

Logic Exercises

Jan. 21, 2014

Overview I

Arguments

Fallacies

Reminders

- 1 Some terminology:
 - An argument is never true or false; it is valid / invalid, sound / unsound.
 - A conclusion of an argument *is* true or false; it is not sound / unsound.
- 2 Deciding validity and soundness:
 - Only deductive arguments can be valid / invalid; and only valid deductive arguments can be sound / unsound.
 - Validity can be decided by just examining the argument; soundness depends on the way things actually are, so most often cannot be decided without looking at the world.
- 3 Importance of context:
 - Whether something is an argument, even whether it is inductive or deductive, can depend on the context.
 - Arguments often have missing premises: either because the author thinks they are obvious, or because he thinks they are problematic. Look out for these!

The turkey vulture is called by that name because its red featherless head resembles the head of a wild turkey.

Because triangle A is congruent with triangle B, and triangle A is isosceles, it follows that triangle B is isosceles.

Since Moby Dick was written by Shakespeare, and Moby Dick is a science fiction novel, it follows that Shakespeare wrote a science fiction novel.

A mammal is a vertebrate animal that nurses its offspring. Thus, cats and dogs are mammals, as are sheep, monkeys, rabbits, and bears.

Eternity is simultaneously whole. But time has a before and an after. Therefore time and eternity are not the same thing.

Every province in Canada has exactly one city as its capital.
Therefore, since there are thirty provinces in Canada, there are thirty provincial capitals.

Paying off terrorists in exchange for hostages is not a wise policy, since such action will only lead them to take more hostages in the future.

Five college students who were accused of sneaking into the Cincinnati Zoo and trying to ride the camels pleaded no contest to criminal trespass yesterday. The students scaled a fence to get into the zoo and then climbed another fence to get into the camel pit before security officials caught them, zoo officials said.

No e-mail messages are eloquent creations. Some love letters are eloquent creations. Therefore, some love letters are not e-mail messages.

The longest river in South America is the Amazon, and the Amazon flows through Brazil. Therefore, the longest river in South America flows through Brazil.

The Encyclopedia Britannica has an article on symbiosis. The Encyclopedia Americana, like the Britannica, is an excellence reference work. Therefore, the Americana probably also has an article on symbiosis.

Each element, such as hydrogen and iron, has a set of gaps — wavelengths that it absorbs rather than radiates. So if those wavelengths are missing from the spectrum, you know that that element is present in the star you are observing.

The Simpson incident had shown me that a dog was kept in the stables, and yet, though someone had been in and had fetched out a horse, he had not barked enough to arouse the two lads in the loft. Obviously the midnight visitor was someone whom the dog knew well.

All leopards with lungs are carnivores. Therefore, all leopards are carnivores.

I'm sick and tired of living in fear. I'm tired of plastic bags and duct tape. I'm tired of alerts telling me whether or not I can walk outside. America should be a bastion of hope. Jobs, affordable health care and respect from the world. These will bring hope, and hope is what prevents terrorism.

Reminder: The ways an argument can go wrong

Fallacies of relevance

- 1 Appeal to emotion
- 2 Appeal to pity
- 3 Appeal to force
- 4 Argument against the person
- 5 Irrelevant conclusion

Fallacies of presumption

- 1 Fallacy of accident
- 2 Complex question
- 3 Begging the question

Fallacies of defective induction

- 1 Fallacy of ignorance
- 2 Appeal to inappropriate authority
- 3 False cause
- 4 Hasty generalization

Fallacies of ambiguity

- 1 Equivocation
- 2 Amphiboly
- 3 Fallacy of composition
- 4 Fallacy of division

“The time of the crustaceans is coming. You’d think people wouldn’t care about lobsters, because they aren’t cuddly and fuzzy and they have these vacant looks and they don’t vocalize. But you’d be surprised how many people care.” “How about the homeless people? Why don’t the animal people use their energy to care for those people? They have no homes! They are hungry!”

- This is an **appeal to emotion**, a very obvious case of a fallacy of relevance.
- Of course, it appeals to our empathy, but this alone does not make it a fallacy called “appeal to pity”, which primarily occurs when the speaker is trying to evoke the pity of the opponent *for himself*. (E.g., by saying that he is poor, and sick, and has a dying mother, so the opponent should believe him.)

No one has proved conclusively that America's nuclear power plants constitute a danger to people living in their immediate vicinity. Therefore, it is perfectly safe to continue to build nuclear power plants near large metropolitan centers.

- This is a **fallacy of ignorance**: from the fact that a case has not been proved, it does not follow that its opposite is true.

An atomic bomb causes more damage than a conventional bomb. Therefore, during World War II, more damage was caused by atomic bombs than by conventional bombs.

- This is a **fallacy of composition**: from the single case of an atomic bomb damage, it concludes that *taken together*, atomic bombs caused more damage at a certain time than conventional bombs.
- What distinguishes it from a simple “hasty generalization” fallacy is that it rests on the assumption that the characteristic of one part (i.e., the damage caused by a single bomb) is also a characteristic of the whole (i.e., the total damage), *just because it is a part of that whole*.

What goes up, must come down. The price of housing has been going up for years. Therefore, it will surely come down soon.

- This is a **fallacy of accident**: it applies a general rule to a particular situation to which it does not apply. (It could perhaps also be a fallacy of equivocation, if we think that it uses 'goes up / comes down' differently in the first and the second sentence.)

Of course abortion is permissible. After all, a woman has a right to do as she pleases with her own body.

- This is a **petitio principii (begging the question)**: it is precisely the premise of the argument (i.e., that a woman has a right to do as he pleases with her body) that is in question in the debate.

In a motion picture featuring the famous French comedian Sacha Guitry, some thieves are arguing over division of seven pearls worth a king's ransom. One of them hands two to the man on his right, then two to the man on his left. "I," he says, "will keep three." The man on his right says, "How come you keep three?" "Because I am the leader." "Oh. But how come you are the leader?" "Because I have more pearls."

- Another **petitio principii**: a clearly circular argument.
- Just because they talk about being a leader, that does not make it an "appeal to inappropriate authority" fallacy.

Whoever thrusts a knife into another person should be arrested.
But surgeons do precisely this when operating. Therefore, surgeons should be arrested.

- Another obvious case of **fallacy of accident**, an otherwise good general rule simply does not apply in the specific case.

When we had got to this point in the argument, and everyone saw that the definition of justice had been completely upset, Thrasymachus, instead of replying to me, said: “Tell me Socrates, have you got a nurse?” “Why do you ask such a question,” I said, “when you ought rather to be answering?” “Because she leaves you to snivel, and never wipes your nose; she has not even taught you to know the shepherd from the sheep.”

- A quote from Plato, committing an **ad hominem (against the person)** fallacy: when Thrasymachus got tired of the debate, he started to attack Socrates directly.

The universe is spherical in form. . . because all the constituent parts of the universe, that is the sun, moon, and the planets, appear in this form.

- Another **fallacy of composition**: from the fact that all parts of a whole are spherical, it incorrectly concludes that the whole itself is spherical.
- Just because the passage contains the connective word 'because', that does not make it a fallacy of "false cause"; it simply means that the speaker regards the premise as leading to the conclusion.

In his *History of the American Civil War*, Jeffry Noland argues that the war had little to do with slavery. However, as a historian from Alabama, Noland could not possibly present an accurate account. Therefore, his arguments should be discounted.

- Another **ad hominem**: the argument does not even consider Noland's arguments, but is based on the completely irrelevant fact of his origin.
- This is, again, *not* an “appeal to inappropriate authority”: here the speaker regards Noland as inappropriate for bad reasons, while in an “appeal to inappropriate authority” case the speaker cites someone who *should be* regarded inappropriate in that specific matter (e.g., the speaker cites a physicist in a question of philosophy).

You folks think we city people are all crooked, but we city people think you farmers are all crooked. There isn't one of you I'd trust in a horse trade, because you'd be sure to skin me. But when it comes to having sympathy with a person in trouble, I'd sooner trust you folks than city folks, because you come to know people better and get to be closer friends.

- Another **appeal to emotion**, probably trying to convince someone about political matters, referring to sympathy, friendship, trust, etc.

All men are mortal. Therefore, some day man will disappear from the earth.

- Another **fallacy of composition**, a little trickier. From the fact that for *each* human being there is a time when that human being dies, it concludes that there is *a single* time when *all* humans die.

People who lack humility have no sense of beauty, because everyone who has a sense of beauty also has humility.

- Another relatively obvious **petitio principii**, where the premise and the conclusion are in fact identical.

Friedrich Nietzsche's philosophy is not worth the paper it's printed on. Nietzsche was an immoral reprobate who went completely insane from syphilis before he died.

- Again, a nice **ad hominem**, attacking Nietzsche's philosophy by attacking the person himself.

No man will take counsel, but every man will take money:
therefore money is better than counsel.

- This is a **fallacy of equivocation**, using the term 'to take' in very different senses in the two premises. (A similar example, which is perhaps easier to see, would be like this: People play baseball with bats; a bat is an animal; therefore, people play baseball with animals. Here, again, 'bat' is used in two, completely unrelated senses.)