

relationships between
categorical propositions

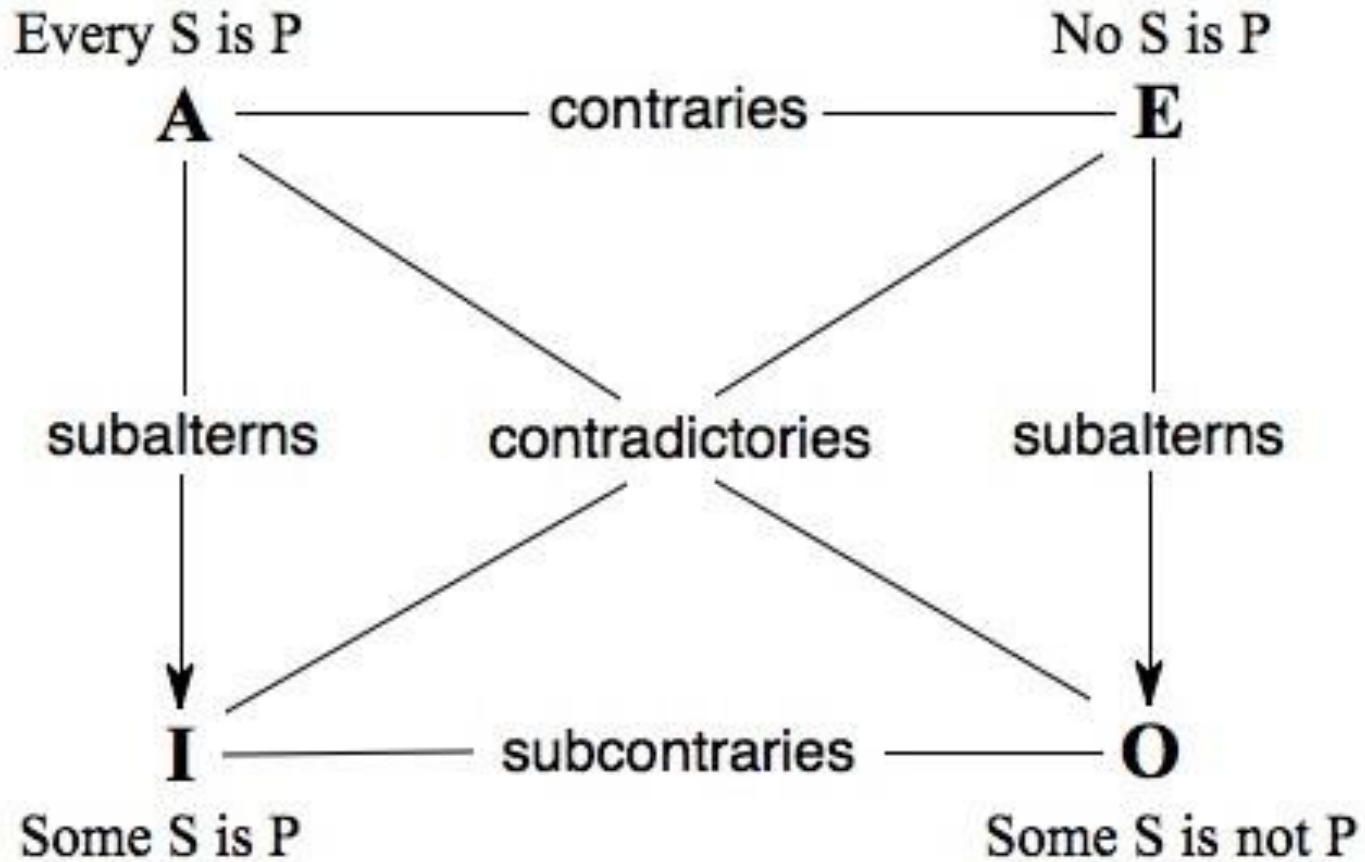
Corresponding claims:

- If I use the same subject and predicate terms in two or more different categorical claims, the result will be **corresponding claims**.
- The meanings of each claim will of course differ.
- E.g. 'All tuna are fish' and 'No tuna are fish' are corresponding claims because their subject and predicate terms are the same.

Relationships:

- Corresponding claims have relationships with one another:
 - Contradictory
 - Contrary
 - Subcontrary
 - Subalternate

Square of Opposition



Contradiction

- What it means for one claim to contradict another is that two corresponding claims must be such that they must never have the same truth-assignment at the same time.

Contradiction

- Consider
 - A: All turtles are famous painters
 - O: Some turtles are not famous painters
- If the A claim is true, then the corresponding O claim must be false, and if the A claim is false, then the corresponding O claim must be true.
- This means that corresponding A and O claims are contradictory (think about E and I claims too)

Contrary

- Consider:
 - A: All sporks are holy relics
 - E: No sporks are holy relics
- If the A claim is true, then the E claim must be false, and if the E claim is true, then the A claim must be false. Isn't that the same as contradiction?

Contrary

- Consider:
 - A: All sporks are holy relics
 - E: No sporks are holy relics
- If the A claim is true, then the E claim must be false, and if the E claim is true, then the A claim must be false. Isn't that the same as contradiction?
- No, both the A and E claims can be false at the same time (perhaps some sporks are holy relics and others are not) even if they can't be true at the same time

Contrary

- Contrary statements are statements whose corresponding claims cannot both be true at the same time, but can both be false at the same time.

Subcontrary

- Consider:
 - I: Some times are times when you feel like a nut
 - O: Some times are not times when you feel like a nut
- Note that both can be true at the same time, but that they cannot both be false at the same time. This would violate the excluded middle principle.

Subcontrary

- Subcontrary statements are statements whose corresponding claims cannot both be false at the same time, but can both be true at the same time.

Subaltern

- Traditionally, the truth of a true A claim was taken to imply the truth of its corresponding I claim (If all tuna are fish, then some tuna are fish).
- Likewise, the truth of the E claim was taken to imply the truth of its corresponding O claim (If no tuna are crabs, then some tuna are not crabs)

Operations

- Using the relationships between the categorical propositions, we can begin to examine what kinds of changes to the format of these claims preserves the truth of the claims.
- This allows us flexibility in translating and using categorical propositions.

Conversion

- Consider:
 - All squares are rectangles
 - All rectangles are squares
- Notice that one of these statements is true, and the other is false. This means that the operation of **conversion** (swapping the subject and predicate terms) does not preserve the truth of an A claim.

Conversion

- Consider:
 - No right feet are left feet
 - No left feet are right feet
- Notice that they both assert effectively the same thing. So if an E claim is true, then so is its **converse**. Conversion is valid for E claims.

Conversion

- I: Some seashells are shells that she sells
- I: Some shells that she sells are seashells
 - Conversion is valid for I claims
- O: Some knots are not naughty things
- O: Some naughty things are not knots
 - Conversion is NOT valid for O claims

Conversion

- A joke:
 - Converse: sneakers that go on the wrong feet.

Contraposition

- Contraposition is conversion plus an extra step.
- Once a claim is converted, you must negate each term.

Contraposition

- A: All voters are citizens
 - Converse (invalid): All citizens are voters
 - Contrapositive: All non-citizens are non-voters (valid)
- E: No triangles are squares
 - Converse (valid): No squares are triangles
 - Contrapositive: No non-squares are non-triangles (invalid)

Contraposition

- I: Some lions are cowards
 - Converse (valid): Some cowards are lions
 - Contrapositive: Some non-cowards are non-lions (invalid)
- O: Some corn are not genetically modified giant baby corn
 - Converse (invalid): Some genetically modified giant baby corn are not corn
 - Contrapositive: Some non-genetically modified giant baby corn are not non-corn (valid)

Obversion

- Obversion reverses the quality of the claim (affirmative/negative) and then negates the predicate term.

Obversion

- A: All voters are residents
 - Obverse: E: No voters are non-residents (valid)
- E: No soldiers are circus clowns
 - Obverse: A: All soldiers are non-circus clowns (valid)
- I: Some things are things that stink
 - Obverse: O: Some things are not non-things that stink (valid)
- O: Some skyscrapers are not waffles
 - Obverse: I: Some skyscrapers are non-waffles (valid)