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In logic, we often refer to the two broad methods of reasoning as deductive and inductive approaches. The deductive reasoning works from the most general to the most specific. Sometimes this is informally called a top-down approach. We could start with thinking a theory about our subject of interest. Then we narrow this down into more specific hypotheses that we can test. We further narrow down when we collect observations to address assumptions. This ultimately leads us to be able to test hypotheses with specific data - a confirmation (or not) of our original theories. Inductive reasoning works inversely, moving from specific observations to broader generalizations and theories. Informally, sometimes we call this a bottom-up approach (please note that it's bottom up and not bottom up, which is kind of the bartender thing telling customers when he's trying to close for the night!). In inductive reasoning, we start with specific observations and measures, we start to detect patterns and regularities, we formulate some provisional hypotheses that we can explore and finally we come to develop some general conclusions or theories. These two reasoning methods have a very different feel to them when you're conducting research. Inductive reasoning, by its very nature, is more open and exploratory, especially at first. The deductive reasoning is of a narrower nature and refers to the testing or confirmation of hypotheses. Even though a particular study may show that it is purely deductive (for example, an experiment designed to test the hypothetical effects of some results), most social research involves both inductive and deductive reasoning processes at some point in the project. In fact, it doesn't take a rocket scientist to see that we could assemble the two graphs above in a single circular, which continuously cycles from theories to observations and back back to theories. Even in the most limited experiment, researchers can observe patterns in the data that lead them to develop new theories. Next topic » Knowledge base written by Prof. William M.K. Trochim. Changes and additions to Conjoint.ly. This page was last modified on March 10, 2020. © 2020, Conjoint.ly, Sydney, Australia. ABN 56 616 169 021. For legal and data protection questions, please refer to the Terms and Conditions and Privacy Policy. We have two basic approaches to how we come to believe that something is true. The first way is that we are exposed to a few different examples of a situation and, from these examples, we conclude a general truth. For example, visit your local grocery store daily to pick up the necessary items. You noticed that on Friday, two weeks ago, all the officials in the store were wearing football shirts. Again, last Friday, officials wore t-shirts Football. Today, also on a Friday, he wears them again. From just these observations, you can conclude that on all Fridays, these supermarket employees wear football shirts to support their local team. This type of pattern recognition, which leads to a conclusion, is known as inductive reasoning. Knowledge can also move the opposite direction. Let's say you read in the news about a tradition in a local grocery store, where employees wore football shirts on Fridays to support the home team. This time, start from the general rule, and you would expect individual evidence to support that rule. Every time you visited the store on a Friday, you would expect employees to wear T-shirts. Such a case, to begin with the general statement and then identify the examples that support it, is known as deductive reasoning. The power of inductive reasoning You've been using inductive reasoning for a very long time. Inductive reasoning is based on your ability to recognize meaningful patterns and connections. Taking into account both the examples and the understanding of how the world works, induction allows you to conclude that something is likely to be true. By using induction, you switch from specific data to a generalization that tries to capture what the data means. Imagine eating a dish of strawberries and shortly afterwards swollen lips. Now imagine that a few weeks later you ate strawberries and shortly afterwards your lips again became swollen. The next month, you ate another dish of strawberries, and you had the same reaction as before. You are aware that swollen lips can be a sign of allergy to strawberries. Using induction, you conclude that, more likely than not, you are allergic to strawberries. Dates: After I ate strawberries, my lips swollen (first time). Dates: After I ate strawberries, my lips swollen (second time). Dates: After I ate strawberries, my lips swollen (third time). Additional information: Swollen lips after eating strawberries may be a sign of allergy. Conclusion: I'm probably allergic to strawberries. Inductive reasoning can never lead to absolute certainty. Instead, induction allows you to say that, given the examples provided for support, the claim is more likely than it is not true. Due to the limitations of inductive reasoning, a conclusion will be more credible if several lines of reasoning are presented in its support. The results of inductive thinking can be distorted if the relevant data is overlooked. In the previous example, inductive reasoning was used to conclude that I am probably allergic to strawberries after suffering several cases of swelling of my lips. Would I be as confident in my conclusion if I ate strawberry shortcake on each of these occasions? Is it reasonable to assume that the allergic reaction could be due to an ingredient other than strawberries? This illustrates that inductive reasoning should be used with care. When assessing an inductive argument, consider the amount of data, the quality of the data, the existence of additional data, the relevance of the additional information required and the existence of possible explanations. Inductive reasoning Put to work A synopsis of features, benefits, and disadvantages of inductive reasoning can be found in this video. The power of deductive reasoning is based on two statements whose logical relationship should lead to a third statement which is an undoubtedly correct conclusion, as in the following example. All raccoons are omnivores. This animal is a raccoon. This animal is an omnivore. If the first statement is true (All raccoons are omnivores) and the second statement is true (This animal is a raccoon), then the conclusion (This animal is an omnivore) is inevitable. If a group must have a certain quality and a person is a member of that group, then the person must have that quality. Going back to the example of the opening of this page, we could frame it this way: grocery store employees wear football shirts on Fridays. Today's Friday. Food store employees will be wearing football shirts today. Unlike inductive reasoning, deductive reasoning allows certainty as long as certain rules are observed. Assessing the truth of a premise A formal argument can be created in such a way that, on its face, it seems logical. However, no matter how well constructed the argument is, the additional information needed must be true. Otherwise, any deduction based on this additional information will not be valid. Inductive reasoning can often be hidden in a deductive argument. That is, a generalization achieved by inductive reasoning can be turned around and used as a beginning truth for a deductive argument. For example, most Labrador retrievers are friendly. Kimber is a Labrador retriever. Therefore, Kimber is friendly. In this case, we can't know for sure that Kimber is a friendly Labrador retriever. The structure of the argument may seem logical, but it is based on observations and generalizations, rather than indisputable facts. Methods for assessing the truth of a premiseS One way to test the accuracy of a premise is to apply the same questions posed by inductive arguments. As a recap, it should take into account the amount of data, the quality of the data, the existence of additional data, the relevance of the additional data, and the existence of possible additional explanations. Determine whether the initial application is based on a representative and sufficiently large sample and ask yourself whether all relevant factors have been taken into account in the analysis of the data leading to a generalization. Another way to evaluate a premise is to determine whether its source is credible. Are the perpetrators identified? What's their background? Was the request something you found on an undocumented website? Did you find it in a popular publication or a scholarly one? How complete, how recent and how relevant were studies or statistics in the source? Overview and Recap A summary of the characteristics, benefits and disadvantages of deductive reasoning can be found this video. Video.

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