

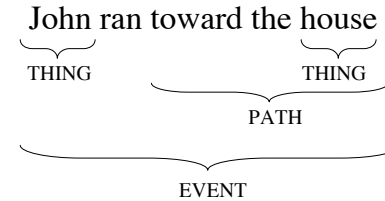
Verb-Conceptual Representation

PSYC 353 - COGNITION 2

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Conceptual semantics - the basics

Every sentence describes an event or a state (mostly these two) which can be further analyzed into other conceptual constituents

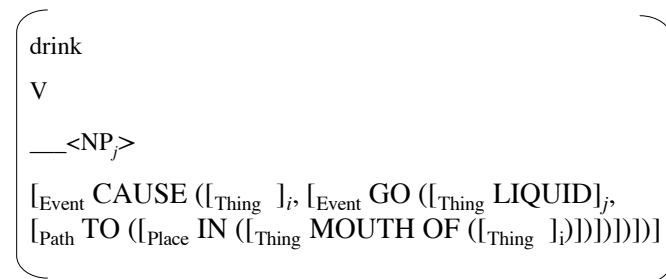


Conceptual semantics - the basics

- Conceptual primitives (Ontological categories)
 - ❖ **Each major syntactic constituent is represented by a particular conceptual category**
 - Thing -> cup, John
 - Place -> location (different from Thing) (*there*, in the cupboard)
 - Event -> John went there, John caused this or that
 - State -> Mary is red
 - Action -> I can do things that you can't
 - Path -> under the bridge
 - Property -> Apples are red
 - Amount -> John is taller than Mary

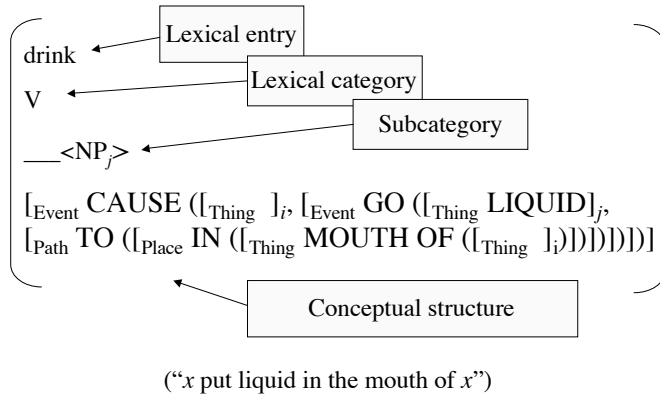
Conceptual semantics - the basics

■ How lexical items are represented



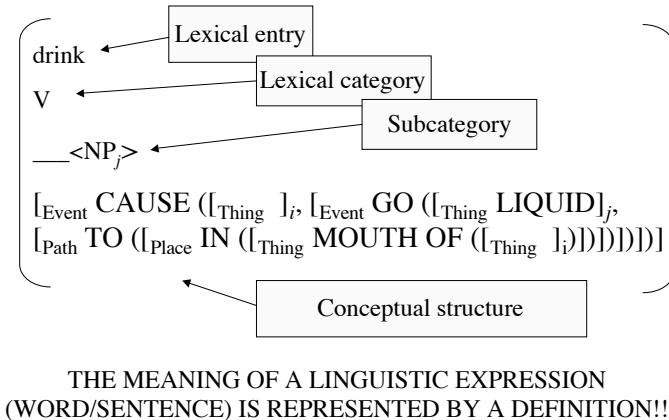
Conceptual semantics - the basics

■ How lexical items are represented



Conceptual semantics - the basics

■ How lexical items are represented



Semantic decomposition: psycholinguistic evidence

- Most studies done in the 70's, 80's and 90's have failed to support the Classical approach
 - ❖ Fodor et al., 1980
- More recent researchers have been finding evidence for verb complexity effects:
 - ❖ McKoon & Macfarland (2002)
 - ❖ Gennari et al. (2003)

Semantic decomposition: psycholinguistic evidence

- McKoon & Macfarland (2002)
 - ❖ **Contrasted sentences containing verbs that (according to their analysis) had different semantic conceptual templates**
 - The potatoes rotted [change of state]
 - The concrete crumbled [externally caused ch. of state]

Event templates		
Event template name	Template	Examples
State	x (IN STATE)	x (LOVE), x (EXIST)
Activity	x (ACT)	x (RACE), x (HIT)
Change of state	x (BECOME IN STATE)	x (BECOME ARRIVED), x (BECOME BLOOMED)
Externally caused change of state	α CAUSE (x (BECOME IN STATE))	α CAUSE (x (BECOME BROKEN)) α CAUSE (x (BECOME FADED))

Semantic decomposition: psycholinguistic evidence

❖ **McKoon & Macfarland (2002)**

- Found that semantically more complex verbs slow processing of their carrier sentences

❖ **Similar results were found by Gennari et al. (2003), using contrasts such as:**

Examples of lexical entailments

Type	Lexical entailments		
EVENTS	break	→	x CAUSE(BECOME (y be-broken))
	discover	→	BECOME(x knows y)
	carry	→	x's ACTS(CAUSE(BECOME(y be-displaced)))
STATES	deserve	→	x deserve y
	possess	→	x possess y

Semantic decomposition: psycholinguistic evidence

■ Failure to find evidence for semantic complexity:

❖ **Fodor et al., 1980**

❖ **de Almeida & Fodor, 1998, in prep.**

On the nature of verb representation

- Case study: causatives in sentence processing
- Lexical Decomposition Hypothesis: Verbs are represented by complex semantic templates
 - Causatives: kill: [[_{S1}x (ACT)] CAUSE [_{S2}BECOME [y <dead>]]]
 - burn: [[_{S1}x (ACT)] CAUSE [_{S2}BECOME [y <burnt>]]]
 - Transitives: kiss: [[x [TOUCH<kiss> [y]]]
 - see: [[x [PERCEIVE<see> [y]]]
- Lexical Atomism Hypothesis: Lexical items are (linguistically) represented by morphemes together with argument structures and mapped onto atomic (but relational) concepts

(de Almeida, 1999; de Almeida & Fodor, in prep.)

- Causatives: kill: (NP_x (NP_y)) → x KILL y
- Transitives: see: (NP_x (NP_y)) → x SEE y

On the nature of verb representation

Experimental Hypotheses

- Two processing predictions derived from the two verb-representation hypotheses
 - If understanding a word (verb) involves recovering its semantic/conceptual constituents, and...
 - If the task is sensitive to structural properties of linguistic tokens, then...
- Lexical Decomposition: Processing as a function of *Semantic-Structure* complexity (in some task that is sensitive to structural properties of linguistic tokens)
 - Prediction: (a) slower than (b)
 - (a) John killed Mary →
[[_{S1}John (ACT)] CAUSE [_{S2}BECOME [Mary <dead>]]]
 - (b) John saw Mary →
[[John [PERCEIVE<see> [Mary]]]
- Lexical Atomism: Processing as a function of Verb Argument Structure (structural/syntactic relatedness between V-N)
 - Prediction: No difference between the two verb types

On the nature of verb representation

Experimental Hypotheses

- Priming (/word probe processing) will be a function of the structural “distance” between verb and its internal argument
- “Shift” in the structural relation between S subject and object (Fodor et al., 1980; Gergely & Bever, 1986; de Almeida, 1999; de Almeida & Fodor, in prep.)
 - John killed Mary

On the nature of verb representation

Experimental Hypotheses

- No “shift” is expected with a “simple transitive” verb (Fodor et al., 1980; Gergely & Bever, 1986; de Almeida, 1999; de Almeida & Fodor, in prep.)
- Semantically “simplex” verbs should engender faster processing (priming, word/probe) (Gennaro et al., 2003)
 - John saw Mary

On the nature of verb representation

Experimental Hypotheses

- Two processing predictions derived from the two verb-representation hypotheses
 - (i) understanding a word (verb) involves recovering its semantic/conceptual constituents, and...
 - (ii) the task is sensitive to structural properties of linguistic tokens, then...

- Control procedure:
 - Sentences that also show a “shift” effect vs. sentences that do not (S-complement vs. NP-complement verbs)
 - “Expect” class: (NP (S))
 - » John thought/expected Mary would/to leave
 - “Persuade” class: (NP_x (NP_y))
 - » John told/persuaded Mary to leave
 - Prediction: *Persuade* faster than *Expect*

On the nature of verb representation

Experimental Hypotheses

- No “shift” verbs (*persuade/tell*): priming between V and N reflect relation within clause (“object control”?)
- “Shift” verbs (*expect/think*): priming between V and N reflect relation across clause boundary (“raising”?)
 - John told Mary to leave John expected Mary to leave

On the nature of verb representation

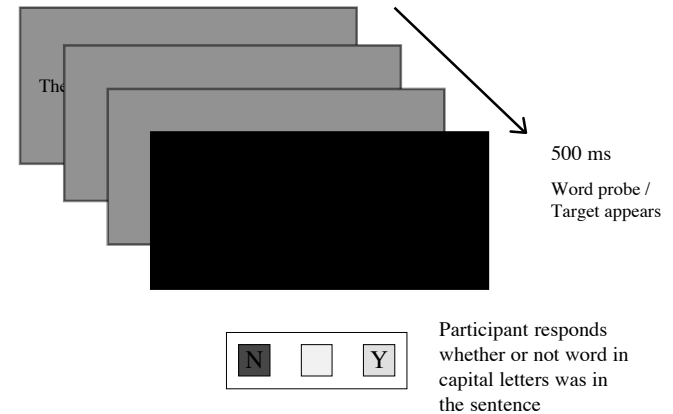
Sample Materials

- Causative / Simple Transitive
 - Despite protests from the manager the owner closed/sold the theater
 - After sitting in his high chair the baby spilled/drank the juice
 - In the orchard the children bent/pulled the branches to get the apples
 - At the end of the day the maid locked/checked the gate in the front yard
 - On Friday the students started/found a fire in the chemistry lab
 - The farmer killed/heard the animal that was hiding in the barn
- “Expect” / “Persuade”
 - The engineer expected/persuaded the public to leave the station
 - The professor assumed/advised the students to be prepared for the exam
 - The guard admitted/allowed the money to be stolen from the store
 - The coach believed/told the players to be more dedicated this year
 - The owners reported/cautioned the team to be in the best possible shape
 - We wonder if the director supposed/convinced the staff to be hard working

On the nature of verb representation

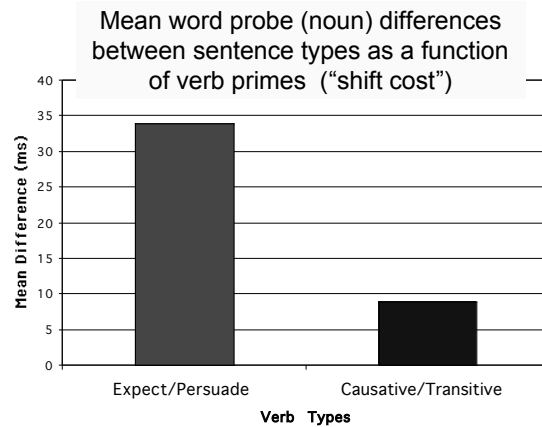
The Task

- Masked Priming of a Word Probe:



On the nature of verb representation

Results



On the nature of verb representation

Some Speculations

- Contrasting results: some tasks/constructions show support for decomposition; other tasks/constructions do not
- What’s in a verb concept?
 - Verbs may be represented by semantic templates (such as in Jackendoff’s theory), but also...
 - Verbs may be atomic representations
 - Represented by their morphemes in the lexicon
 - Together with the specification of the phonological forms
 - Together with their argument structures
 - Verb projections follow from argument structures, not “internal” semantic analyses
 - Conceptual representations (“outside the language system) are mapped from verb argument structures (“simple” compositionality)