
When you choose evidence to support a claim, you are asserting that there is a logical relationship between them. However, that relationship may not be clear to the listener, so you need to explain how the evidence supports the claim, which is an act of *inference* because you are *inferring* that some information in the evidence is relevant to the claim. To explain how it is relevant, you need to understand the logical relationship that exists between the evidence and the claim. Although logical reasoning can be complex, within the context of informal reasoning, there are four fundamental ways in which the evidence supports the claim.

1. Reasoning from Parts to Whole. This type of reasoning usually occurs when a person makes observations about a situation and then draws a conclusion. In other words, you are thinking that what's true of the part is probably true of the whole. For example, you buy three calculators from Company X and all of them break down within weeks, so you conclude that Company X makes bad calculators. Likewise, your parents meet three of your classmates, all of whom have poor posture. Your father later says to you, "Why do all teenagers these days have poor posture." Both examples are *generalizations* because they demonstrate reasoning from the specific to the general. Our tendency to generalize is commonly found in two ways: *statistical* or *anecdotal*.

A) **Statistical:** We make a *statistical generalization* when we quantify people's opinions on some issue and then extrapolate that the opinion of the smaller group is probably true of a larger group. For example, when we say that 52% of 1,000 people will vote for a particular candidate, and then claim that 52 % of the voters in a country will probably vote for that candidate, we've made a *statistical generalization*. In other words, we conclude that what's true of a sample is probably true of the entire population. Drawing this conclusion is accurate within 4% if the small sample size is large enough--at least 200 people—the participants are randomly chosen, and they are representative of the larger population.

B) **Anecdotal:** We make an *anecdotal generalization* when we state that specific examples are sufficient to support a general conclusion. For example, consider the resolution: *Affirmative action in College and University admissions is necessary*. To support this resolution, you

could make the following claims: 1) Many minorities have fewer educational opportunities to excel in public schools. 2) A government needs to ensure that all its citizens are well-educated. 3) Universities and Colleges can reduce prejudice by bringing people together from different races and classes. Of course, for each of these claims, you need to provide evidence. However, even with evidence, an *anecdotal generalization* is often ambiguous because, in the examples above, it is not possible to measure quantitatively whether affirmative action will indeed reduce prejudice or improve the standard of living of the disadvantaged as a whole in the long run. At most, one can assert that the policy of affirmative action can certainly help to achieve the larger goal of reducing prejudice in society.

2. Reasoning with Comparisons. This pattern of reasoning is very common because--to evaluate the value and relevance of something--the mind continually assesses aspects of one thing in relationship to aspects of another that are considered credible and acceptable. If there are several important aspects, such as 2 or 3, that are similar--although there may be a few that are different--the evidence is credible and valuable, which means that it helps to convince the listener of your position. When considering evidence for this kind, there are basically two types: *literal* and *figurative*.

A) **Literal Comparisons.** These are direct comparisons of objects, events, situations, places and so on that are in the same general category. A simple example would be a comparison between one of two cars that you are considering purchasing. On a more complex level, it could be a comparison between two school boards. For example, the Toronto school board wants to emphasize essay writing more than literature in the English classroom. To support this proposal, you make a comparison between the cities of Toronto and Chicago because the Chicago school board has a highly effective essay writing program. You are considering adopting this program because the cities of Toronto and Chicago are very similar, for they have roughly the same population, they both grew dramatically over the last 50 years, they are both geographically spread out, they both rely on the automobile and they both have a culturally diverse population. By selecting this evidence, you are reasoning by comparison because you are stating that Toronto and Chicago are similar in many notable ways, so they should also be similar in this way, which is Toronto adopting the

Chicago approach to teaching essay writing in the classroom. Although this is the most common form of literal comparison, there are two specialized forms: the *judicial* and the *a fortiori*.

a) ***Judicial***. As you may assume, this refers to the reasoning process in which one argues something is true because a previous situation, usually established in a court of law, has declared that something else is true. For example, in 1965 the American Supreme Court heard a case called *Griswold v. Connecticut*, in which the Supreme Court established that married couples have the right to use contraceptives because the right to privacy was implicit in the Constitution and several amendments. Later, in 1972 in *Roe v. Wade*, based on this ruling of right to privacy, the Supreme Court ruled that couples have the right to terminate pregnancy through abortion. You can see that the latter case was based on the right to privacy ruling that was established in the previous case.

b) ***a fortiori***. This is an argument that compares more and less. That is, it argues that what is true of the lesser is even truer of the greater, or vice versa. For example, if a business insists on accounting for missing office supplies, then even more should it insist on accounting for missing amounts of cash. Sometimes this form of reasoning is used the other way around. That is, what is false for the greater is even more likely to be false for the lesser. For example, if I'm not going to pay for an extended warranty for my car, even less will I likely pay for an extended warranty for my cell phone.

B) Figurative Analogy. This is a comparison not between things in themselves, but rather it is a comparison between the relationships among objects, events, places, situations and so on. The items compared are not in the same sphere of reality, but they are brought together because one intends to clarify the meaning of one relationship by comparing it to another. For example, the province of Ontario urgently needs to cut spending because of a growing deficit. One suggestion is to close several schools and bus students' long distances to other schools. One critic said, "That's like burning down the barn to kill the rats." In both situations, one offers a solution to a problem. In the first situation, the problem is a growing provincial debt, and the solution is the closing of some schools. In the second situation, the problem is a rat infestation in a barn, and the solution is the burning down of the barn. Clearly, the second situation offers an exaggeration to the problem, which indirectly criticizes the solution offered in

the first situation by referring to a simple situation that the reader can easily and quickly understand.

3. Reasoning by Correlation.

This type of inference assumes that an outcome can be predicted based on knowledge and often an action. However, it *cannot be predicted with complete certainty* because reasoning by correlation assumes that one cannot measure the relationship between the knowledge and the outcome. At most, one can assume that there is a **probable cause**, which means that it is *highly likely* that the knowledge has influenced or will influence the outcome. A closer look reveals three ways to describe the relationship between the knowledge and the outcome.

- a) **Prediction of Outcomes.** Sometimes correlations are used to predict the relationship of a particular action and the likelihood of a result. For example, you want to improve your test performance because you want to go to university. Therefore, you decide to study five hours for your biology test because you believe that there is a probable correlation between how long one studies and how well one does on a test.
- b) **Unknown from the Known.** When one knows a few aspects, one can infer with some degree of certainty the unknown aspect. For example, let's say that a teacher believes that a student cheated on a test, but the teacher cannot prove it. To conclude, the teacher looks at the student's past performance and discovers that he has a history of cheating. The teacher therefore concludes that the student probably cheated on the test.
- c) **Knowledge from Experts.** There are many situations in life when we need to resolve a problem, but we do not have the expertise. To help us, we consult an expert, such as a doctor, an architect, a bus driver, because we assume that her or his expertise, which is based on both experience and knowledge, will add valuable information that can help us resolve the problem.

4. Reasoning by Causation.

Reasoning by causation is like correlation because they both describe a cause-and-effect relationship. However, whereas reasoning by *correlation* suggests that the effect **probably** results from the cause, reasoning by *causation* suggests that the effect results **directly** from the cause. In debating, one rarely

encounters a resolution that can be proven with absolute certainty because such resolutions are primarily the domain of scientific experimentation. Instead, you will encounter resolutions that focus on policy or values, which can be proven with significant certainty if one selects evidence that is quantifiable. When the quantifying is well done, it reduces the margin of error significantly, so the inference between the evidence and the claim can be considered reasoning by causation. Consider the following two types of inferences by causation.

A) **Observational.** A grocery store owner observes that jars of almond butter by Company Q sell quickly in his stores. As a result, he hires a company to make a generic version of almond butter, which he plans to sell for less. After six months on the shelf, the generic brand is outselling the almond butter by Company Q by 14%. In this example, the store owner first observes the trend that the almond butter by Company Q is a popular item. From this **observation**, *which is the cause*, he develops a similar generic product, *which is the effect*, that outsells the original. Because one can quantify the increased sales of the generic brand of almond butter relative to Company Q, one can make an inference by causation

B) **Intentional.** The Liberal Party of Canada introduces a Carbon Tax on each ton of carbon produced by companies. The intention is to incentivize the companies to pollute less because they pay less tax when they pollute less. The Liberal Party also knows that the program will probably reduce their popularity as measured by polling. However, the Liberal Party, which is leading in the polls, wagers that it can absorb a loss in popularity due to the new Carbon Tax and still maintain a lead over the opposition party. One month after the advent of the Carbon Tax Policy, the Liberal Party's popularity has indeed dropped by 4%. In this example, the Carbon Tax policy, which is an **intentional** intervention, is the *cause*, and the fall in public popularity is the *effect*. To be sure, if the Liberal Party falters in some other way during that time, it could influence the polling results. However, if they do not, one can infer that the Carbon Tax is the direct cause for the 4% fall in popularity of the Liberal Party as measured by the polls.

