7.3: Types of Reasoning

Inductive Reasoning

Inductive reasoning is the process of reasoning from specifics to a general conclusion related to those specifics. You have a series of facts and/or observations. From all of this data you make a conclusion or as the graphic above calls it, a "General Rule." Inductive reasoning allows humans to create generalizations about people, events, and things in their environment. There are five methods of inductive reasoning: example, cause, sign, comparison, and authority.

Example Reasoning

Example reasoning involves using specific instances as a basis for making a valid conclusion. In this approach, specific instances 1, 2, and 3 lead to a generalized conclusion about the whole situation. For example: I have a Sony television, a Sony stereo, a Sony car radio, a Sony video system, and they all work well. It is clear that Sony produces
superior electronic products. Or, I have taken four good professors at this college, Mr. Smith, Mrs. Ortiz, Dr. Willard, and Ms. Richard; therefore, I can conclude that the professors at this college are good.

Tests for Reasoning by Example

1. **There must be a sufficient number of examples** to justify the generalized conclusion. How many examples are enough? The answer depends on the significance of the specific instances and the threshold of your target audience.

   Some audiences may find one enough, while others may need many more. For instance, the Neilson Ratings that are used to measure the television viewing preferences of 300 million Americans are determined by roughly 3,000 homes scattered throughout the United States. Yet, the television industry, which uses them to set advertising rates, accepts the 3,000 examples as enough to validate the conclusions.

2. **The examples must be typical of the whole.** They must be representative of the topic about which the conclusion is reached, not fringe examples. For example, you come to college and take one English class whose instructor you find disappointing. You conclude that all 300 instructors at this particular college are poor teachers from this one class from this one Department. The sample might not be representative of the whole population of instructors.

3. **Important counter examples must be accounted for.** If the counter examples mitigate against the examples used, the generalization is threatened. What if a good friend of yours also took another English class and was pleased by the experience. He found that his instructor was an excellent teacher. His example becomes a counter one to the specific instance you used to draw your conclusion, which is now very much in doubt.

4. **The examples must be relevant to the time period of your argument.** If you are dealing with something recent, you need recent examples. If you are trying to prove something in the 1850's, examples from that period are appropriate. If you took the English class 30 years ago, it would be difficult to draw a valid conclusion about the nature of teachers at the college today without using recent examples. Likewise, recent examples may not be reflective of the way the college was 30 years ago.

Causal Reasoning

Causal Reasoning is based on the idea that for every action there is a reaction. Stated very simply, a cause is anything that is directly responsible for producing something else, usually termed the effect. There are two forms of causal reasoning:

The goal of causal reasoning is to figure out how or why something happened. For instance, you did well on a test because you studied two days in advance. I could then predict that if you study two days in advance of the next test, you will do well. In causal reasoning, the critical thinker is trying to establish a predictive function between two directly related variables. If we can figure out how and why things occur, we can then try to predict what will happen in the future.

- Cause to effect, a known cause or causes is capable of producing some unknown effect or effects
- Effect to cause, some known effect(s) has/have been produced by some unknown cause or causes.

Tests of Causal Reasoning

1. **The cause must be capable of producing the effect described, and vice versa.** Has causality really been
established or is it just coincidence? Is the cause really capable of producing the effect and vice versa? There must be a direct connection between the cause and the effect that can be demonstrated using empirical evidence. For example, many people mistake superstition for causal reasoning. Is the source of good luck the rubbing of a rabbit’s foot? Is the cause of bad luck really the fact that you walked under a ladder or broke the mirror? Did wearing that shirt really cause your team to win five games in a row? The critical thinker must make a clear distinction between a valid causal occurrence and sheer coincidence.

2. **Cumulative causal reasoning increases the soundness of the conclusion.** The more times the causal pattern has happened, the greater the strength given to the causal reasoning, leading to a more valid conclusion. If this is the first time this association has ever been asserted the advocate will have to use more evidence to support the soundness of the causal reasoning advanced.

3. **Counter causal factors must also be accounted for.** The advocate must be aware of the other inherent causal factors that could disrupt the relationship between the cause and effect presented. A claim was made by a father that his son committed suicide, because he was influenced to do so by the songs of a particular rock musician. If we assume that such a causal association exists, we also need to know if there are any other factors that could disrupt the connection: Was the son using drugs; had he tried to commit suicide before; were there family problems; did he listen to other artists and other types of music; did he have peer problems; did he have relationship problems; was he having problems in school, etc.? Each one of these, individually, might be enough to destroy the direct causal relationship that is attempting to be established.

In Massachusetts, Michelle Carter is on trial for manslaughter. As a teenager, she texted her boyfriend, Roy, and encouraged him to commit suicide. And he did. Her defense attorney is arguing that Roy had mental problems, was already suicidal, and that the texts did not cause him to take his life. The prosecution is arguing that the text did cause Roy to kill himself. This is going to be a difficult case to resolve. As stated by Daniel Medwed, a Northeastern University law professor, “Causation is going to be a vital part of this case, can the prosecution prove that she caused him to kill himself in this way? Would he have done it anyway?”

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**Sign Reasoning**

**Sign reasoning** involves inferring a connection between two related situations. The theory is that the presence or absence of one indicates the presence or absence of the other. In other words, the presence of an attribute is a signal that something else, the substance, exists. One doesn't cause the other to exist, but instead is a sign that it exists.

Football on television is a sign that Fall has arrived. Football on television does not cause Fall to arrive; they just arrive at the same time. A flag is flying at half-staff is a sign that there has been a tragedy or a significant person has died. The flag flying at half-staff did not cause the death. It is a sign that the situation occurred.

**Sign Reasoning in Poker**

Quite a few players' posture betrays the nature of their cards. An unconscious change in their sitting position, such as leaning forward, likely indicates a strong hand. With a weak hand they often show less body tension, for example, having hanging shoulders.

If someone has concealed his mouth with his hand, he often holds a weak hand - he wants to hide his emotions. In a sense, he does not want his expression to betray his hand. The same is true for a player who is reluctant to glance at you: he is worried that his eyes might indicate he is afraid.

Particularly for beginners, a quick glance at his cards is a reliable tell. The tell here is an unconscious one, brief look at
the player's own cards. If, for example, the flop brings 3 hearts and the player looks at his cards, it is unlikely he has the flush.

This is because with an off-suit hand, a beginner usually takes no notice of the suits at first glance. Only with a suited hand will they remember the suit. Thus, you can often assume here that they have at most one heart.

**Tests of Sign Reasoning**

1. **Other substance/attribute relationships must be considered.** Is there another substance that might have the same attributes? Could the sending of roses to your wife be a sign of something other than love? Can the same signs indicate the presence of a valid second or third substance?

2. **Cumulative sign reasoning produces a more probable connection.** The more often this substance/attribute relationship occurs, the more likely it is to repeat itself. If this is the first time you have noticed the association, you will need a good deal of evidence to demonstrate that it really is a valid sign argument.

**Comparison Reasoning**

Comparison reasoning is also known as reasoning by analogy. This type of reasoning involves drawing comparisons between two similar things, and concluding that, because of the similarities involved, what is correct about one is also correct of the other. There was once an ad for alligator meat that presented this comparison; "When you try alligator meat just remember what is considered exotic food today may often become normal fare in the future. This was the case with lobster. About 75 years ago, lobster was thought of as poor man's food; many New Englanders would not even think of eating it. Today, of course, lobster is a delicacy savored by many people." This type of reasoning wants us to conclude that alligator meat is to humans today, as lobster meat was to humans 75 years ago. And since lobster is now a delicacy so will alligator meat. There are two types of comparisons: figurative and literal.

- **Literal comparisons** attempt to establish a link between similar classifications; cars to cars, states to states, people to people. For instance, you can compare a Ford compact car with a Toyota compact car; the lottery in one state with the lottery in another state; how your parents treat you with how your best friend is treated by her parents. In these comparisons, similar classifications are being used for the purposes of making the analogy. Literal comparisons can provide logical proof for the point being made and thus can increase the validity of the argument.

- **Figurative comparisons** attempt to link similarities between two cases from different classifications. Jim Baker of the Bush 2000 campaign, argued after the 5-4 Supreme Court decision awarding the state of Florida to Bush, “Saying George W. Bush stole the Presidency from Al Gore is like saying someone tried to steer the Titanic after it had already hit the iceberg.” Figurative comparisons carry no weight in terms of providing logical proof for an argument. They can, however, be very effective for the purpose of illustration and persuading an audience.

The line between a Literal and Figurative analogy is not clear. Instead of a comparison being totally figurative or totally literal, the comparison can be viewed in degrees using the following continuum.

<table>
<thead>
<tr>
<th>Person to Person</th>
<th>Person to Animal</th>
<th>Person to Computer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literal</td>
<td></td>
<td>Figurative</td>
</tr>
<tr>
<td>Analogy</td>
<td></td>
<td>Analysis</td>
</tr>
</tbody>
</table>

7.3.2: "Analogy Diagram" (CC BY 4.0; J. Marteney)
There are few literal comparisons that can be made between a person and a computer. A person to an animal may have some overlapping actual similarities. While comparing one person to another person suggests a Literal Analogy. The more towards the figurative side the comparison is, the less the argument is logically valid. The more towards the literal side the comparison is, the more logically valid the argument is.

Tests for comparison reasoning

1. **To be considered as proof, the analogy must be a literal one.** The further advocates move away from figurative comparisons and toward the literal comparison end of the continuum, the more validity they secure for their argument. Figurative comparisons carry no logical argumentative influence at all.

2. **The cases need to contain significant points of similarity.** The greater the number of important or major similar points between the cases, the easier it is to establish the comparison as a sound one. However, no matter how many points of similarity can be established between the two cases, major points of differences can destroy the analogy.

3. **Cumulative comparison reasoning will produce a more probable conclusion.** The greater the number of cases a person can use for the purpose of comparison, the more valid the comparison. If a student has been to more than one college or has had many instructors, he or she can evaluate the quality of the teachers by comparing them. The validity of his or her conclusion is increased as the number of teachers compared increases.

Children often try to convince a parent to let them do or try something the parent is opposed to by comparing themselves to another child. They point out they are the same age as the other child, they are in the same grade in school, the child lives in the same neighborhood as they do, thus they should be allowed to do what the other child is allowed to do. This seems to be a very effective argument by comparison until the parent says, you are not that child or we are not their parents. To the parents, these points of difference destroy the comparison the child is trying to make.

**Poor Figurative Analogy May 23, 2016**

(CNN) Veterans Affairs Secretary Bob McDonald downplayed Monday the time it takes for veterans to receive medical treatment by comparing the "experience" of waiting for health care to Disneyland guests waiting for a ride.

"When you go to Disney, do they measure the number of hours you wait in line? Or what's important?" McDonald told reporters at a Christian Science Monitor breakfast in Washington. "What's important is what's your satisfaction with the experience?"

American Legion National Commander Dale Barnett excoriated McDonald: "The American Legion agrees that the VA secretary's analogy between Disneyland and VA wait times was an unfortunate comparison because people don't die while waiting to go on Space Mountain." 

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Reasoning from Authority

Reasoning from Authority is used when a person argues that a particular claim is justified, because, it is held or advocated by a credible source. That credible source can be a person or organization. Basically, the authority possesses some credentials that qualify the source as an authority. Thus, you accept the argument because someone you feel is an authority tells you so. You can use this type of argument in two ways. First, you can ask that an argument be accepted simply because someone you consider an authority advocates it. People grant authority status to other people they think have more knowledge than they do: students to teachers, patients to doctors, and clients to lawyers. Children often argue this way when they justify a position by saying “because my mommy or daddy said so.”

Second, you can support your arguments with the credibility of another person. Here you are attempting to transfer the positive ethos from the credible source to the position you are advocating. Advertisers do this when they get popular athletes and entertainers to promote their products. The advertisers are hoping that your positive view of these people will transfer to their product, thus producing higher sales for the products. You may be persuaded to see a particular movie, attend a certain play, or eat at a restaurant because, it was advocated by a well-known critic.

Tests for reasoning from authority

1. The authority must be credible. That is, the authority must possess the necessary qualifications for the target audience in order for the source to be used as justification for a point of view. If challenged, the advocate must be prepared to defend the expertise and ethos of his or her authority.

2. Views of counter authorities must be taken into account. The advocate must be aware of the other “experts” or highly credible sources who take an opposite position from the one being advocated. If he or she fails to do this, the argument breaks down into a battle over whose expert or authority should be accepted as being the most
3. **Cumulative views of authorities increase the validity of the reasoning.** Citing more than one expert or authority will increase the likelihood that your position will be viewed as the most valid one being argued.

**Important conclusion:** Since the process of reasoning by induction usually involves arriving at a conclusion based on a limited sampling, the conclusion to an inductive argument can never be totally certain. Why? Because no matter which type of inductive reasoning is used, nor how carefully critical thinkers adhere to the tests of each reasoning pattern, critical thinkers can never sample the totality of the population used to infer the generalization about that population.

Thus, **conclusions drawn from inductive reasoning are always only probable.** To use induction effectively, an advocate must demonstrate that the specifics are compelling, and thus justify the conclusion, but never claim that the conclusion is guaranteed in all situations.

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**Deductive Reasoning**

**Deductive reasoning** is the process of reasoning from general statements, or rules, to a certain, specific, and logical conclusion. Deductive arguments begin with a general statement that has already been arrived at inductively. Unlike inductive reasoning, where the conclusion may be very valid, but is always only probable, the conclusion reached by deductive reasoning is logically certain.

A deductive argument offers two or more premises that lead to a conclusion directly related to those premises. As long as the two premises are sound, there can be no doubt that the final statement is correct. The final statement is a matter of logical certainty.

Deductive arguments are not spoken of as “true” or “false,” but as “sound” or “unsound.” A sound argument is one in which the premises guarantee the conclusion, and an unsound argument is one in which the premises do not guarantee the conclusion.

An advocate who uses deduction to frame an argument must be certain that the general statement is accepted as correct and then must demonstrate the relationship between this general statement and the specific claim, thus proving beyond a doubt the conclusion.

A deductive argument has three parts: a major premise, a minor premise, and a conclusion. This form is called a syllogism.

The major premise is a general statement. For example: **All telemarketers are obnoxious.** The subject section of the major premise (All telemarketers) is known as the antecedent; the predicate section of the major premise (are obnoxious) is known as the consequent.

The minor premise is a statement of a specific instance related to the major premise:

**The person on the phone is a telemarketer.**

The conclusion is the statement derived from the minor premises relationship to the major premise: **The person on the phone is obnoxious.**
An effective deductive argument is one in which your audience accepts the general statement and is then logically compelled by the development of the argument to accept your conclusion.

Thus, we use inductive reasoning to create generalizations or major premises, and we can use deductive reasoning to apply those generalizations to specific situations.

The final step in checking the strength of reasoning is to make sure there are no fallacies. Often, correcting for fallacies is the missing piece to creating and evaluating logical arguments.

7.3.4: “Silhouette Brain Logic” (CC0 1.0; mohamed_hassan via Needpix.com)

Reference

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2. "Poker tells - hidden body language. To bluff or not to bluff?" PokerStrategy.com,  

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