Psych 156A/ Ling 150: Psychology of Language Learning

Lecture 3
Sounds I

Quick Quiz 1
Will commence as soon as the quizzes are passed out.
15 minutes, open-note, non-collaborative.

15 minutes left

Quick Quiz 1
Will commence as soon as the quizzes are passed out.
15 minutes, open-note, non-collaborative.

5 minutes left
Quick Quiz 1

Will commence as soon as the quizzes are passed out.
15 minutes, open-note, non-collaborative.

1 minute left

Announcements

Reminder: Homework 1 is due this Thursday, 4/10/08. It must be handed in during class. Typed homework preferred for legibility reasons.

Lecture notes are also now available in black & white (with a white background).

New information on the web page: reference readings. Like the lecture notes, these will be posted after the class session.

Learning Sounds
Sounds of Language (Speech Perception)

Learner’s job: parse continuous stream of speech into sentences, clauses, words, syllables, and phonemes

Phonemes are language-specific. /r/ is a phonemic contrast (changes word’s meaning) in English but not in Japanese.

Lisa vs. Risa for some of my Japanese friends

Kids of the world require knowledge of phonemes before they can figure out what different words are – and when different meanings are signaled by different words

About Speech Perception

Important: Not all languages use the same sounds. Languages draw from a common set of sounds.

Child’s task: Figure out what sounds their native language uses.

Acoustic-Level Information

Includes: timing and frequency
Tones: frequency
Acoustic-Level Information

Includes: timing and frequency
Tones: frequency (close-up)

Vowels combine acoustic energy at a number of different frequencies

Different vowels (e.g., "ah", "ee", "oo" etc.) contain acoustic energy at different frequencies

Listeners must perform a 'frequency analysis' of vowels in order to identify them
(Fourier Analysis)
Acoustic-Level Information

Language sounds
Female Vowels (close up)

Synthesized Speech

Allows for precise control of sounds
Valuable tool for investigating perception

Acoustic-Level Information

Language sounds
Timing: Voicing
Acoustic-Level Information

Language sounds

Timing: Voice Onset Time (VOT)

60 ms

English VOT production

Not uniform - there are 2 categories

Perceving VOT

‘Categorical Perception’: /d/ vs. /t/
Discrimination

Same/Different
0ms  60ms

Same/Different
0ms  10ms

Same/Different
40ms  40ms

Why is this pair difficult?
(i) Acoustically similar?
(ii) Same Category?

A More Systematic Test

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Within-Category Discrimination is Hard

Cross-language Differences

R  L

R  L
Cross-Language Differences

English vs. Japanese R-L

Cross-Language Differences

English vs. Hindi
alveolar [d]
retroflex [D]

Human and Non-Human Perception

Perceptual biases shared with other animals:
Discriminate native language rhythm only when played forward, not backward

Categorical discrimination of some contrasts
(ex: voice onset time “d” vs. “t”)
Perceptual biases possibly shared with other animals:

- Preference for speech over acoustically matched non-speech sounds
- Sensitivity to cues that indicate word boundaries

(From cognitive neuroscience studies): unique cortical activation to forward speech vs. backward speech