

24.119 Minds and Machines

Handout 2: Arguments -- the basics

It is useful to think of an argument as a list of sentences.^[1] The last sentence is the conclusion, and the other sentences are the premises. Thus:

(1) No professors are ignorant.
All ignorant people are vain.

No professors are vain.

and:

(2) All lions are fierce.
Some lions do not drink coffee.

Some creatures that drink coffee are not fierce.

are both arguments. (These two examples are taken from [Lewis Carroll](#), who was an amateur logician, as well as the author of *Alice in Wonderland*.) The readings will usually not contain arguments in this nice form. Rather, you will have to extract premises and conclusions from much more complex and lengthy passages of text. In doing this, it is helpful to look out for certain key words which often serve as indicators of ("flags" for) premises or conclusions.

Some common premise-indicators are **because, since, given that, for**. These words usually come right before a premise. Examples of the use of such "flags" for premises:

(3) The estate tax should be abolished, **for** it is unfair to tax income twice.

(4) **Given that** euthanasia is a common medical practice, we might as well make it legal.

(5) **Because** marijuana is a dangerous recreational drug, it should not be prescribed by doctors.

(6) We must engage in affirmative action, **because** America is still a racist society.

(7) **Since** abortion is a hotly contested issue in this country, nobody should force his opinion about it on anyone else.

Some common conclusion-indicators are **thus, therefore, hence, it follows that, so, consequently**. These words usually come right before the conclusion of the argument. Examples of the use of such "flags" for conclusions:

(8) Either Clinton lied about sex, or about whether he was alone with Monica, or about the meaning of 'alone'; **so** he lied about something.

(9) Affirmative action violates the rights of white males to a fair shake; **hence** it is unjust.

(10) It is always wrong to kill a human being, and a fetus is undoubtedly a human being. **It follows that** abortion is always wrong.

(11) Martha Stewart is a CEO of impeccable credentials. **Consequently**, she is not guilty of insider trading.

(12) Tony Soprano is seeing a psychiatrist and **so** is not playing with a full deck. **Thus**, he won't make a good mob boss and should **therefore** be taken out.

It is also helpful to use these premise- and conclusion-indicators in your own writing, to make the structure of your arguments clearer. Don't use them lightly, however: make sure they really are "flagging" either a premise or a conclusion of your argument, as appropriate. Anyone reading your paper is entitled to think that sentences preceded by **because**, etc., are premises, and that sentences preceded by **therefore**, etc., are conclusions. Make sure they are, or you are misleading the reader.

Evaluating arguments

Definitions:

(1) A conclusion is entailed by some premises just in case it is *not possible* for all the premises to be true and the conclusion false. Put another way, the conclusion follows from the premises just in case, *necessarily*, if the premises are all true, the conclusion is true.

(2) An argument is valid just in case its conclusion is entailed by its premises. (An argument that is not valid is invalid.)

Note that there are perfect good arguments (in the sense that believing that the premises are true gives you good reason to believe that the conclusion is true) that are nonetheless *invalid*. For example:

(3) Past Congresses have always contained many adulterers.

The current Congress contains some adulterers.

However, the arguments that we will encounter in this course will be any good only if they are valid. So, the first thing you should ask yourself in evaluating an argument from the readings -- or one of your own -- is whether it is valid. Is it possible for the conclusion to be false and the premises true? Exercise: determine, for each of the two arguments

from Lewis Carroll, and for each of the following arguments, whether it is valid or invalid. If the argument is invalid, explain why.

(4) Clinton's troubles were caused either by a right-wing conspiracy, or by his own animal urges.

They were caused by his animal urges.

There was no right-wing conspiracy.

(5) If Hans Blix is a space alien, then I'll eat my hat.

Hans Blix is a space alien.

I'll eat my hat.

(6) All politicians enjoy cheating on their spouses.

Some male politicians enjoy cheating on their spouses.

(7) Abortion is morally wrong.

Abortion is not a constitutional right.

Abortion ought to be against the law.

Sometimes an argument which is invalid as written can easily be "fixed up" so that it is valid and in line with what the proponent of the argument intended. The most common reason for this kind of "corrigible" invalidity is *missing premises*. Sometimes a writer does not state all of his or her premises explicitly, and this renders his or her argument invalid. In such cases we can make the argument valid by supplying an appropriate premise, supposing that the writer intended it to be a premise all along. You should become adept at filling in missing premises so that you can see the structure of an argument more clearly. Exercise: supply the missing premises to arguments (6) and (7) above, and to the following arguments:

(8) If you keep up the negative attacks, you'll lose your reputation as a Washington outsider.

You won't win the race for the nomination.

(9) Abortion involves terminating the existence of some organic matter.

Abortion is always morally wrong.

Note that sometimes a premise is left out because it is taken to be obvious, as in argument (6) above. However, sometimes the missing premise is contentious, as in (7) above. Sometimes, in fact, it is the most contentious premise of the argument, as in (9) above.

Definition:

(10) A deductive argument is sound just in case it is valid and all its premises are true. (An argument that is not sound is unsound.)

Argument (5) above is an example of a valid argument which is unsound.

Note the following fact, which is a consequence of the definitions of soundness and validity:

(11) The conclusion of a sound argument is true.

This fact has practical import. It means that if you read an article and disagree with the conclusion, the onus is on you to show why the argument is unsound. For (by (11)) if it were sound, the conclusion would be true. Therefore, if (according to you) the conclusion is false, the argument must be unsound. This means that either the conclusion does not actually follow from the premises -- in other words, there is a problem with the author's reasoning or logic -- or at least one of the premises is false. In this subject, it is never enough simply to say that you disagree with someone's position, or that his or her position is mistaken. If it is mistaken, there must be something wrong with the argument, and you need to say what it is.

Soundness is thus the most important criterion in evaluating both arguments from the readings and your own arguments. After having identified the conclusion for which a writer is arguing, and the premises which he or she advances in support of that conclusion, you should attempt to determine whether the argument, thus reconstructed, is sound. And in making arguments of your own, you should always try to give a valid argument the premises of which are true, or at least defensible.

Argument-forms and common flaws

Here are some examples of valid forms of argument.

Modus ponens. The general form of a modus ponens argument is given in (1). Two examples follow.

(1)
If **P** then **Q**
P
Q

(2) If the FBI tapes your conversations, then you are in big trouble.

The FBI tapes your conversations.

You are in big trouble.

(3) If affirmative action is an effective way of achieving greater equality, then it ought to be practiced.

Affirmative action is an effective way of achieving greater equality.

Affirmative action ought to be practiced.

Modus tollens. The general form of a modus tollens argument is given in (4). Two examples follow.

(4)

If **P** then **Q**.

Not-**Q**.

Not-**P**.

(5) If Bush decides to invade then Chirac will support him.

Chirac will not support him.

Bush will not decide to invade.

(6) If abortion in the ninth month of pregnancy is acceptable, then infanticide is acceptable.

Infanticide is not acceptable.

Abortion in the ninth month of pregnancy is not acceptable.

Disjunctive syllogism. The general form of a disjunctive syllogism is given in (7a) and (7b). Two examples follow.

(7a)

(Either) **P** or **Q**

Not-**P**

Q

(7b)

(Either) **P** or **Q**

Not-**Q**.

P

(8) Either Saddam Hussain is a liar, or Hans Blix is a CIA agent.

Saddam Hussain is not a liar.

Hans Blix is a CIA agent.

(9) Either ElBaradei will find a smoking gun or Blix will.

Blix will not find a smoking gun.

ElBaradei will find a smoking gun.

Categorical syllogism. Two general types of categorical syllogism are given in (10a) and (10b). Two examples follow.

(10a)

All **F**s are **G**
x is (an) **F**
x is **G**

(10b)

All **F**s are **G**.
All **G**s are **H**
All **F**s are **H**

(11) All men are liars.
Saddam Hussain is a man.

Saddam Hussain is a liar.

(12) Abortion involves terminating the existence of organic matter.
It is always morally wrong to terminate the existence of organic matter.

Abortion is always morally wrong.

Arguments can have various kinds of flaws: for example, invalidity, false premises, dialectical ineffectiveness. NB: these are quite different, and should not be confused. Exercise: give an example of a dialectically ineffective argument (i.e. an argument that your imagined opponent will find unpersuasive) that is also sound.

Some of these flaws have common labels, as follows. The fallacy of equivocation: using key terms in different senses in different parts of the argument. Begging the question (also known as a circular argument): assuming what you are trying to prove. We will seldom see really obvious cases of begging the question in the readings. What we may see is a weak form of begging the question, namely putting forward as a premise something so close to the conclusion that no one would believe the premise who didn't already believe the conclusion. This is an ineffective mode of argument, precisely because it does not persuade. Proving too much: an argument is said to prove too much if it appeals to a principle which has consequences that the formulator of the argument would not accept, or which are clearly erroneous. Example: no politician should be taken seriously if he used to smoke pot. Ad hominem arguments: an *ad hominem* argument involves a personal attack on one's opponent rather than a reasoned objection to his or her position or argument. Appeals to authority: in philosophy, there are no authorities. It is never acceptable to support a position *simply* by pointing out that someone we've read holds it. Descartes is on the philosophy All-Star team, but that doesn't mean that dualism is true. Appealing to supposed authorities in this way is the mirror image of an *ad*

hominem argument. Straw man arguments: representing your opponent's position or argument unfairly so that it is easier to shoot down. In such cases, all you have shot down is a "straw man," not your actual opponent.

[1] More exactly, sentences that are either true or false. Thus 'Shut the door', and 'Is the door shut?', although perfectly acceptable sentences, cannot form part of an argument.
