

Language development

PSY 200
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Lecture 30

When should you learn a foreign language?

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Language

- Instinctive
 - ♦ your brain is wired to work with grammars, words, phrases
- Learning
 - ♦ you *do* have to learn some specifics for your native tongue
 - ♦ rules
 - ♦ words

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Learning

- What is learned?
- How does a child learn?
- How much about language does a child know?
- When have you mastered language?
- How do you learn a second language?
- What do babies do?



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Babies and phonemes

- Infants have linguistic skills as soon as they are born
 - ♦ babies are interested in new things
 - ♦ attach a tape player to a pacifier
 - ♦ each suck causes the player to play a sound
- Repetition of the same sound leads to boredom and fewer sucks
 - ♦ ba, ba, ba, ba, ba, ba, ba, ba,

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Babies and phonemes

- When the syllable changes
 - ♦ babies suck more often
 - ♦ ba, ba, ..., pa, pa, pa, pa, pa,...

BA












PA

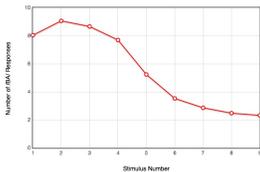

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Babies and phonemes

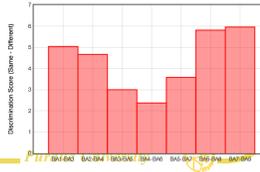
- Moreover, the way they hear things is similar to adults
 - ♦ you can change the pronunciation (voice onset timing) of /ba/ and still hear it as /ba/ (CogLab data)
 - ♦ But too big a change in VOT turns it into /pa/
 - ♦ babies hear it the same way
- CogLab data:

Identification task



Stimulus Number	Number of Baby Responses
1	8
2	9
3	8
4	7
5	4
6	3
7	2
8	2

Discrimination task



Stimulus Pair	Discrimination Score (Score - Chance)
1-2	0.5
2-3	0.4
3-4	0.3
4-5	0.2
5-6	0.3
6-7	0.4
7-8	0.5

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Babies

- Babies hear *all* phonemes, even ones their parents cannot distinguish
- Babies, even newborns, *do* show a preference for what will become their native tongue
 - occurs because they hear mother's voice while in the womb
- Mostly prefer the melody, stress, timing
 - French infants like French and Italian equally well
 - playing language backwards keeps many consonants but distorts melody (babies are not interested)





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Language development

- Between 5-7 months, babies start making sounds
 - clicks, hums, hisses, smacks,...
- Between 7-8 months babies start babbling in syllables
 - ba-ba-ba-ba-ba
 - neh-neh-neh
 - da-da-da-da-da





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Babbling

- Babbling sounds are the same in all languages
 - patterns are common across languages
- By the end of the first year babies combine syllables to sound like words
 - neh-nee
 - da-dee
 - meh-neh
- Babbling is important
 - children who do not babble often show slower speech development
 - deaf children babble with hands, if parents use sign language





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Babbling

- Babbling teaches child how sequences of muscle combinations lead to different sounds
 - necessary to produce speech
- By about 10 months babies learn the sounds of their native tongue
 - they can no longer distinguish phonemes that are not part of the language
 - Part of learning is forgetting!



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Language stages

- Nearly all children learn language in stages
 - 1) Cooing (first several months)
 - 2) Babbling (~6 months)
 - 3) One word utterances (~1 year)
 - 4) Two-word utterances and telegraphic speech (1-3 years)
 - 5) Basic adult sequences with grammar (~4 years)
- The rate of learning varies substantially



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Learning words

- Children learn words with ridiculous ease
- An average 6 year old knows 13,000 words
 - learned one new word every two waking hours
 - this is without knowing how to read!
- The average high school graduate knows about 60,000 different words (not counting compound words and such)
 - means that in 17 years of life (not counting the first one), they learned an average of 10 new words each day (one word every 90 waking minutes)



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Age of Acquisition

- Word learning is an integral part of human knowledge, with lasting effects
- CogLab experiment used a Lexical decision task to measure reaction time to words that were
 - Learned relatively early in life (Early AoA: age 6 or sooner)
 - Learned relatively late (Late AoA: age 7 or later)
 - 168 participants

Type of Stimulus	RT (ms)
Early AoA	~750
Late AoA	~780
Nonword	~850

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Around 18 months

- Children learn simple rules of syntax
 - All dry. All messy. All wet.
 - I sit. I shut. No bed.
 - No pee. See baby. See pretty.
- Content is similar for all languages
 - objects appear, disappear, move,...
 - people do things, see things,...
 - ask questions, who, what, where,...

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All hell breaks loose

- After mastering 2-word strings, toddlers go crazy on language
- Consider changes in language (year;month)
 - (2;3) Play checkers. Big drum. I got horn.
 - (2;5) Now put boots on. Where wrench go? What that paper clip doing?
 - (2;7) Ursula has a boot on. Shadow has hat like that.
 - (2;9) Where Mommy keep her pocket book? Show you something funny.
 - (2;11) Why you mixing baby chocolate? I finishing drinking all up down my throat.
 - (3;1) You went to Boston University? Doggies like to climb up.

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Errors

- Three year olds make lots of grammatical errors
 - that is because there are lots of opportunities for errors
 - but pick any particular grammatical rule and you find most three year olds obey it most of the time
 - this is amazing because there lots of cases that you would expect would be difficult to learn

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Expected errors

- Consider a child hearing adults talk and how they might incorrectly apply what they learn
- Out of 66,000 sentences, children never made these errors

Grammatical	Not grammatical
He seems happy. --> Does he seem happy?	He is smiling. --> Does he be smiling?
He did eat. --> He didn't eat.	He did a few things. --> He didn't a few things.

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Errors

- Children *do* make errors, but the errors are consistent with rules of language
- Children often over generalize a rule
 - -s to pluralize a noun
 - » Mouses, leafs
 - -ed to make the past tense of a verb
 - » My teacher holded the baby rabbits and we patted them.
 - » Hey, Horton hearded a Who.
 - » I finded Renee.
 - » Once upon a time a alligator was eating a dinosaur and the dinosaur was eating the alligator and the dinosaur was eaten by the alligator and the alligator goed kerplunk.

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Overgeneralization

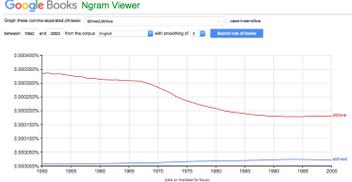
- These past tense forms sound wrong because English has around 180 irregular verbs
 - inherited from other languages
 - These past-tense forms are not derived from rules
- Irregular forms have to be memorized, word by word
- If a child cannot remember (in its lexicon)
 - s/he defaults to the rule
- These errors are for the most difficult parts of a language to learn
 - Because they don't follow the normal rules

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Overgeneralizations

- We know this is the most difficult part of language because adults make the same *kind* of mistakes
 - tread - trod strive - strove
 - dwell - dwelt slay - slew
 - rend - rent smite - smote
- Sound weird because we do not often hear them
 - many adults "regularize" the words
- treaded, strived, dwelled, slayed, rended, smited
- thus language changes...!



Google Books Ngram Viewer

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Syntax errors

- Children make similar mistakes in applying grammatical rules
- In English there is a causative rule that applies to some verbs and not others
 - takes a verb meaning "to do something" and converts it to a verb meaning "to cause to do something"
- Thus you can say
 - The butter *meltd*. --> Sally *meltd* the butter.
 - The ball *bounced*. --> Hiram *bounced* the ball.
- But you can't say the second of each pair
 - I *like* sausage. --> I am *liked* of sausage.
 - I *giggled*. --> Sally *giggled* me.

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Syntax errors

- Children over generalize application of the causative rule to inappropriate verbs
 - I *go* to the bathroom. --> Go me to the bathroom.
 - Aunt Jane *died*. --> The tiger will come and eat David and then he will be *died* and I won't have a little brother anymore.
 - I *drink* with a cup. --> Yawny Baby - you can push her mouth open to *drink* her.
- Many of these errors would be fine in other languages!
- The situation is similar to the special past tense verbs
 - This rule must be memorized as applying to some verbs and not others

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Syntax errors

- Adults also misapply the causative rule
 - *Sparkle* your table with Cape Cod classic glass-ware.
 - Well, that *decided* me.
 - This new golf ball could *obsolete* many golf courses.
 - If she *subscribes* us up, she'll get a bonus.
 - *Boiler* up!
- Children's errors tend to track the more difficult aspects of a language, relative to other languages
 - Adults make the same kinds of mistakes for still more difficult to remember cases

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Second language

- It is difficult (and rare) for an adult to become fluent in a second language
 - children do it easily
- What accounts for the difference?
 - most likely it is age
 - there seems to be a critical period during which language can be learned
 - beyond age six (or so) it becomes more difficult to learn a language (first or second)

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Second language

- High school and college (or later) is too late for most people to completely learn a second language
- It should be in kindergarten or preschool
 - There is still value in learning a second language as an adult, just have realistic expectations!
- Immigrants who arrive after age 6 may never *fully* learn a second language
- Children who fail to learn any language by age 6 never do
 - they might create a pidgin of some sort

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Conclusions

- Language development
- Stages of learning
- Errors
- Second language

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Next time

- Language & brain
- Broca's aphasia
- Wernicke's aphasia
- Anomia
- Language ability of chimps
- *What's the big deal about Nim Chimpsky?*

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