

Philosophy 57 — Day 13

- Quiz #3 Returned Thursday (Grader forgot to give them to me today)
 - Solutions posted now — will be discussed Thursday
 - “Curve” To Be Announced Thursday
- Mid-Term Next Tuesday (March 18th)
 - Will cover everything through today’s lecture (*except* chapter 5)
 - Chapters 1, 3, 4 (just sections covered in class)
 - One 8.5 × 11 sheet (2-sided) of notes allowed for exam!
- Today: Translation from English to CL (section 4.7)
 - Last 5 Parts of Section 4.7
- Time Permitting: Introduction to Chapter 5
 - Categorical Syllogisms
 - Arguments in CL with two premises



Chapter 4: Categorical Statements — Translation from English Overview

- Many English claims can be translated faithfully into one of the four standard form categorical claims. There are 10 things to look out for.
 - * Terms Without Nouns ✓
 - * Nonstandard Verbs ✓
 - * Singular Propositions ✓
 - * Adverbs and Pronouns ✓
 - * Unexpressed Quantifiers ✓
 - * Nonstandard Quantifiers ✓
 - * Conditional Statements
 - * Exclusive Propositions
 - * “The Only”
 - * Exceptive Pronouns
- You do not need to remember the names of these 10 watchwords, but you’ll need to know how to translate English sentences which involve them.



Chapter 4: Categorical Statements — Translation from English VI

- **Nonstandard Quantifiers:** In English there are many types of quantifiers. In categorical logic, there are only two. Nonstandard quantifiers must be translated into standard quantifiers in a way that best preserves meaning.
 - “A few soldiers are heroes” becomes “___ soldiers are heroes”
 - “Not everyone who votes is a Democrat” becomes ___?
 - “Not a single dog is a cat” becomes ___?
 - “All newborns are not able to talk” becomes ___?
 - “All athletes are not superstars” becomes ___?
- Sometimes, more than one categorical claim will be required to capture the meaning of an English sentence with a nonstandard quantifier:
 - “A small percentage of the sailors entered the regatta” becomes ___?
 - “Few marriages last a lifetime” becomes ___?



Chapter 4: Categorical Statements — Translation from English VII

- **Conditional Statements:** Conditional statements can often be translated into universal categorical claims.
 - “If it’s a mouse, then it’s a mammal” becomes “All mice are mammals”
 - “If an animal has four legs, then it’s not a bird” becomes ___?
- When the “if” occurs in the middle of a sentence, we need to move it to the beginning, then translate into a universal claim:
 - “A person will succeed if he or she perseveres” becomes “If a person perseveres, then they will succeed” and then “All persons who persevere are persons who will succeed.”
 - “Jewelry is expensive if it is made of gold” becomes ___?
- The key is to preserve the meaning of the conditional. A helpful rule about conditionals is called **transposition**, which says that “If p , then q ” is equivalent to “If not q , then not p ”. (looks like *contraposition*!)



- “If something is not valuable then it is not scarce” becomes (by transposition) “If something is scarce then it is valuable” and then ____?
- Whenever you see “*p unless q*”, you can read this as “*p if not q*”.
 - “Tomatoes are edible unless they are spoiled” becomes “If a tomato is not spoiled then it is edible.” and then ____?
 - “Unless a boy misbehaves he will be treated decently” becomes ____ and then ____?



Chapter 4: Categorical Statements — Translation from English VIII

- **Exclusive Propositions:** Many propositions involve the words “only”, “none but”, “none except” and “no ... except” are exclusive propositions. We must be careful to get the subject and predicate terms right in such examples. It helps to translate into a conditional statement first, then into a universal categorical statement:
 - “Only elected officials will attend the convention”. Which is correct: “All elected officials are persons who will attend the convention” or “All persons who will attend the convention are elected officials”?
 - “None but the brave deserve the fair”. Which is correct: “All persons who deserve the fair are brave persons” or “All brave persons are persons who deserve the fair”?
 - “No birds except peacocks are proud of their tails.”
 - **General hint:** “Only *A* are *B*” becomes “All *B* are *A*”. The same goes for “none but ...” and “no ... except”.



Chapter 4: Categorical Statements — Translation from English IX & X

- **“The Only”:** “The only *A* are *B*” gets translated as “All *A* are *B*”. Note “*the only*” is different than “Only” in this sense.
 - “The only animals that live in this canyon are skunks” becomes “All animals that live in this canyon are skunks”.
 - “Accountants are the only ones who will be hired” becomes ____ and then ____?
- **Exceptive Propositions:** Statements of the form “All except *S* are *P*” require *two* categorical statements for proper translation.
 - “All except students are invited” becomes “No students are invited persons, *and* ____”.
 - “All but managers must report to the president” becomes ____ *and* ____?



Chapter 4: Categorical Statements — Translation from English: Table of Hints

| Key Word (to be eliminated) | Translation Hint |
|--|---|
| Proper names (specific individuals) | <i>Parameterize</i> , and use “all” or “no” |
| whoever, wherever, always, anyone, never, etc. | use “all” or “no”, together with persons, places, times |
| a few | “some” |
| if ... then | use “all” or “no” |
| unless | “if not” |
| only, none but, none except, no ... except | use “all” and switch order of terms |
| the only | “all” |
| all but, all except, few | two statements required (an I and an O) |
| not every, not all | “some ... are not” |
| there is, there are | “some” |



Chapter 5: Categorical Syllogisms I

- A **Categorical Syllogism** is an argument in categorical logic which contains exactly two premises and three terms. Here's a simple example:

All soldiers are patriots. (All *S* are *P*.)

No traitors are patriots. (No *T* are *P*.)

Therefore, no traitors are soldiers. (No *T* are *S*.)

- The three terms in a categorical syllogism (CS) each have names:
 - The **major term** is the predicate term of the CS's conclusion.
 - The **minor term** is the subject term of the CS's conclusion.
 - The **middle term** is the remaining term in the CS.
- In our simple example above, which are the major, minor, middle terms?
- The premises in a CS also have names (which are which in our example?):
 - The **major premise** is the premise containing the major term.
 - The **minor premise** is the premise containing the minor term.



Chapter 5: Categorical Syllogisms II

- A categorical syllogism said to be in **standard form** iff:
 - All three statements are standard-form categorical propositions.
 - The two occurrences of each term are identical.
 - Each term is used in the same sense throughout the argument.
 - Order: major premise first, minor premise second, conclusion third.
- The following syllogisms are *not* in standard form (why?):

| | |
|--|---|
| Anyone who led America into the space age will live in history. John Glenn led America into the space age. Therefore, John Glenn will live in history. | All <i>P</i> are non- <i>W</i> . Some <i>E</i> are <i>W</i> . Therefore, Some non- <i>P</i> are non- <i>E</i> . |
| No men are pregnant animals. All human beings are men. ∴ No human beings are pregnant animals. | All <i>W</i> are <i>P</i> . Some <i>W</i> are <i>M</i> . Therefore, Some <i>P</i> are <i>M</i> . |



Chapter 5: Categorical Syllogisms III

- The **mood** of a categorical syllogism consists of the letter names of the categorical propositions that make it up (in order).
 - Example: if the major premise is an **A** claim, the minor premise is an **O** claim, and the conclusion is an **E** claim, then the *mood* of the CS is **AOE**.
- The **figure** of a categorical syllogism is determined by the location of the two occurrences of the middle term in the premises. Four possible arrangements:

| Figure 1 | Figure 2 | Figure 3 | Figure 4 |
|--|--|--|--|
| <i>M P</i> <i>S M</i> ∴ <i>S P</i> | <i>P M</i> <i>S M</i> ∴ <i>S P</i> | <i>M P</i> <i>M S</i> ∴ <i>S P</i> | <i>P M</i> <i>M S</i> ∴ <i>S P</i> |

- What are the mood and figure of the following categorical syllogisms?

| | | |
|------------------------------------|------------------------------|--------------------------------|
| No <i>P</i> are <i>M</i> . | No <i>P</i> are <i>M</i> . | Some <i>P</i> are <i>M</i> . |
| Some <i>M</i> are <i>S</i> . | All <i>S</i> are <i>M</i> . | All <i>M</i> are <i>S</i> . |
| ∴ Some <i>S</i> are not <i>P</i> . | ∴ No <i>S</i> are <i>P</i> . | ∴ Some <i>S</i> are <i>P</i> . |



Chapter 5: Categorical Syllogisms IV

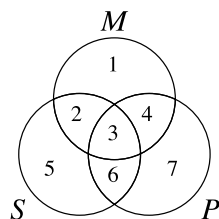
- The **form** of a categorical syllogism is determined by its mood and its figure. For instance, the form of the following categorical syllogism is **EAE-4**:

| |
|------------------------------|
| No <i>P</i> are <i>M</i> . |
| All <i>S</i> are <i>M</i> . |
| ∴ No <i>S</i> are <i>P</i> . |
- Since there are 4 kinds of categorical propositions and there are 3 categorical propositions in a categorical syllogism, there are $4^3 = 4 \times 4 \times 4 = 64$ moods.
- Since there are 4 different figures and 64 different moods, there are grand total of $4 \times 64 = 256$ different forms of categorical syllogisms.
- The **validity of a categorical syllogism is determined entirely by its form**.
- As it turns out, exactly 15 of the 256 forms are valid (the rest are invalid).
- Hurley gives a list of the valid forms (page 245). You will *not* need to remember this list. We'll use (3-circle) Venn Diagrams to determine validities.



Chapter 5: Categorical Syllogisms V

- Because categorical syllogisms involve 3 terms, Venn Diagrams for categorical syllogisms will require 3 circles. We draw them like this:



- As was the case with our 2-circle diagrams, we will need some conventions for marking these 3-circle Venn Diagrams for categorical syllogisms.
- The basic rules are the same as before. If a region is empty, then we shade it, and if a region is non-empty, then we put an “X” in it (the precise placement of “X”s will be a little more subtle in the 3-circle case). Work lots of examples!

