

Logic presentation

Josef Thomas Simpson

1. If Santa existed, then he would have brought me presents
2. Santa did not bring me presents
3. $\therefore$ Santa does not exist

Obviously this is a valid argument which we discussed last class. However, is it sound? Are the premises true as well as the form of the argument valid?

Since Santa does not exist the antecedent is false, while the consequent false. Given that a material conditional is false only if the antecedent is true and the consequent false we may affirm that the first premise is true. The second premise is also true: since Santa does not exist he did not bring presents to anyone including me. The conclusion we also know to be true as well. Hence, all of the premises of the argument are true and the form is valid—here we have a sound argument.

Yet the argument once understood like this is clearly question-begging—we are assuming the conclusion of the argument in one of the premises of the argument. Interestingly enough, an argument may be sound and still beg the question. So while soundness has a higher strength than mere validity there must be a further degree of strength required for demonstration—one which does not allow for begging the question.

To demonstrate the conclusion of an argument one needs premises which are *independently* known from the conclusion. A demonstration, then, requires this further degree of strength of an argument alluded to above. But a demonstration is much more difficult to arrive at. Take the following independent premise for the above argument. If Santa exists, then he is somewhere on this planet. To determine the truth/falsity of this premise we would have to have looked everywhere (and most likely everywhere at once since Santa could hide and return to a place which has already been looked over, etc.).

The material conditional has a few problems for these reasons. A stronger reading of the conditional is known as the strict/formal conditional/implication. This says that a conditional is true only if it is impossible for the antecedent to be true and the consequent false. All other cases are false.

On this stronger reading, the first premise is false. For the time being we only deal with the truth-functional material implication.

For now, the key points are:

- 1) A materially implies B =df.
 - a. If A is false and B is True $\rightarrow$ the conditional is true
 - b. If A is true and B is true $\rightarrow$ the conditional is true
 - c. If A is true and B is false $\rightarrow$ the conditional is false
 - d. If A is false and B is false $\rightarrow$ the conditional is true.
- 2) An argument may be sound and still question begging

- 3) Three degrees of strength of an argument discussed thus far are:
- a. Validity =df. Premises and the negation of the conclusion form an inconsistent set of propositions.
 - b. Soundness =df. Premises and the negation of the conclusion form an inconsistent set of propositions and all of the premises are true.
 - c. Demonstration/Proof =df Premises and the negation of the conclusion form an inconsistent set of propositions and all of the premises are true and premises are known independently of conclusion.