. Argumentative evidence — We sometimes draw conclusions based on facts. However, this evidence is unreliable when the facts are not directly testing a hypothesis. For example, seeing a light in the sky and concluding that it is an alien aircraft would be argumentative evidence. Testimonial evidence — When an individual presents an opinion, it is testimonial evidence. Once again, this is unreliable, as people may be biased and there may not be any direct evidence to support their testimony. — Laplace, Théorie analytique des probabilités (1812) Reasoning by Induction The fictional character Sherlock Holmes is a master of induction. He is a careful observer who processes what he sees to reach the most likely conclusion in the given set of circumstances. Although he pretends that his knowledge is of the black-or-white variety, it often isn't. It is true induction, coming up with the strongest possible explanation for the phenomena he observes. Consider his description of how, upon first meeting Watson, he reasoned that Watson had just come from Afghanistan: "Observation with me is second nature. You appeared to be surprised when I told you, on our first meeting, that you had come from Afghanistan." "You were told, no doubt." "Nothing of the sort. I knew you came from Afghanistan. From long habit the train of thoughts ran so swiftly through my mind, that I arrived at the conclusion without being conscious of intermediate steps. There were such steps, however. The train of reasoning ran, 'Here is a gentleman of a medical type, but with the air of a military man. Clearly an army doctor, then. He has just come from the tropics, for his face is dark, and that is not the natural tint of his skin, for his wrists are fair. He has undergone hardship and sickness, as his haggard face says clearly. His left arm has been injured. He holds it in a stiff and unnatural manner. Where in the tropics could an English army doctor have seen much hardship and got his arm wounded? Clearly in Afghanistan.' The whole train of thought did not occupy a second. I then remarked that you came from Afghanistan, and you were astonished." (From Sir Arthur Conan Doyle's A Study in Scarlet) Inductive reasoning involves drawing conclusions from facts, using logic. We draw these kinds of conclusions all the time. If someone we know to have good literary taste recommends a book, we may assume that means we will enjoy the book. Induction can be strong or weak. If an inductive argument is strong, the truth of the premise would mean the conclusion is likely. If an inductive argument is weak, the logic connecting the premise and conclusion is incorrect. There are several key types of inductive reasoning: Generalized — Draws a conclusion from a generalization. For example, "All the swans I have seen are white; therefore, all swans are probably white." Statistical — Draws a conclusion based on statistics. For example, "95 percent of swans are white" (an arbitrary figure, of course); "therefore, a randomly selected swan will probably be white." Sample — Draws a conclusion about one group based on a different, sample group. For example, "There are ten swans in this pond and all are white; therefore, the swans in my neighbor's pond are probably also white." Analogous — Draws a conclusion based on shared properties of two groups. For example, "All Aylesbury ducks are white. Swans are similar to Aylesbury ducks. Therefore, all swans are probably white." Predictive — Draws a conclusion based on a prediction made using a past sample. For example, "I visited this pond last year and all the swans were white. Therefore, when I visit again, all the swans will probably be white." Causal inference — Draws a conclusion based on a causal connection. For example, "All the swans in this pond are white. I just saw a white bird in the pond. The bird was probably a swan." The entire legal system is designed to be based on sound reasoning, which in turn must be based on evidence. Lawyers often use inductive reasoning to draw a relationship between facts for which they have evidence and a conclusion. The initial facts are often based on generalizations and statistics, with the implication that a conclusion is most likely to be true, even if that is not certain. For that reason, evidence can rarely be considered certain. For example, a fingerprint taken from a crime scene would be said to be "consistent with a suspect's prints" rather than being an exact match. Implicit in that statement is the assertion that it is statistically unlikely that the prints are not the suspect's. Inductive reasoning also involves Bayesian updating. A conclusion can seem to be true at one point until further evidence emerges and a hypothesis must be adjusted. Bayesian updating is a technique used to modify the probability of a hypothesis's being true as new evidence is supplied. When inductive reasoning is used in legal situations, Bayesian thinking is used to update the likelihood of a defendant's being guilty beyond a reasonable doubt as evidence is collected. If we imagine a simplified, hypothetical criminal case, we can picture the utility of Bayesian inference combined with inductive reasoning. Let's say someone is murdered in a house where five other adults were present at the time. One of them is the primary suspect, and there is no evidence of anyone else entering the house. The initial probability of the prime suspect's having committed the murder is 20 percent. Other evidence will then adjust that probability. If the four other people testify that they saw the suspect committing the murder, the suspect's prints are on the murder weapon, and traces of the victim's blood were found on the suspect's clothes, jurors may consider the probability of that person's guilt to be close enough to 100 percent to convict. Reality is more complex than this, of course. The conclusion is never certain, only highly probable. One key distinction between deductive and inductive reasoning is that the latter accepts that a conclusion is uncertain and may change in the future. A conclusion is either strong or weak, not right or wrong. We tend to use this type of reasoning in everyday life, drawing conclusions from experiences and then updating our beliefs. Everyday inductive reasoning is not always correct, but it is often useful. For example, superstitious beliefs often originate from inductive reasoning. If an athlete performed well on a day when they wore their socks inside out, they may conclude that the inside-out socks brought them luck. If future successes happen when they again wear their socks inside out, the belief may strengthen. Should that not be the case, they may update their belief and recognize that it is incorrect. Another example (let's set aside the question of whether turkeys can reason): A farmer feeds a turkey every day, so the turkey assumes that the farmer cares for its wellbeing. Only when Thanksgiving rolls around does that assumption prove incorrect. The issue with overusing inductive reasoning is that cognitive shortcuts and biases can warp the conclusions we draw. Our world is not always as predictable as inductive reasoning suggests, and we may selectively draw upon past experiences to confirm a belief. Someone who reasons inductively that they have bad luck may recall only unlucky experiences to support that hypothesis and ignore instances of good luck. In The 12 Secrets of Persuasive Argument, the authors write: In inductive arguments, focus on the inference. When a conclusion relies upon an inference and contains new information not found in the premises, the reasoning is inductive. For example, if premises were established that the defendant slurred his words, stumbled as he walked, and smelled of alcohol, you might reasonably infer the conclusion that the defendant was drunk. This is inductive reasoning. In an inductive argument the conclusion is, at best, probable. The conclusion is not always true when the premises are true. The probability of the conclusion depends on the strength of the inference from the premises. Thus, when dealing with inductive reasoning, pay special attention to the inductive leap or inference, by which the conclusion follows the premises. … There are several popular misconceptions about inductive and deductive reasoning. When Sherlock Holmes made his remarkable "deductions" based on observations of various facts, he was usually engaging in inductive, not deductive, reasoning. In Inductive Reasoning, Aiden Feeney and Evan Heit write: …inductive reasoning … corresponds to everyday reasoning. On a daily basis we draw inferences such as how a person will probably act, what the weather will probably be like, and how a meal will probably taste, and these are typical inductive inferences. […] [I]t is a multifaceted cognitive activity. It can be studied by asking young children simple questions involving cartoon pictures, or it can be studied by giving adults a variety of complex verbal arguments and asking them to make probability judgments. […] [I]nduction is related to, and it could be argued is central to, a number of other cognitive activities, including categorization, similarity judgment, probability judgment, and decision making. For example, much of the study of induction has been concerned with category-based induction, such as inferring that your next door neighbor sleeps on the basis that your neighbor is a human animal, even if you have never seen your neighbor sleeping. Reasoning by Deduction Deduction begins with a broad truth (the major premise), such as the statement that all men are mortal. This is followed by the minor premise, a more specific statement, such as that Socrates is a man. A conclusion follows: Socrates is mortal. If the major premise is true and the minor premise is true the conclusion cannot be false. Deductive reasoning is black and white; a conclusion is either true or false and cannot be partly true or partly false. We decide whether a deductive statement is true by assessing the strength of the link between the premises and the conclusion. If all men are mortal and Socrates is a man, there is no way he can not be mortal, for example. There are no situations in which the premise is not true, so the conclusion is true. In science, deduction is used to reach conclusions believed to be true. A hypothesis is formed; then evidence is collected to support it. If observations support its truth, the hypothesis is confirmed. Statements are structured in the form of "if A equals B, and C is A, then C is B." If A does not equal B, then C will not equal B. Science also involves inductive reasoning when broad conclusions are drawn from specific observations; data leads to conclusions. If the data shows a tangible pattern, it will support a hypothesis. For example, having seen ten white swans, we could use inductive reasoning to conclude that all swans are white. This hypothesis is easier to disprove than to prove, and the premises are not necessarily true, but they are true given the existing evidence and given that researchers cannot find a situation in which it is not true. By combining both types of reasoning, science moves closer to the truth. In general, the more outlandish a claim is, the stronger the evidence supporting it must be. We should be wary of deductive reasoning that appears to make sense without pointing to a truth. Someone could say "A dog has four paws. My pet has four paws. Therefore, my pet is a dog." The conclusion sounds logical but isn't, because the initial premise is too specific. The History of Reasoning The discussion of reasoning and what constitutes truth dates back to Plato and Aristotle. Plato (429–347 BC) believed that all things are divided into the visible and the intelligible. Intelligible things can be known through deduction (with observation being of secondary importance to reasoning) and are true knowledge. Aristotle took an inductive approach, emphasizing the need for observations to support knowledge. He believed that we can reason only from discernable phenomena. From there, we use logic to infer causes. Debate about reasoning remained much the same until the time of Isaac Newton. Newton's innovative work was based on observations, but also on concepts that could not be explained by a physical cause (such as gravity). In his Principia, Newton outlined four rules for reasoning in the scientific method: "We are to admit no more causes of natural things than such as are both true and sufficient to explain their appearances." (We refer to this rule as Occam's Razor.) "Therefore, to the same natural effects we must, as far as possible, assign the same causes." "The qualities of bodies, which admit neither intensification nor remission of degrees, and which are found to belong to all bodies within the reach of our experiments, are to be esteemed the universal qualities of all bodies whatsoever." "In experimental philosophy, we are to look upon propositions collected by general induction from phenomena as accurately or very nearly true, notwithstanding any contrary hypotheses that may be imagined, 'till such time as other phenomena occur, by which they may either be made more accurate, or liable to exceptions." In 1843, philosopher John Stuart Mill published A System of Logic, which further refined our understanding of reasoning. Mill believed that science should be based on a search for regularities among events. If a regularity is consistent, it can be considered a law. Mill described five methods for identifying causes by noting regularities. These methods are still used today: Direct method of agreement — If two instances of a phenomenon have a single circumstance in common, the circumstance is the cause or effect. Method of difference — If a phenomenon occurs in one experiment and does not occur in another, and the experiments are the same except for one factor, that is the cause, part of the cause, or the effect. Joint method of agreement and difference — If two instances of a phenomenon have one circumstance in common, and two instances in which it does not occur have nothing in common except the absence of that circumstance, then that circumstance is the cause, part of the cause, or the effect. Method of residue — When you subtract any part of a phenomenon known to be caused by a certain antecedent, the remaining residue of the phenomenon is the effect of the remaining antecedents. Method of concomitant variations — If a phenomenon varies when another phenomenon varies in a particular way, the two are connected. Karl Popper was the next theorist to make a serious contribution to the study of reasoning. Popper is well known for his focus on disconfirming evidence and disproving hypotheses. Beginning with a hypothesis, we use deductive reasoning to make predictions. A hypothesis will be based on a theory — a set of independent and dependent statements. If the predictions are true, the theory is true, and vice versa. Popper's theory of falsification (disproving something) is based on the idea that we cannot prove a hypothesis; we can only show that certain predictions are false. This process requires vigorous testing to identify any anomalies, and Popper does not accept theories that cannot be physically tested. Any phenomenon not present in tests cannot be the foundation of a theory, according to Popper. The phenomenon must also be consistent and reproducible. Popper's theories acknowledge that theories that are accepted at one time are likely to later be disproved. Science is always changing as more hypotheses are modified or disproved and we inch closer to the truth. Conclusion In How to Deliver a TED Talk, Jeremey Donovan writes: No discussion of logic is complete without a refresher course in the difference between inductive and deductive reasoning. By its strictest definition, inductive reasoning proves a general principle—your idea worth spreading—by highlighting a group of specific events, trends, or observations. In contrast, deductive reasoning builds up to a specific principle—again, your idea worth spreading—through a chain of increasingly narrow statements. Logic is an incredibly important skill, and because we use it so often in everyday life, we benefit by clarifying the methods we use to draw conclusions. Knowing what makes an argument sound is valuable for making decisions and understanding how the world works. It helps us to spot people who are deliberately misleading us through unsound arguments. Understanding reasoning is also helpful for avoiding fallacies and for negotiating.

similarities of inductive and deductive arguments. what is the main difference between inductive and deductive arguments. what are the similarities between inductive and deductive reasoning. what are the differences between inductive and deductive arguments

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