The Last Stretch

Cognition and Language

Psycholinguistics Experiments
Spatial Relation
Motor Control
Metaphor
Grammar

Computation

Structured Connectionism

Neural Net & Learning
Regier Model
Bailey Model
Narayanan Model

Computational Neurobiology

Neural Net & Learning

Biology

Visual System
Neural Development

Triangle Nodes

Quiz
Midterm
Finals
Homework

- A6 (model merging) is due next Tuesday
- A7 (metaphor) is due next Thursday
- Any homework questions?
Questions

- Is there experimental evidence for metaphorical thinking?
- What is tense?
- What is aspect?
- How does an X-Net relate to aspect?
- How can you diagram tense?
- How do aspect and tense interact?
Metaphor

• There are LOTS of metaphors we use
  - Power is size
  - Knowing is seeing
  - Event structure is motion
Event Structure Metaphor

- States are Locations
- Changes are Movements
- Causes are Forces
- Causation is Forced Movement
- Actions are Self-propelled Movements
- Purposes are Destinations
- Means are Paths
- Difficulties are Impediments to Motion
- External Events are Large, Moving Objects
- Long-term, Purposeful Activities are Journeys
Metaphor

- Is there evidence that people use metaphor to think?
  - If so, what?
Ego Moving versus Time Moving

Fig. 1. (a) Schematic of the ego-moving schema used to organize events in time. (b) Schematic of the time-moving schema used to organize events in time.
Ego Moving and Object Moving Spatial Primes

(a)  
The dark can is in front of me.

(b)  
The light widget is in front of the dark widget.
Do people use Spatial Metaphors for time?

- Participants answered several priming questions about spatial relations of objects in pictures.
  - Ego-moving or object moving
- Then, participants interpreted an ambiguous temporal statement such as `Next Wednesday's meeting has been moved forward two days'.
- If the above statement is interpreted using the ego-moving schema, then forward is in the direction of motion of the observer, and the meeting should now fall on a Friday.
- In the time-moving interpretation, however, forward is in the direction of motion of time, and the meeting should now be on a Monday.
Hypothesis

• If space and time do share some relational structure, then participants primed in the ego-moving spatial perspective should thus think that the meeting will be on Friday.

• Participants primed in the object-moving perspective should prefer the time-moving interpretation and think that the meeting will be on Monday.

• However, if the domains of space and time do not share any relational structure, then spatial primes should have no effect on the way participants think about time.
## Results

<table>
<thead>
<tr>
<th>PRIME</th>
<th>Meeting is Monday</th>
<th>Meeting is Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ego Moving</td>
<td>26.7%</td>
<td>73.3%</td>
</tr>
<tr>
<td>Object Moving</td>
<td>69.2%</td>
<td>30.8%</td>
</tr>
</tbody>
</table>
Tense

- What is tense?
- Time information
- Present, Reference point, Event
He talked
He will talk
He will have talked
Aspect

- What is aspect?
- Aspect is different from tense in that it deals with the temporal structure of events
- Viewpoints
  - looking at the same event at different granularity
  - *He was walking / He has walked / He walks*
- Phases of Events
  - stages of an event
  - *He is about to walk / He finished walking*
- Inherent Aspect
  - perfective / imperfective (telic / atelic)
  - *He is walking / He is tapping his finger*
Controller X-Schema

- The controller x-schema is meant to capture the generic structure of events.
- Aspect therefore marks (or profiles) certain states or transitions.
The car is on the verge of falling into the ditch.
He *stumbled* on the uneven road.
She cancelled her trip to Paris.
You can ‘blow up’ any state or transition into a lower level x-schema, allowing embedding.
He is concluding his talk.
They are getting ready to continue their journey across the desert.
She smokes. (habitual reading)
Mapping down to the time line

- we can use Reichenbach’s system to map the controller $X$-schema down to a time line and get tenses

Speech Time (S)
Reference Time (R)
Event Time (E)
He is talking
He has talked
He will have talked
The Present Triumvirate

JAN RUNS

JAN IS RUNNING

JAN HAS BEEN RUNNING