What are you learning when you’re learning a language?

DID YOU SEE THE CLEVERBOT-CLEVERBOT CHAT?
I AM NOT A ROBOT. I'M A UNICORN.

YEAH. IT'S HILARIOUS, BUT IT'S JUST CLUMSILY SAMPLING A HUGE DATABASE OF LINES PEOPLE HAVE TYPED. CHATTERBOTS STILL HAVE A LONG WAY TO GO.

SO... COMPUTERS HAVE MASTERED PLAYING CHESS AND DRIVING CARS ACROSS THE DESERT, BUT CAN'T HOLD FIVE MINUTES OF NORMAL CONVERSATION?

PRETTY MUCH.

IS IT JUST ME, OR HAVE WE CREATED A BURNING MAN ATTENDEE?
Language at age 3

• Good narrative skills
• Gestures
• [Over]generalizes concepts
  – Obi-Wan is a teacher, garage sale for robots
• Phoneme errors
  – Erratic production of final L sound
    • “well” followed by “wew”
  – sh --> s (siny guy, spacesip)
  – th --> f (He tried to do it wifout seeing, Darf Vader)
• Verb forms overregularized (“blowed up”)
• Frozen phrases (Don’t talk back to Darf Vader, he’ll get ya!)
What are you learning?

• Speech sounds
• Finding word boundaries
• Mapping words to meanings
• Syntax (grammar)
• Language in social context

How do these things go together?
Possible patterns

• Sequential

Speech sounds  Words  Grammar  Social context

• Overlapping

Speech sounds  Words  Grammar  Social context
Producing language

<table>
<thead>
<tr>
<th>Speech sounds</th>
<th>Words</th>
<th>Grammar</th>
<th>Social context</th>
</tr>
</thead>
<tbody>
<tr>
<td>~6-8 months: Babbling onset</td>
<td>10-12 months: say first words</td>
<td>18 months: “word spurt”</td>
<td>This takes quite a while…</td>
</tr>
</tbody>
</table>

A caution: Perception precedes production.

“two-word speech”
Recognizing/comprehending language

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By 10-12 months:
Only sensitive to speech sound changes in your native language (mostly)

Older idea: you need to have a small set of sound “symbols” (kind of like mental letters) to be able to store words in the brain—otherwise, information overload

**BUT...**

Show some word recognition at 6-9 months (Bergelson & Swingley, 2012)
Respond to word order at 17 months, before 2-word stage (Hirsh-Pasek & Golinkoff, 1993)

Show some social (?) responsiveness to language in infancy (Kinzler et al., 2007)

MANY studies showing non-adultlike sensitivity to differences in speech sounds, voices, vocal emotion, word stress patterns in preschool years and beyond
Finding word boundaries
Cues to word boundaries

• Stress
  – English: most nouns are stress-initial
  – ThePREttyBAbyWANTSaBOTtle
Cues to word boundaries

• Strong-initial vs. weak-initial words
  – Strong: BUTter, CANdle, PUPpy, SAUsage
  – Weak: baNAna, caBOOSE, reCLINE, aGREE

• Cutler and colleagues: “metrical segmentation strategy” (MSS)
  – Strong syllable is the start of a word
Cues to word boundaries

• Jusczyk, Houston & Newsome
  – Infants’ recognition of word forms
  – 7.5 months:
    • Stress-initial (kingdom) ✔
    • Stress not initial (guitar) ❌
  – 10.5 months:
    • Stress not initial (guitar) ✔
But...

• Not all languages have this kind of stress pattern.

• How do you know what the properties of words are if you don’t know what the words are?
• Lookattheprettybaby
• Whereisthebabynowprettygirl
• Thisbabyisprettysilly
• Look at the pretty baby
• Where is the baby now pretty girl
• This baby is pretty silly

• Given “ty”, what’s likely to come next?
• What about given “ba”? 
Statistical learning

• Saffran, Aslin & Newport (1996)
  – 8-month-old infants

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Statistical learning

- Play for 2 minutes
- Present kids with bidaku or piro.bi type words
- What do they listen to longer? bidaku < piro.bi
  - (novelty preference)
- At 8 months infants can segment words based on statistical cues
But what about stress?

• Johnson & Jusczyk (2001)
  – 8-month-olds
  – Stress vs. statistics: Stress wins
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  – Statistics wins @ 7 mos
  – Stress wins @ 9 mos
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• *Segmentation precedes stress.*
More questions about language development
How do you represent words’ sound patterns, if not as a string of speech sounds?

• Maybe as the whole word’s sound pattern itself

• Later, speech sounds (or something like them) emerge from the whole collection of words you know
  – Probably with a lot of help from speaking an alphabetic language
If learning is so slow, why are kids so good at learning language?

• Answer 1: we don’t know because there are a lot of variables at play
  – Social preferences, % time in new language
• Answer 2: they aren’t.
  – Slower vocabulary learning in L2 situations
• Answer 3: because they’re doing it differently
  – Adults learning an L2 depend on their preexisting knowledge ("kind of like /d/ in English")
  – Children (under age 6 or 7) are learning sound patterns of L2 from the ground up