

The Biological Basis of Language

Ling/Psych 371
May 12, 2003
Aitchison, Ch 2; Cairns, Ch. 3, pp. 47-55
A Linguistic Big Bang

Lenneberg's Criteria for Biological Behavior

- Universality: all members of the species exhibit the behavior
- Species Specificity
- Emerges on its own, without active teaching
- All member of the species acquire the behavior on a similar developmental schedule.
- There is a critical period during which the behavior must be acquired.
- Language has anatomical and physiological correlates.

Language is universal in humans

- Human languages share:
 - A lexicon
 - A grammar
 - Phonological rule system
 - Morphological rule system
 - Syntactic rule system
- General properties of rule systems are the same for all languages.

Language is Specific to Humans
(See Aitchison, Ch. 2)

- Some chimps have been taught symbolic languages, like sign languages....
- They can acquire large lexicons
- They can talk about past events
- They can even lie
- They can produce complex behavioral sequences to get a reward...
- **BUT:** they do not show creativity the way humans do.

Language emerges on its own, and need not be taught

- Children acquire language without active teaching by caregivers (corrections rarely have an impact on young children)
- Children do need input (auditory input for spoken language, visual input for signed language)
- What kind of input?? (cf. Jim, 18 mo. & Glen, 3yrs. 9 mo., brothers who were hearing children of deaf parents).

Similar Developmental Schedule

- All babies begin babbling between 6-12 mo.
- Deaf babies babble with their hands
- Some deaf babies will babble vocally for a short time.
- Children around the world go through similar stages of language acquisition (Cairns, Ch. 4)

Critical Period – Case Studies

- Victor (1797): the Wild Boy of Aveyron
 - Had been living in woods
 - Found at age 13
 - Showed characteristics of feral children, e.g. insensitivity to temperature
 - After 9 months: could match written word to the object it stood for; use gestures
 - After 5 years: could finally apply names of things to larger semantic groups (*book*)
 - Vocabulary size unknown

Critical Period – Case Studies, 2

- Kasper Hauser (1828)
 - Found at 17; had been imprisoned in a dungeon
 - Uttered one garbled sentence when found →
 - Evidence of some language before imprisonment
 - After 5 years:
 - Recovered fluent speech
 - Learned to read and write fluently

Critical Period – Case Studies, 3

- Isabelle (early 1900s)
 - Found at age 6.5;
 - Kept confined with deaf-mute mother
 - Well cared for, but no spoken language input;
 - After 1 mo.: learned single words
 - After 2 mo.: short sentences, read printed words
 - After 1 yr.: write, count, understand stories
 - After 1.5 yrs.: 1500-200 words, complex sentences

Critical Period – Case Studies, 4

- Genie (1970s)
 - Found at age 13; had been severely abused
 - Insensitive to temperature, but social (good eye contact)
 - After 8 months: ~200 words, 2-word utterances
 - After 1 year: 3 word utterances (combined two word utterances)
 - After 2 years: still mostly content words; no bound function morphemes, except for “-ing” and occasional plural “-s”

Critical Period – Case Studies, 5

- Chelsea
 - Born deaf in a remote town in CA
 - Misdiagnosed as developmentally disabled (common in the past)
 - Raised by loving family who never believed she was retarded
 - At age 31, was referred to a neurologist, who fitted her with hearing aids

Critical Period – Case Studies, 5

- Chelsea, contd.
 - After intensive therapy, now scores at a 10 yr. Old level on intelligence tests,
 - Knows 2000 words, reads, writes, communicates, lives independently
- Examples of her speech:
 - Orange Tim car in.
 - Breakfast eating girl.
 - The woman is bus the going.

Critical Period Summary

When is the critical period?

More Evidence for a Critical Period, and Innateness: Nicaraguan Sign Language

- Pidgin

More Evidence for a Critical Period, and Innateness: Nicaraguan Sign Language

- Creole

History of Sign Language in Nicaragua

- 1979/1980 – School for the Deaf founded
- Children from all over the country attended
- Children initially used “homesign” with their families
- Once in contact with others, their language became more developed.

Nicaraguan Sign Language

- Older children did not develop as fluent a sign language as younger children
- As younger children continue to arrive at the school, the sign language becomes richer.

Nicaraguan Sign Language, contd.

- ISN: Idioma de Signos Nicaraguense
 - The pidgin
- LSN: Lenguaje de Signos Nicaraguense
 - The creole

Why is this evidence ...

- For a critical period?

- For innateness of language?
