Rational Appeal: Inductive and Deductive Reasoning

From Purdue University /The Owl
Using Rhetorical Strategies for Persuasion
There are three types of rhetorical appeals, or persuasive strategies, used in arguments to support claims and respond to opposing arguments. A good argument will generally use a combination of all three appeals to make its case.

Logos
Logos or the appeal to reason relies on logic or reason. Logos often depends on the use of inductive or deductive reasoning.

**Inductive** reasoning takes a specific representative case or facts and then draws generalizations or conclusions from them. Inductive reasoning must be based on a sufficient amount of reliable evidence, in other words the facts you draw on must fairly represent the larger situation or population.
Example:

> Fair trade agreements have raised the quality of life for coffee producers, so fair trade agreements could be used to help other farmers as well.

In this example the specific case of fair trade agreements with coffee producers is being used as the starting point for the claim. Because these agreements have worked the author concludes that it could work for other farmers as well.

**Deductive** reasoning begins with a generalization and then applies it to a specific case. The generalization you start with must have been based on a sufficient amount of reliable evidence.
Example:

> Genetically modified seeds have caused poverty, hunger, and a decline in biodiversity everywhere they have been introduced, so there is no reason the same thing will not occur when genetically modified corn seeds are introduced in Mexico.

In this example the author starts with a large claim, that genetically modified seeds have been problematic everywhere, and from this draws the more localized or specific conclusion that Mexico will be affected in the same way.

From Utah State U
Inductive and Deductive Reasoning

**Deduction**
Deduction: In the process of deduction, you begin with some statements, called 'premises', that are assumed to be true, you then determine what else would have to be true if the premises are true. For example, you can begin by assuming that God exists, and is good, and then determine what would logically follow from such an assumption. You can begin by assuming that if you think, then you must exist, and work from there. In mathematics, you can also start will a
premise and begin to prove other equations or other premises. With deduction you can provide absolute proof of your conclusions, given that your premises are correct. The premises themselves, however, remain unproven and unprovable, they must be accepted on face value, or by faith, or for the purpose of exploration.¹

**Examples of deductive logic:**
- All men are mortal. Joe is a man. Therefore Joe is mortal. If the first two statements are true, then the conclusion must be true.²
- Bachelors are unmarried men. Bill is unmarried. Therefore, Bill is a bachelor.³
- To get a Bachelor's degree at Utah State University, a student must have 120 credits. Sally has more than 130 credits. Therefore, Sally has a bachelor's degree.

**Induction**
Induction: In the process of induction, you begin with some data, and then determine what general conclusion(s) can logically be derived from those data. In other words, you determine what theory or theories could explain the data. For example, you note that the probability of becoming schizophrenic is greatly increased if at least one parent is schizophrenic, and from that you conclude that schizophrenia may be inherited. That is certainly a reasonable hypothesis given the data. However, induction does not prove that the theory is correct. There are often alternative theories that are also supported by the data. For example, the behavior of the schizophrenic parent may cause the child to be schizophrenic, not the genes. What is important in induction is that the theory does indeed offer a logical explanation of the data. To conclude that the parents have no effect on the schizophrenia of the children is not supportable given the data, and would not be a logical conclusion.¹

**Examples of inductive logic:**
- This cat is black. That cat is black. A third cat is black. Therefore all cats are black.²
- This marble from the bag is black. That marble from the bag is black. A third marble from the bag is black. Therefore all the marbles in the bag black.²
- Two-thirds of my latino neighbors are illegal immigrants. Therefore, two-thirds of latino immigrants come illegally.
- Most universities and colleges in Utah ban alcohol from campus. That most universities and colleges in the U.S. ban alcohol from campus.

Deduction and induction by themselves are inadequate to make a compelling argument. While deduction gives absolute proof, it never makes contact with the real world, there is no place for observation or experimentation, no way to test the validity of the premises. And, while induction is driven by observation, it never approaches actual proof of a theory. Therefore an effective paper will include both types of logic.¹

**From San Jose State University**
Inductive and Deductive Reasoning
Many people distinguish between two basic kinds of argument: inductive and deductive. Induction is usually described as moving from the specific to the general, while deduction begins with the general and ends with the specific; arguments based on experience or observation are
best expressed inductively, while arguments based on laws, rules, or other widely accepted principles are best expressed deductively. Consider the following example:

Adham: I've noticed previously that every time I kick a ball up, it comes back down, so I guess this next time when I kick it up, it will come back down, too.

Rizik: That's Newton's Law. Everything that goes up must come down. And so, if you kick the ball up, it must come down.

Adham is using inductive reasoning, arguing from observation, while Rizik is using deductive reasoning, arguing from the law of gravity. Rizik's argument is clearly from the general (the law of gravity) to the specific (this kick); Adham's argument may be less obviously from the specific (each individual instance in which he has observed balls being kicked up and coming back down) to the general (the prediction that a similar event will result in a similar outcome in the future) because he has stated it in terms only of the next similar event--the next time he kicks the ball.

As you can see, the difference between inductive and deductive reasoning is mostly in the way the arguments are expressed. Any inductive argument can also be expressed deductively, and any deductive argument can also be expressed inductively.

Even so, it is important to recognize whether the form of an argument is inductive or deductive, because each requires different sorts of support. Adham's inductive argument, above, is supported by his previous observations, while Rizik's deductive argument is supported by his reference to the law of gravity. Thus, Adham could provide additional support by detailing those observations, without any recourse to books or theories of physics, while Rizik could provide additional support by discussing Newton's law, even if Rizik himself had never seen a ball kicked.

From Spark Notes (yes! Spark Notes)

**Inductive Reasoning**

Inductive reasoning is the process of arriving at a conclusion based on a set of observations. In itself, it is not a valid method of proof. Just because a person observes a number of situations in which a pattern exists doesn't mean that that pattern is true for all situations. For example, after seeing many people outside walking their dogs, one may observe that every dog that is a poodle is being walked by an elderly person. The person observing this pattern could inductively reason that poodles are owned exclusively by elderly people. This is by no means a method of proof for such a suspicion; in fact, in the real world it is a means by which people and things are stereotyped. A hypothesis based on inductive reasoning, can, however, lead to a more careful study of a situation. By inductive reasoning, in the example above, a viewer has formed a hypothesis that poodles are owned exclusively by elderly people. The observer could then conduct a more formal study based on this hypothesis and conclude that his hypothesis was either right, wrong, or only partially wrong.

**Deductive Reasoning**

Deductive reasoning, unlike inductive reasoning, is a valid form of proof. It is, in fact, the way in which geometric proofs are written. Deductive reasoning is the process by which a person makes conclusions based on previously known facts. An instance of deductive reasoning might go something like this: a person knows that all the men in a certain room are bakers, that all bakers get up early to bake bread in the morning, and that Jim is in that specific room. Knowing these statements to be true, a person could deductively reason that Jim gets up early in the morning. Such a method of reasoning is a step-by-step process of drawing conclusions based on previously known truths. Usually a general statement is made about an entire class of things, and then one specific example is given. If the example fits into the class of things previously mentioned, then deductive reasoning can be used. Deductive reasoning is the method by which conclusions are drawn in geometric proofs.