

PHIL 2020 Day 7 Week 4

Continuing types of arguments and
evaluating arguments

Deductive and Inductive

- Argument based on Mathematics
- Argument from Definition
- Categorical Syllogism
- Hypothetical Syllogism
- Disjunctive Syllogism
- Prediction
- Argument from Analogy
- Generalization
- Argument from Authority
- Argument based on signs
- Causal Inference

Evaluating Deductions

Question 1: If you hypothetically accept the premises, do you then have to accept the conclusion?

(Pretend you are living in the imaginary world the premises create, just for a minute.)

If yes, the argument is **VALID**.

If no, the argument is **INVALID**.

This is separate from

Question 2: Are the premises each really true?

If all premises are true as statements on their own, **SOUND**.

If there is even one false premise, **UNSOUND**.

Officially:

- Once you see that an a deductive argument is unsound, it has to also be considered invalid.
- However for the sake of our quiz on Unit 2, please do note the argument had a valid structure in which the premises would have made the conclusion true if the premises had been true.
- In online quizzes, I will be sure to try and limit the choices so it is clear which is the best answer.
- In written exams, you can write VALID and then strike through it as in ~~VALID~~.

Evaluating Inductions

Question 1: If you hypothetically accept the premises, do you then find the conclusion has a strong likelihood of being true?
(Pretend you are living in the imaginary world the premises create, just for a minute.)

If yes, the argument is **STRONG**.

If no, or low likelihood, the argument is **WEAK**.

This is separate from

Question 2: Are the premises each really true?

If all premises are true as statements on their own, **COGENT**.

If there is even one false premise, **UNCOGENT**.

Remember:

- The two questions are separate:
- 1. Do the premises give sufficient reason for the conclusion, if you pretend the premises are accurate for the sake of argument?
- 2. Are the premises actually true on their own?

Types

Deduction

- Arguments based on Math
 - Literally facts from math
- Arguments based on Definitions
 - Terms defined in the argument
- Categorical Syllogism
 - 3 categories, 3 statements
- Hypothetical Syllogism
 - If—then conditions being met, usually 3 conditional if—then statements
- Disjunctive Syllogism
 - Either- or choice being made, usually 3 statements as well

Induction

- Prediction
 - Claims about future events
- Arguments from Analogy
 - Two things are compared and said to be alike in a new way too
- Generalization
 - Moving from group-individual claims or individual-group
- Arguments from Authority
 - Usually one individual is named who is well known, a claim about agreeing with them is made
- Arguments based on Signs
 - Literally a sign or a plaque is claimed to tell the truth
- Causal Inference (inferring what caused an effect)
 - Seeing some effect or evidence, and then inferring who did it or what did it as in Sherlock Holmes mysteries

What do you think?

- 1. Joe must own at least ten DVDs, because he's been buying one a week since he got that DVD player in June.*
- 2. All cats are mammals, and no mammals are fish, so no cats are fish.*
- 3. Either we'll get Chinese or Thai. But Thai Café is closed today, so we'll have to get Chinese.*
- 4. The Bobcats will probably come in last place this year because they are a terrible team.*
- 5. Smith must have been smoking in the company front yard again, he's the only person here who smokes Camels and these are all Camel cigarette butts in the yard.*
- 6. The world is like a huge machine made up of smaller machines, and since machines have intelligent creators, the world must have one too.*
- 7. Philosophers always write both fiction and non-fiction. After all, Sartre and Rousseau both wrote fiction and non-fiction.*

At least 10 DVDs

- 1. Joe must own at least ten DVDs, because he's been buying one a week since he got that DVD player in June.
- Argument based on Math, Deductive
- Relying on the math of "1 per week" with us counting the number of weeks since June
- Valid and Sound
- Premises would lead necessarily to that conclusion (at least 10) and the premises are the kind of imagined scenario we call true in Logic

Mammals, Cats, Fish

- 2. All cats are mammals, and no mammals are fish, so no cats are fish.
- Categorical Syllogism, Deductive
- Valid and Sound
- If we imagine the premises are true, the conclusion follows necessarily with no alternative and no probability
- Sound, all true premises: all cats really are mammals and no mammals are fish.

Either - Or

- 3. Either we'll get Chinese or Thai. But Thai Café is closed today, so we'll have to get Chinese.
- This is actually a Disjunctive Syllogism, an example of disjunctive either-or argumentation.
- There is a hidden premise/hidden assumption that Thai Café is the only Thai restaurant choice possible – if we assume that is true, then it is valid and the conclusion does follow from the premises. We would say sound as well, as we can assume these premises are indeed all true.

Bobcats a Bad Team

- 4. The Bobcats will probably come in last place this year because they are a terrible team.
- Prediction, Induction
- Strength depends on how bad of a team they are – if we accept that they are a terrible team then this is a strong prediction. Cogent.

Whose cigarette butts

- 5. Smith must have been smoking in the company front yard again, he's the only person here who smokes Camels and these are all Camel cigarette butts in the yard.
- Causal Inference, Induction (inferring from the cigarette butts who must have left them)
- If we accept the premises, then the conclusion seems likely – strong, cogent

World like a Machine

- 6. The world is like a huge machine made up of smaller machines, and since machines have intelligent creators, the world must have one too.
- Analogy, Induction (analogy comparing the world to a huge machine)
- If we accept all the premises, strong. But many people would dispute these premises.
- Some might argue that there is a different way to understand the world as indeterminate, so this is probably uncogent (the premises are not all true.)

Fiction and non-fiction

- 7. Philosophers always write both fiction and non-fiction. After all, Sartre and Rousseau both wrote fiction and non-fiction.
- Generalization, Induction
- If we accept the premise about Sartre and Rousseau, this argument might seem strong, but actually relatively few philosophers wrote fiction and philosophy.
- The premise is true, so officially it is cogent, but it is weak (only two examples.)

Here is an example of an argument:

If you want to find a good job, you should work hard. You do want to find a good job. So you should work hard.

The first two sentences here are the premises of the argument, and the last sentence is the conclusion. To give this argument is to offer the premises as reasons for accepting the conclusion.

<http://philosophy.hku.hk/think/arg/arg.php>

Premise Indicator Words

- since
- firstly, secondly, ...
- for, as, after all,
- assuming that, in view of the fact that
- follows from, as shown / indicated by
- may be inferred / deduced / derived from

Conclusion Indicator Words

- therefore, so, it follows that
- hence, consequently
- suggests / proves / demonstrates that
- entails, implies

Passages that are not arguments

Here are some examples of passages that do not contain arguments.

When people sweat a lot they tend to drink more water. [Just a single statement, not enough to make an argument.]

Once upon a time there was a prince and a princess. They lived happily together and one day they decided to have a baby. But the baby grew up to be a nasty and cruel person and they regret it very much. [A chronological description of facts composed of statements but no premise or conclusion.]

Can you come to the meeting tomorrow? [A question that does not contain an argument.]

Explanations are also not counted as arguments. These passages explain why something happened, but do not prove (or try to prove) a particular fact.

Example: The jet crashed because of bad weather. (No attempt to prove this as a point of view, or to prove that the jet crashed -- just an explanation for why it happened.)

§ A01.4 Exercises

Do these passages contain arguments? If so, what are their conclusions?

Cutting the interest rate will have no effect on the stock market this time round as people have been expecting a rate cut all along. This factor has already been reflected in the market. [Answer](#)

So it is raining heavily and this building might collapse. But I don't really care. [Answer](#)

Virgin would then dominate the rail system. Is that something the government should worry about? Not necessarily. The industry is regulated, and one powerful company might at least offer a more coherent schedule of services than the present arrangement has produced. The reason the industry was broken up into more than 100 companies at privatisation was not operational, but political: the Conservative government thought it would thus be harder to renationalise. *The Economist* 16.12.2000 [Answer](#)

Bill will pay the ransom. After all, he loves his wife and children and would do everything to save them.

[Answer](#)

All of Russia's problems of human rights and democracy come back to three things: the legislature, the executive and the judiciary. None works as well as it should. Parliament passes laws in a hurry, and has neither the ability nor the will to call high officials to account. State officials abuse human rights (either on their own, or on orders from on high) and work with remarkable slowness and disorganisation. The courts almost completely fail in their role as the ultimate safeguard of freedom and order. *The Economist* 25.11.2000 [Answer](#)

Do these passages contain arguments? If so, what are their conclusions?

Cutting the interest rate will have no effect on the stock market this time round as people have been expecting a rate cut all along. This factor has already been reflected in the market.

Yes. The conclusion is that this time, cutting interest rate will have no effect on the stock market.

So it is raining heavily and this building might collapse. But I don't really care.

Not an argument. Although the first statement starts with "so" it does not indicate a conclusion.

Virgin would then dominate the rail system. Is that something the government should worry about? Not necessarily. The industry is regulated, and one powerful company might at least offer a more coherent schedule of services than the present arrangement has produced. The reason the industry was broken up into more than 100 companies at privatisation was not operational, but political: the Conservative government thought it would thus be harder to renationalise. *The Economist* 16.12.2000

Yes. The main conclusion is that the domination of the rail system by Virgin is not something the government should worry about.

Bill will pay the ransom. After all, he loves his wife and children and would do everything to save them.

The first statement is the conclusion.

All of Russia's problems of human rights and democracy come back to three things: the legislature, the executive and the judiciary. None works as well as it should. Parliament passes laws in a hurry, and has neither the ability nor the will to call high officials to account. State officials abuse human rights (either on their own, or on orders from on high) and work with remarkable slowness and disorganisation. The courts almost completely fail in their role as the ultimate safeguard of freedom and order. *The Economist* 25.11.2000

An argument. The conclusion is that the legislative, executive and judicial systems in Russia are not working properly.

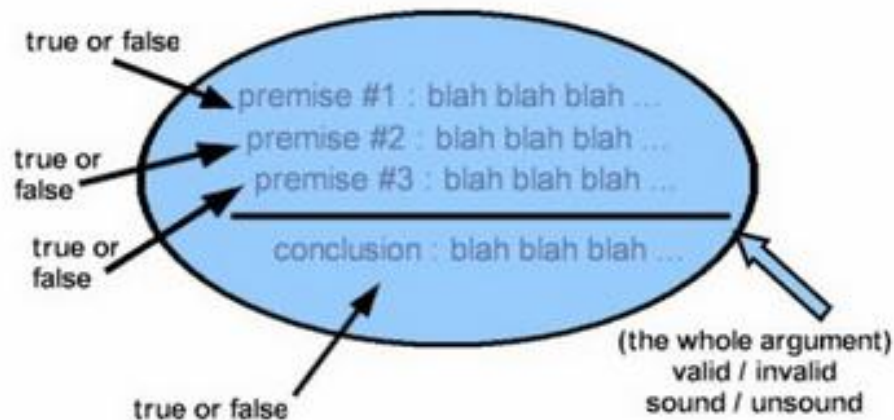
Finding Premises and Conclusions (Standard Form)

1. He is either in Hong Kong or Macau. John says that he is not in Hong Kong. So he must be in Macau.
2. If the Government wants to build an incinerator here they should compensate those who live in the area. Incinerators are known to cause health problems to people living nearby. These people did not choose to live there in the first place.

Validity compared to Truth:

§ A03.4 A reminder

The concept of validity provides a more precise explication of what it is for a conclusion to follow from the premises. Since this is one of the most important concepts in this course, you should make sure you fully understand the definition. In giving our definition we are making a distinction between truth and validity. In ordinary usage "valid" is often used interchangeably with "true" (similarly with "false" and "not valid"). But here validity is restricted to only arguments and not statements, and truth is a property of statements but not arguments:



So never say things like "this statement is valid" or "that argument is true"!

- Remember exercises on this page of the linked material too!

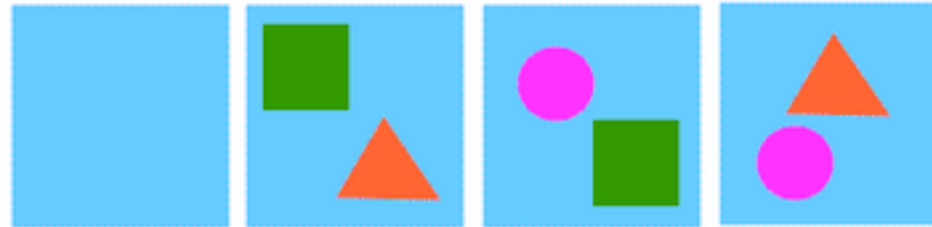
Counterexamples and attempting to invalidate your conclusion (reductio ad absurdum arguments)

Question 2

Consider this argument :

- If there is a square in the picture then there is a circle as well.
Therefore, if there is a circle in the picture there is a triangle in the picture.

Now look at these four pictures below. Which of them constitute invalidating counterexamples to the argument, and which do not?



Answer

Only the second one from the right.

“What we need to check further is of course whether the premises are true. If an argument is valid, and all the premises are true, then it is called a sound argument.”

- An argument that is not sound is an unsound argument. If an argument is unsound, it might be that it is invalid, or maybe it has at least one false premise, or both.
- Valid and Unsound: "Cows are insects. Insects are mammals. So cows are mammals."
- Invalid and Unsound: "Cows are mammals. So the sun is larger than the moon."

§ A07.1 What is induction?

Consider the following argument :

Dipsy bought one ticket in a fair lottery with ten million tickets.
So Dipsy is not going to win the lottery.

This argument is of course not valid, since Dipsy might be so lucky that he wins the lottery. But this is quite unlikely to happen if the lottery is indeed a fair one. If you believe that the premise is true, you probably will accept the conclusion as well. In other words, the conclusion is highly likely to be true **given that the premise is true**.

Here is another example :

Dylan is a man.
He is 99 and is in a coma.
Therefore, Dylan will not run in the marathon tomorrow.

Again, it is not logically impossible for Dylan to recover from his coma and join the marathon, but if the premises are true this is unlikely to happen.

Although the two arguments above are not valid, we would still regard them as good arguments. What is special about them is that they are **inductively strong** arguments : the conclusion is highly likely to be true given that the premises are true. With an inductively strong argument, although the premises do not logically entail the conclusion, they provide **strong inductive support** for it.

There are at least three main differences between an inductively strong argument and a valid argument :

1. As already noted, in a valid argument, the conclusion follows logically from the premises, but this is not the case in an inductively strong argument. It is logically possible for the premises to be true while the conclusion is false.
2. Deductive validity is not a matter of degree. An argument is either deductively valid, or it is not. But inductive support is a matter of degree, depending on the probability of the conclusion being true given the premises.

In each argument, note which parts are the premises and conclusion (Standard Form)

1. All humans are mammals. All mammals are warm-blooded. Therefore, all humans are warm-blooded.
2. Texans must all wear spurs because everyone on the streets of Dallas wears spurs, and everyone on the streets of Houston wears spurs.
3. There are footprints in the mud by the window. There are fingerprints on the windowsill. We must have either a peeping tom or a burglar.
4. Even numbers yield even numbers when they are squared. It follows that the square roots of odd perfect squares are odd.
5. Politicians never live perfect lives, and often the most imperfect people make excellent politicians. Therefore personal lives should not be brought into presidential debates.

Are the following passages arguments, or some type of non-argument? Hint: Try to be as specific as you can in naming the non-arguments.

6. Every swan ever observed thus far has been white. Therefore, the next swan observed will probably be white.

7. If the United States allows foreign workers to come in and do the jobs that legal citizens don't want to do, and if they will be able to collect SSI benefits and things of that nature that legal citizens have a hard time getting, then we're going to have a serious problem taking care of our own citizens.

8. The Titanic sank on its maiden voyage in 1912 because it collided with an iceberg. Four of the ship's 16 watertight compartments could have been flooded without the ship sinking. However, the iceberg tore several gashes in the hull, flooding 5 of these compartments.

9. High school health clinics across the country should be permitted to dispense the Ortho Evra patch, a birth control medication. The reason why is because teenage pregnancy today is at an all-time high, and the patch is 99 percent effective in preventing pregnancy. Furthermore, a single patch ensures protection for a full month.

Practice Identifying the Type of Argument, and Evaluate it using the right terms (valid/sound, strong/cogent, etc.)

10. A plaque on the Leaning Tower of Pisa says that Galileo performed experiments there with falling objects. It must be the case that Galileo did indeed perform those experiments there.

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11. This is a standard deck of 52 playing cards. So if I draw a card at random from it, I predict that card will be a king.

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12. 90% of humans are right-handed. Joe is a human. Therefore, the probability that Joe is right-handed is 90%.

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