Lecture 3
Predicates and Their Arguments

7/14/2017
Happy Bastille Day!
### From L0 to L1

**Categories and Types**

<table>
<thead>
<tr>
<th>Category</th>
<th>Descriptor</th>
<th>Some Basic Expressions</th>
<th>Semantic Type</th>
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</thead>
<tbody>
<tr>
<td>S</td>
<td>Formula, sentence</td>
<td>?</td>
<td>( t )</td>
</tr>
<tr>
<td>N(ame)</td>
<td>Individual term</td>
<td>j, m, b</td>
<td>( e )</td>
</tr>
<tr>
<td>N(ame)</td>
<td>Individual variable</td>
<td>x, y, z</td>
<td>( e )</td>
</tr>
<tr>
<td>P1</td>
<td>1-place Predicate</td>
<td>dog', man', bark', break1'</td>
<td>( e, t )</td>
</tr>
<tr>
<td>P2</td>
<td>2-place Predicate</td>
<td>chase', love', break2'</td>
<td>( e, (e, t) )</td>
</tr>
<tr>
<td>P3</td>
<td>3-place Predicate</td>
<td>give'</td>
<td>( e, (e, (e, t)) )</td>
</tr>
</tbody>
</table>
From L0 to L1

Syntactic Rules (As they differ from those of L0)

1: If \( \delta \) is a 1-place predicate and \( \alpha \) is a name, then \( \delta(\alpha) \) is a sentence.
2a: If \( \delta \) is a 2-place predicate and \( \alpha \) is a name, then \( \delta(\alpha) \) is a 1-place predicate.
2b: If \( \delta \) is a 3-place predicate and \( \alpha \) is a name, then \( \delta(\alpha) \) is a 2-place predicate.
8: If \( \phi \) is an expression of type \( \tau \) containing a free occurrence of \( \nu \), then \( \lambda \nu \phi \) is an expression of type \( \langle e, \tau \rangle \).
Semantic Composition Rules

1: For expressions produced by S1: $[[\delta(\alpha)]_{M,c} = [[\delta]]_{M,c}([[\alpha]]_{M,c})$
2a: For expressions produced by S2a: $[[\delta(\alpha)]_{M,c} = [[\delta]]_{M,c}([[\alpha]]_{M,c})$
2b: For expressions produced by S2b: $[[\delta(\alpha)]_{M,c} = [[\delta]]_{M,c}([[\alpha]]_{M,c})$
8: For expressions created by S8, $[[\lambda \nu \phi]]_{M,c}$ the function (whose domain is the universe of discourse) and whose value on any particular entity is $[[\phi]]_{M,c'}$, where $c'$ assigns that entity as the value of $\nu$.

From L0 to L1

Composition Rules
The Lambda Operator
From L0 to L1

VOS Binary and VSO Flat Representations

give’ (Mary) (flowers) (John) = give’ (John, flowers, Mary)
Semantic Objects

- Propositions
- Entities
- Eventualities
- Properties
- Predicates: Parameterized propositions, saturated by arguments
Sentences express different propositions in context

- I am happy
- I saw him
- You gave it to her
Different Sentences may express the same proposition

- Angelo ordered the cheesecake.
- The cheesecake was ordered by Angelo.
- The waiter served the cheesecake to Angelo.
- The waiter served Angelo the cheesecake.
Argument Structure (Linking and Alignment)

• Under a fixed valence assumption, NL verbs typically express multiple predicates.

• Relations among the predicates expressed can be viewed as result of syntactic combinatorics or relations in the lexicon.

• Other things being equal, verbs link to their arguments in an order that aligns with grammatical and participant hierarchies.
A Brief History of Argument Structure

- DS alignment in classical transformation grammar
- Fillmore’s “case for case”
- Lexicalist interpretation of A-movement
- Exuberant combinatorics (syntactic and semantic)
- Lexical items and words as ephemera or emergent phenomena
Eventuality Descriptions

- Interpreting propositions as descriptions of eventualities
  - Type or kind of eventuality
  - Spatiotemporal location parameter
  - Cast of Participants
Participant Roles

- Event-specific individual roles: the murderer and the deceased
- Role types: heroes and villains
- Traditional typologies of “Thematic Roles/Relations”
Two Tiers of Analysis

- Movement (literal or metaphorical)
  - Theme
  - Source / Goal / Path
- Actions and their Effects
  - Cause, Initiator, Agent (Intentional or Otherwise)
  - Proto-Patient Properties, “Affected Themes”
“Logical Forms” for Eventuality Descriptions

- Jones buttered the toast slowly, with a knife, in the bathroom, at midnight.

- Classical predicate logic

- Davidsonian “logical form of action sentences”

- Neo-Davidsonian representations
Fin