Categorical Propositions

Aristotle and the Logic of Categories

- Aristotle often focused on the importance of categorization to knowledge and discovery.
- Some examples include:
  - Categorizing plant and animal species by their similarities and differences
  - Sorting near and far societies by type of government
  - Identifying behaviors into categories of virtue and vice.

Aristotle and the Logic of Categories

- Most importantly for our purposes, Aristotle noticed that the language we use to put things into categories can itself be analyzed by putting it into categories.

(In order to understand recursion, you must understand recursion)

Laws of Logic

- Non-contradiction: nothing is both in and not in some category at the same time
- Excluded middle: a thing is either in some category or it is not

The Categorical Statements

- There are only four ways of talking about categories, and so there are four types of categorical statements:
  - …that put everything into a category
  - …that put some things into a category
  - …that exclude everything from a category
  - …that exclude some things from a category

Properties of Categorical Statements

- Notice that two of the ways of putting things into categories included things into categories and the other two excluded things from categories.

- We call those statements that include things into categories **affirmative** statements.

- We call those statements that exclude things from categories **negative** statements.

Properties of Categorical Statements

- Two of the statements entirely included or entirely excluded things. The other two statements included or excluded just some things from a category.

- Those that dealt with entirety are called **universal** statements

- Those that dealt with only some things are called **particular** statements

Categorical Claim Format

- We have a standard format for categorical claim, as well as names for each one:

A: All_____are_____.

E: No_____are_____.

I: Some_____are_____.

O: Some_____are not_____.

Categorical Claim Format

- We have a standard format for categorical claim, as well as names for each one:

A: All_____are_____.

E: No_____are_____.

I: Some_____are_____.

O: Some_____are not_____.

- Only **plural noun phrases** are permitted in the blanks.

Categorical Claim Format

- We have a standard format for categorical claim, as well as names for each one:

A: All_____are_____.

E: No_____are_____.

I: Some_____are_____.

O: Some_____are not_____.

- Each plural noun phrase is called a **term**.

Categorical Claim Format

- We have a standard format for categorical claim, as well as names for each one:

A: All_____ are_____.

E: No_____ are_____.

I: Some_____ are_____.

O: Some_____ are not_____.

- The left blank contains the **subject term**; the right blank contains the **predicate term**.

Organization

Letter	Format	Quality	Quantity
A	All S are P	Affirmative	Universal
E	No S are P	Negative	Universal
I	Some S are P	Affirmative	Particular
O	Some S are not P	Negative	Particular

Distribution

- You have seen that each of the categorical statements has a pair of properties (quality and quantity).
- Each term in a categorical statement has a property called distribution.

Distribution

- Consider:
  - All smurfs are sources of dietary calcium.
- The claim is saying something about every member of the set 'smurf'.
- That is, in order to tell whether the claim were true, we would have to know something about every smurf.
- But we would not have to know anything about every source of dietary calcium.

Distribution

- Consider:
    - All smurfs are sources of dietary calcium.
- So the subject term of an A claim is **distributed** while the predicate term is not.

Distribution

- Consider:
  - No college administrators are muppets.
- To determine whether this claim is true, we would have to know something about every college administrator (namely that they are not muppets (muppets are easy to spot))
- We would also have to know something about each muppet (that each is not a college administrator)

Distribution

- Consider:
  - No college administrators are muppets.
- So both the subject and predicate terms of an E claim are **distributed**.

Distribution

- Consider:
  - Some people with face tattoos are people who eat ears
- To determine whether this claim is true, we only have to know one individual who falls into each category

Distribution

- Consider:
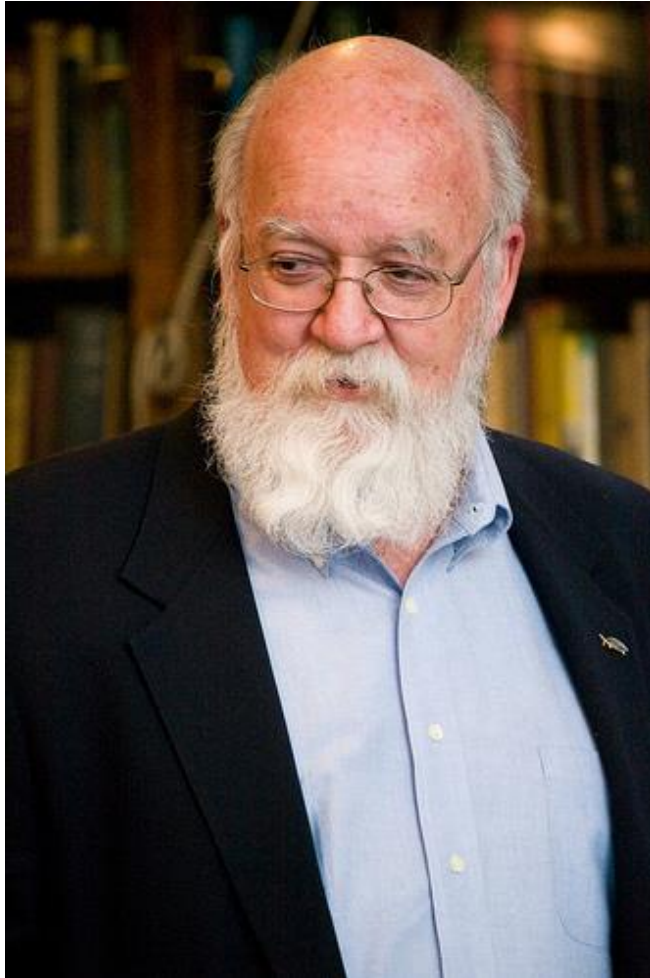 - Some people with face tattoos are people who eat ears

Neither the thubject term nor the predicate term of an I claim ith dithtributed!

Distribution

- Consider:
  - Some philosophers are not old, dead, white guys.
- To determine the truth of this claim, we have to be acquainted with *only one philosopher* excluded from the *entirety* of old, dead, white guys

Distribution

- This is the philosopher Daniel Dennett.
- And he is not at all dead.

So the predicate of an O claim is distributed, but not the subject.