

ELEMENTS OF DEDUCTIVE LOGIC

2. More on argument evaluation and standardisation

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KUL 2012

Deductive validity vs invalidity: examples

- Let's test our judgments about deductive validity...

Cluedo

- (1) Either Professor Plum did it, or Colonel Mustard did.
- (2) Professor Plum didn't do it.

- (3) Colonel Mustard did it. (From (1) and (2))

Steroids

- (1) If steroids were taken, the test will come out positive.
- (2) Sam's test came out positive.

- (3) Sam took steroids. (From (1) and (2))

The story so far

- Arguments: sets of declarative sentences.
- Declarative sentences: sentences making a factual claim, and thus in principle evaluable as being true or false.
- The sentences that make up an argument are divided into two sets, (i) the premise(s) and (ii) the conclusion, with (i) being offered as a sufficient reason to accept (ii).
- Such a reason is provided when an argument is deductively valid: when it couldn't have been possible for the premises to be true whilst the conclusion is false.

Deductive validity vs invalidity: examples (ctd.)

Zoo

- (1) Some residents of the prison went to the zoo.
- (2) All prisoners are residents of the prison.

- (3) Some prisoners went to the zoo. (From (1) and (2))

Hooligans

- (1) Some football fans are hooligans.
- (2) All hooligans are bad-tempered.

- (3) Some football fans are bad-tempered. (From (1) and (2))

Deductive validity vs invalidity: examples (ctd.)

- What about this one, which we saw earlier?

Doors

- (1) The sign on the red door says that the prize is behind the red door.
 - (2) The signs on both the blue door and the green door say that the prize isn't behind the blue door.
 - (3) At least one of the signs states a falsehood and at least one of the signs states a truth.
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- (4) The prize is behind the green door. (From (1)–(3))

Inductive validity

- It doesn't follow from the fact that an argument isn't deductively valid, that it isn't a good argument!
- There are good reasons that fall short of *guaranteeing* truth.

Marseille

- (1) The past ten times that I've been to Marseille, my car has been broken into.
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- (2) The next time I go to to Marseille, my car will be broken into. (From (1))

- (1) seems to provide a good enough reason to expect (2), but it doesn't *guarantee* its truth (I might be lucky).

Deductive validity vs invalidity: examples (ctd.)

- *Doors is* in fact deductively valid.
- This might *look* a little difficult to figure out. . .
- But we'll see later on that, given the right tools, it's actually really easy.

Inductive validity (ctd.)

- We say that arguments like *Marseille* are **inductively valid**.
- We won't be discussing inductive validity here.
- Henceforth: 'valid' = 'deductively valid'

Validity & soundness

- There is more to a good argument than mere validity:

Cheshire cat

- (1) The Cheshire cat has a head.
 (2) Anything with a head can be beheaded.
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- (3) The Cheshire cat can be beheaded. (From (1) and (2))

- This *is* a valid argument: the truth of (1) and (2) would guarantee that of (3).
- But yes, it is unpersuasive: premise (2) is clearly false.
- A **sound** argument is an argument (i) that is valid *and* (ii) whose premises are all true.

Standardisation and implicit premises

- Many real-world arguments that *appear* to be invalid are in fact **elliptical**.
- They fail to explicitly state all the premises that are relied on.
- Ellipticality is perfectly OK in practise, so long as the person offering the argument believes that the implicit premises are:
 - easily recoverable from context,
 - entirely uncontroversial.
- When standardising, however, you are expected to make sure that *all* implicit premises are listed:
 - It avoids unfairly construing someone as committing an error of reasoning.
 - The missing premises might not be that uncontroversial after all.

Validity & soundness (ctd.)

- To forestall any misunderstandings:

	All premises true	At least one premise false
Valid	Sound	Unsound
Invalid	Unsound	Unsound

- So every sound argument has a true conclusion. (But *not* all arguments with true conclusions are sound!!!)
- If you reject the conclusion of an argument, you have a duty to show that the latter is unsound, by either:
 - showing that the argument is invalid, or
 - casting doubts on the truth of the premises.
- In this course, we will *only* focus on validity: assessing the truth of the premises or an argument is not the job of the logician.

Standardisation and implicit premises (ctd.)

- Ask yourself:
 - What are the explicit premises and conclusion?
 - Given these, does the argument seem valid as it stands?
 - If so, leave things as they are. If not, what extra premises would be required?
 - Is it plausible that the proponent of the argument tacitly assumed these?
 - If so, add them to your list. If not, leave things as they are.
- Some examples...

Implicit premises: example #1

Englishmen

‘All Englishmen are idiots. You shouldn’t marry one.’

- (1) All Englishmen are idiots.
- (2) *You shouldn’t marry an idiot.*

- (3) You shouldn’t marry an Englishman. (From (1) and (2))

Implicit premises: example #3

Out and about

‘She’s not home. If she drove home, her car would be in the drive. And it’s raining, so she didn’t walk home.’

- (1) *If she is home, then either she walked home or she drove.*
- (2) If she drove home, then her car would be in the drive.
- (3) *Her car is not in the drive.*

- (4) *She didn’t drive home.* (From (2)–(3))
- (5) *If it’s raining, then she didn’t walk home.*
- (6) It’s raining.

- (7) She didn’t walk home. (From (5)–(6))

- (8) She’s not home. (From (1), (4) and (7))

Implicit premises: example #2

Lottery

‘Positive thinking can’t help you win the lottery. If it could, then lots of people would win.’

- (1) If positive thinking could help you win the lottery, then lots of people would win.
- (2) *Not many people do win.*

- (3) Positive thinking can’t help you win the lottery. (From (1) and (2))

Implicit premises: example #4

Tattoos

‘You shouldn’t get a tattoo. The Bible says that God forbids it.’

- (1) The Bible says that God forbids tattoos.
- (2) *Whatever the Bible says is true.*

- (3) *God forbids getting a tattoo.* (From (1) and (2))
- (4) *One should not do what God forbids.*

- (5) You should not get a tattoo. (From (3) and (4))

Next session

- Exercise class: please do exercise set #1