Language and Mind  
HONR 218L

Class #1  
Introduction

Course website  
www.ling.umd.edu/zukowski/courses/Spring2005/hon218L

How are humans different from other animals?

• Humans are smarter (?)  
• Humans have language

Could these be related?

Possibility #1  
We have language because we are smarter

• Language is somehow derivative of greater smarts  
• Language is just another manifestation of our greater smarts  
• Other species don’t have language because they are not as smart as we are

Problems with Possibility #1:  
Being smart is not sufficient

• Some disordered groups have normal intelligence but impaired language
Specific Language Impairment

- Genetic disorder, currently poorly understood
- Good general cognitive abilities, poor language

“It’s a flying finches, they are.”
“She remembered when she hurts herself the other day.”
“The neighbors phone the ambulance because the man fall off the tree.”
“The boys eat four cookie.”
“Carol is cry in the church.”

Problems with Possibility #1: Being smart is not sufficient

- Some disordered groups have normal intelligence but impaired language
  - Other species are very smart
    – Tunisian ants are experts at dead reckoning

- Cataglyphis fortis
- Lives in featureless desert
- Forages for food
- Does not lay odor trails

Displacement Experiment

Figure 5. Homing path in desert ant displaced to an unknown territory is traced on a 1 m gridwork. The ant was captured as it turned to head home from a feeding station 30 m south of its nest and displaced to an unfamiliar portion of the desert on which the gridwork had been painted. S = release point; N = fictive nest (open circle marks place where it would have found its nest had it not been captured and displaced); O = sharp turn with which the ant initiates its search for the nest entrance (point of turn marked by filled circle). (Redrawn from Wehner and Srinivasan 1981, p. 318, by permission of author and publisher.)
What minimally must the ant be able to calculate, given this dead reckoning ability?

It must be able to estimate its position by either:

a) integrating its velocity with respect to time or
b) keeping track of its change in position (its displacement) by summing successive small displacements

Problems with Possibility #1: Being smart is not sufficient

- Some disordered groups have normal intelligence but impaired language
- Other species are very smart
  - Tunisian ants are experts at dead reckoning
  - Honeybees calculate and remember angles and use this information to express the direction of a food source to other bees

Dance of the honeybee

Under 50 m from hive

Over 50 m from hive

The angle of the waggle segment relative to the gravitational vertical equals the angle formed by
  - the hive
  - the sun’s azimuth
  - the food source
How do ants and bees hold a course?

Answer: They use the sun as a compass

Problems with using the sun as a compass

a) It moves throughout the day (and at different rates at different times of the year)
   Sometimes it’s cloudy

   Nevertheless, ants and bees compensate for the time-dependent change in the direction of the sun, even during periods when the animal cannot see the sun

   • Bees and ants can hold a course on a cloudy day
   • Bees can calculate the solar bearing of a food source even on cloudy days
   • Bees change the angle of the waggle dance as the morning passes

   In order to do this, an animal must have both:
   An internal clock (circadian clock)
   A record of the sun’s compass direction as a function of the time of day (a solar ephemeris function)

Problems with Possibility #1:
Being smart is not sufficient

• Other species are very smart

Problems with Possibility #1:
Being smart may not even be necessary

• “Smart” people don’t speak their native language any better than the average person
Literacy vs. speaking

- Almanacs publish ‘literacy rates’ for different countries.
- Why don’t they publish ‘speaking rates’? (percent of people who learn to speak their native language)

Problems with Possibility #1: Being smart may not even be necessary

- “Smart” people don’t speak their native language any better than the average person
- Very young children already know a lot about language

My daughter, age 2;11

- Cannot tie her shoes
- Cannot draw any letter except O
- Draws people’s legs as coming out of their heads
- Thinks every set contains 2 items
- Can produce complex utterances like this:
  - “Mommy, can you show Jaiva how ‘One was Johnny’ works?”
  - “Which of these people you like?”
  - “I hold mommy’s hand so she don’t slip on the ice”

Problems with Possibility #1: Being smart may not even be necessary

- “Smart” people don’t speak their native language any better than the average person
- Very young children already know a lot about language
- Many people with mental retardation have very good (if not perfect) language
Spina Bifida, hydrocephaly

- Some reported as having chatterbox syndrome’
  - Talks excessively but fluently
  - Seems to use syntactic forms appropriately

- Tew (1979) studied 49 children with spina bifida
- Split group into chatterboxes (20) and others (29)
- Chatterbox group scored 26–32 points lower on IQ!

“D.H.” (Cromer)

- Full scale IQ of 44
- Cannot do simple arithmetic
- Digit span poor (short term memory)

  - “I said I’d never go canoeing again”
  - “If she was a good swimmer, she could probably swim to safety.”
  - “Somehow mum didn’t mind me moving about, but Dad objected to it because he knew it was bothering me and it was bothering my school work.”

Cognitive Characteristics of Williams Syndrome

- Low general IQ (50–60)
- Poor math, reasoning
- Poor *visuospatial construction* abilities
- Highly social
- Good language

Copying Simple Pictures

<table>
<thead>
<tr>
<th>Model</th>
<th>WS Age 11</th>
<th>WS Age 11</th>
<th>Control Age 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Model" /></td>
<td><img src="image2.png" alt="WS Age 11" /></td>
<td><img src="image3.png" alt="WS Age 11" /></td>
<td><img src="image4.png" alt="Control Age 6" /></td>
</tr>
</tbody>
</table>
Could these be related?

- Humans are smarter
- Humans have language

Describing Complex Pictures

“Bill is looking at the cow that the boy is pointing, and Max is looking at the cow that the girl is pointing at.”

(WS, IQ approx. 40)

Possibility #1

We have language because we are smarter

- But it looks like being smart is neither necessary nor sufficient for having language
Possibility #2:
We’re smarter (in part) because we have language

• Having language gives us a crucial advantage that allows us to be smarter in particular ways

Language makes us smarter in particular ways

• Syntax allows us to combine information from core knowledge systems to effectively create new concepts

Another possible relationship between language and thought

Big Brother

• “Don’t you see that the whole aim of Newspeak is to narrow the range of thought? In the end we shall make thought crime literally impossible, because there will be no words in which to express it …” (George Orwell, 1984)
• Orwell’s vision
  – Language constrains human thought
  – Language can be put to sinister use to control thought

• Widespread idea: people who speak different languages think differently

**Possibility #3**
Knowing a particular language influences the way you think

Whorfian Hypothesis
Sapir-Whorf Hypothesis

Languages vary in whether they encode certain domains at all

Speakers of Pirahã have no way of expressing exact quantities (no number words)

Can speakers distinguish between exact quantities (5 and 6)?

Languages vary in which aspects of the world must be encoded

Turkish speakers must indicate for every event that they describe whether they witnessed it themselves

Do Turkish speakers tend to encode this aspect of the world even when they’re not talking about it?
Languages vary in their semantic partitioning of the world

Do speakers of different languages carve up the world differently even when they are not speaking?

Course Roadmap

- First 5 weeks:
  - What language is (and is not)
  - How human language is different from communication systems of other animals
  - How children acquire language
  - How human minds represent sentences

- Remaining 9 weeks:
  - How does having a language (any language) influence thought/intelligence?
  - Does having a particular language influence our thoughts or how we perceive the world?

Grades

- Homework: 44%
  - 4 assignments @ 8 pts each
  - 1 lab @ 12 pts

- Presentations: 16%

- Participation: 8%

- Mid-term: 12%

- Final Exam: 20%