Development of Language Skill

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Today’s class

• Overview of language acquisition
• Skills involved in word learning
Symbols

= Ways of representing & conveying information

• 1 thing stands for something else
  e.g., numbers, pictures, maps, language
Language Learning Demo
Language Involves...

- **Language comprehension** = understanding what others say (or sign or write)
- **Language production** = actually speaking (or signing or writing) to others
Language Acquisition: Basic order of events

- Speech perception
- Pre-speech production
- Word production
- Sentences, paragraphs...
Speech Perception

• Hearing the sounds of speech
• Hearing the “melody” of speech
Speech perception

• Usually we perceive stimuli continuously

• BUT some stimuli are perceived categorically
Speech perception: Sounds

Categorical perception:
• Both adults and infants perceive speech sounds as belonging to discrete categories
• By 1 month old, infants can do this well - sometimes even better than adults!

“bak” or “dak”? 
Speech Perception “Trade-off”

• By age 1, infant speech perception becomes specialized for own language

• **But** also become more sensitive to patterns of speech in own language
Word Segmentation: Problem

- How do we know where one word ends and the next one begins?

Where are the silences marking word boundaries?
Word Segmentation: Solution

• Infants are sensitive to how often sounds are used together
• Accomplished in part by statistical learning

[Image of a baby with a speech bubble containing random letters]
Speech Perception

• Hearing the sounds of speech
• Hearing the “melody” of speech
Speech Perception: Prosody

Prosody = characteristic rhythm, cadence, melody, & intonation of speech
Speech Perception: Prosody

Prosody = characteristic rhythm, cadence, melody, & intonation of speech

• Infants are sensitive to prosody from birth
• Exaggerated in infant-directed talk (IDT)
Infant Directed Talk (‘‘Motherese’’)

• Slower, repetitive, more exaggerated form of speech (exaggerates prosody & emotion)
Infant Directed Talk (“Motherese”)

• Infants prefer IDT to regular speech

Effects:
• Heightens infant’s attention
• Helps infant make discriminations in sounds
→ Helps infant learn language
Language Acquisition: Basic order of events

Speech perception

Pre-speech production
Pre-Speech Production

- Limited sounds at birth: crying, burping, sneezing, etc.
- At 6-8 weeks: begin **cooing**
- At 6-10 months: begin **babbling**
Babbling

• Typically consists of syllables made up of repeated consonant-vowel pairs e.g., “bababa”

• Babble only a limited set of sounds, some not in their native language

• Eventually take on rhythms of native language
Babbling

Additional findings:

• Babbling does not rely on feedback

• Babbling is not necessary (though it may be helpful) to learn language

• Deaf infants exposed to sign also babble (with their hands)
Language Acquisition: Basic order of events

Speech perception

Pre-speech production

Word production
Early Word Production

Order of events:

1. Recognize words
   e.g., name at 4 months

2. Comprehend words
   e.g., By 6 months, understand referents of words to meaning

3. Produce words (begins 10-25 months)
First Words

• Typically nouns (“ball”), frequent events (“bye-bye”), relational words (“more”)
• Exact words and meanings can be different from adults (e.g., “woof” to mean “dog”)
First Words

- Common error: overextension

“dog”
First Words

• Less common error (but still present): underextension
First words

- Holophrastic period = expressing “whole phrase” with single words
  e.g., “hot,” “go,” “eat”
Language Acquisition: Basic order of events

Speech perception

Pre-speech production

Word production

Sentences, paragraphs...
Two word utterances

• By around age 2, start to combine words into simple sentences ➔ **Telegraphic speech**
  e.g., “go car,” “eat cookie”

• Do not include all adult elements (plurals, prepositions, etc.)

• However, word order is consistent
  e.g., English-speakers do not say “cookie eat”
Early sentences

• Gradually, child begins to add first person pronouns, verb endings, plurals e.g., “I eating cookies”

• Practice skill on their own “Crib-talk”
Early sentences

• Overregularization errors
  e.g. “goed,” “foots,” “mans”
  – shows children have learned grammatical rules
  – also apply rules to novel words → “Wug” study
Today’s class

• Overview of language acquisition
• Skills involved in word learning
Language Learning is an Impressive Feat!

- We know 60,000+ words by the time we graduate high school
- Starts out slow and then accelerate up to ~12 words per DAY
- Remembering facts can be slow, hard, but remembering words is often fast, effortless
How do children learn words?

• Associative Learning Account
  – Parents label objects for the child
  – Child begins to associate the word it hears with the object it sees at the time the word is uttered
  – Parents give feedback (smiling, correcting, etc.)

Example: Child toddles after dog and mother says “Dog!” That’s the dog. You’re chasing the dog. Dog! Child says “Daw”. Mother smiles and says “Yes. Dog.”
Arguments Against Association Accounts

• ~ 30% of time the object isn’t present
• When parents do label things, it’s mostly nouns, yet children learn abstract terms and “non-nouns”
• Parents rarely give feedback, and it’s often ineffective
• Blind children learn language as well as sighted children
• Children learn language in cultures where parents don’t speak to them directly
So how DO children learn words?
Fast Mapping

Markson & Bloom (1997):

• Present children with a new word: “Let’s use the *koba* to measure which is longer. We can put the *koba* away now.”

• Tested if children could pick the object immediately, one week, & one month later
Word (koba) results

% Target Object Selected

Immediate  Week  Month

4-year-olds
Adults
3-year-olds
Fast Mapping

Markson & Bloom (1997):

- Children also remembered other arbitrary linguistic associations e.g., “This is the one my uncle gave me” but NOT sticker locations
The Quinean Reference Problem

“Gavagai”

• Does it refer to something?
• If so, *what* does it refer to?
Solving the Reference Problem

Children are guided by:

• Whole object bias
• Linguistic context
• Mutual exclusivity
Whole Object Bias

• Assumption that words label whole objects, and not parts or attributes

Example: “squirrel” refers to a whole animal, not just tail or its color

Why does this bias arise?
Linguistic context & word learning

- Children use grammar to infer word meanings
Grammatical cues

Cues to quantity or substances (Brown, 1957):

“sibbing”

“a sib”

“some sib”
Mutual Exclusivity

• Children assume that entities have only one name, so if they hear a new word, it must be something else

Example: “Show me the blicket.”
Mutual-Exclusivity

How do children know this?

• Use **pragmatics**: infer what the speaker knows or shared knowledge
Pragmatics & Mutual-Exclusivity

“Look at this one. It’s a jop! See, it’s a jop. This is a jop”.

“Look at this one. It’s nice. This one is cool. It’s neat.”

“Can you give me the bem?”
Pragmatics & Word Learning

Children use social skills to learn words by focusing on:

• Speaker’s attention/eye gaze
e.g., base judgments on what speaker is looking at
Children use social context to learn words by focusing on:

• Speaker’s emotions
  e.g., use emotional reaction to judge which word speaker refers to
Pragmatics & Word Learning

Children use social skills to learn words by focusing on:

• **Familiarity principle** = unobservable properties that are specific to individuals or objects can only be known by people who have experience with them

  e.g., Proper names (Birch & Bloom, 2002)
Familiar

“I brought these from home. I’ve played with all of these animals before.”

Unfamiliar

This bag of animals is ‘discovered’. “Wow! I’ve never seen that dog before.”

(Birch & Bloom, 2002)
Proper Name Condition:
“Where’s Jessie? Can you find Jessie?”

Common Noun Condition:
“Where’s the dog? Can you find the dog?”
Social Cues: Familiarity

• In proper name condition, children age 2 and up picked the familiar toy → understood familiarity principle
How do children learn words?

- Memory (specialized for language)
- Attention
- Detecting patterns (of language)
- Social knowledge and skills
Book Recommendations

- The Language Instinct: How the Mind Creates Language by Steven Pinker
- How Children Learn the Meanings of Words by Paul Bloom
Next class

Presentations on:
2. Bortfeld et al. (2005)
3. Richert et al. (2010)
Questions?

1. E-mail jhd@msu.edu
2. Office hours:
   Wed. Sept. 14\textsuperscript{th} 2:30 – 3:30 PM
   Psychology 225B