Evaluating the Structure of an Argument

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WHAT'S COVERED

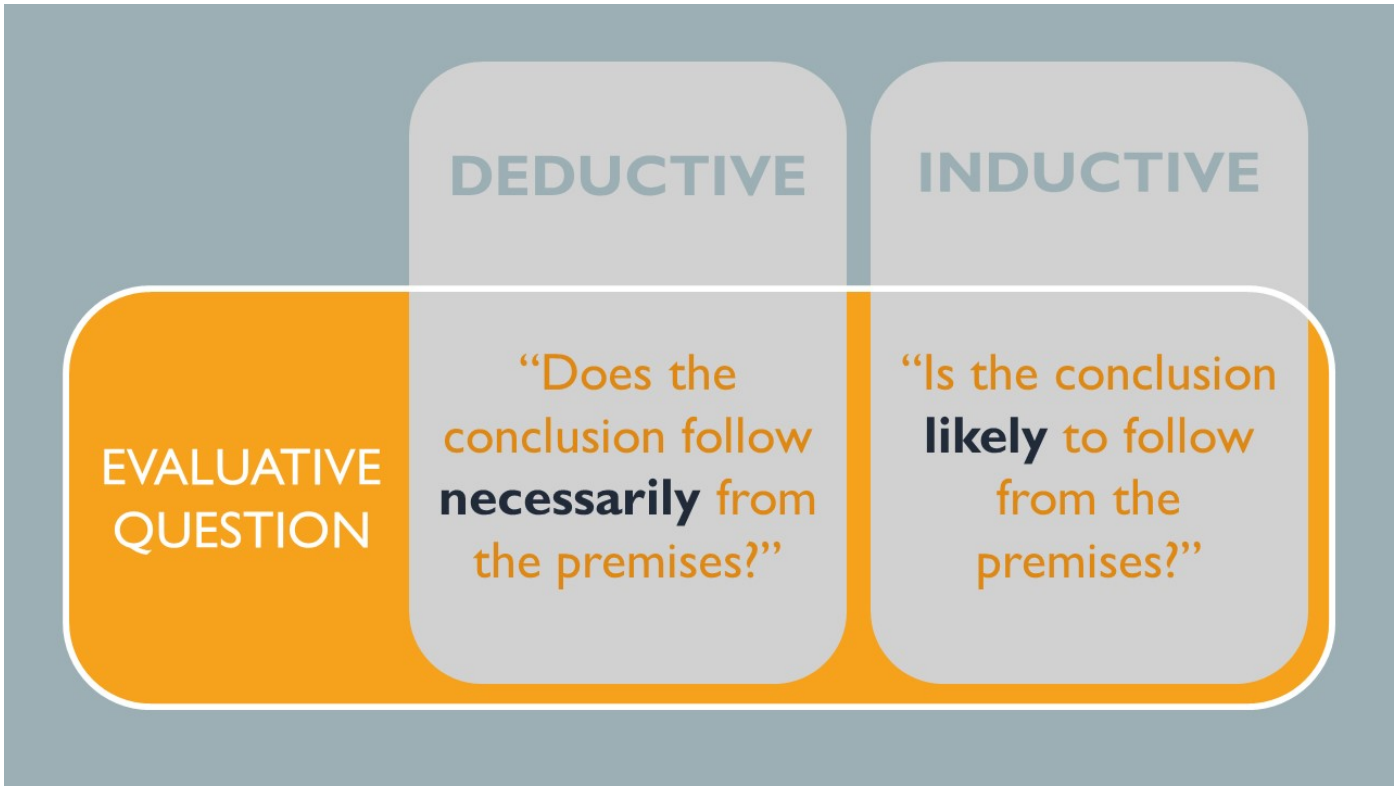
In this tutorial we will review the nature of arguments, before looking at the different ways in which deductive and inductive arguments are evaluated. Our discussion will break down like this:

1. Review of Arguments

To begin with, recall the nature of arguments. When making an argument you offer some factual claims (these are called the premises of the argument). You then claim that something follows from these factual claims (what follows is called the conclusion). This is the inferential claim.

If you want to find out if the premises are correct, then you need to see if the facts really match up to how things are. But if you want to find out if the inference is correct, then you need to ask: "assuming all premises were true, would they support the conclusion?"

There are two different sorts of inferences: deductive and inductive. How you evaluate an argument depends on what sort of inference is at work. In the illustration below you can see the different kinds of questions you must ask.



With this distinction in view we can now look at how you are to evaluate each type of inference in more detail.

2. Valid and Invalid Deductive Arguments

A deductive argument is either **valid** or **invalid**. It must be one of these, and it cannot be somewhere in between. For instance, you can't say a deductive argument is "somewhat valid" or "kind of invalid."

This is because validity has to do with the necessity with which the conclusion follows from the premises. An argument is valid if there is necessity, and invalid if there isn't necessity.

It should be noted that a valid argument can still produce a false conclusion.

> EXAMPLE The following argument is valid but has a false conclusion:
>
> "Cats can read minds. Whiskers is a cat. Therefore, Whiskers can read minds".
>
> The first premise ("cats can read minds") is factually incorrect, but the structure of this argument is nevertheless valid. Recall that a valid argument is one where, assuming the premises are true, it is inconceivable that the conclusion is false. Since one of the premises isn't true, a false conclusion cannot prove that it is invalid.

TERMS TO KNOW

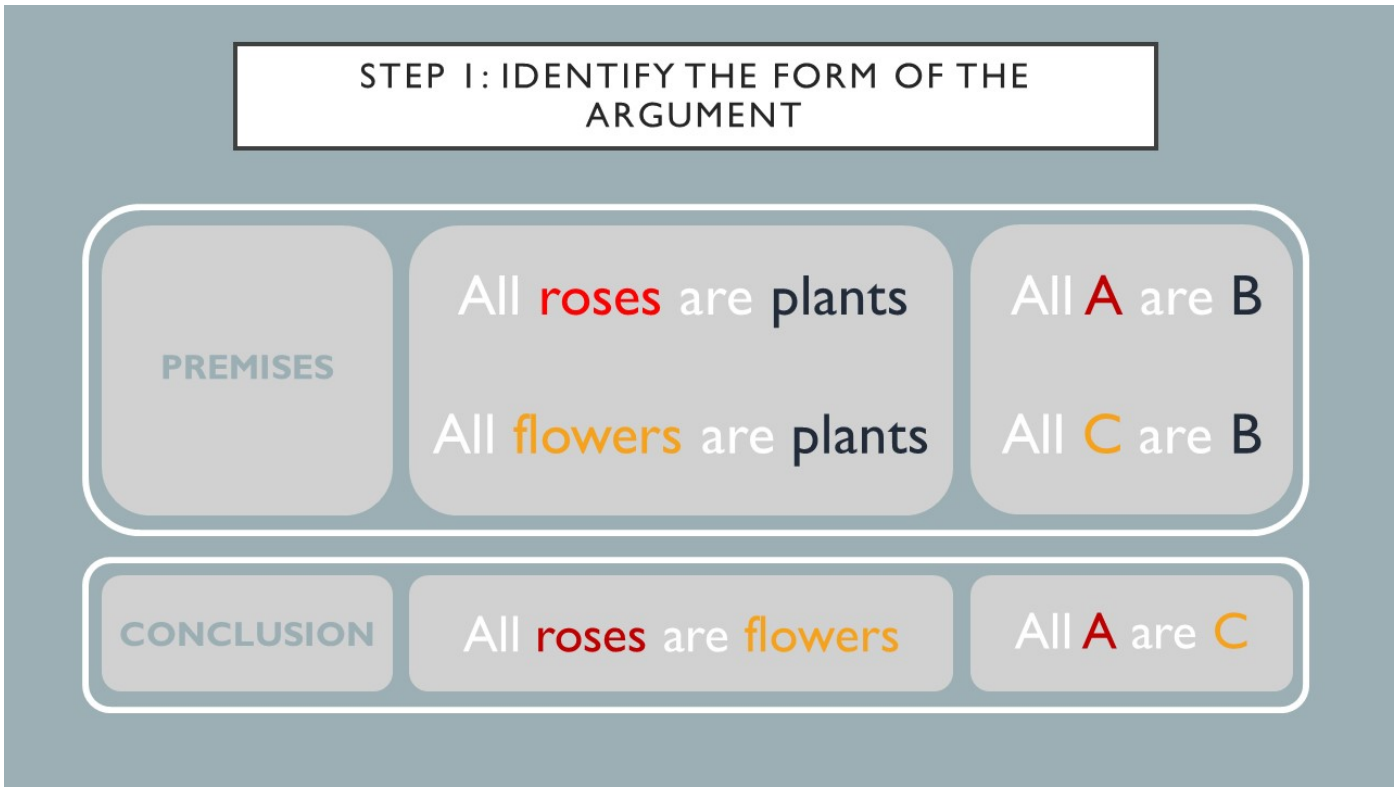
Valid
A deductive argument whose premise(s) logically guarantee their conclusion.

Invalid
A deductive argument in which the premise(s) do not logically guarantee their conclusion.

3. Proving Invalidity with the Counterexample Method

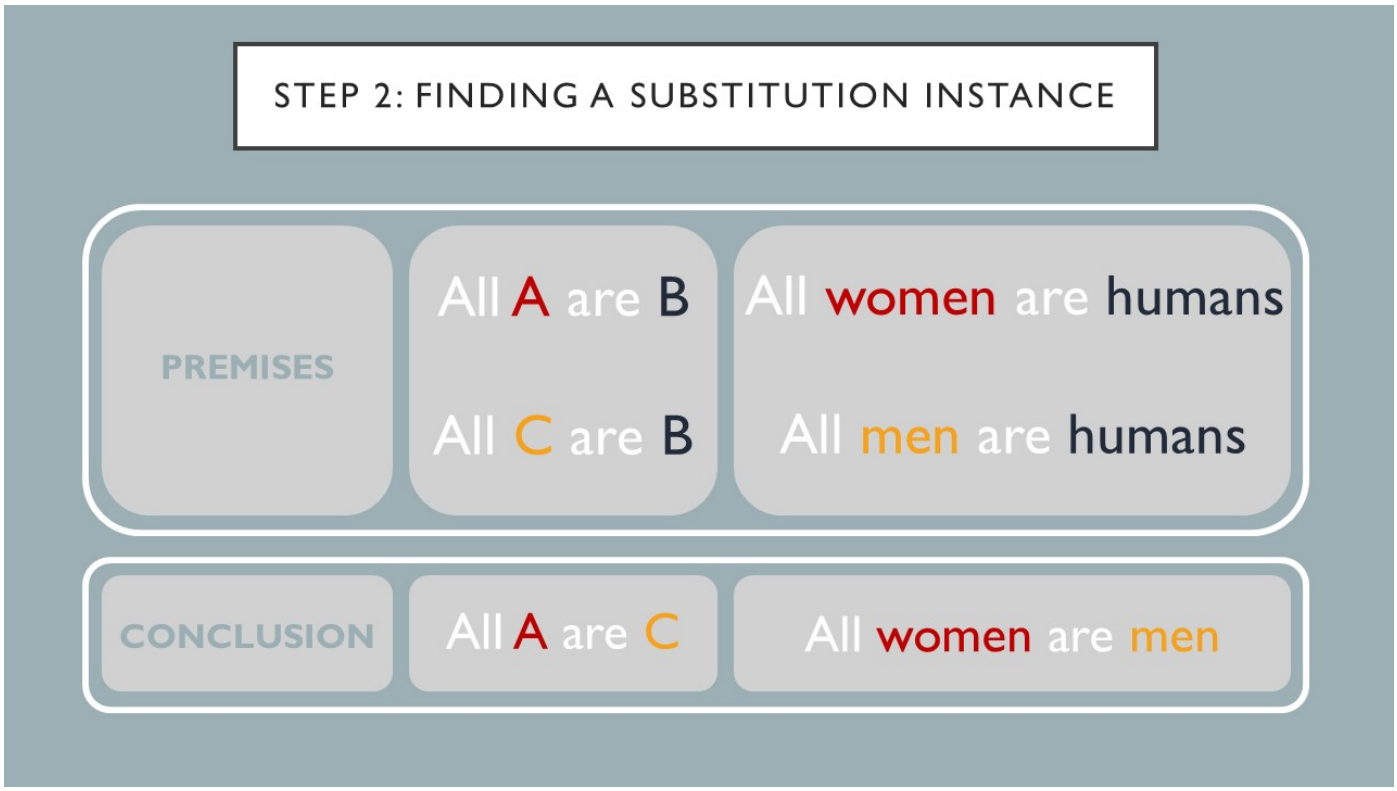
Let's start with an argument that looks to be providing deductive support for a conclusion: "All roses are plants. All flowers are plants. Therefore, all roses are flowers". The premises and the conclusion are true, but the form of the argument is actually invalid. In order to see that this is the case, let's go through the steps of the counterexample method.

First, you need to make the structure (the form) of the argument clear by giving symbols to the things you are talking about. In the illustration below, the symbols used are the first three letters of the alphabet.



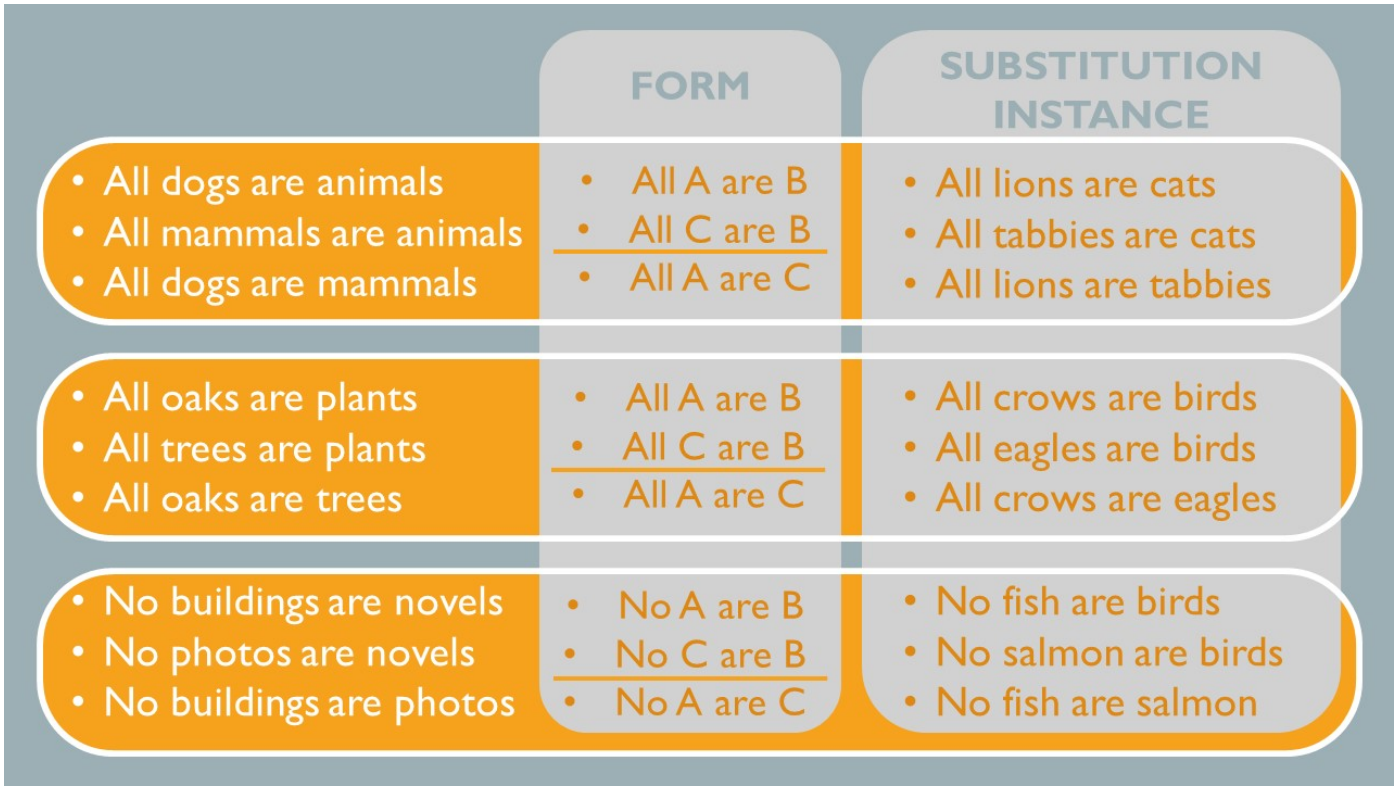
Next, you need to try and find an example of an argument of the same form, but which gives a false conclusion from true premises. If you are able to find an example such as this, then you have found a counterexample to the first argument. In other words, you would have proven the argument invalid.

Let's see how you could do this for the structure we just extracted.



Here the symbols have been filled in again with some content—this process is usually referred to as providing a substitution instance. You can see that the form of the argument is the same, but the conclusion is false. Therefore, you know that the argument is invalid.

Here are some more instances of using the counterexample method to show that an argument is invalid.



4. Strong and Weak Inductive Arguments

An inductive argument is either **strong** or **weak**. It must be one of these, but there is room for levels of strength and weakness (e.g. “quite strong” or “very weak”). This is because evaluating the inference of an inductive argument is only a matter of likelihood or probability, rather than a matter of necessity as it is with deductive arguments.

Consider the following inductive argument; do you think it is strong or weak?

↱ EXAMPLE “America won the most medals at the last Olympics. America is likely to win many medals at this Olympics.”
This is strong because, assuming the premise is true, it makes the conclusion probable. You need to keep in mind that a strong inductive argument could still produce false conclusions if the premise is false.

↱ EXAMPLE “Every cat you’ve walked past on this street barked at you. The next cat you walk past will probably bark.”
This is a strong inductive argument because, if the premise was true, then the conclusion would likely be true also. But in this case, the premise and the conclusion are untrue. This shows that strength (like validity) is not enough to make a conclusion true.

It should be noted that the counterexample method cannot be used to evaluate inductive arguments. This is because the counterexample method only proves invalidity, and inductive arguments cannot be invalid, only weak.

TERMS TO KNOW

Strong
An inductive argument in which the premises render the conclusion probable.

Weak
An inductive argument in which the premises do not render the conclusion probable.

SUMMARY

We started this tutorial with a **review of arguments**, focusing on the difference between deductive and inductive arguments. The we looked at how **valid and invalid deductive arguments** can be distinguished in terms of the structure of the argument.

Then the process of **proving invalidity with the counterexample method** was presented. Finally, **strong and weak inductive arguments** were distinguished in terms of the probability or improbability of the inference.

TERMS TO KNOW

Invalid
A deductive argument in which the premise(s) do not logically guarantee their conclusion.

Strong
An inductive argument in which the premises render the conclusion probable.

Valid
A deductive argument whose premise(s) logically guarantee their conclusion.

Weak
An inductive argument in which the premises do not render the conclusion probable.