Agenda

1. What is an Argument?
2. Evaluating Arguments
3. Validity
4. Soundness
5. Persuasive Arguments
6. Consistency
What is an Argument?

An argument provides reasons (premises) in support of a claim (conclusion).

An argument must include at least one premise and one conclusion.

The banking concept of education dehumanizes students because it treats them as objects rather than conscious subjects.
Premise and Conclusion Flags

It isn’t always clear what the premises and conclusion of an argument are in a given text. However, often times, there are key words that authors use to signal premises and conclusions.

**Premise flags:** because, since, given that, for

**Conclusion flags:** thus, therefore, hence, it follows that, so, consequently

Note that premise and conclusion flags do NOT always indicate premises or conclusions.

- Hunter College has been around since 1870.
- The ball rolled down the hill because Jane pushed it.
- Thus far, the movie has been funny.
Organizing Arguments

A simple convention for organizing an argument is to:
- write its premises above a solid line, and
- write the conclusion underneath.

1. If you study philosophy, then your critical thinking skills will improve.
2. If your critical thinking skills improve, then you are more likely to do well on the LSAT, GMAT, GRE, etc.
3. Therefore, if you study philosophy, you are more likely to do well on the LSAT, GMAT, GRE, etc.
Main and Auxiliary Arguments

• Any philosophical work will have a main argument defending the author’s central conclusion, which is basically the work’s thesis statement.

• But if an author feels that a reader may not automatically agree that one of the premises in the main argument is true, they may need to provide an auxiliary argument (an additional, supplementary one) to defend that premise.
Evaluating Arguments

Evaluate an argument by asking two questions:
1. Are its premises true and worthy of our belief?
2. Does its conclusion really follow from the premises?

These are completely independent issues.

1. No one can receive a Hunter College degree unless he or she has paid tuition to Hunter College.
2. Jane received a Hunter College degree.
3. Therefore, Jane paid tuition to Hunter College.

If an argument is bad, this does not mean we have a reason to reject its conclusion. It simply means the argument can give us no reason for believing the conclusion is true.
Deductive Arguments

• In this class, we will be focusing primarily on deductive arguments.

• **Deductive** arguments are arguments that attempt to provide premises whose truth guarantees that the conclusion is true.

• **Inductive** arguments attempt to provide premises whose truth make it more likely that the conclusion is true.

1. Every swan I have ever seen was white.
2. Therefore, all swans are white.
Validity

• An argument is **valid** when the conclusion is entailed by, or logically follows from, the premises.
• Validity is a property of the argument’s **form**. The **content** of the premises and conclusion doesn’t matter. Note that a valid argument need not have true premises or conclusions.
• To say an argument is valid is to say: *IF* the premises of the argument were true, then the conclusion would also have to be true.

1. All cats are reptiles.
2. Bugs Bunny is a cat.
3. Therefore, Bugs Bunny is a reptile.

1. All B’s are C’s.
2. A is a B.
3. Therefore, A is a C.
Conditionals

A claim of the form “If P then Q” is known as a **conditional**. P is called the **antecedent** of the conditional, and Q is called the **consequent** of the conditional.

- If P then Q
- P implies Q
- P -> Q
- P is sufficient (or: a **sufficient condition**) for Q
- If you've got P you must have Q
- A **necessary condition** for having P is that you have Q
- Q is necessary for having P
- It's only the case that P if it's also the case that Q
- P only if Q
Biconditionals

Just because P entails Q, it doesn’t follow that Q entails P. However, sometimes it’s both the case that P entails Q and also the case that Q entails P. A claim of the form “P if and only if Q” is known as a biconditional.

• P iff Q
• P just in case Q
• P <-> Q
• If P then Q, and if Q then P
• P is both sufficient and necessary for Q
• P is a necessary and sufficient condition for Q
Logical Form

To write an argument in its logical form:
1. Identify the propositions (phrases that can stand alone) of a sentence.
2. Assign letters to each proposition.

If Hunter College is in Manhattan, then Hunter College is in New York City.
Hunter College is in Manhattan.

Therefore, Hunter College is in New York City.

P = Hunter College is in Manhattan
Q = Hunter College is in New York City.

Modus Ponens
If P, then Q.
P.

Q.
Validity Exercises

1. Your high idle is caused either by a problem with the transmission, or by too little oil, or both.
2. You have too little oil in your car.
3. Therefore, your transmission is fine.

Invalid
Validity Exercises

1. If the moon is made of green cheese, then cows jump over it.
2. The moon is made of green cheese.
3. Therefore, cows jump over the moon.

Valid

Modus Ponens
Validity Exercises

1. Either Colonel Mustard or Miss Scarlet is the culprit.
2. Miss Scarlet is not the culprit.
3. Hence, Colonel Mustard is the culprit.

Valid

**Disjunctive Syllogism**

P or Q.
Not Q.

P.
Validity Exercises

1. All engineers enjoy ballet.
2. Therefore, some males enjoy ballet.

Invalid

Hidden premise: Some engineers are male.
1. All engineers enjoy ballet.
2. Some engineers are male.
3. Therefore, some males enjoy ballet.
Supplying Missing Premises Exercises

1. If you keep driving your car with a faulty carburetor, it will eventually explode.

2. Therefore, if you keep driving your car with a faulty carburetor, you will eventually get hurt.

Missing Premise: If your car eventually explodes, you will eventually get hurt.
Supplying Missing Premises Exercises

1. Abortion is morally wrong.
2. Abortion is not a constitutional right.
3. Therefore, abortion ought to be against the law.

Missing Premise: If abortion is morally wrong and abortion is not a constitutional right, then abortion ought to be against the law.
Soundness

- An argument is **sound** just in case:
  1. It’s valid, AND
  2. All its premises are true.

1. If the moon is made of green cheese, then cows jump over it.
2. The moon is made of green cheese.
3. Therefore, cows jump over the moon.

Valid but NOT sound.

Do sound arguments always have true conclusions?
Validity and Soundness Exercises

Which arguments are valid and which valid arguments are also sound?

1. If Socrates is a man, then Socrates is mortal.
2. Socrates is a man.
3. So, Socrates is mortal.

Valid and Sound

Modus Ponens
Validity and Soundness Exercises

1. If Socrates is a horse, then Socrates is mortal.
2. Socrates is a horse.
3. So, Socrates is mortal.

Valid but NOT Sound

Modus Ponens
Validity and Soundness Exercises

1. If Socrates is a horse, then Socrates has four legs.
2. Socrates is a horse.
3. So, Socrates has four legs.

Valid but NOT Sound

Modus Ponens
Validity and Soundness Exercises

1. If Socrates is a horse, then Socrates has four legs.
2. Socrates doesn't have four legs.
3. So, Socrates is not a horse.

Valid and Sound

**Modus Tollens**

If P, then Q.
Not Q.
P.
Validity and Soundness Exercises

1. If Socrates is a man, then he's a mammal.
2. Socrates is not a mammal.
3. So, Socrates is not a man.

Valid but NOT Sound

Modus Tollens
Validity and Soundness Exercises

1. If Socrates is a horse, then he's warm-blooded.
2. Socrates is warm-blooded.
3. So, Socrates is a horse.

Invalid

Affirming the Consequent
If P, then Q.
Q. ______
P. ______
Validity and Soundness Exercises

1. If Socrates was a philosopher, then he wasn't a historian.
2. Socrates wasn't a historian.
3. So, Socrates was a philosopher.

Invalid

Affirming the Consequent
Valid and Invalid Argument Forms

**Valid Forms:**

- **Modus Ponens**
  - If P, then Q.
  - P. ________
  - Q.

- **Modus Tollens**
  - If P, then Q.
  - Not Q. ________
  - Not P.

- **Disjunctive Syllogism**
  - P or Q.
  - P. ________
  - Q.

**Invalid Forms:**

- **Affirming the Consequent**
  - If P, then Q.
  - Q. ________
  - P.

- **Denying the Antecedent**
  - If P, then Q.
  - Not P. ________
  - Not Q.

- **Dysfunctional Syllogism**
  - P or Q.
  - Not P. ________
  - Q.
A sound argument is not necessarily a persuasive one.
It might be that your premises are true, but it’s hard to recognize that they’re true.
A persuasive argument is a valid argument with plausible, or obviously true, or antecedently accepted premises.

Argument A
1. Either God exists, or 2+2=5.
2. 2+2 does not equal 5.
3. So, God exists.

Argument B
1. Either God doesn’t exist, or 2+2=5.
2. 2+2 does not equal 5.
3. So, God doesn’t exist.

Both arguments are sound but unpersuasive.
Necessary and Sufficient Conditions

- To say that one fact is a **necessary condition** for a second fact means that, in order for the second fact to be true, it's required that the first fact also be true.
  - For example, in order for a shape to be a square, it's necessary that the shape has four equal sides.

- To say that one fact is a **sufficient condition** for a second fact means that, so long as the first fact obtains, that's enough to guarantee that the second fact obtains, too.
  - For example, if you have ten children, that is sufficient for you to be a parent.

- When P entails Q,
  - then P is a sufficient condition for Q (if P is true, that guarantees that Q is true, too);
  - and Q is a necessary condition for P (in order for P to be true, Q also has to be true).
Necessary and Sufficient Exercises

Consider the following pairs and say whether one provides sufficient and/or necessary conditions for the other.

1. A valid argument, a sound argument
2. Knowing that it will rain, believing that it will rain

Validity is necessary for soundness and soundness is sufficient for validity.
Belief is necessary for knowledge and knowledge is sufficient for belief.
Consistency

• When a set of propositions cannot all be simultaneously true, we say that the propositions are **inconsistent (or incompatible)**.

• Note that consistency is no guarantee of truth. It's possible for a set of propositions to be consistent, and yet for some or all of them to be false.

• A **contradiction** is a proposition that's inconsistent with itself, like "P and not-P."

• Sometimes it's tricky to see that a set of propositions is inconsistent, or to determine which of them you ought to give up. For instance, the following three propositions all seem somewhat plausible, yet they cannot all three be true, for they're inconsistent with each other:

  1. If a person promises to do something, then he's obliged to do it.
  2. No one is obliged to do things which it's impossible for him to do.
  3. People sometimes promise to do things it's impossible for them to do.