

PHI103 Deductive Reasoning Lecture

This lecture covers deductive reasoning. A deductive argument is an argument in which it is intended that the conclusion logically follows from the premises. An argument that succeeds in this intention is called a *valid* argument. A valid argument is one in which there is no possible way for the premises to be true and the conclusion false. In other words, in a valid argument, *if* the premises are true, then the conclusion *must* be true as well.

It is not easy to make an argument logically valid, but the skill to do so is a valuable one. In order for an argument to be valid there must be premises that link together that lead logically to the conclusion.

Here is an example of a valid argument:

If we watch another episode, then we won't leave in the next half hour.
If we don't leave in the next half hour, then we will miss our plane.
If we miss our plane, then we won't be at my sister's wedding.
If we are not at my sister's wedding, then she will be furious with me.
If my sister is furious at me, then she won't talk to me for weeks.
Therefore, if we watch another episode, then my sister won't talk to me for weeks.

Whether or not all of those premises are true in this argument is another matter, but the links formed between the premises guarantee that *if* all of those premises are true, *then* the conclusion will follow. Valid arguments are often valid by virtue of their logical form. The argument just given has the following form:

If P is true, then Q is true (where the letters "P" and "Q" are *variables* that represent any statements)
If Q is true, then R is true.
If R is true, then S is true.
If S is true, then W is true.
If W is true, then V is true
Therefore, if P is true, then V is true.

We can see that any argument with this form will be valid based on the way that the premises link together to lead to the inevitability of the truth of the conclusion. This is not the only valid argument form. There are millions, and our book covers many others. It also teaches methods for testing deductive arguments for validity. Two of those methods are Venn diagrams and truth tables, but you will have to consult the book for more instruction on those methods, as we do not have time to cover them in this video.

One of the most common deductive argument forms is the following:

All As are Bs
X is an A
Therefore X is a B

An example of an argument of this form with a moral conclusion is:

It is always wrong to kill a human being.
Capital punishment kills a human being.

Therefore, capital punishment is wrong.

Because of its form, this argument is valid. *If* the premises are true, then the conclusion must be true as well. The goal in creating a valid argument is usually not just to create an argument with a valid form, but to create one that is actually *sound*, that is, one that is valid *and* that has all true premises.

Creating sound arguments can be a very challenging process. One of the reasons that it is so challenging is not just that you might have to change a premise to make it true, but that if you change one premise you may destroy the logical link with the other premises, making the argument invalid, so you will have to change the other premises as well.

In the example given, if you decide that it is not true that “it is *always* wrong to kill a human being,” then you might change it to “it is usually wrong to kill a human being.” However, then the argument becomes invalid because capital punishment could be one of those cases in which it is not wrong. Making this argument sound is therefore, quite a challenging process.

Some valid arguments end up quite complex. A moral argument might end up with a logical form like this one, for example:

All As are Bs unless they are C
X is an A
X is not C
Therefore X is B

After revision, our argument, for example, could end up like this:

It is always wrong to kill a human being unless it is in self-defense
Capital punishment kills a human being.
Capital punishment is not self-defense.
Therefore, capital punishment is wrong.

This process of adding missing premises and tailoring their wording so that they lead to the conclusion in a strict logical way can not only improve your arguments, but can actually make your thinking more rigorous and careful, and thereby make you a smarter person in general.

One of the specific ways in which it can make you smarter, is by helping you to see the missing links between people’s premises and their conclusions. These links represent the assumptions that people make, often without even noticing them.

For example, suppose someone reasons as follows:

He should be elected president because his policies would be better for the economy.

The hidden assumption here is that we should elect whoever’s policies would be better for the economy. This assumption seems to mean that the economy should be valued over any other factors like the environment, foreign policy, human rights, etc. Practice using deductive reasoning enables us to more readily notice such assumptions, which then allows us to analyze them for truth.

Only with deductively keen minds are we likely to be able effectively to assess the quality of people’s reasoning in life and to notice things like hidden assumptions and even contradictions

within in the reasoning that they give. We hope that the study of deductive reasoning can help you to tighten your own thinking and that you learn to enjoy the rigor of careful and precise reasoning.