Psych 3371 / Ling 3701: Language and the Mind – Lecture 15

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Evidence for Syntactic Categories

People seem to discriminate syntactic categories idiosyncratically... 

▶ Lee Osterhout & Phillip Holcomb ’92: P600 ERP effect 
  ▶ stimuli: sentences, one word at a time, centered; grammaticality query 
    (a) ‘The broker hoped to sell the stock was sent to jail.’
    (b) ‘The broker persuaded to sell the stock was sent to jail.’
  ▶ measure: positivity/negativity at multiple scalp electrodes 
  ▶ results: anterior positivity at 500 to 800ms after ‘to’ (b) and ‘was’ (a) 
    Differs from N400, but may confound w. preparation for judgement task.

▶ Seanna Coulson, Jonathan King & Marta Kutas ’98: no gramm. query 
  ▶ stimuli: same sentence presentation; occasional comprehension query 
    (a) ‘Every Sunday he mows the lawn.’
    (b) ‘Every Sunday he mow the lawn.’

    also, probability of ungramm. stimuli varies between blocks: 50/50, 80/20
  ▶ measure: positivity/negativity at multiple scalp electrodes 
  ▶ results: anterior positivity at 500 to 800ms after ‘mow’ (b) 
    also, effect of category violations not additive with probability 

Not necessarily lang.-specific (∼P3b), but shows categorization, salience.
These categories are of syntactic context:

- I think \([V \text{ Pat knows the facts}]\) (finite) / \(*[B \text{ Pat know the facts}]\)
- I let \([B \text{ Pat know the facts}]\) (base) / \(*[V \text{ Pat knows the facts}]\)
- I expect \([I \text{ Pat to know the facts}]\) (infinitive)
- I keep \([A \text{ Pat knowing the facts}]\) (adjectival/predicative)
- I decry \([N \text{ Pat’s knowledge of the facts}]\) (nominal)
Categories

A set of primitive categories — different clause types for same meaning:

**V**: finite clause  
(e.g. they knew it)

**I**: infinitive clause  
(e.g. them to know it, as in expect ...)

**B**: base-form clause  
(e.g. them know it, as in let ...)

**L**: participial clause  
(e.g. them known it)*

**A**: adjectival/predicative/‘small’ clause  
(e.g. them knowing it, it known)

**R**: adverbial clause  
(e.g. them knowingly)*

**G**: gerund clause  
(e.g. them knowing it)

**C**: complementized finite clause  
(e.g. that they know it)

**E**: embedded infinitive clause  
(e.g. for them to know it)

**Q**: interrogative clause  
(e.g. did they know it)

**S**: complete utterance  
(e.g. know it)

**N**: nominal clause / noun phrase  
(e.g. their knowledge of it)

**D**: determiner (clause)  
(e.g. their knowledge of it’s)

**O**: non-possessive genitive (clause)  
(e.g. of their knowledge of it)

* Some don’t occur as complete clause.
Subcategories

Categories ‘subcategorize’ for arguments ahead of predicate, use operator -a

- I think \[ V \ [N \ Pat ] [V-aN \ knows \ these \ facts ] ]
- I decry \[ N \ [D \ Pat’s ] [N-aD \ knowledge \ of \ these \ facts ] ]

Categories ‘subcategorize’ for arguments behind predicate, use operator -b

- Pat \[ V-aN \ [V-aN-bN \ knows ] [N \ these \ facts ] ]
- Pat’s \[ N-aD \ [N-aD-bO \ knowledge ] [O \ of \ these \ facts ] ]

Define rules for argument attachment (\(\rightarrow\) = ‘can be made of’):

- \(\phi \rightarrow \psi \ \phi-a\psi\) (e.g. \(\phi = V, \ \psi = N: V \rightarrow N \ V-aN\))
- \(\phi \rightarrow \phi-b\psi \ \psi\) (e.g. \(\phi = V-aN, \ \psi = N: V-aN \rightarrow V-aN-bN \ N\))

Define rules for modifier attachment (\(\rightarrow\) = ‘can be made of’):

- \(\phi \rightarrow \phi \ \psi-a\chi\) (\(\phi=N-aD, \psi=A, \chi=N: N-aD \rightarrow N-aD \ A-aN\) ‘kids talking’)
- \(\phi \rightarrow \psi-a\chi \ \phi\) (\(\phi=N-aD, \psi=A, \chi=N: N-aD \rightarrow A-aN \ N-aD\) ‘talking kids’)

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Some Common Subcategories

- one argument:
  - $[V-aN \text{ sleep }]$

- two arguments:
  - $[V-aN-bN \text{ decry }]$
  - $[V-aN-bV \text{ think }] / [V-aN-bC \text{ think } ]$
  - $[V-aN-bA \text{ keep }]$
  - $[V-aN-bB \text{ let }]$
  - $[V-aN-bI \text{ expect }]$
  - $[V-aN-b(A-aN) \text{ become }] \ldots \text{ exciting}$
  - $[V-aN-b(B-aN) \text{ will }] \ldots \text{ know it}$
  - $[V-aN-b(G-aN) \text{ begin }] \ldots \text{ knowing it}$
  - $[V-aN-b(I-aN) \text{ promise }] \ldots \text{ to know it}$
  - $[V-aN-b(L-aN) \text{ have }] \ldots \text{ known it}$

- three arguments (last = closest):
  - $[V-aN-bN-bN \text{ give }] \ldots \text{ a pig a pancake}$
  - $[V-aN-bC-bN \text{ tell }] \ldots \text{ a pig that he should not eat pancakes}$

- four arguments (last = closest):
  - $[V-aN-bC-bN-bN \text{ bet }] \ldots \text{ you 5 pounds that you can’t drink all the vinegar}$
Case and agreement are additional specifications on arguments:

Case (**\(n = \text{nominative}, \text{none} = \text{accusative}**):

\[
[V \[Nn \ \text{they/*them} \] [V-aNn [V-aNn-bN \ \text{know} ] [N \ \text{them/*they} ] ] ]
\]

Agreement (**\(3S = \text{3rd person singular}, \ PL = \text{plural/1st sing./2nd sing.}**):

\[
[V \[NnPL \ \text{they/*she} \] [V-aNnPL [V-aNnPL-bN \ \text{know} ] [N \ \text{her/them} ] ] ] \\
[V \[Nn3S \ \text{she/*they} \] [V-aNn3S [V-aNn3S-bN \ \text{knows} ] [N \ \text{her/them} ] ] ]
\]

Arguments define dependencies between words.

Words may be non-adjacent (think..knows, let..know) but categories connect.

Connections need not be familiar constituents, however:

\[
[V \[V-bN [Nn3S \ \text{Pat} \] [V-bN-aNn3S \ \text{knows} ] ] [N \ \text{these facts} ] ]
\]
Also, nested categories can be drawn as trees:

This makes the category dependencies easier to see.