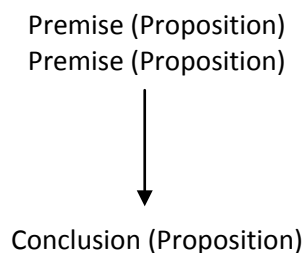


Handout #1: Argument Terminology

1. Argument, Proposition, Premise, Conclusion

Open Question: What happens when two people are in an argument?

An argument is an abstraction from what goes on when people arguing. An **argument** is a set of propositions arranged in such a way that one proposition (the conclusion) is supposed to follow from another set of propositions (the premises).

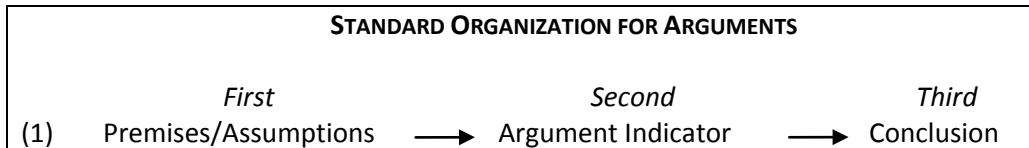


Arguments are differentiated from other kinds of linguistic behavior, e.g. prayers, yelling at people, asking questions, reading a book aloud, by the fact the premises of an argument purportedly *support* the conclusion.

A **proposition** is the content expressed by a sentence that is capable of being true or false.

- *Sentence ≠ Proposition*: While all propositions are expressed by sentences, not all sentences express propositions, e.g. commands, questions, exclamations do not express propositions.
- *Many Sentences Can Express One Proposition*: A single proposition can be expressed in a variety of different ways
 - Example 1: 'John loves Liz' vs. 'Liz is loved by John.'
 - Example 2: A single proposition expressed in two different languages
- *One Sentence Can Express Many Propositions*: A single sentence does not always express the same proposition, e.g. 'I ate breakfast'
- *Being T or F vs. Knowing T of F*: While a proposition must express content that is true or false (or can be true or false), it is not necessary that you *know* the truth value of a sentence (or know how to confirm the truth value) in order for the sentence to be a proposition, e.g. 'there are 50,304 trees in State College.'

The **conclusion** of an argument is the statement that is said to follow from (or be supported by) a set of statements, while the **premises** of an argument are the statements (or reasons) that are said to support (or entail) the conclusion. Arguments also have **arguments indicators** like 'therefore', 'since', 'due to the fact that', 'it follows that', 'consequently' which indicate the presence of an argument. While arguments do not have a single order of presentation, a standard way of presenting arguments is as follows:



In this course, we will present arguments in the following fashion:

P1: [First premise here]

P2: [Second premise here]

.

.

.

C: [conclusion here]

EXERCISES

For the following, determine which sentences express propositions.

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Let the dog out. 2. In a fixed rate par bond, the issuer issues the bond at par value. 3. Pick up carrots at the store. 4. Jon picked up carrots at the store. 5. Brandon has Finance 301 at 11:15AM on Thursdays. 6. Recycling bins are blue. 7. Let's Go Pens! 8. Mike goes to the University of Miami. 9. Billboards are a great way to advertise for your company. 10. Can you pass me the pepper? 11. Finance is awesome. | <ol style="list-style-type: none"> 12. Isaac Newton discovered gravity when he dropped a piano on his brother's head. 13. Shut up. 14. Squash the spider next to the refrigerator. 15. Eric is a successful fitness model and pilot. 16. That iPhone has a very plain background. 17. Brush your teeth so that you don't get cavities. 18. The longer you stand in the rain, the more wet your clothes will become. 19. When I was young, I broke my foot after falling into a ditch on the way to the bus stop. |
|---|--|

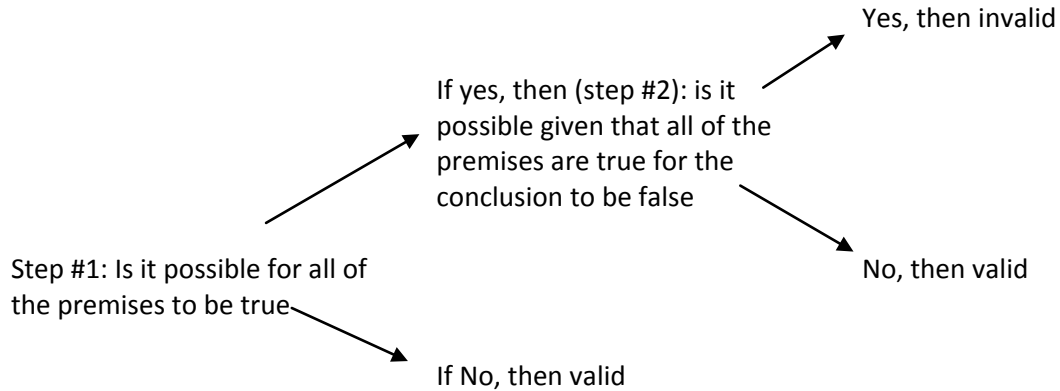
3. Deductive Arguments

In broad strokes, a **deductive argument** aims to draw out the information contained in the premises, i.e. it draws out the premises implications or what is entailed by the premises. Arguments can be **deductively valid** or **deductively invalid**. An argument is **deductively valid** if and only if it is impossible for the premises to be true and the conclusion false. In other words, assuming the premises of an argument are true, the conclusion must be true. In contrast, an argument is **deductively invalid** if and only if it is possible for the premises to be true and the conclusion false. Two important points:

(1) in considering whether an argument is deductively valid, you are not considering whether the premises are *in fact* true.

(2) Rather, you are considering the *relation* between the premises and the conclusion: *is it impossible for all of the premises to be true and the conclusion to be false?*

To **test** whether an argument is valid or invalid, start by assuming that all of the premises are true. If you cannot, then the argument is valid. If you can, then we must consider another step. Given this assumption consider whether it is possible for the conclusion to be false. If it is, then the argument is *invalid*. If not, then the argument is *valid*.



Let's look at some examples.

	Example	Analysis
1	Either John is president of the U.S.A. or Liz is the president. Liz is not the president. Therefore, John is the president.	Both of the premises of the argument are <i>false</i> (and the conclusion is false) but the argument is deductive valid. Why?
2	Barack Obama is the president of the U.S.A. Barack Obama supports Obamacare. Therefore, Obamacare was declared constitutional.	Both of the premises of the argument are <i>true</i> (and the conclusion is true) but the argument is <i>deductively invalid</i> . Why?

Logicians and philosophers of logic are interested in abstract argument forms (or structures) that, no matter what content we insert into these forms, remain deductively valid. To illustrate, consider the various argument forms below (not that "P" and "Q" are just placeholders for propositions):

Some Valid Argument Forms in Propositional Logic		
modus ponens If P then Q P Therefore Q	modus tollens* If P then Q not Q Therefore, not P	disjunctive syllogism* P or Q not Q Therefore not P
disjunctive introduction P Therefore, P or R	hypothetical syllogism If P then Q If Q then R Therefore, if P then R	reductio ad absurdum P not P Therefore, Q

Note that you can insert different *real life* propositions into these structures and the arguments will be deductively valid. Amazing!

Why should you care about deductive validity? Well, the nice thing about a deductively valid argument is that they are *truth preserving*: provided the premises are true, the conclusion will be true as well. That is, if an argument is deductively valid, then you won't (no, *can't!*) go from true premises to a false conclusion. But, while deductively valid arguments preserve truth, we also want to know if there is any truth to preserve. That is, we want to know if the premises of the argument are true. Arguments are **sound** or **unsound**. An argument is **sound** if and only if the argument is both deductively valid and all of its premises are true. An argument is **unsound** if and only if the argument is either *deductively invalid* or *deductively valid yet has at least one false premise*.

Soundness	Deductively Valid + All True Premises
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4. Inductive Arguments

An **inductive argument** goes beyond the information in the premises by making a projection based upon them. Two quick examples:

Example #1: All observed ravens

P1: Every raven observed is black.

C: Therefore, all ravens are black.

Example #2: Supporting Tuition

P1: 63 percent of Penn State students surveyed said they do not support raising tuition.

C: Therefore, 63 percent of Penn State students do not support raising tuition.

Notice that P1 could be true while C is false and it appears that it wasn't the design of the argument to "draw out" information in the premises to see what follows. Instead, the content expressed in the premises is used to render the conclusion *likely*.

The simplest kind of inductive arguments are **arguments by enumeration**. These are arguments that try to support a universal conclusion by citing instances of that conclusion

P1: John played football and has bad knees at age 50

P2: Frank played football and has bad knees at age 50

P3: Liz played football and has bad knees at age 50

C: Therefore, everyone who plays football will have bad knees at age 50.

Adding more premises, e.g. a couple thousand, would make it more likely that if the premises are true, then the conclusion is true. Arguments by enumeration have a couple different forms, but here is one:

Argument by Enumeration

supporting instances	a_1 is P and Q a_2 is P and Q . . . a_n is P and Q
Conclusion (generalization)	All Ps are Qs

An argument is **strong** if and only if the premises provide significant support for the conclusion. That is, *if* the premises were true, then it is *likely* that the conclusion is true. Another way of putting this is that the truth of the premises makes the conclusion *very probable*. In contrast, an argument is **weak** if and only if the premises provide little (or no support) for the conclusion. That is, the truth of the premises does *not* make it *very likely* that the conclusion is true. Another way of putting this is that the truth of the premises does not make the conclusion *very probable*.

To **test** whether an argument is strong or weak, start by assuming that the premises are true (if it is possible to do so), then given this assumption consider whether the conclusion is very likely. If it is, then the argument is *strong*. If not, then the argument is *weak*.

Weak Inductive Argument

- P1 There is a bag on the table filled with 50 beans.
- P2 I randomly drew 5 beans from a bag and they are all black.
- C Therefore, all of the beans in the bag are black.

Strong Inductive Argument

- P1 There is a bag on the table filled with 50 beans.
- P2 I randomly drew 40 beans from the bag and they are all black.
- C Therefore, all of the beans in the bag are black.

While validity is an all-or-nothing, the strength is a **matter of degree** and a comparative notion. Some premises provide more support to their conclusions than others; arguments of this nature are thought to be *stronger* than those that provide less support. We might say that the “strong” argument above is not as strong if P2 were “I randomly drew 49 beans from the bag and they are all black.”

Keep in mind, calling an argument strong or weak concerns the *support* the premises offer the conclusion and is unrelated to whether the premises or the conclusion are *in fact* true. An argument can be extremely strong but have false premises and a false conclusion.

Strong Inductive Argument

- P1 There is a bag on the table filled with 50 beans. *False*, there are actually 100
- P2 I randomly drew 40 beans from the bag and they were all black. *False*, a couple of these were blue.
- C Therefore, all of the beans in the bag are black. *False*, some beans were orange.

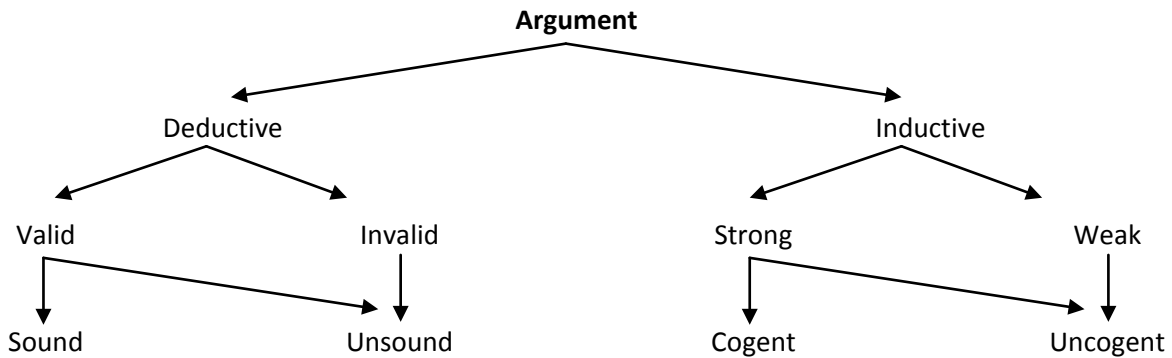
In short, saying that an argument is *strong* just means that *if* the premises were true, then the conclusion *would be very likely*, it does not mean that the premises are actually true.

Finally, whereas deductive arguments are **sound** or **unsound**, inductive arguments are **cogent** or **uncogent**. An inductive argument is **cogent** if and only if the argument is *strong* and its *premises are true*. An inductive argument is **uncogent** provided the argument is either weak or strong but its premises are not true.

Cogent	Strong Inductive Argument + All True Premises
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5. A Quick Review

Consider the following diagram and the brief summary below:



Arguments consist of propositions where at least one of the propositions (the premise) is used to support another proposition (the conclusion). There are two kinds of arguments: deductive and inductive. Deductive arguments draw out information in the premises to a conclusion while inductive arguments take information in the premises and go beyond it to a conclusion. Deductive arguments are valid if and only if it is impossible for the premises to be true and the conclusion false, and invalid otherwise. Inductive arguments are strong if and only if were the premises true, the conclusion would be likely, and weak otherwise. Deductive arguments are sound if and only if they are both valid and all of its premises are true, and unsound otherwise. Inductive arguments are cogent if and only if they are both strong and all of its premises are true, and uncogent otherwise.

2. Ethics: A Preliminary Definition

Ethics is a branch of philosophy that inquires into how we ought to behave by critically investigating claims about

good, bad, ought to be done, or shouldn't be performed.

One way that this , its goal is to examine various propositions that have terms like “good”, “bad”, “right”, “wrong”, and “ought”, “evil” and determine which of these are true and which are false.

3. Three Ethical Cases to Consider

Case #1: Baby Theresa

Theresa Ann Campo Pearson was born with anencephaly. Her parents wanted to donate her organs for transplant. But, since she is considered to be alive and Florida law says that it is illegal to remove one's organs while they are living, her parents and the hospital could not remove the organs for donation.

Some people think that Florida law is right.
Other people think that Florida wrong is wrong.

When considering the view from a philosophical perspective, what we want to know is *not what people think* but *whether what they think is true*. Is it morally right or wrong to remove someone's organs before they are dead?

4. What is Ethics?

Rachels takes away two ideas from his consideration of the three cases. The **first** concerns the importance of *reason* in moral decision making. Rachels says that “we cannot rely on our feelings” as they “may be irrational” and so “we must let our feelings be guided as much as possible by reason. [...] *The morally right thing to do is always the thing best supported by arguments*” (p.11, my emphasis).

This is an *overstatement*. The *possibility* of our feelings being irrational does not warrant getting rid of them altogether nor does it warrant their use in our evaluation of whether an action is good or bad. A less extreme way of making Rachels' point is this:

Ethics is a branch of philosophy that critically investigates good and bad action.

For any action, we can search for reasons for why that action is good or bad. We can put these reasons into arguments and then assess the quality of these arguments. Out of this critical assessment, a number of things emerge. **First**, we can draw an inference about how well an action's *goodness* or *badness* can be supported. If there are a lot of reasons in support of the claim that *killing is morally wrong*, then we can conclude that this proposition is well-supported. **Second**, we might decide to revise or even *reverse* our position. For example, suppose we think that *killing is wrong in every case*. We then think about reasons that support this view and reasons that undermine it. Given the fact that there are some powerful reasons against the view that *killing is wrong in every case*, we might develop a more nuanced view, e.g. *killing is wrong in cases x, y, and z*.

The **second** key idea that Rachels takes away is that “each individual's interests are equally important; no one should get special treatment” (p.12). What he means by this is *not that we should treat everyone*

equally, but instead that we should only treat people differently when there is a good reason for doing so. In other words, when deciding whether an action is morally good or bad, we should not make our determination by appealing to *characteristics of a person, group of people, or activity* that is morally irrelevant. Rachels identifies a few that he takes to be arbitrary, skin color, sex, one's ethnicity or racial makeup.

Reading Questions