

C SC 620
Advanced Topics in Natural
Language Processing

Lecture 4

1/27/04

English Verbs as a Semantic Net

- This lecture...
 - a deeper look into the organization of verbs in WordNet
- Paper:
 - *English Verbs as a Semantic Net*, Fellbaum, C. (pp. 40–61)

Polysemy

- Verbs have multiple senses
 - More polysemous (2.11) than nouns (1.74)
 - Source: Collins English Dictionary
 - Suggests that verb meanings are more flexible or mutable

Polysemy

- Most frequent verbs are also the most polysemous
 - *Have, be, run, make, set, go, take ...*
 - Example:
 - [*using database from the TTY version of wnconnect*]
 - `findall((X,Z),s2(run,v,X_,Z),L),length(L,N).`
 - L =
[(77366,1),(77375,2),(77891,2),(78237,1),(78360,3),(78417,1),(80838,2),(80875,2),(81147,2),(81486,2),(83112,5),(83114,1),(83658,1),(84024,2),(84154,2),(84686,2),(84935,1),(84994,1),(84996,1),(84999,1),(85001,1),(85002,1),(85674,1),(85705,1),(85745,1),(85835,1),(85881,1),(86533,1),(87347,1),(87450,2),(87837,1),(88008,1),(88225,1),(88395,4),(88397,1),(88561,1),(88563,1),(88754,5),(88761,1),(88764,1),(88795,2)],
 - **N = 41** ?
 - Notes:
 - `s2(Word,C,I,S,O)`
 - C = category, I = ID, S = synset ID, O = synset offset
 - `set_prolog_flag(toplevel_print_options,[max_depth(0)]).`

Top-Level Organization

1. Verbs of Bodily Functions and Care (275 synsets) - *sweat, shiver, faint ...*
2. Verbs of Change (750 synsets) - sub-types: alter, change state, change by reversal, change integrity, change shape, adjust
3. Verbs of Communication (710 synsets) verbal and nonverbal (senses of *read* from last time)
4. Competition Verbs (200 synsets)
5. Consumption Verbs (130 synsets) sub-types: ingesting, using, exploiting, spending and sharing
6. Contact Verbs (820 synsets) central concepts: attach, cover, cut and touch
7. Cognition Verbs (?) reasoning judging, learning, memorizing, understanding and concluding
8. Creation Verbs (250 synsets) create by mental act, by artistic means, from raw materials
9. Motion Verbs (500 synsets) central concepts: motion-in-place and locomotion
10. Emotion or Psych Verbs (?) *fear, love, amuse, charm, anger ...*
11. Stative Verbs (200 synsets) verbs of being and having
12. Perception Verbs (200 synsets) five senses
13. Verbs of Possession (300 synsets) central concepts: have, transfer, receive
14. Verbs of Social Interaction (400 synsets)
15. Weather Verbs (66 synsets) *rain, thunder, snow ...*

Semantic Inference: Types of Entailment

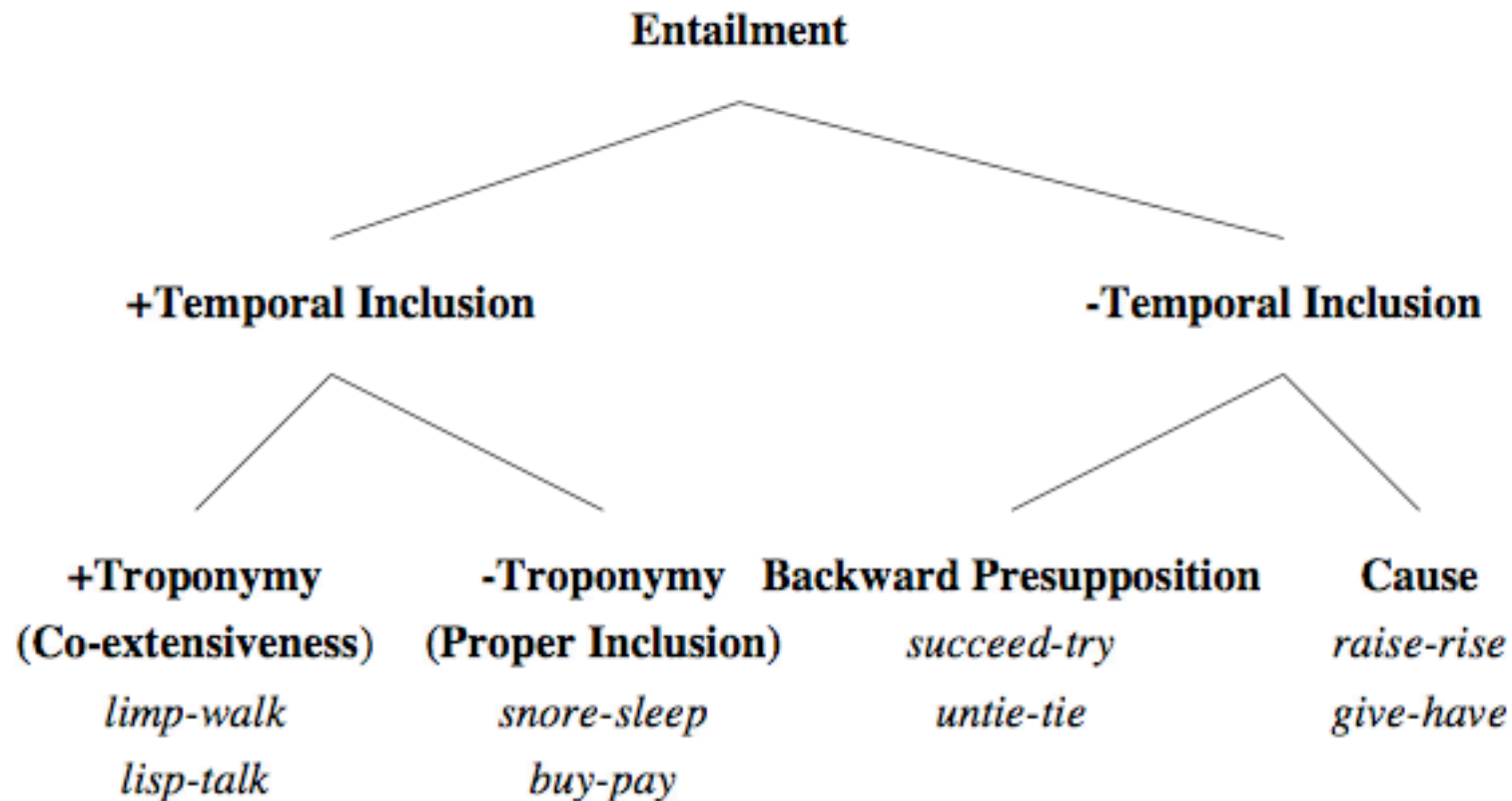


Figure 3. Four kinds of entailment relations among verbs

Troponymy

- Troponymy (Fellbaum & Miller, 1990)
 - Is a semantic relation between verbs
 - To V_1 is to V_2 in some manner
 - Example:
 - To *limp* is to *walk* in a certain manner
 - *Limp* is a troponym of *walk*
 - Entailment: *He is limping* entails *He is walking*
 - Troponym pairs are always temporally co-extensive and related by entailment

Troponymy

- Compare with examples:
 - *snore - sleep*
 - *buy - pay*
 - *get a medical checkup - visit the doctor*
- Note:
 - Entailment holds but not temporally co-extensive

Semantic Inference: Opposition and Entailment

- Examples:
 - *Hit* and *miss* both entail *aim*
 - *Fail* and *succeed* both entail *try*
 - *Win* and *lose* both entail *play/gamble*
 - Entailment type: backwards presupposition

Other Semantic Differences

- Example:
 - Telic and atelic *walk*
 - Telicity test (Dowty)
 - [-telic] *for an hour*
 - [telic] *in an hour*

