
Levin classes (Levin, 1993)
- 3100 verbs, 47 top level classes, 193 second and third level
- Each class has a syntactic signature based on alternations.
  
  *John broke the jar.* / *The jar broke.* / Jars break easily.
  
  *John cut the bread.* / *The bread cut.* / Bread cuts easily.
  
  *John hit the wall.* / *The wall hit.* / *Walls hit easily.*

Summary of semantic components
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Summary of syntactic patterning

<table>
<thead>
<tr>
<th></th>
<th>Touch</th>
<th>Hit</th>
<th>Cut</th>
<th>break</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conative</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Body-part</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>ascension</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

Common class components
markers, not distinguishers

- **cut**: [CAUSE] [CHANGE] [MOTION] [CONTACT]
- **break**: [CAUSE] [CHANGE]
- **touch**: [CONTACT]
- **hit**: [MOTION] [CONTACT]

Which semantic components are grammatically relevant?

- **Pinker**
  - Set of conceptually interpretable elements
  - Smaller than # of verbs, universal
  - Used by children
  - Have grammatical relevance
  - Distinguish classes that have different sets of lexical rules
Diathesis Alternations

Alternations:
- Spray / Load
- Hit / Break

Non-alternating:
- Swat / Dash
- Fill / Cover

Spray / Load Alternation

Example:
Mary loaded the hay onto the truck.
Mary loaded the truck with hay.

Mary sprayed the paint onto the wall.
Mary sprayed the wall with paint.

- Levin: theme/location alternation
- Dowty:
  - Analyzed via proto-roles, not e.g. as a theme / location alternation.
  - Direct object analyzed as an Incremental Theme, i.e. either of two non-subject arguments qualifies as incremental theme. This accounts for alternating behavior.

Hit / Break Alternation

John hit the fence with a stick.
John hit the stick against a fence.

John broke the fence with a stick.
John broke the stick against the fence.

- Radical change in meaning associated with break but not hit.
- Dowty: Explained via proto-roles (change of state for Proto-Patient with break class).

Fill / Cover

Fill / Cover are non-alternating:
Bill filled the tank (with water).
*Bill filled water (into the tank).

Bill covered the ground (with a tarpaulin).
*Bill covered a tarpaulin (over the ground).

- Dowty: Only goal lexicalizes as incremental theme (direct object).
Limitations to Levin Classes

Coverage of only half of the verbs (types) in the Penn Treebank (1M words, WSJ)
Usually only one or two basic senses are covered for each verb
Confusing sets of alternations
- Different classes have almost identical "syntactic signatures"
- or worse, contradictory signatures

Dang, Kipper & Palmer, ACL98

Multiple class listings

Homonymy or polysemy?
- draw a picture, draw water from the well

Conflicting alternations?
- Carry verbs disallow the Conative, (*she carried at the ball), but include {push, pull, shove, kick, yank, tug}
- also in Push/pull class, does take the Conative (she kicked at the ball)

Dang, Kipper & Palmer, ACL98

Intersective Levin Classes

Dang, Kipper & Palmer, ACL98