Prelinguistic development

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Developmental stages

When does L1 acquisition begin?

- > 1;0 preverbal stage
- > 1;0-1;6 one-word stage
- > 1;7-2;0 two-word stage
- > 2:0-3;0 Multi-word stage

Early speech recognition

Two months-old infants:

- recognize their mothers' voice
- are able to differentiate speech sounds from noises
- are able to distinguish different types of languages



High-amplitude sucking procedure

Early speech recognition

Two months-old infants are able to distinguish French from Russian, but fail to differentiate French from Spanish.

- Stressed-timed languages
- Syllable-timed languages
- Mora-timed languages



High-amplitude sucking procedure

Up to the age of 0;7 infants are able to recognize many allophonic distinctions that adult speakers may not be able to hear.

[Werker and Tees 1984]

[t ^h ɔt]	top	aspirated
[stop]	stop	plain

$$\begin{array}{ccc} /p \ t \ k / & \longrightarrow & [p^h \ t^h \ k^h] / \ \# _, V' \\ & & [p \ t \ k] \ elsewhere \end{array}$$

Once infants have tuned into the phonological system of their mother language, they loose the ability to discriminate speech sounds they were able to discriminate previously.

[Werker and Tees 1984]







phoneme /t/









"The neural resources are used for the native language at the expense of the non-native language."

[Saxton 2010: 117]

Segmentation of the speech stream

[demse .. tyfesalesp ... esbedlaesdnd ... sj ... deneb]

Segmentation of the speech stream

- Phonological cues
- Distributional cues

Phonological cues

The discovery of spoken language



Peter Jusczyk

Intonation and pauses

Yesterday ... after we had lunch ... with Sally ... we went to the movies.

Perceptual cues of intonation:

- Amplitude
- Duration
- Pitch

Pitch provides the strongest cue.

Pauses and intonation are important to identify utterance boundaries, but how do children identify word boundaries?

ADULT: What's that? CHILD: That's a 'raffe'.



ADULT: What's that? CHILD: That's a 'nana'.



Typical placement of English word stress:

'apple 'happy 'unhappy 'newspaper

Mother: Behave! Child: I'm heyv.

Phonotactic constraints

English syllable structure CCCV VCCC

Phoneme sequences: [g] [d]

 \dots bigdog \dots = big / dog

Allophonic variation

/t/	\rightarrow	[t ^h]	top
	\rightarrow	[t]	stop
/1/	\rightarrow	[1]	light
	\rightarrow	[1]	call

Allophonic variation



Nonce words: tupiro golabu bidaku padoti

Subjects: 8 months-old infants

tupiro – bidaku – padoti – bidaku – golabu ...

Condition1: tupiro-bidaku-...

Condition 2: da-pi-ku-ro-tu-...

Head-turn procedure







transitional probabilities

Condition 1: 100-100-25-100-100-25 ...

Condition 2: 8.3-8.3-8.3-8.3-...

Early speech production



Early speech production



Primate vocal tract

Human vocal tract

Early speech production

> 0;2	reflexive vocalization
0;2-0;6	vocal play
0;6 – 0;10	babbling
	(i) dadadada [reduplicated babbling]
	(ii) dabagidi [varigated babbling]
0;10 >	jargon (conversational babbling)

Canonical word forms

[majos] or [mεjan]monster[tajak] or [tajaŋ]tiger

[nana] [neɪneɪ] [neɪneɪ] or [niɪnɪ] [nana]

Randall window finger

another

[nVnV]

[CVjCV]

Canonical word forms

[I]]	fish
[dı∫]	dish
[u∫]	vest
[by∫]	brush
[1]]	fetch

[(C)VS]

- Context-free strategies
- Context-bound strategies

dæs]	
bed]	
sek]	
hæn]	
da]	

glass bread snake hand star Reduction of consonant cluster

van
that
there
Jack
jam
check

Word-initial fricatives are replaced by stops

[bɔt]	pot
[do]	toe
[dɪ]	kiss

Voicing of word-initial stops

[dat]	duck
[det]	gate
[zus]	shoes
[mæts]	match
[tæbədz]	cabbage

Fronting of
consonants

[nɔp]	knob
[bæt]	bad
[dət]	dog
[duf]	stove

Devoicing of final obstruents

bʌt]	but
[длд]	big
gлk]	book
[gɪg]	pig
[gɔg]	dog
[dət]	dot
[gʌk]	duck
[gɪk]	stick

Harmonization of initial consonants (if the word ends in a velar consonant)