

Introduction to Logic and Critical Thinking

Version 1.3



"You have logic, I have Roscoe."

Matthew J. Van Cleave
Lansing Community College

4.1 Formal vs. informal fallacies

A **fallacy** is simply a mistake in reasoning. Some fallacies are formal and some are informal. In chapter 2, we saw that we could define validity formally and thus could determine whether an argument was valid or invalid without even having to know or understand what the argument was about. ~~We saw that we could define certain valid rules of inference, such as modus ponens and modus tollens.~~ These inference patterns are valid in virtue of their form, not their content. ~~That is, any argument that has the same form as modus ponens or modus tollens will automatically be valid.~~ A formal fallacy is simply an argument whose form is invalid. Thus, any argument that has that form will automatically be invalid, regardless of the meaning of the sentences. Two formal fallacies ~~that are similar to, but should never be confused with,~~ modus ponens and modus tollens are **denying the antecedent** and **affirming the consequent**. Here are the forms of those invalid inferences:

Denying the antecedent

$p \supset q$

$\sim p$

$\therefore \sim q$

Affirming the consequent

$p \supset q$

q

$\therefore p$

Any argument that has either of these forms is an invalid argument. For example:

1. If Kant was a deontologist, then he was a non-consequentialist.
2. Kant was not a deontologist.
3. Therefore, Kant was a not a non-consequentialist.

The form of this argument is:

1. $D \supset C$
2. $\sim D$
3. $\therefore \sim C$

As you can see, this argument has the form of the fallacy, denying the antecedent. Thus, we know that this argument is invalid even if we don't know what "Kant" or "deontologist" or "non-consequentialist" means. ("Kant" was a famous German philosopher from the early 1800s, whereas "deontology" and "non-consequentialist" are terms that come from ethical theory.) It is mark of a formal fallacy that we can identify it even if we don't really understand the meanings of the sentences in the argument. ~~Recall our Jabberwocky argument from chapter 2. Here's an argument which uses silly, made-up words from Lewis Carroll's "Jabberwocky."~~ See if you can determine whether the argument's form is valid or invalid:

1. If toves are brillig then toves are slithy.
2. Toves are slithy
3. Therefore, toves are brillig.

You should be able to see that this argument has the form of affirming the consequent:

1. $B \supset S$
2. S
3. $\therefore B$

As such, we know that the argument is invalid, even though we haven't got a clue what "toves" are or what "slithy" or "brillig" means. The point is that we can identify formal fallacies without having to know what they mean.

~~In contrast, **informal fallacies** are those which cannot be identified without understanding the concepts involved in the argument. A paradigm example of an informal fallacy is the fallacy of composition. We will consider this fallacy in the next sub-section. In the remaining subsections, we will consider a number of other informal logical fallacies.~~

~~4.1.1 Composition fallacy~~

~~Consider the following argument:~~

~~Each member on the gymnastics team weighs less than 110 lbs.
Therefore, the whole gymnastics team weighs less than 110 lbs.~~