Lecture 8

LCD 306: Semantics & Pragmatics

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Outline

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Exam No. 1

- Distributing the exam 1 calculations
- If you didn't send your first exam or corrections, please do so ASAP

Exam

- **Exam 1 Grade**: exam 1 grade plus the extra credit for resubmission [On handout]
  - Calculating grade (G_{E1}) for exam:
    $G_{E1} = (\frac{68 - d}{68} + \frac{r}{d} \times 0.1) \times 100 + e$
  - d = points deduced; r = points revised and resubmitted; e = extra credit
- **Overall Grade**: Exam 1 worth 20% of overall grade [Calculate yourself]
  - Calculating impact on overall grade (I_{FG}):
    $I_{FG} = 100 - \frac{G_{E1}}{100} \times 20$

Homework Packet No. 1

- **Homework Grade**: Five homework assignments, plus formatting points
- Total 60 points [On rubric]
- Points per homework assignment given based on proportion of sections completed
- Overall Homework grade: 10%

Homework

- No late submissions
- Correct document and email formatting (see syllabus)

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Group Project

- Updated handout with more details

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Set Notation

Review

- Majuscule for sets: A, B, C
- Miniscule for members: a, b, c, x, y, z
- empty set: $\emptyset$

Set Notation

- Extension notation: $A{=}\{a, b, c\}$
- Set-builder notation: $A{=}\{x : x \text{ is a roman alphabet character}\}$

Set Notation

Review

- b belongs to A: $b \in A$
- Both A and B are sets and B is a member of A: $B \in A$
- c does not belong to A: $c \notin A$

Set Notation

- A is a subset of B: $A \subseteq B$
- C is not a subset of B: $C \nsubseteq B$
- B is a superset of A: $B \supseteq A$
- B is not a superset of C: $B \not\supseteq C$

Set Notation

- Two sets A, B are identical iff $A \subseteq B$ and $B \subseteq A$. We write $A = B$ to indicate that A and B are identical.
- A set A is a proper subset of a set B iff $A \subseteq B$ but $B \nsubseteq A$ (or equivalently, iff $A \subseteq B$ and $A \neq B$). We write $A \subset B$ to indicate that A is a proper subset of B.
- The power set of A, written as $\mathscr{P}(\mathrm{A})$, is the set of all subsets of A.

Set Notation

- A is a proper subset of B: $A \subset B$
- C is not a proper subset of B: $C \not\subset B$
- B is a proper superset of A: $B \supset A$
- B is not a proper superset of C: $B \not\supset C$

Homework no. 6

Exercise 10.1

List all the subsets of the following sets, the power set of X, $\mathscr{P}(\mathrm{X})$:

1. $\mathscr{P}(\{\mathrm{a}, \mathrm{b}, \mathrm{c}\})$
   - $\{\mathrm{a}, \mathrm{b}, \mathrm{c}\}, \{\mathrm{a}, \mathrm{b}\}, \{\mathrm{b}, \mathrm{c}\}, \{\mathrm{a}, \mathrm{c}\}, \{\mathrm{a}\}, \{\mathrm{b}\}, \{\mathrm{c}\}, \emptyset$
2. $\mathscr{P}(\{\mathrm{a}, \{\mathrm{b}, \mathrm{c}\}\})$
   - $\{\mathrm{a}, \{\mathrm{b}, \mathrm{c}\}\}, \{\{\mathrm{b}, \mathrm{c}\}\}, \{\mathrm{a}\}, \emptyset$
3. $\mathscr{P}(\{\mathrm{a}\})$
   - $\{\mathrm{a}\}, \emptyset$
4. $\mathscr{P}(\{\mathrm{a}, \mathrm{b}, \{\emptyset\}, \mathrm{c}\})$
   - $\{\mathrm{a}, \mathrm{b}, \{\emptyset\}, \mathrm{c}\}$
   - $\{\mathrm{a}, \mathrm{b}, \{\emptyset\}\}, \{\mathrm{a}, \{\emptyset\}, \mathrm{c}\}, \{\mathrm{b}, \{\emptyset\}, \mathrm{c}\}$
   - $\{\mathrm{a}, \mathrm{b}\}, \{\mathrm{a}, \{\emptyset\}\}, \{\mathrm{a}, \mathrm{c}\}, \{\mathrm{b}, \{\emptyset\}\}, \{\mathrm{b}, \mathrm{c}\}, \{\{\emptyset\}, \mathrm{c}\}$
   - $\{\mathrm{a}\}, \{\mathrm{b}\}, \{\{\emptyset\}\}, \{\mathrm{c}\}, \emptyset$

Homework no. 6

Exercise 10.2

What is the relation (if any) between the sets A and B in each of these examples?

1. $A = \{\mathrm{a}, \mathrm{b}, \mathrm{c}\}$; $B = \{\mathrm{a}, \mathrm{b}, \mathrm{c}, \mathrm{d}\}$
   - $A \subset B$
2. $A = \{\mathrm{a}, \mathrm{b}, \{\emptyset\}\}$; $B = \{\mathrm{a}, \mathrm{b}\}$
   - $A \supset B$
3. $A = \{\mathrm{a}, \mathrm{b}, \mathrm{c}\}$; $B = \{\mathrm{a}, \{\mathrm{b}, \mathrm{c}\}\}$
   - No subset/superset relation

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Antonymy

Review

If we have a world that contains only the entities $U_{<w,t>} = \{\alpha, \beta, \gamma, \delta, \epsilon, \zeta, \eta, \theta\}$, A and B are mutually exclusive antonyms if the set of entities denoted by A are not in the set of entities denoted by B, and all entities belong to one of these two sets.

$[[A]] = \{\alpha, \beta, \gamma, \delta\}$

$[[B]] = \{\epsilon, \zeta, \eta, \theta\}$

- Refers to sets that are not overlapping
- Can be mutually exclusive (contradictory)

Antonymy

Review

If we have a world that contains only the entities $U_{<w,t>}$ ={Karen, Christen, Janelle, Jay, Daniel, Katherine}, "American" and "Not American" are mutually exclusive antonyms if the set of entities denoted by "American" are not in the set of entities denoted by "Not American", and all entities belong to one of these two sets.

[[American]] = {Christen, Janelle, Jay, Daniel }

A={x : x is American}

[[Not American]] = {Karen, Katherine}

A^{-}={x : $x \notin A$}

Antonymy

Review

If we have a world that contains only the entities $U_{<w,t>} = \{\alpha, \beta, \gamma, \delta, \epsilon, \zeta, \eta, \theta\}$, A and B are not mutually exclusive antonyms if the set of entities denoted by A are not in the set of entities denoted by B, and there are some entities which belong to some other set(s).

$[[A]] = \{\alpha, \beta, \gamma\}$

$[[B]] = \{\epsilon, \zeta, \eta\}$

$[[\neg A \wedge \neg B]] = \{\delta, \theta\}$

- Refers to sets that are not overlapping
- Can be opposites, but not being a member of one doesn't entail membership in the other category. There can be entities that don't fall in one or the other

Antonymy
Review

If we have a world that contains only the entities $U_{<w,t>}$ ={Karen, Christen, Janelle, Jay, Daniel, Katherine}, "tall" and "short" are not mutually exclusive antonyms if the set of entities denoted by "tall" are not in the set of entities denoted by "short", and there are some entities which belong to some other set(s), such as "not tall and not short".

[[tall]] = {Christen, Katherine} T={x : x is tall}
[[short]] = {Janelle, Jay} S={x : x is short}
[[¬tall ∧¬short]] = {Karen, Daniel} M={x : $x \notin T$ and $x \notin S$}

Homework no. 4

For the following, define a $U_{<w,t>}$ and the set of individual objects that are in it, then come up with two (2) examples each using sets:

- mutually exclusive antonyms
- not mutually exclusive antonyms

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Synonymy
Review

If we have a world that contains only the entities $U_{<w,t>} = \{\alpha, \beta, \gamma, \delta\}$, A and B are **perfect** synonyms if the set of entities denoted by A is the same as the set of entities denoted by B.

$[[A]] = \{\alpha, \beta\}$

$[[B]] = \{\alpha, \beta\}$

- Sets that contain exactly the same objects
- $A = B$

Synonymy
Review

If we have a world that contains only the people $U_{<w,t>}$ ={Karen, Christen, Janelle, Jay, Daniel, Katherine}, "woman" and "female" are **perfect** synonyms if the set of entities denoted by "woman" is the same as the set of entities denoted by "females"

[[woman]] = {Karen, Janelle, Katherine}

[[female]] = {Karen, Janelle, Katherine}

$\{x : x$ is a woman$\}$=$\{x : x$ is female$\}$

$\{x : x$ is a woman and x is female$\}$

Synonymy
Review

If we have a world that contains only the entities $U_{<w,t>} = \{\alpha, \beta, \gamma, \delta\}$, A and B are "close enough" synonyms if the set of entities denoted by A contains some of the same entities denoted by B.

$[[A]] = \{\alpha, \beta, \gamma\}$

$[[B]] = \{\alpha, \beta, \delta\}$

- Sets that contain mostly the same objects

Synonymy
Review

If we have a world that contains only the people $U_{<w,t>}$ ={Karen, Christen, Janelle, Jay, Daniel, Katherine}, "Linguist" and "Speech Scientist" are **close enough** synonyms if the set of entities denoted by "Linguist" is almost the same as the set of entities denoted by "Speech Scientist"

[[Linguist]] = {Karen, Christen, Daniel}

[[Speech Scientist]] = {Karen, Christen, Daniel, Katherine}

Homework no. 4

For the following, define a $U_{<w,t>}$ and the set of individual objects that are in it, then come up with two (2) examples each using sets:

- perfect synonyms
- close enough synonyms

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Types of Polysemy

Review

- Meronymy
  - *Pars pro toto* – Part for the whole
  - A is used to refer to B and A is a part of B
  - Hyponymy
  - Downward taxonomic shift
  - Use a subset to refer to the superset
  - Impossible for A to be A without also being B

Meronymy

Review

- Using a part to refer to the whole
  - Calling someone "big ears" or "orejón"
  - Referring to your car as you "wheels"

Hyponymy

Review

If we have a world that contains only the entities $U_{<w,t>} = \{\alpha, \beta, \gamma, \delta, \epsilon, \zeta, \eta, \theta\}$, A is a hyponym if the set of entities in A are contained within the set of entities that are contained in B, yet the label A is used to refer to the set of B

$[[A]] = \{\alpha, \beta, \gamma\}$

$[[B]] = \{\alpha, \beta, \gamma, \delta, \epsilon, \zeta, \eta, \theta\}$

- A subset to refer to a superset

Hyponymy

Review

If we have a world that contains only the entities $U_{<w,t>}$ ={chihuahuas, rat terriers, German shepards, wolves, coyotes, jackals}, "dogs" is a hyponym if the set of entities denoted by "dogs" are contained within the set of entities that are denoted by "canines", yet the word "dogs" is used to refer to the set of "canines", including non-dog canines.

[[canines]] = {chihuahuas, rat terriers, German shepards, wolves, coyotes, jackals}

[[dogs]] = {chihuahuas, rat terriers, German shepards}

Homework no. 6

Exercise 4.19

In (4.7), the implication relation went in the same direction as the hyponymity relation. In the following examples it goes in the opposite direction. Draw the Venn diagrams and explain why.

1. Tiny is not a dog.
1′. Tiny is not an alsatian.
2. They want to ban drink.
2′. They want to ban beer.
3. Sport is forbidden.
3′. Football is forbidden.

Types of Polysemy

Review

- Holonymy
  - *Totum pro parte* – Whole for the part
  - C is used to refer to D and D is a part of C
  - Hypernymy
  - Use a superset to refer to the subset
  - Upward taxonomic shift
  - Impossible for D to be D without also being C

Holonymy

Review

- Using the whole to refer to a part
  - Using the word "tree" to refer to "leaves in the phrase "trees are turning red"
  - Using the word "the remote controller" to refer to the "battery" in the phrase "the remote controller is dead"

Hypernymy
Review

If we have a world that contains only the entities $U_{<w,t>} = \{\alpha, \beta, \gamma, \delta, \epsilon, \zeta, \eta, \theta\}$, A is a hypernym if the set of entities in B are contained within the set of entities that are contained in A, yet the label A is used to refer to the set of B

$[[A]] = \{\alpha, \beta, \gamma, \delta, \epsilon, \zeta, \eta, \theta\}$

$[[B]] = \{\alpha, \beta, \gamma\}$

- A superset to refer to a subset

Lecture 8
Signs and Sets
Polysemy

Hypernymy
Review

If we have a world that contains only the entities $U_{<w,t>}$ ={chihuahuas, rat terriers, German shepards, wolves, coyotes, jackals}, "canines" is a hypernym if the set of entities in "dogs" are contained within the set of entities that are contained in "canines", yet the label "canines" is used to refer to the set of just "dogs"

[[canines]] = {chihuahuas, rat terriers, German shepards, wolves, coyotes, jackals}

[[dogs]] = {chihuahuas, rat terriers, German shepards}

Lecture 8
Signs and Sets
Polysemy

Types of Polysemy
Review

- Polysemy
  - A cover term
  - Everything else that doesn't fit squarely or neatly into 'meronymy', or 'holonymy'

Lecture 8
Signs and Sets
Polysemy

Types of Polysemy
Review

- Polysemy
  - Eponymy: name of tribe, inventor, era, etc is takes on meaning of a new thing Vandals → Vandals
  - Synecdoche: Word with more comprehensive meaning is used to refer to a less comprehensive one, and vice versa
    - A container is used to refer to its contents
    - The material that a thing is (actually, historically, or supposedly) made of referring to that thing
    - A specific class name used to refer to a general set of associated things
    - A general class name used to denote a specific member of that or an associated class
    - A part referring to the whole

Homework no. 4

For the following, come up with two (2) examples each:

- meronyms
- holonyms

Homework no. 4

For the following, define a $U_{<w,t>}$ and the set of individual objects that are in it, then come up with two (2) examples each using sets:

- hypernyms
- hyponyms

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Truth

- We assume that propositions can be either True or False

Notation

- For clarity we can use the following shorthand
  - A proposition can be represented with a capital letter
  - Truth = 1
  - False = 0

Truth Conditions

- What makes for the truth of an utterance
- We are able to assess what goes into deciding if a statement is true or not

Homework No. 7

Exercise 2.1

What is the truth value of the following statements, according to the information in your nearest window? Assume the truth values are *true* and *false*.

1. 'it is snowing.'
2. 'there are at least two airplanes.'
3. 'there is not a cloud in the sky.'