Psych 56L/ Ling 51: Acquisition of Language

Lecture 2
Introduction Continued

Announcements

Review questions for introduction available

Homework 1 available (start working on it): due 1/21/10

Kalin's office hours posted: W 9:30am-12pm in SST 685

A Little History

The linguistic capabilities of children have been a source of fascination since ancient times.

First recorded language acquisition experiment conducted by Egyptian king Psammetichus, described by Greek historian Herodotus in fourth century B.C. He ordered that two infants be raised in isolation by shepherds who would never speak to the infants.

Test: What language would children speak?

Assumption: It would be the "original" language of the peoples of the world.

(Results: They ended up speaking Phyrigian, not Egyptian. Any ideas why?)

Language without input?

Ongoing research question: What language does the brain create when it is not given an existing language to learn?

How to test this a little more ethically than total enforced isolation: study the gestural communication systems created by deaf children of hearing parents who use the oralist tradition of not communicating via sign language with their children.

Children invent "signs" and combine them in two and three-sign sequences. This suggests the ability to *combine* is a natural one for human beings.

Language without input?

Ongoing research question: What language does the brain create when it is not given an existing language to learn?

Another way to test this: "wild" children who have not been exposed to language during the early part of their childhoods - usually not so successful at language acquisition

- wild-boy of Aveyron, ~12 yrs old, discovered in the woods. Never learned more than a few words.

- Genie, 13 years old when discovered, locked in a room since the age of 18 months. Somewhat more successful at learning language, but missing many aspects of language structure.

Investigating normal language development

Diary studies: keeping diaries of children's development. Charles Darwin did this with his son (Darwin, 1877). Seemed to follow the progression we now expect.

Other diary studies: Clara & Wilhelm Stern's 1907 *Die Kindersprache* and Werner Leopold's (1939-1949) four volume account of his daughter's acquisition of English & German.

Modern diary studies: Bowerman 1985, 1990; Dromi 1987; A. Gopnik & Meltzoff 1987; L. Bloom, 1993; Naigles, Vear, & Hoff 2002

Chomskyan Revolution

Chomsky 1957: *Syntactic Structures*

Innovation: What speakers do is not as interesting as the mental grammar that underlies what speakers do

So, if adults have a mental grammar that explains what they do when they talk, children must have a mental grammar that explains what children do when they talk.

New formation of language development: What are children's grammars like and how do they eventually achieve adult grammars?

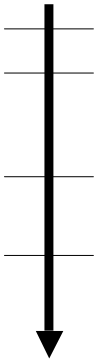
Progression of Study

1960s: grammatical development (focusing on structure of sentences)

Later 1960s: focus on semantics (meaning)

Late 1970s: added language use (pragmatic & sociolinguistic development)

1980s & 1990s: back to syntax, but also still working on word meaning (lexicon) and pragmatics (language use); also, interest in phonological development



Current Approaches

Language socialization: language development is learning to communicate in the way the adults in the social or cultural group do.

Focus: Language as a vehicle for social interaction

Typical work: description of children's language use in social contexts and an account of the social processes by which children come to use language in the manner of their culture

Current Approaches

Language as a complex cognitive system that maps sounds to meaning

Focus: Language Acquisition Device - what is it?

Information from the environment →  → Language Acquisition

Language Acquisition Device (unconscious process inside child's mind)

Current Approaches

Language as a complex cognitive system that maps sounds to meaning

Focus: Language Acquisition Device - what is it?

Biological approach

Premise: language development is best understood as a biological process.

Focus: description of the genetic bases of the human language capacity and its disorders + description of the structures and processes in the brain that serve language development

Current Approaches

Language as a complex cognitive system that maps sounds to meaning

Focus: Language Acquisition Device - what is it?

Linguistic approach

Premise: LAD contains some domain-specific knowledge about the structure of language (this is often called Universal Grammar).

Knowledge specifically about human language

Focus: description of children's prior (innate) linguistic knowledge and how that knowledge interacts with the data from the native language to produce knowledge of the native language

Current Approaches

Language as a complex cognitive system that maps sounds to meaning

Focus: Language Acquisition Device - what is it?

Domain-general cognitive approach

Premise: Language acquisition is no different from any other kind of knowledge acquisition; children can solve this problem in the same way that they solve other problems (such as perception, for example)

Focus: description of domain-general learning capacities that serve language development, and the sources of input those capacities use

Useful for all kinds of learning (ex: grouping things together into larger units)

Nature vs. Nurture

The debate in a nutshell

Is the development of language in children the result of humans' innate endowment (like upright posture & bipedal locomotion)? Or is it the result of circumstances in which children are nurtured (like table manners and formal math, which depend on particular experiences)?

Empiricism: all knowledge and reason come from experience

Nativism: mind has some pre-existing structure it imposes to interpret experience

Nativism: Why believe it?

(1) Children acquire language rapidly
(2) Children acquire language with very little conscious effort
(3) Children acquire language without explicit instruction for most of it

Nativism: mind has some pre-existing structure it imposes to interpret experience

Nativism: Why believe it?

"Language learning is not really something that the child does; it is something that happens to a child placed in an appropriate environment, much as the child's body grows and matures in a predetermined way when provided with appropriate nutrition and environmental stimulation." - Chomsky, 1973

Nativism: mind has some pre-existing structure it imposes to interpret experience

Interactionist View

"We on the other side think that learning language is a long slog, which requires from the child a lot of work. And the child is working as hard as he can, fifteen, sixteen hours a day. We think it requires a relationship with an adult, and a whole set of cognitive abilities." - Snow, 1993

Interactionist/constructivism: language is constructed by the child from experience, and the input is crucial - but there may still be some innate knowledge contributing

The nature of nature

There are different ways for something to be innate:

Knowledge itself is innate

Procedures for learning are innate (knowledge is the result from these procedures)

The nature of nature

There are different ways for something to be innate:

Knowledge itself is innate: children have inborn knowledge of the general form of language (domain-specific capacities)

Procedures for learning are innate (knowledge is the result from these procedures)

Why do we think knowledge could be innate?

Common properties of human languages: all languages of the world share structural properties. This could be due to innate biases about how languages are structured.

Evolution has equipped the human mind with other useful knowledge (ex: world is 3D, even though retinas process only 2D) - why not prior knowledge about language?

The nature of nature

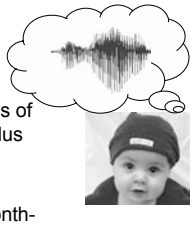
There are different ways for something to be innate:

Knowledge itself is innate: children have inborn knowledge of the general form of language (domain-specific capacities)

Procedures for learning are innate (knowledge is the result from these procedures): children have domain-general capacities that all contribute to language acquisition, such as symbolic representation, memory, segmenting input into smaller parts, and pattern analysis.

Why do we think some learning procedures are innate?

Babies as statistical learners:

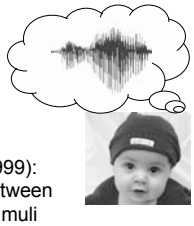


Statistical learning: tracking frequencies of various stimuli, how often one stimulus follows another, etc.

Saffran, Aslin, & Newport (1996): 8-month-olds can (unconsciously) track probabilities between syllables in order to identify words in fluent speech in an artificial language

Why do we think some learning procedures are innate?

Babies as statistical learners:



Statistical learning is domain-general.

Saffran, Johnson, Aslin, & Newport (1999): babies can track the probabilities between tones (not just between language stimuli like syllables)

Why do we think some learning procedures are innate?

Babies as rule learners:

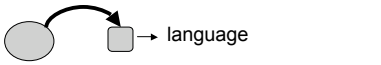
Marcus et al. (1999): 7-month-old infants can learn rules for patterns of syllables after 2 minutes of exposure

wo wo fe…ga ga ti…li li na.. = A A B

Implication: babies can use symbols/variables (which language may require)

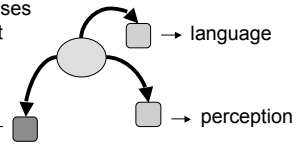
The nature of nature

There are different ways for language acquisition to work:



One domain-specific module

General cognitive processes applied to language input (can also apply to other kinds of input)



The nature of nature

There are different ways for language acquisition to work:

Currently this debate between domain-specific and domain-general is going on for many areas of cognition, not just for language acquisition.

Quick Summary of Major Current Theories of Language Development

Generativist

Constructivist

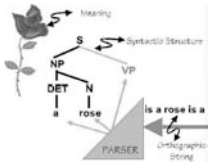
Social interactionist

Quick Summary of Major Current Theories of Language Development

Generativist: Universal Grammar, which contains biases for language structure, is innate. Language experience triggers prior knowledge. Domain-specific ability.

Constructivist

Social interactionist

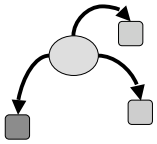


Quick Summary of Major Current Theories of Language Development

Generativist

Constructivist: language is constructed by the child using general cognitive learning procedures applied to language input.

Social interactionist



Quick Summary of Major Current Theories of Language Development

Generativist

Constructivist

Social interactionist: language is a social phenomenon, acquired because children want to communicate with others. Communicative interaction is crucial, and social-cognitive abilities drive language acquisition.

Research Methods

Research Methods

Important: do cross-linguistic and cross-cultural research.
Even if language is universal, there are individual differences in language development and there may be more than one route to acquisition success. Also, there may be influence from different cultures on the language learning environment for children.





Research Methods

Analyzing samples of spontaneous speech from children:

Video/audio records of spontaneous speech samples

CHILDES Child Language Data Exchange System

Used to find out the nature of language children produce. Ideally, sample is representative of everything child says - but hard to do in practice.

Because of this, it is hard to make claims that children don't use/know a particular structure based on its absence in spontaneous speech samples.

Research Methods

Analyzing samples of spontaneous speech from children:

Video/audio records of spontaneous speech samples

CHILDES Child Language Data Exchange System

Difficulty: Have to transcribe recorded speech. May take between 5 and 20 hours to faithfully transcribe 1 hour of child speech.

Why?

Conversational speech does not often use complete sentences.

Child pronunciation is often not adult-like - and the non-adult-like parts are usually what researchers are interested in.

Research Methods

Getting standardized assessments of children's performance

From coding systems like Mean Length of Utterance (MLU), which correlates with measures of children's grammatical and phonological development.

From estimates that caregivers provide of children's performance, such as the MacArthur-Bates Communicative Development Inventories (CDIs): 8-16 months, 16-30 months, 30-36 months. These include checklists of words, gestures, and word combinations children use or comprehend.

From examiner-administered tests like the Peabody Picture Vocabulary Test, which assesses vocabulary comprehension.

Research Methods

Computational Modeling (Digital Children)

Create a computer program that takes the data children hear as input and see if it can learn the same knowledge children do from that input. Usually, the program will implement some learning theory's assumptions about how learning works, and therefore test that theory empirically.

Ex: Learning to identify words in fluent speech (word segmentation) [Swingley 2005, Gambell & Yang 2006, Pearl, Goldwater, & Steyvers (2010)]

Ex: Learning what *one* refers to in "Look at the purple goblin - and there's another one behind Jareth, too." [Foraker et al. 2007, Pearl & Lidz 2009.]

Questions?