HG2002 Semantics and Pragmatics

Meaning Components

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Lecture 9
Location:

Overview

- Revision: Speech as Action
  - Austin's Speech Act Theory
  - Categorizing Speech Acts
  - Indirect Speech Acts
- Componential Analysis
- Katz's Semantic Theory
- Levin's Verbal Alternations
- Talmy's Cognitive Structure
- Jackendoff's (Lexical) Conceptual Structure
- Pustejovsky's Generative Lexicon
- Next Lecture: Chapter 10 — Formal Semantics

Revision:
Speech as Action

Speech as Action

- Language is often used to do things: **speech acts**
  language has both
  - **interactivity**
  - **context dependence**

- There are four syntactic types that correlate closely to pragmatic uses

Syntactic Type		Speech Act
declarative	$\leftrightarrow$	**assertion**
interrogative	$\leftrightarrow$	**question**
imperative	$\leftrightarrow$	**order** or **command**
optative	$\leftrightarrow$	**wish**

- Mismatches are **indirect speech acts**

Perfomative Utterances

(1) *I promise I won't drive home*
(2) *I bet you 5 bucks they get caught*
(3) *I declare this lecture over*
(4) *I warn you that legal action will ensue*
(5) *I name this ship the Lollipop*

- Uttering these (in an appropriate context) is acting
  Utterances themselves can be actions

- In English, we can signal this explicitly with *hereby*

Felicity Conditions

- Performatives (vs Constantives) (Austin)
  Given the correct **felicity conditions**

  A1 There must exist an accepted conventional procedure that includes saying certain words by certain persons in certain circumstances,
  A2 The circumstances must be appropriate for the invocation
  B1 All participants must do it both correctly
  B2 …and completely
  C1 The intention must be to do this the act
  C2 The participants must conduct themselves so subsequently.

- If the conditions don't hold, the speech act is **infelicitous**
  - Failing **A** or **B** is a **misfire**
  - Failing **C** is an **abuse**

Explicit and Implicit Performatives

- **Explicit Performatives**
  - Tend to be first person
  - The main verb is a performative: *promise, warn, sentence, bet, pronounce, …*
  - You can use *hereby*

- **Implicit Performatives**

  (6) *You are hereby charged with treason*

  (7) *Students are requested to be quiet in the halls*

  (8) *10 bucks says they'll be late*

  (9) *Come up and see me some time!*

  Can be made explicit by adding a perfomative verb

Elements of Speech Acts

Locutionary act the act of saying something

Illocutionary act the force of the statement

Perlocutionary act the effects of the statement "such as persuading, convincing, scaring, enlightening, inspiring, or otherwise getting someone to do or realize something whether intended or not" (Austin 1962)

Illocutionary force indicating devices(IFID)

- word order; stress; intonation contour; punctuation; the mood of the verb performative verbs: *I (Vp) you that …*

Searle's speech act classification

Declarative changes the world (like performatives)

Representative describes the (speaker's view of the) world

Expressives express how the speaker feels

Directives get someone else to do something

Comissives commit oneself to a future action

Literal and non-literal uses

(10) a. *Could you get that?*
b. *Please get pass the salt.*

(11) a. *I wish you wouldn't do that.*
b. *Please don't do that.*

(12) a. *You left the door open.*
b. *Please close the door.*

- People have access to both the literal and non-literal meanings
- Non literal meanings can be slower to understand
- Some non-literal uses are very conventionalized
  Can/Could you X? $\rightarrow$ *Please X*
- Questioning the felicity conditions produces an indirect version

Why be Indirect?

- Mainly for politeness
  - **Positive Face** desire to seem worthy and deserving of approval
  - **Negative Face** desire to be autonomous, unimpeded by others
  - Threats to another's face
    - to positive: disapproval, disagreement, interruption
    - to negative: orders, requests, suggestions
  - Face-saving acts:
    - don't threaten another's face: *I may be wrong but, …*
    - allow for negative face: *Could you please, …*
  - Is politeness trans-cultural?

Componential Analysis

Break word meaning into its components

- For example:

woman	[FEMALE]	[ADULT]	[HUMAN]	
spinster	[FEMALE]	[ADULT]	[HUMAN]	[UNMARRIED]
bachelor	[MALE]	[ADULT]	[HUMAN]	[UNMARRIED]
wife	[FEMALE]	[ADULT]	[HUMAN]	[MARRIED]
girl	[FEMALE]	[CHILD]	[HUMAN]	
boy	[MALE]	[CHILD]	[HUMAN]	

semantic components/**primitives** shown as [COMPONENT]

- components allow a compact description
- interact with morphology/syntax
- form part of our cognitive architecture

Defining Relations using Components

- **hyponymy**

  A lexical item P is a hyponym of Q if all the components of Q are also in P.

woman	[FEMALE]	[ADULT]	[HUMAN]	
spinster	[FEMALE]	[ADULT]	[HUMAN]	[UNMARRIED]
wife	[FEMALE]	[ADULT]	[HUMAN]	[MARRIED]

  spinster $\subset$ ***woman***; ***wife*** $\subset$ ***woman***

- **incompatibility**

  A lexical item P is incompatible with Q if they share some components but differ in one or more **contrasting** components

  spinster $\not\asymp$ ***wife***

Binary Features

- We can make things more economical (fewer components):

woman	[+FEMALE]	[+ADULT]	[+HUMAN]	
spinster	[+FEMALE]	[+ADULT]	[+HUMAN]	[–MARRIED]
bachelor	[–FEMALE]	[+ADULT]	[+HUMAN]	[–MARRIED]
wife	[+FEMALE]	[+ADULT]	[+HUMAN]	[+MARRIED]
girl	[+FEMALE]	[-ADULT]	[+HUMAN]	

  - Which should be $+$? [+FEMALE] or [–MALE]
  - Presumably also [–ELECTRIC], [–CONICAL], …
    Only show **relevant** features
  - **antonyms** differ in only one binary component

Redundancy Rules

- We can add relations between components:

[+HUMAN]	→	[+ANIMATE]	
[+ADULT]	→	[+ANIMATE]	
[+ANIMATE]	→	[+CONCRETE]	
[+MARRIED]	→	[+ADULT]	
[+MARRIED]	→	[+HUMAN]	...

- Which allows us to write:

woman	[+FEMALE]	[+ADULT]	[+HUMAN]	
spinster	[+FEMALE]	[+ADULT]	[+HUMAN]	[–MARRIED]
bachelor	[–FEMALE]	[+ADULT]	[+HUMAN]	[–MARRIED]
wife	[+FEMALE]			[+MARRIED]

Can we say [–MARRIED] → [+HUMAN]?

More Complex Breakdowns

- We can add relations between components:

[+FATHER]	→	[+MALE] [+PARENT]
[+FATHER](x,y)	→	[+MALE](x) [+PARENT](x,y)
[+SON](x,y)	→	[+MALE](x) [+PARENT](y,x)
[+BROTHER](x,y)	→	[+MALE](x) [+PARENT](z,x) [+PARENT](z,y)
[+GRANDFATHER](x,y)	→	[+MALE](x) [+PARENT](x,z) [+PARENT](z,y)

- Assume [+PARENT](x,y) means "x is the parent of y"

- There are various ways you can formalize such relationships
  - Many parts of language can be formalized in such a way
  - Can you do this for demonstratives?
    this, that, these, those, what, here, there, where **?**

Katz's Semantic Theory

Katz's Semantic Theory

- Two Central Ideas:
  - Semantic rules must be recursive
    to deal with infinite meaning
  - Semantic rules interact with syntactic rules
    to build up meaning, which is **compositional**

- Two major components:
  - A dictionary pairing lexical items with semantic representations
  - A set of **projection rules** that show how meaning is built up

Compositional : the meaning of the whole depends only on the meanings of the parts and the method of combination.

The dictionary

➢ ***bachelor*** {N}

1. (`human`) (`male`) [one who has never been married]
2. (`human`) (`male`) [young knight serving under the standard of another knight]
3. (`human`) [one who has the lowest academic degree]
4. (`animal`) (`male`) [young fur seal without a mate in the breeding season]

➢ (`semantic markers`) are the links that bind lexical items together in lexical relations

➢ [**distinguishers**] serve to identify this particular lexical item this information is not relevant to syntax

Projection Rules

1. Projection rules combine with syntactic rules to produce the meaning of a sentence
   - ➢ Information is passed up the tree and collected at the top.
     - ➢ Information is only added, never deleted
     - ➢ It must come from words or rules (or constructions)

2. **Selectional restrictions** ⟨⟩ help to reduce ambiguity and limit the possible readings

Selectional restrictions

1. ***colorful*** {adj}

   (a) (`color`) [abounding in contrast or variety of bright colors) ⟨(`physical object`) or (`social activity`)⟩
   (b) (`evaluative`) [having distinctive character, vividness or picturesqueness) ⟨(`aesthetic object`) or (`social activity`)⟩

2. ***ball*** {N}

   (a) (`social activity`) (`large`) (`assembly`) [for the purpose of social dancing]
   (b) (`physical object`) [having globular shape]
   (c) (`physical object`) [solid missile for project by engine of war]

➢ *colorful ball*: The selectional restrictions rule out: 1b + 2b, 1b + 2c

Grammatical Rules and Semantic Components

Verb Classification

- We can investigate the meaning of a verb by looking at its grammatical behavior

  (13) Consider the following transitive verbs

  a. *Margaret cut the bread*

  b. *Janet broke the vase*

  c. *Terry touched the cat*

  d. *Carla hit the door*

- These do not all allow the same argument structure alternations

Diathesis Alternations

- **Causative/inchoative** alternation:

  Kim broke the window $\leftrightarrow$ *The window broke*
  also *the window is broken* (state)

- **Middle construction** alternation:

  Kim cut the bread $\leftrightarrow$ *The bread cut easily*

- **Conative** alternation:

  Kim hit the door $\leftrightarrow$ *Kim hit at the door*

- **Body-part possessor ascension** alternation:

  Kim cut Sandy's arm $\leftrightarrow$ *Kim cut Sandy on the arm*

Diathesis Alternations and Verb Classes

- A verb's (in)compatibility with different alternations is a strong predictor of its lexical semantics:

	break	***cut***	***hit***	***touch***
Causative	YES	NO	NO	NO
Middle	YES	YES	NO	NO
Conative	NO	YES	YES	NO
Body-part	NO	YES	YES	YES

break = {*break, chip, crack, crash, crush, ...*}
cut = {*chip, clip, cut, hack, hew, saw, ...*}
hit = {*bang, bash, batter, beat, bump, ...*}
touch = {*caress, graze, kiss, lick, nudge, ...*}

(Levin, 1993)

- We can analyze components that correlate with the alternations

break	CAUSE, CHANGE
cut	CAUSE, CHANGE, CONTACT, MOTION
hit	CONTACT, MOTION
touch	CONTACT

- The semantic class/components predicts the syntax of novel words

- Not all parts of meaning are relevant to syntax

has an affect	has no affect
Semantic Markers	Semantic Distinguishers
Grammatically Relevant Subsystem	Unrestricted Conceptual Representation
Semantic Structure	Semantic Content
Semantic Form	Conceptual Structure
Semantic Structure	Conceptual Structure

Thematic Roles and Linking Rules

- Verbs often link their thematic roles to arguments in different ways

  (14) a. *He loaded newspapers onto the van* ⟨AGENT, THEME⟩

  b. *He loaded the van with newspapers* ⟨AGENT, GOAL⟩

- But the meanings are not identical: (14b) implies completion, and the theta-grid does not deal with the adjuncts

- We need more than just theta-grids/roles

Movement-to-location verbs

➢ locative alternation

(15) a. *Andy poured oil into the pan*

b. **Andy poured the pan with oil*

(16) a. **Andy filled oil into the pan*

b. *Andy filled the pan with oil*

(17) a. *Andy brushed oil onto the pan*

b. *Andy brushed the pan with oil*

(18) a. ⟨AGENT, THEME, PP:GOAL⟩

b. ⟨AGENT, PATIENT, PP:INSTRUMENT?⟩

Explain with verb classes

- Verbs of movement: ‘X causes Y to move into/onto Z’

  1. Simple motion verbs: ***put, push***
  2. Manner specified: ***pour, drip, slosh***

  X puts Y on Z

- Verbs of change of state: ‘X causes Z to change state by means of moving Y into/onto Z’: ***fill, coat, cover***

  X fills Z with Y

- Verbs of movement ‘X causes Y to move into/onto Z’ which also describe a kind of motion which causes an effect on the entity Z: ***spray, paint, brush***

  X paints Z with Y

Components and Conflation Patterns

Cognitive Semantics

- Major semantic components of Motion:
  - **Figure**: object moving or located with respect to the **ground**
  - **Ground**: reference object
  - **Motion**: the presence of movement of location in the event
  - **Path**: the course followed or site occupied by the Figure w.r.t. the Ground.
  - **Manner**: the type of motion

(19) *Kim swam away from the crocodile*
Figure Manner Path Ground

(20) *The banana hung from the tree*
Figure Manner Path Ground

- These are lexicalized differently in different languages.

Different Lexicalizations of Movement

- English: Manner in verb, Path as adjunct

  (21) *The bottle floated into the cave*

  (22) *They rolled the keg into the party*

- Spanish: Path in verb, Manner as adjunct

  (23) *La botella entró a la cueva flotando*
  the bottle moved-in to the cave floating
  "The bottle entered the cave, floating"

  (24) *Metí el barril a la bodega rodandolo*
  I-moved-in the barrel to the storeroom rolling
  "I put the keg into the storeroom, rolling"

Typology of Motion in Languages

Language (Family)	Verb Conflation Pattern
Romance, Semitic, Polynesian, …	Path + fact-of-Motion
Indo-European (– Romance), Chinese	Manner/Cause + fact-of-Motion
Navajo, Atsuwegei, …	Figure + fact-of-Motion

- **verb-framed** (Motion with Path)
- **satellite-framed** (Motion with Manner)
- Which group is this from?

(25)

樽 を	倉庫 に	転がして	入れた
taru-wo	souko-ni	korogasite	ireta
barrel-ACC	storeroom-TO	rolling	put

"I put the keg into the storeroom, rolling"

Jackendoff's Conceptual Semantics: Lexical Conceptual Structure

Describing Mental Representations

- An attempt to explain how we think
- **Mentalist Postulate**

  Meaning in natural language is an information structure that is mentally encoded by human beings

- Try to capture regularities

x lifted y	entails	y rose
x gave z to y	entails	y received z
x persuaded y that P	entails	y came to believe P
x cause E to occur	entails	E occurs

- Also linked to vision and music (through X-bar theory)

(Jackendoff, 1990, 1997)

Semantic Components

- Universal Semantic Categories
  - **Event**
  - **State**
  - **Material Thing/Object**
  - **Path**
  - **Place**
  - **Property**

(26) a. [$_S$ [$_{NP}$ Bobby] [$_{VP}$ [$_V$ went] [$_{PP}$ [$_P$ into] [$_{NP}$ the house]]]]

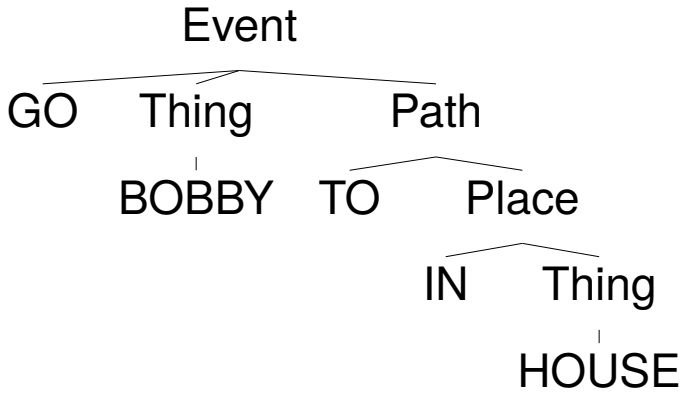
b. [$_{Event}$ GO ([$_{Thing}$ BOBBY], [$_{Path}$ TO ([$_{Place}$ IN ([$_{Thing}$ house])])])]

Motion as a tree

(27) *Bobby went into the house*

(28) "Bobby traverses a path that terminates at the interior of the house"

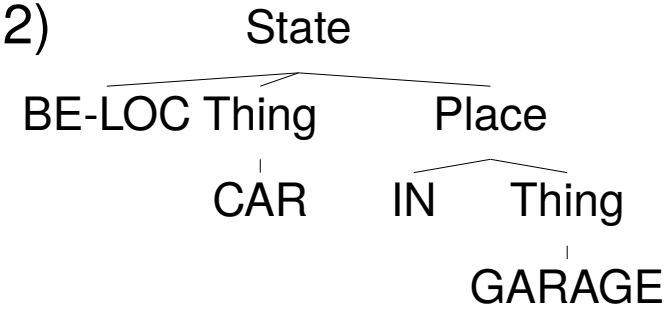
(29)



(30) *The car is in the garage*

(31) "The car is in the state located in the interior of the garage"

(32)



Extend Location in three ways

Semantic Field	BE (state)	GO (event)
spatial location	*Jo is in the club*	*Alex went into the house*
temporal location	*The exam is on Wednesday*	*The exam moved to Thursday*
property ascription	*The class is full*	*The class went from full to empty*
possession	*This theory belongs to Ann Elk*	*The prize went to JC*

➢ Break down the meaning into components

(33) a. *The pool emptied*

b. [$_{Event}$ INCH ([$_{State}$ BE-IDENT ([$_{Thing}$ POOL], [$_{Place}$ AT ([$_{Property}$ EMPTY])])])]

(34) a. *Sandy emptied the pool*

b. [$_{Event}$ CAUSE ([$_{Thing}$ SANDY], [$_{Event}$ INCH ([$_{State}$ BE-IDENT ([$_{Thing}$ POOL], [$_{Place}$ AT ([$_{Property}$ EMPTY])])])])]

THING: Boundedness and Internal Structure

- Two components:

Boundedness	Internal Struct.	Type	Example
$+$b	$-$i	**individuals**	*a dog*/*two dogs*
$+$b	$+$i	**groups**	*a committee*
$-$b	$-$i	**substance**s	*water*
$-$b	$+$i	**aggregates**	*buses, cattle*

- This can be extended to verb aspect (the verb event is also [$\pm$b, $\pm$i]).
  sleep [$-$b], ***cough*** [$+$b], ***eat*** [$\pm$b]

  (35) *Bill ate two hot dogs in two hours.*
  (36) **Bill ate hot dogs in two hours.*
  (37) #*Bill ate two hot dogs for two hours.*
  (38) *Bill ate hot dogs for two hours.*

Conversion: Boundedness and Internal Structure

- Including

plural	[+b, –i] → [–b, +i]	*brick → bricks*
composed of	[–b, +i] → [+b, –i]	*bricks → house of bricks*
containing	[–b, –i] → [+b, –i]	*coffee → a cup of coffee/a coffee*

- Excluding

element	[–b,+i] → [+b, –i]	*grain of rice*
partitive	[–b, ±i] → [+b, –i]	*top of the mountain*, *one of the dogs*
universal grinder	[+b, –i] → [–b, –i]	*There's dog all over the road*

See Bond (2005) for an extension to Japanese and computational implementation.

Pustejovsky's Generative Lexicon

The Generative Lexicon

- This brings in more encyclopedic knowledge

- Each lexical entry can have:

  ARGUMENT STRUCTURE

  EVENT STRUCTURE

  LEXICAL INHERITANCE STRUCTURE

  QUALIA STRUCTURE:

CONSTITUTIVE	constituent parts
FORMAL	relation to other things
TELIC	purpose
AGENTIVE	how it is made

- Interpretation is **generated** by combining word meanings

The ideas behind the Generative Lexicon

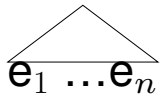
- Word meaning is decomposed, so that it can be composed with other words

- The range of composition teaches us something about the internal structure of the word
  - Rich Representation: lexical decomposition
  - Rich Rules: coercion, sub-selection, co-composition

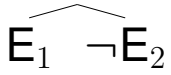
Event Structure

- Events have **complex** structure
  - **State** S
    |
    e

    understand, love, be tall
  - **Process** P

    sing, walk, swim
  - **Transition** T

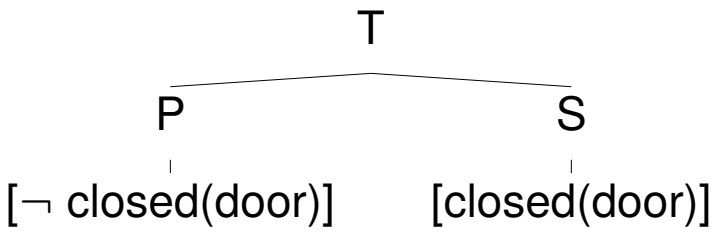
    

    open, close, build

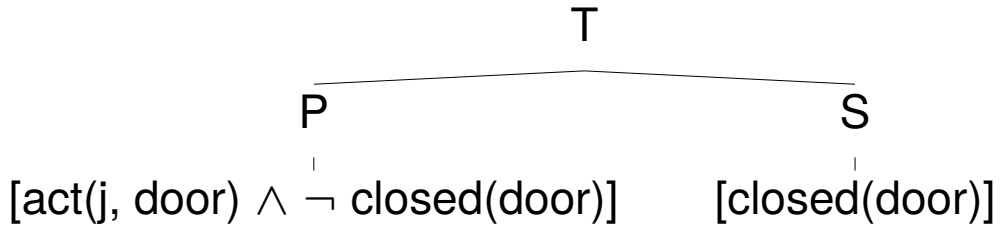
    For an achievement, typically $E_1 = \neg e_1$; $E_2 = e_1$

Different Alternations

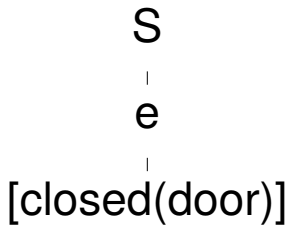
(39) *The door closed*



(40) *Jamie closed the door*



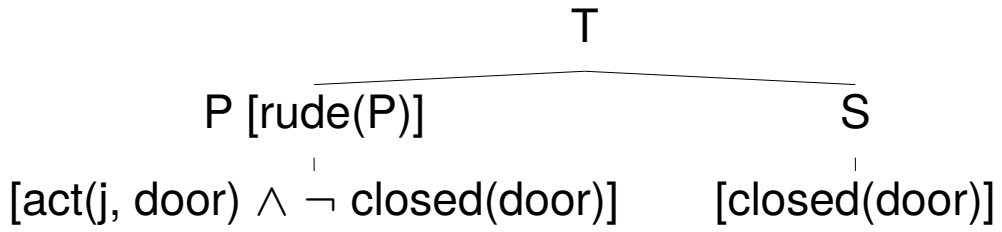
(41) *The door is closed*



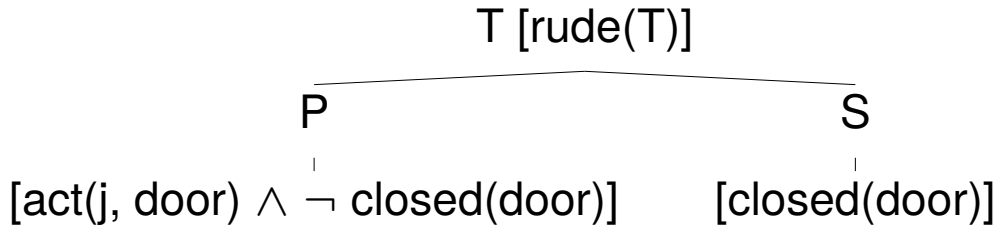
Modifier Ambiguity

(42) *Jamie closed the door rudely*

a. *Jamie closed the door in a rude way [with his foot]*



b. *It was rude of Jamie to close the door*



Qualia Structure

(43) *fast typist*

a. a typist who is fast [at running]

b. a typist who types fast

➢ typist

$$\begin{bmatrix} \text{ARGSTR} & \begin{bmatrix} \text{ARG1} & \texttt{x:typist} \end{bmatrix} \\ \text{QUALIA} & \begin{bmatrix} \text{FORMAL} & \begin{bmatrix} \texttt{x} \left[\subset \texttt{person} \right] \end{bmatrix} \\ \text{TELIC} & \begin{bmatrix} \texttt{type(e,x)} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

➢ (43a) *fast* modifies x

➢ (43b) *fast* modifies e

Problems with Components of Meaning

- Primitives are the same as necessary and sufficient conditions
  it is impossible to agree on the definitions
  but they allow us to state generalizations better
- Don't capture all aspects of meaning
- Psycho-linguistic evidence is weak
- It is just **markerese** which still needs to be explained, there is no **grounding**
- Recent work replaces components with inheritance or dimensions
  - $\textbf{\textit{boy}}_1 \subset \textbf{\textit{male}}_1 \wedge \subset \textbf{\textit{child}}_1$
  - $\textbf{\textit{boy}}_1$ near $\textbf{\textit{male}}_1$ on some dimensions; near $\textbf{\textit{child}}_1$ on others
  - same generalizations, more psychologically plausible

Conclusion

- Meaning can be broken up into units smaller than words: **components**
  - These can be combined to make larger meanings
  - At least some of them influence syntax
  - They may be psychologically real
  - Many parts of meaning can be treated in this way

- Note: Selectional restrictions are too strict, selectional preferences (giving prototypical arguments and measuring the similarity) are more common in modern approaches:
  assigning probabilities to interpretations

Fry & Laurie: *Language*

- Series 1 Episode 2
  `http://abitoffryandlaurie.co.uk/sketches/language_conversation`
- Series 2 Episode 6
  `http://abitoffryandlaurie.co.uk/sketches/beauty_and_ideas`
- Stephen Fry on *Language*
  `http://www.stephenfry.com/2008/11/04/dont-mind-your-language%E2%80%A6/`

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