

Deductions and Validity

An argument is deductively valid if and only if it is impossible for the premises to be true and the conclusion false. The crucial thing about a valid argument is that it is impossible for the premises to be true at the same time that the conclusion is false. Consider this example:

Oranges are either fruits or musical instruments.
Oranges are not fruits.
∴ Oranges are musical instruments.

The conclusion of this argument is ridiculous. Nevertheless, it follows validly from the premises. This is a valid argument. If both premises were true, then the conclusion would necessarily be true. This shows that a deductively valid argument does not need to have true premises or a true conclusion. Conversely, having true premises and a true conclusion is not enough to make an argument valid. Consider this example:

London is in England.
Beijing is in China.
∴ Paris is in France.

The premises and conclusion of this argument are, as a matter of fact, all true. This is a terrible argument, however, because the premises have nothing to do with the conclusion. Imagine what would happen if Paris declared independence from the rest of France. Then the conclusion would be false, even though the premises would both still be true. Thus, it is logically possible for the premises of this argument to be true and the conclusion false. The argument is invalid.

The important thing to remember is that validity is not about the actual truth or falsity of the sentences in the argument. Instead, it is about the form of the argument: The truth of the premises is incompatible with the falsity of the conclusion.

Soundness:

The truth of the premises is verified in a separate step: a deductive argument with all true premises is said to be sound. If a deductive argument has one or more false premises, it is unsound.