LING 581: Advanced Computational Linguistics

Lecture Notes
March 30th
Administrivia

• I sent feedback on the WordNet homework

1. We will review the homework today
2. One more WordNet homework today
3. Framenet (next time)
WordNet Homework Exercise

• Question 1:
  – Find the shortest distance links between star and telescope
  – (Make sure you have the right word sense)
  – How many are there?

Noun

1. **S: (n) star#1** (astronomy) a celestial body of hot gases that radiates energy derived from thermonuclear reactions in the interior
2. **S: (n) ace#3, adept#1, champion#4, sensation#2, maven#1, mavin#1, virtuoso#1, genius#3, hotshot#1, star#2, superstar#1, whiz#1, whizz#1, wizard#1, wiz#1** (someone who is dazzlingly skilled in any field)
3. **S: (n) star#3** (any celestial body visible (as a point of light) from the Earth at night)
4. **S: (n) star#4, principal#3, lead#8** (an actor who plays a principal role)
5. **S: (n) star#5** (a plane figure with 5 or more points; often used as an emblem)
6. **S: (n) headliner#1, star#6** (a performer who receives prominent billing)
7. **S: (n) asterisk#1, star#7** (a star-shaped character * used in printing)
8. **S: (n) star topology#1, star#8** (the topology of a network whose components are connected to a hub)
WordNet Homework Exercise

• But only one sense for telescope:

Noun

• S: (n) telescope#1, scope#3 (a magnifier of images of distant objects)
WordNet Homework Exercise

• Use bfs4.perl:

perl bfs4.perl star#n#1 telescope#n#1 1000000
Max set to: 1000000
Found at distance 8 (232993 nodes explored)
telescope#n#1 holo finder#n#3 hypo optical_device#n#1 hypo device#n#1 hypo instrumentality#n#3 hypo artifact#n#1 ants natural_object#n#1 hype celestial_body#n#1 hype star#n#1
Found at distance 8 (233025 nodes explored)
telescope#n#1 holo prism#n#2 hypo optical_device#n#1 hypo device#n#1 hypo instrumentality#n#3 hypo artifact#n#1 ants natural_object#n#1 hype celestial_body#n#1 hype star#n#1
Found at distance 8 (438947 nodes explored)
telescope#n#1 holo finder#n#3 hypo optical_device#n#1 hypo device#n#1 hype constellation#n#2 holo star#n#1
Found at distance 8 (438979 nodes explored)
telescope#n#1 holo prism#n#2 hypo optical_device#n#1 hypo device#n#1 hype instrumentality#n#3 hypo artifact#n#1 ants natural_object#n#1 hype constellation#n#2 holo star#n#1
All minimal solutions found
WordNet Homework Exercise

• Use bfs4.perl:

perl bfs4.perl star#n#3 telescope#n#1 800000
Max set to: 800000
Found at distance 8 (166291 nodes explored)
telescope#n#1 holo finder#n#3 hypo
optical_device#n#1 hypo device#n#1 hypo
instrumentality#n#3 hypo artifact#n#1 ants
natural_object#n#1 hype celestial_body#n#1 hype
star#n#3
Found at distance 8 (166323 nodes explored)
telescope#n#1 holo prism#n#2 hypo optical_device#n#1
hypo device#n#1 hypo instrumentality#n#3 hypo
artifact#n#1 ants natural_object#n#1 hype
celestial_body#n#1 hype star#n#3
All minimal solutions found
WordNet Homework Exercise

• Graph (borrowed from Benjamin Mullins):

  very abstract concepts

  semantic opposition

"has part"
WordNet Homework Exercise

• Generative Lexicon (Pustejovsky, 1995)
• Qualia structure:
  – Form(al) role: hypernym
  – Constitutive role: meronym
  – Telic role: purpose
  – Agentive role: creator

People also ask

What is a telescope and what is it used for?

A telescope is an instrument that is used to view distant objects. If you want to look at the planets, you can use a telescope. The higher the magnification on the telescope, the better your view will be. **Galileo** is often credited with the invention of the telescope, but this is incorrect.
WordNet Homework Exercise

• But it's not so easy to collect this data:

Meade Instruments Corporation - How Telescopes Work
www.meade.com/support/telewrk.html ▾ Meade Instruments ▾
The purpose of a telescope is not to magnify, as commonly thought, but to collect light. The larger the telescope's main light-collecting element, whether lens or ...

Main functions of a telescope - Amateur Telescope Optics
www.telescope-optics.net/functions.htm ▾
The main purpose of astronomical telescope is to make objects from outer space appear as bright, contrasty and large as possible. That defines its three main ...

The Purpose of a Telescopes
www.astro.cornell.edu/academics/courses/.../purpose.h... ▾ Cornell University ▾
The main purpose of a telescope is to gather light, i.e. to collect and focus photons. We can think of a telescope then as a "light bucket" - the bigger the bucket, the more photons a telescope can collect.
Modifying the bfs code

- How to map word into word#pos#sense
- Website: senses.perl

perl senses.perl star
star#n#1 star#n#2 star#n#3 star#n#4 star#n#5
star#n#6 star#n#7 star#n#8
star#v#1 star#v#2 star#v#3
star#a#1

```perl
use WordNet::QueryData;
my $wn = WordNet::QueryData->new( noload => 1);
my @r = $wn->validForms($ARGV[0]);
foreach $wpos (@r) {
    @r2 = $wn->querySense($wpos);
    print "@r2 \n";
}
```
Word Smart for the GRE
acumen, remarking on his company's financial successes, but I think his fashion sense is much more interesting.

- Her acumen in anticipating her opponent's strategy is legendary; it's what makes her so hard to beat.

<table>
<thead>
<tr>
<th>Q=U+I+C+K • Q=U+I+Z #1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Match each word in the first column with its definition in the second column. Check your answers in the back of the book.</td>
</tr>
<tr>
<td>1. accolade a. deviating</td>
</tr>
<tr>
<td>2. aberrant b. keen insight</td>
</tr>
<tr>
<td>3. abate c. abolish</td>
</tr>
<tr>
<td>4. abscond d. lessen in intensity</td>
</tr>
<tr>
<td>5. acumen e. sour or bitter</td>
</tr>
<tr>
<td>6. acerbic f. depart secretly</td>
</tr>
<tr>
<td>7. abscission g. building up</td>
</tr>
<tr>
<td>8. accretion h. renounce</td>
</tr>
<tr>
<td>9. abjure i. removal</td>
</tr>
<tr>
<td>10. abrogate j. praise</td>
</tr>
</tbody>
</table>

**ADMONISH** v to reprove; to express warning or disapproval

- How many times has your roommate admonished you to put the toilet seat down?
- An admonition is a warning or a scolding and *admonitory* means expressing warning or disapproval.
- He tried to admonish us not to open the secret passageway, but his admonition fell on deaf ears. Man, were we sorry we hadn't listened to him when all the monsters came rushing out!
- Dad's admonitory tone made us feel guilty about ruining our appetites with pre-dinner cookies.

when he was a kid he could get people to do what he wanted.

- Although her adroit handling of the situation minimized the damage, nothing could really save the conference after the room flooded.
- Since he is ambidextrous, he is equally adroit at shooting marbles with either hand.

√ Maladroit means clumsy or bumbling. Inpl.

- Jerry Lewis was able to make a career out of playing maladroit characters.

**ADULATION n excessive praise; intense adoration**

- Leif Garrett was the object of much adolescent adulation.
- Samuel had taken his little brother's adulation for granted until his brother grew four inches taller and was no longer as easily impressed.

**ADULTERATE v to reduce purity by combining with inferior ingredients**

- There was a huge scandal when customers discovered that the health food store had been adulterating the wheat grass juice with clippings from the front lawn.
- In an effort to determine why the house's foundation was crumbling, the inspectors tested the concrete to see if it had been improperly adulterated when it was mixed.

Adulteration is the process or effect of adulterating. 
Unadulterated, appropriately enough, means pure.

- I could tell that what her used car salesman was saying was one hundred percent, pure, unadulterated hogwash.

**ADUMBRATE v to foreshadow vaguely, intimate, suggest, or outline sketchily**

- The possibilities for further cooperation between the two naries were adumbrated at the first private
**Homework**

- **Task:** use Wordnet to determine which words best match which definitions
  - (Quiz 64 from *Word Smart for the GRE*)

<table>
<thead>
<tr>
<th></th>
<th>Word</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>veritable</td>
<td>make ineffective</td>
</tr>
<tr>
<td>2</td>
<td>vigilant</td>
<td>annoyance</td>
</tr>
<tr>
<td>3</td>
<td>verisimilitude</td>
<td>characterize harshly</td>
</tr>
<tr>
<td>4</td>
<td>vitiate</td>
<td>sticky</td>
</tr>
<tr>
<td>5</td>
<td>vilify</td>
<td>watchful</td>
</tr>
<tr>
<td>6</td>
<td>vexation</td>
<td>appearing true</td>
</tr>
<tr>
<td>7</td>
<td>virulent</td>
<td>extremely harmful</td>
</tr>
<tr>
<td>8</td>
<td>viscous</td>
<td>authentic</td>
</tr>
</tbody>
</table>
# Homework

– (Quiz 65 from *Word Smart for the GRE*)

<table>
<thead>
<tr>
<th>Word</th>
<th>Definition</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. zealous</td>
<td>be in turmoil</td>
<td>a.</td>
</tr>
<tr>
<td>2. waft</td>
<td>ravenous</td>
<td>b.</td>
</tr>
<tr>
<td>3. waver</td>
<td>be unsettled in opinion</td>
<td>c.</td>
</tr>
<tr>
<td>4. vituperate</td>
<td>censure severely</td>
<td>d.</td>
</tr>
<tr>
<td>5. wend</td>
<td>impassioned</td>
<td>e.</td>
</tr>
<tr>
<td>6. welter</td>
<td>go</td>
<td>f.</td>
</tr>
<tr>
<td>7. voracious</td>
<td>light breeze</td>
<td>g.</td>
</tr>
<tr>
<td>8. volatile</td>
<td>changeable</td>
<td>h.</td>
</tr>
</tbody>
</table>
Homework

• Write a program that automatically matches up words with definitions for the 3 quizzes.
  – Report your matches
    • Number / letter pairs
  – Explain the heuristics you chose
  – For cases that don’t work, explain why?
    • Is it your algorithm? Is it WordNet? …
  – Your conclusion:
    • is Wordnet adequate to the task of connecting up the words with the definitions?
Sample ideas

• **Heuristics**
  – cost = # relations in (a) shortest path
    • `bfs3.perl stops when it finds a shortest path`
  – overall lowest cost for the quiz
    • *looks at all possible assignments from words to definitions*
    • *there could be other same lowest cost paths*
  – stopwords
    • *prepositions, articles, etc.*
  – multi-word definitions
    • *check match for word to all of the non-stopwords*
    • *discounted cost if multiple matches*
Example

- Word:
  - cadge
  - brook
  - cacophony

- Definition:
  - mooch
  - tolerate
  - discordant sound

same synset

cadge hype obtain hype get hypo buy enta
pay deriv payer deriv pay hype tolerate
brook hype permit hype accept deri acceptation deri accept
hype get hypo obtain hypo mooch#c#1

same synset

cadge hype beg hype request hype communicate deri communication
hypo auditory communication hypo sound
brook hype permit hype accept hypo agree deri agreement hypo accord deri accordant ants discordan
brook hype stream hype body_of_water hypo sound
cacophony hype dissonance hypo sound_property hypo property hypo strength
hypo endurance deri tolerate
cacophony hype dissonance deri discordant
cacophony hype noise hypo sound
Using WordNet: Example

- **Semantic Opposition:**
  - ICoS-3 Workshop (Fong, 2001)
  - John mended the *torn* dress
  - John mended the *red* dress

- **Semantic Bleaching:**
  - Event-based Models of Change and Persistence in Language (Pustejovsky, 2000)
  - #Kim *boxed* the present in a *paper bag*
  - ... to *land* a hydroplane on *water*

- **Logical Metonymy:**
  - Remarks on Denominals (Kiparsky, 1997)
  - Mary enjoyed the *sonata* (listen to/play)
  - #Mary enjoyed the *door* (?? telic role)

- Generative Lexicon (Pustejovsky, 1995)
Using WordNet: Example

Persistence and Change of State Verbs

*Event-based Models of Change and Persistence in Language* (Pustejovsky, 2000):

- John mended the *torn* dress
- John mended the *red* dress

Mary cleaned the *dirty* table
The waiter filled every *empty* glass
Mary fixed the *flat* tire
Bill swept the *dirty* floor
Bill swept the *dirty* floor clean
Nero built the *gleaming* temple
Nero ruined the *splendid* temple

<table>
<thead>
<tr>
<th>Change of State</th>
<th>Activity</th>
<th>Accomplishment</th>
<th>Creation</th>
<th>Destruction</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>torn</em> dress</td>
<td><em>empty</em> glass</td>
<td><em>flat</em> tire</td>
<td><em>dirty</em> floor</td>
<td><em>dirty</em> floor clean</td>
</tr>
</tbody>
</table>
Using WordNet: Example

Event Template Representation

Change of State Verbs:

John mended the torn/red dress

\[ mend: x \text{ CAUS } y \text{ BECOME } \langle \text{STATE (mended)} \rangle \]

John CAUS the torn/red dress BECOME \langle \text{STATE (mended)} \rangle

- Antonym relation between adjective and end state
Using WordNet: Example

- Find shortest link with antonym relation in derivation chain:

  mend → repair → break → bust₁ → bust₂ → tear

- mend -> tear: reachable in 6 ways.
### Using WordNet: Example

#### Results

<table>
<thead>
<tr>
<th>Candidate Pair</th>
<th>Shortest Chain</th>
<th>Semantic Opposition</th>
<th>Search Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>mend-torn</td>
<td>5</td>
<td>Yes</td>
<td>1261</td>
</tr>
<tr>
<td>mend-red</td>
<td>-</td>
<td>No</td>
<td>11974</td>
</tr>
<tr>
<td>fix-leaky</td>
<td>5</td>
<td>Yes</td>
<td>12167</td>
</tr>
<tr>
<td>fix-blue</td>
<td>11</td>
<td>No</td>
<td>14553</td>
</tr>
<tr>
<td><strong>fix-flat</strong></td>
<td>-</td>
<td>No*</td>
<td>12286</td>
</tr>
<tr>
<td>mix-powdered</td>
<td>6</td>
<td>Yes</td>
<td>11931</td>
</tr>
<tr>
<td>comfort-crying</td>
<td>9</td>
<td>Yes</td>
<td>11359</td>
</tr>
<tr>
<td><strong>blue-white</strong></td>
<td>-</td>
<td>No*</td>
<td>24431</td>
</tr>
<tr>
<td>rescue-drowning</td>
<td>13</td>
<td>Yes</td>
<td>9142</td>
</tr>
<tr>
<td>clean-dirty</td>
<td>1</td>
<td>Yes</td>
<td>61</td>
</tr>
<tr>
<td>fill-empty</td>
<td>1</td>
<td>Yes</td>
<td>48</td>
</tr>
</tbody>
</table>
Using WordNet: Example

1. Thresholding

No upper limit on the length of the shortest chain.

<table>
<thead>
<tr>
<th>Candidate Pair</th>
<th>Shortest Chain</th>
<th>Semantic Opposition</th>
<th>Search Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>fix-blue</td>
<td>11</td>
<td>No</td>
<td>14553</td>
</tr>
</tbody>
</table>

Diagram:
- blue → discolor → change → leave → leave out₁ → leave out₂
- fix → make₂ → make₁ → remake → destroy → eliminate
Using WordNet: Example

2. Shortest Path Criterion

Take the shortest chain.

<table>
<thead>
<tr>
<th>Candidate Pair</th>
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<th>Semantic Opposition</th>
<th>Search Space</th>
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<tr>
<td>fix-flat</td>
<td>-</td>
<td>No*</td>
<td>12286</td>
</tr>
</tbody>
</table>
Using WordNet: Example

3. Color and Opposition

WORDNET organizes color by chromaticity.

<table>
<thead>
<tr>
<th>Candidate Pair</th>
<th>Shortest Chain</th>
<th>Semantic Opposition</th>
<th>Search Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>blue-white</td>
<td>-</td>
<td>No*</td>
<td>24431</td>
</tr>
</tbody>
</table>

John painted the *red* door *blue*
Mary painted the white tiles grey
Semantic Bleaching

Three Problems

• Semantic Opposition:

  1. John mended the *torn* dress
     John mended the *red* dress

     *Event-based Models of Change and Persistence in Language* (Pustejovsky, 2000)

• Semantic Bleaching:

  2. #Kim boxed the present in a *paper bag*
     ... to land a hydroplane on *water*

     *Remarks on Denominals* (Kiparsky, 1997)

• Logical Metonymy:

  3. Mary enjoyed the *sonata* (listen to/play)
     #Mary enjoyed the *door* (?? telic role)

     *Generative Lexicon* (Pustejovsky, 1995)
Semantic Bleaching

Denominal Verbs: Box and Butter

 Remarks on Denominals (Kiparsky, 1997):

John boxed the present
John PUT present IN <box> Location

John boxed the present in a gift box
#John boxed the present in a paper bag

John buttered the bread
John PUT <butter> ON bread Locatum

John buttered the bread with margarine
#John buttered the bread with marmalade/onions
Semantic Bleaching

Partial Bleaching

Peter **shelved** the books on the **windowsill/mantelpiece/stand/table**

#Peter **shelved** the books on the **ball/spike/ceiling/floor/balcony**

Sue **breaded** the fish with **breadcrumbs/shredded coconut/crushed almonds**

#Sue **breaded** the fish with **marmalade/butter/treacle/ice**
Semantic Bleaching

Full Bleaching

Location verbs:

- to land a hydroplane on water
- to dump garbage by the roadside
- to ditch a car in a vacant lot
- to warehouse the empty crates in the silo

Locatum verbs:

- highways blanketed with fog
- burgers blanketed with onions
- streets blanketed with cars
- a steep embankment blanketed with dense foliage
Semantic Bleaching

Full Bleaching

Locatum verb (blanket):

highways blanketed with fog
burgers blanketed with onions
streets blanketed with cars
a steep embankment blanketed with dense foliage

Locatum verb (blindfold):

blindfolded with his own shirt/duct tape/a filthy rag/a teacosy

• Note: blindfold, dump are de-verbals (diachronically)
Semantic Bleaching

**Question**

Can WordNet be used to predict and account for semantic bleaching?

Spectrum of bleaching:

- box butterfly
- shelf bread
- blanket blindfold

- none
- partial
- full
Semantic Bleaching

Using WORDNET

• Concept of *shelf* as a horizontal support:

  shelf
  \[\text{hyponym}\]
  bookshelf  hob  chimneypiece
  mantle  mantelpiece  mantel  overmantel

• Web search (shelved +on <location>):

  windowsill  mantel  case  radiator  table  stand  carrel
  bookstand  bookshelf
Semantic Bleaching

Support and Shelf

<noun.artifact> shelf
- (a support that consists of a horizontal surface for holding objects)
  => <noun.artifact> support
  -- (any device that bears the weight of another thing)
Semantic Bleaching

Table and Shelf

Cannot account for *table*:

- Notion of “functional” hypernymy
Semantic Bleaching

Hyponyms of Support

andiron, firedog, dog, dogiron, arch support, back, backrest, backboard, baluster, base, pedestal, stand, bearing, bearing wall, bedpost, bookend, brace, bracket, bridge, foot, foothold, footing, handrest, hanger, harness, harp, headstock, leg, perch, pier, pillow block, rack, stand, rest, rib, rocker, seat, shelf, skeg, sling, spoke, radius, step, stair, stirrup, stirrup iron, stock, gunstock, structural member, tailstock, tee, football tee, undercarriage, yoke
Semantic Bleaching

WordNet and Non-Bleaching Verbs

Asphalt and tarmac:

the crew asphaltered/tarmaced the road with fresh asphalt/new tarmac

#the crew asphaltered/tarmaced the road with concrete

#the crew asphaltered/tarmaced the road with cobblestones
Semantic Bleaching

Paving Materials

Hypothesis: Denominal leaf nodes are non-bleaching
Semantic Bleaching

Bleaching and Leaf Concepts

- **Counterexamples**: *blanket* and *blindfold*

  highways **blanketed** with fog
  burgers **blanketed** with onions
  streets **blanketed** with cars
  a steep embankment **blanketed** with dense foliage
Semantic Bleaching

Blanket

Functional superordinate: covering

\[\text{blanket}_1 \xrightarrow{\text{isa}} \text{bedclothes} \xrightarrow{\text{isa}} \text{cloth covering} \xrightarrow{\text{isa}} \text{covering}_1 \xrightarrow{\text{isa}} \text{artifact} \]

\[\text{blanket}_2 \xrightarrow{\text{isa}} \text{covering}_2 \xrightarrow{\text{isa}} \text{natural object} \]
Semantic Bleaching

**Bleaching of Blanket**

Web Data:

- snow, fog, parachutes, sauce, smog, debris, ash, flowers, glaze, wildflowers, bacon, forest, garland, mixed grill, turkey, ham, smoke, compost, clippings, mulch, cheese, onions, plants, fallout, panels, bodies, pines, mixture, foliage, tephra, blast material, craters, salsa, yogurt, shards, paper, scrub, cars, till, wilderness, loess, crabmeat, fondue, logos, landmines, deposits, Teflon, bags, turf, notices, bracken, heather, moss, mud, fronds, trees, groves, posters, handbills, doorknobs, powder, haze, sand, absorbent, leaves, stars, crickets, peanuts, plaques, foul air, particles, ice, rainforest, spruce, cedar, coating
Semantic Bleaching

Bleaching of Blanket

Exclude metaphorical uses:

The countryside is blanketed in snow, but it is also blanketed with concern [BBC NEWS]

Event semantics:

x PUT <blanket> ON/OVER y
x PUT <covering> ON/OVER y

Same goes for blindfold...
Semantic Bleaching

Spindle and Spear

the dragon has been spindled on a spear
x PUT y on &lt;spindle&gt;

WordNet hierarchy:
Semantic Bleaching

Components of a Spear

WordNet hierarchy:

- Two senses for spear:
  1. an implement with a shaft and a barbed point used for catching fish
  2. a long pointed rod used as weapon

- Notion of Indirect Functionality: sharpened shaft or rod
Logical Metonomy

Three Problems

• Semantic Opposition:

1. John mended the *torn* dress
   John mended the *red* dress

   *Event-based Models of Change and Persistence in Language* (Pustejovsky, 2000)

• Semantic Bleaching:

2. #Kim *boxed* the present in a *paper bag*
   ... to *land* a hydroplane on *water*

   *Remarks on Denominals* (Kiparsky, 1997)

• Logical Metonymy:

3. Mary enjoyed the *sonata* (listen to/play)
   #Mary enjoyed the *door* (?? telic role)

   *Generative Lexicon* (Pustejovsky, 1995)
Logical Metonomy

Eventive Verbs: Begin and Enjoy


John began the novel  (reading/writing)
The author began the unfinished novel back in 1962  (writing)

novel:
  telic role: read  (purpose/function)
  agentive role: writing  (creation)

event/non-eventive noun mismatch: coercion
Logical Metonomy

Eventive Verbs: Begin and Enjoy


John began the novel  (reading/writing)
The author began the unfinished novel back in 1962 (writing)

Mary enjoyed the novel  (reading)
!!The visitor enjoyed the door  (?telic role)
Mary enjoyed the garden  (seeing...)

Logical Metonomy

Multiple Telic Roles

Mary enjoyed the garden (seeing)
Mary enjoyed inspecting the garden
Mary enjoyed visiting the garden
Mary enjoyed strolling through the garden
Mary enjoyed rollerblading in the garden
Mary enjoyed sitting in the garden
Mary enjoyed dozing in the garden
Logical Metonomy

Discourse and Telic Roles

Easily defeasible:

My goat eats anything.
He really enjoyed your book  \((\text{reading})\)
\((\text{eating})\)
(Lascarides & Copestake, 1995)

My dog eats everything.
!He really enjoyed your shoe  \((\text{eating})\)
Logical Metonomy

**WordNet and Telic Roles**

John enjoyed the cigarette \( (smoking) \)
Logical Metonymy

Contextual Function Search Rules

Principle of Specificity: Prefer $R_i$ to $R_j$ in

$R_i$ $R_j$  
$C \rightarrow \cdots \rightarrow C_i \rightarrow \cdots \rightarrow C_j$

Override possible but requires strong contextual support

Principle of Locality: Plausibility of $R_i$ scales with $m$
and inversely with $l$

$R_i$

$C \rightarrow \cdots \rightarrow C_i \rightarrow \cdots \rightarrow C_T$

$l$ $m$
Logical Metonymy

Polysemy

!John enjoyed the dirt

Diagram:
- dirt
  - earth
  - body waste
  - gossip
    - report
      - hear
      - read
  - material
    - substance
      - physical object
  - speech act
    - act
Logical Metonomy

Type/Function Distinction

Mary enjoyed the wine (drinking)
Logical Metonymy

Type/Function Distinction

Mary enjoyed the amphetamine  

(abuse)
Logical Metonomy

Grammatical Constraint

!!John enjoyed the door
EXP enjoy NP
EXP$_i$ enjoy [PRO$_i$ [V(ing) NP]]

\[ x \text{ block } y \]

\[ x \text{ enter } y \]
Logical Metonymy

Grammatical Constraint

!He enjoyed your shoe

[PRO [V(ing) shoe]]

foot covering  shoe  [shoe [cover(ing) foot]]

footwear

covering

artifact

physical object

wear [PRO [wear(ing) shoe]]

cover [shoe [cover(ing) y]]

verbs of perception
Logical Metonomy

Summary

- Linguistic phenomena as benchtests for WordNet relations
  - *Antonymy*: Semantic Opposition
  - *Hyponymy*: Semantic Bleaching and Logical Metonomy

- Linguistic phenomena help point out problems and possible refinements
  - Semantic Opposition: representation of color
  - Bleaching: distinguish functional/non-functional hypernymy
  - Logical Metonymy: telic role annotation

- Other issues
  - Language specificity? Variation in N->V conversion