

An *argument* is a set of statements one of which (the *conclusion*) is taken to be supported by the remaining statements (the *premises*). [Note that a “statement” can either be a whole sentence, or an independent clause within a sentence.]

Two types of Arguments: Deductive and Non-Deductive.

Compare the following two arguments:

- |   |   |
|---|---|
| (P1) The sun rose today.                                      | (P1) Everyone in my family has been stung by a bee. |
| (P2) The sun rose yesterday.                                  | (C) So, my mother been stung by a bee.              |
| (P3) The sun rose the day before<br>yesterday.                |   |
| (P4) The sun rose the day before<br>the day before yesterday. |   |
| [etc.]  |   |
| (C) So, the sun will rise tomorrow.                           |   |

The argument about my family is notable in that if the premise happens to be true, then the conclusion is *guaranteed* to be true as well. After all, if *everyone* in my family has been stung by a bee, then it **MUST** be true that my mother has been stung (since my mother is part of my family). It is *contradictory* to say otherwise.

In contrast, the conclusion of the other argument is not completely guaranteed, even though the premises are true. After all, it is not a *contradiction* to think that the sun won't rise tomorrow, even though it has risen every day prior to that. Of course, it's extremely unlikely that the earth will stop rotating on its axis tonight (thus causing the sun not to rise), but it does not strictly conflict with what the premises say.

Arguments whose premises guarantee their conclusions are called **deductive**, in contrast to **non-deductive** arguments like the argument about the sun rising. In this course, we will be primarily concerned to distinguish **deductive** arguments from non-deductive ones, using rigorous, algorithmic methods.

Official Definition: An argument is **deductive** if and only if [abbreviation: “iff”] it is not possible for the premise(s) to be true and the conclusion false.

Another example of a deductive argument:

- (P1) Jim likes either Coke or Pepsi.  
 (P2) Jim does not like Pepsi.  
 (C) So, Jim likes Coke.

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<sup>1</sup> This is a shorter version of a handout I use for my Language & Logic course. The longer version is available at <http://tparent.net/validityhandoutFULL.pdf>

Here too, if you accept the premises, you *must accept the conclusion too*. Why? 'Cause in this argument there's no way for both the premises to be true and the conclusion false.

Unfortunately, most of the time a deductive argument is called (misleadingly) a 'valid argument'. The term is misleading, since you can have a "valid" argument which is nonetheless a bad argument, all things considered. For instance, the premises might be totally implausible. Yet such an argument still counts as "valid" if it is the kind of argument where *if* you granted the premises, the conclusion *would* be guaranteed.

Here is a very similar argument which is not deductive:

- (P1) Jim likes either Coke or Pepsi.
- (P2) Jim does not like Mountain Dew.
- (C) So, Jim likes Coke.

In this, it is possible for the premises to be true, and the conclusion false. That's not to say the premises are *actually* true or the conclusion is *actually* false. Rather, it's just to say that this combination of truth and falsity is *possible*. N.B., A non-deductive argument is also sometimes called a *non-sequitur*—it is an argument where the conclusion "does not follow" from the premise(s).

Some deductive arguments are also SOUND: An argument is *sound* iff it is deductive AND every premise is true. Accordingly, an argument is *unsound* iff it is non-deductive or some premise is false (or both).

So, to verify that an argument is sound, you have to verify that the argument is deductive and that each and every premise is true. An example of a sound argument:

- (P1) If a thing is a rectangle, then it's not a circle.
- (P2) This page is a rectangle.
- (C) So, this page is not a circle.

This argument is sound, since it is valid, and all of its premises are true. In contrast, here's an argument that's unsound:

- (P1) If Bill Gates is poor, then I'm a monkey's uncle.
- (P2) Bill Gates is poor.
- (C) So I'm a monkey's uncle.

Although it is deductive, this argument is unsound since not every premise is true.

NOTE: Truth and Falsity are NOT properties of *arguments*, but of *statements*. Thus, we do not say that a deductive argument is "true;" rather, we say that it is deductive or non-deductive. Or, if we want to talk of "true" and "false," we can evaluate the *statements in the argument* as true or false.