Language and Mind
HONR 218L
Class #2
Language as an Instinct

‘Instincts’
- Bats use sonar to echolocate
- Homing pigeons know where home is
- Deer rub antlers against trees
- Spiders spin webs
- Dolphins play
- Some primates walk
- Special properties of individual species, not related to ‘general intelligence’, develop automatically
- Another ‘instinct’: human language

Why call language an instinct?
- Independence from other mental abilities
- Uniformity throughout human species
- Species specificity
- Sensitive period for learning language
- Humans spontaneously create languages

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Being smart is neither necessary nor sufficient for being good at language

- Other species are extremely smart in specific ways, but their communication systems are very primitive.
- SLI: normal intelligence, impaired language
- 3 and 4 year olds: poor reasoning, poor understanding of number, poor drawing, but already linguistically very savvy

“I don’t know which lollipop I want.”
“We need to figure out the plan.”
—Zoe, age 2;11

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Uniformity of Human Language

- All humans master a human language … except in extreme circumstances
- This differs from many other complex abilities that humans are capable of:
  - Swimming
  - Reading
  - Driving
  - Pole vaulting
  - Math aptitude
  - Navigation
Uniformity of Human Language

- All human languages are remarkably similar in their basic properties
- All able to express an unlimited number of never-before-expressed sentences
- All able to express ideas of similar level of complexity
- Even the form of languages varies in restricted ways

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“We may not be able to take flight by flapping our upper extremities, but we are the only species known that can rationally discuss our inability to do so”

—Stephen Anderson, Doctor Doolittle’s Delusion

Species Specificity

- Other species simply can’t learn human language
- The communication systems of other animals are not even remotely as complex as human language.

Attempts to Teach Primates Human Language

- Which species have been the most successful at learning human language?
  - Chimps (98.4% DNA shared with humans)
- How successful have the best chimp been?
  - Maximum 200 words
  - Vocabulary restricted to ‘here and now’, nouns/verbs
  - No assimilation of function words
  - Chimp-initiated speech often violates learned word orders
Systems of Communication in Other Species

What a vervet cannot express

- “I saw a snake near that cave yesterday, so keep your eyes open”
- “Where is the leopard?”
- “Can you repeat that—I’m hard of hearing?”

Vervet Monkeys
—Struhsaker, 1967

- 3 classes of predators
- 3 distinct alarm calls
- Packmates respond appropriately, even if predator is not visible to them

- Loud bark (leopard alarm)  Run for a tree
- “Cough” (eagle alarm)  Rush into the bushes
- “Chutter” (snake alarm)  Stand up & scan ground

Dance of the Honeybees
—von Frisch, 1919 and onward

Under 50 m from hive

Over 50 m from hive
The waggle dance conveys information about 3 parameters regarding a food source:
– Direction
– Distance
– Quality

Every message is unique

Honeybees can express more messages than vervets, but...

• Conceptual content of all messages boils down to “location of what we are all looking for right now”

What a honeybey cannot express

• “There’s going to be some great food at location X soon because the flowers are almost ready to bloom”

• “I saw a hive that looks just like ours. We could move in there if anything ever happens to ours.”

Creativity of Human Language

• Animal communication systems have a fixed, limited range of messages (e.g. bee dance, bird song, monkey call)

• Human language is infinitely creative

“There’s an armadillo golfing next to the library.”

“Have you ever seen an armadillo golfing next to the library?”
Creativity of Human Language

• Increased expressive power of human language is not simply a difference of degree - human language is fundamentally different

• Creativity of human language results from its combinatorial properties

• Small number of memorized ‘pieces’ yield vast range of possible messages

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Language vs. Communication

• Communication: the conveying of information between a message-sender and a message-receiver.

• Language: one type of communication system used by human beings, and the only one that we are aware of in any species that takes a finite number of ‘pieces’ (sounds, words, phrases) and combines them with a finite set of combinatorial rules to yield an infinite number of possible messages about any topic.
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Sensitive Period for Language Learning

- Language learning is *effortless* before puberty, extremely effortful later in life
- Applies to both first and second language learning
- Applies to spoken and signed languages
- Sensitive periods familiar from ‘instincts’ in other species

What is a Sensitive/Critical Period?

- “A period of development during which some crucial experience will have its peak effect on development or learning, resulting in normal behavior attuned to the particular environment to which the organism has been exposed.”
  —Newport

Examples of Sensitive Periods in other Species

- Species: Various DUCKS/BIRDS
- What they learn: Attachment to their mother (‘imprinting’)
- Critical period for this ‘learning’:
  - 9-21 hours after hatching
  - After 21 hours, less likely to form a attachment
Examples of Sensitive Periods in other Species

- **Species:** WHITE-CROWNED SPARROWS
- **What they learn:** Their species mating song (from hearing adults sing it)
- **Critical period for this 'learning':**
  - 7-60 days after birth (to fully acquire the song)
  - 60-100 days after birth (to acquire skeletal basics of song)
  - After 100 days of age, bird will never sing normally

A Sensitive Period for FIRST Language Acquisition

- **Cases Studies**
  - Isabelle
  - Genie
  - Chelsea
- **A Special Population:** Deaf children born to hearing parents

Case Studies: Isabelle
(Davis, 1947)

- **Family background:** Hidden in attic by a deranged mother, never spoken to
- ’Discovered’ at age 6, had no speech, cognitively at level of a 2-year-old
- **Outcome:** Within 1 year, she caught up with other 7-year-olds

Case Studies: Genie
(Curtiss, 1977)

- **Family background:** From 18 months onward, lived tied to a chair in a darkened room, frequently beaten, never spoken to
- ’Discovered’ at age 13, had no speech
- **Outcome:** Learned a large vocabulary, but syntax and morphology never fully developed:
  - “Man motorcycle have”
  - “Genie full stomach”
  - “Want Curtiss play piano”
Case Studies: Chelsea (Curtiss, 1989)

- **Family background**: A partially deaf woman incorrectly diagnosed as ‘retarded’
- ‘Discovered’ at age 31, and fitted with hearing aids
- **Outcome**: Learned a large vocabulary, but syntax and morphology even worse than Genie:
  - “Breakfast eating girl”
  - “Banana the eat”

A Special Population: Deaf children born to hearing parents (Newport, 1990)

- Examined ASL proficiency in people who had been using ASL for 30 years.
- **But different ages of first exposure to ASL**:
  - NATIVE/EARLY LEARNERS: Between birth and age 6
  - LATE LEARNERS: After age 12

A Special Population: Deaf children born to hearing parents (Newport, 1990)

- **Basic Result**: Before age 6 > After age 12
- **One Exception**: WORD ORDER uniformly good for all learners

A Sensitive Period for SECOND Language Acquisition (Johnson and Newport, 1989)

- Examined English proficiency in Korean and Chinese immigrants to the U.S. who had lived here at least 5 years
- **Again, different ages of first exposure to English**:
  - Arrived in U.S. anywhere from age 3 to age 39
A Sensitive Period for SECOND Language Acquisition (Johnson and Newport, 1989)

- Test: Hear recorded sentences, judge as GOOD or BAD
- The farmer bought two pig at the market.
- Tom is reading book in the bathtub.

Results: Second Language Acquisition

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<thead>
<tr>
<th>Age of Arrival</th>
<th>Total Correct</th>
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<tbody>
<tr>
<td>Native</td>
<td>150</td>
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<tr>
<td>3-7</td>
<td>170</td>
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<tr>
<td>3-10</td>
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<td>17-39</td>
<td>230</td>
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<td>25-39</td>
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Sum up: Sensitive Period for Language Learning

- Language learning is *effortless* before puberty, extremely effortful later in life
- Applies to both first and second language learning
- Applies to spoken and signed languages
- Sensitive periods familiar from biologically-programmed abilities in other species

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- Humans *spontaneously* create languages
Children spontaneously create language: Everyday cases

- Poverty of the stimulus: *Every* child has to go beyond what is heard in the environment
- Children acquire many linguistic generalizations that experience could not have made available.

“Who did you see Dick Cheney and on the landing strip?”

“Who did you see Dick Cheney with on the landing strip?”

Every child has to go beyond what is heard in the environment

- Children cannot hear every possible sentence of their native language
- Children *never* hear impossible sentences
- Both of these sets are infinitely large
- Yet we all end up basically agreeing about which ones are possible and which ones are impossible
Some Constructions disallow certain verbs

The millionaire {gave donated bought offered sent obtained presented} the museum a painting.

Comparative ‘-er’

This one is... This one is EVEN...
big happy enormous sad melancholy red crimson delighted fun

t

Some or Any?

Yesterday Nicole didn’t eat_____ pizza.
Yesterday Nicole did eat_____ pizza.

I made margaritas after_____ guests had arrived.
I made margaritas before_____ guests had arrived.

One computer had_____ games on it.
Only one computer had_____ games on it.

Every tourist who ate_____ mussels got stomach cramps.
Every tourist who ate mussels got_____ stomach cramps.

Children create their own system

“IT broke!”
“Don’t giggle me!”
I’m going to the party, am’nt I?

Mom: “What do you need Zoe?”
Zoe: “I doesn’t need any something”
Why do we all agree on what sounds like English and what doesn’t?

• Not because somebody taught us
• Not because the “good-sounding” things “make sense” while the “bad-sounding” things “don’t make sense”
• Often, our knowledge of language is unconscious
• Linguists try to make this knowledge explicit