

How Extended High-Frequency Amplification Affects Word Learning in Children

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Background

- Combination of two previous studies
 - Bandwidth and perception
 - Word learning and hearing loss

- Purpose
 - To determine the affect of bandwidth on word learning in normal-hearing and hearing-impaired children
 - Standard bandwidth - 4 kHz
 - Extended bandwidth - 9 kHz

Novel-Word Construction

Manner

		Place						
		Bilabial	Labio-dental	Dental	Alveola	Post Alveola	Palatal	Velar
Plosive	p b			t d			k g	
Nasal	m			n			ŋ	
Fricative		f v	θ ð	s z	ʃ ʒ	ç ʝ		h
Approximate				r		j		
Lateral Approximate	w			l				

Novel-Word Construction

p b

t d

k g

m

n

ŋ

f v

θ ð

s z

ʃ ʒ

ç ʝ

h

r

j

w

l

Novel-Word Construction

b a i r I l

v o j I ŋ

j u ʒ æ p

z i k I n

d i w I m

t a i ð u s

θ o g I ʃ

h u ç I f

Novel-Word Construction

bayrill

vojing

youzzap

zeekin

deewim

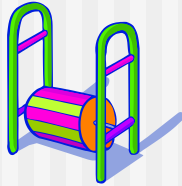
tathus

thogish

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Novel-Word Construction

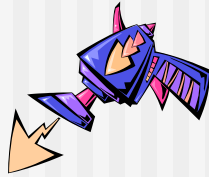
bayrill



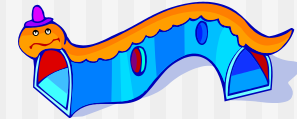
vojing



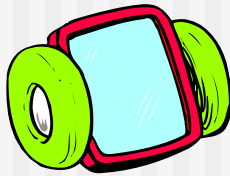
youzzap



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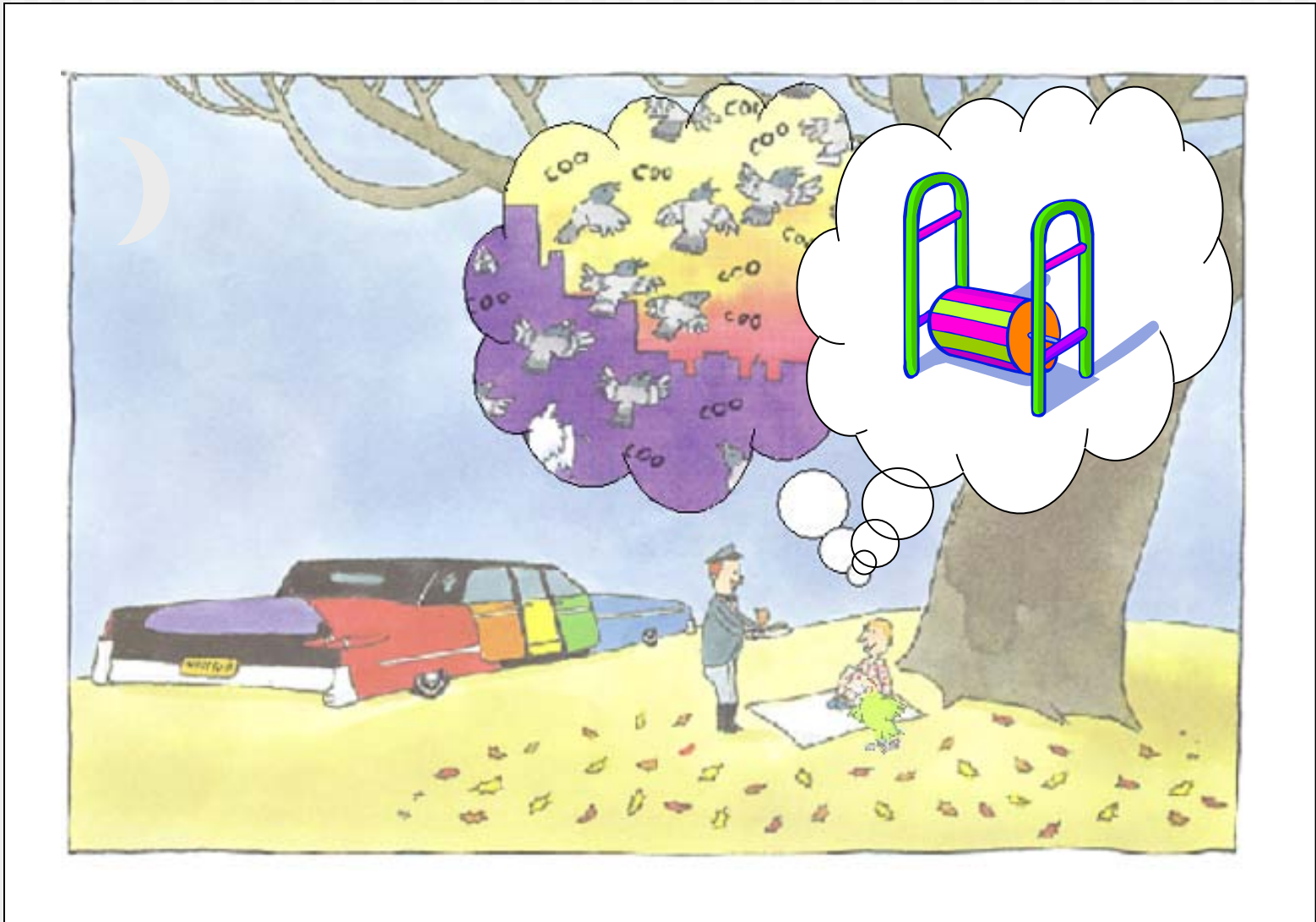
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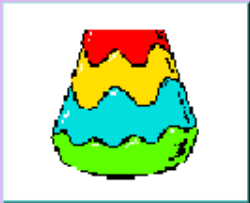
Story Construction

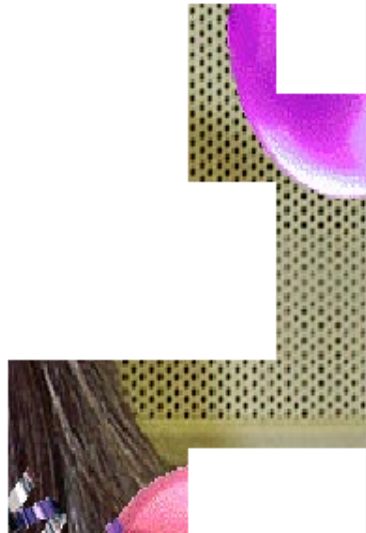
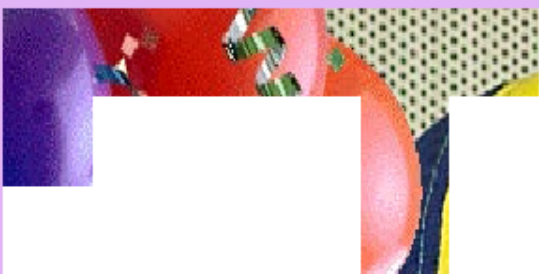


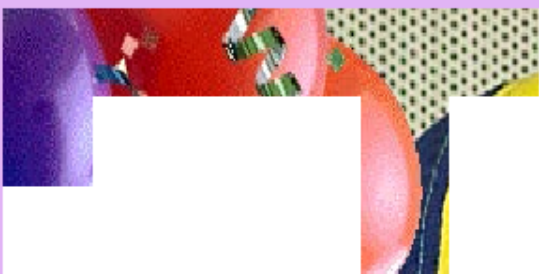
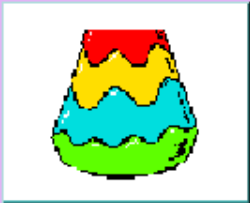
Story Presentation

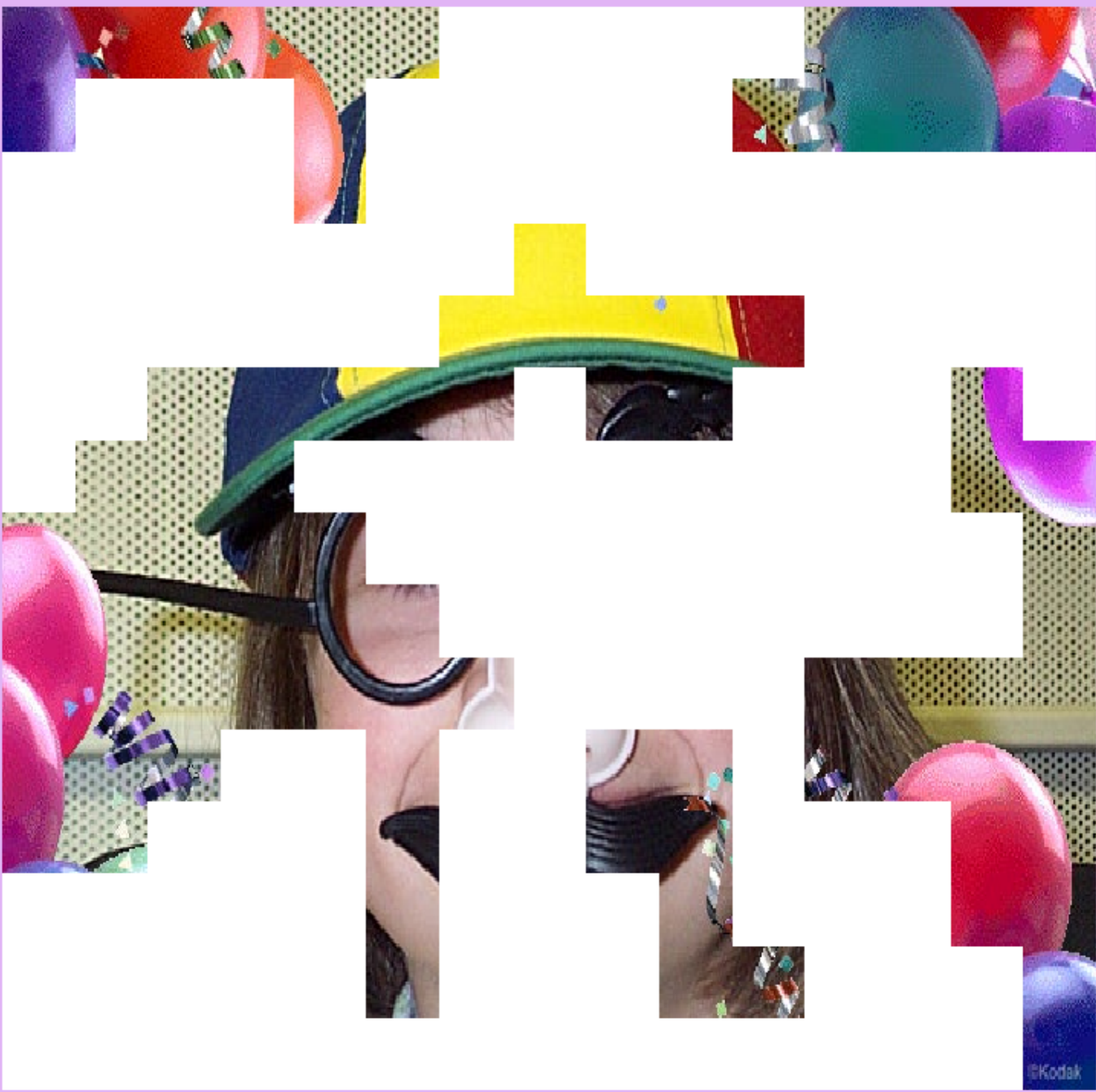
- Low-pass filtered half the words at 4-kHz and half at 9-kHz
- Each word was presented 3 times
- The 4-minute story was presented twice before testing
- Word-learning parameters
 - 8 words
 - 6 presentations each
 - 8 minute period









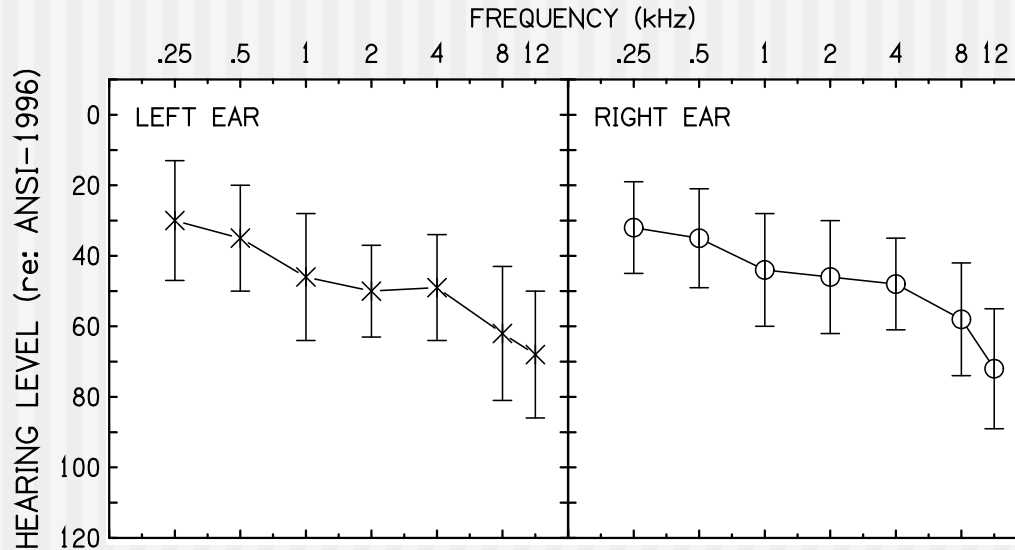






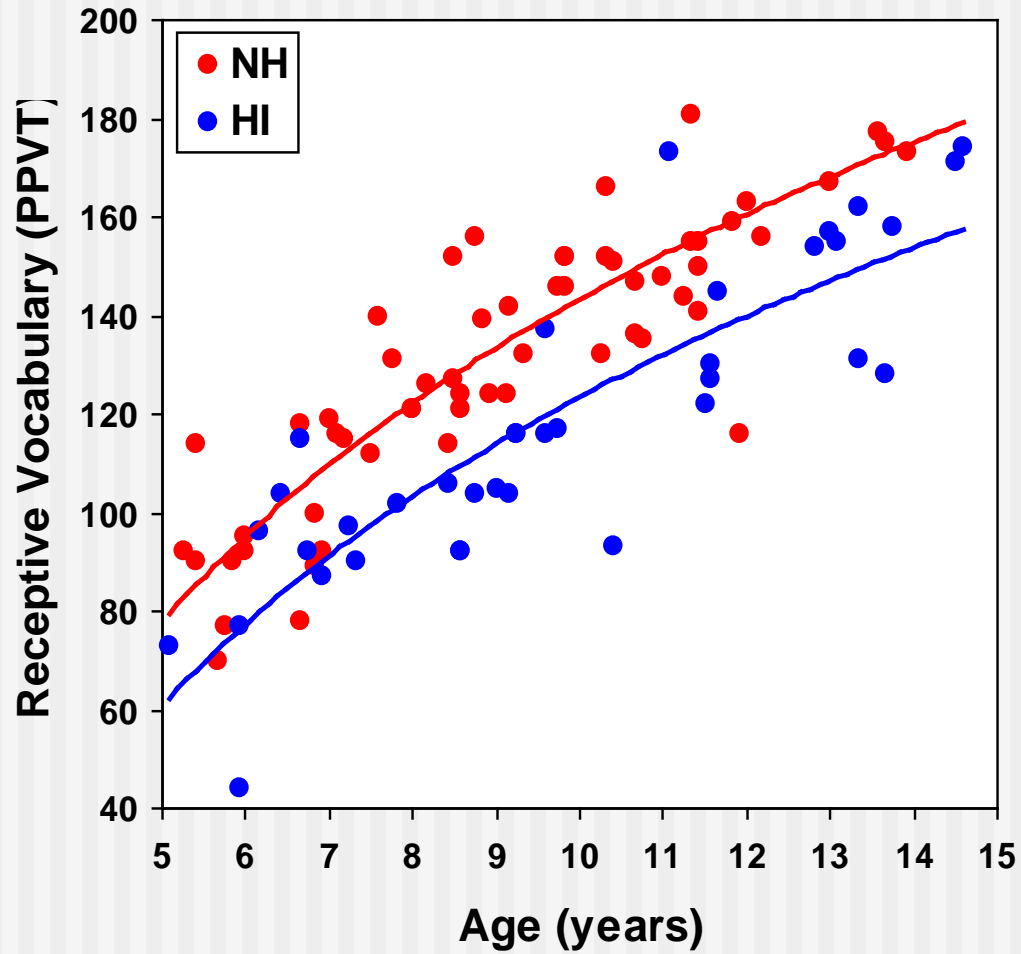
Participants

- 97 Children between 5- and 14-years-old
 - 60 Normal Hearing (mean age: 9yrs, SD: 2yrs)
 - 37 Hearing Impaired (mean age: 9yrs, SD: 2yrs)

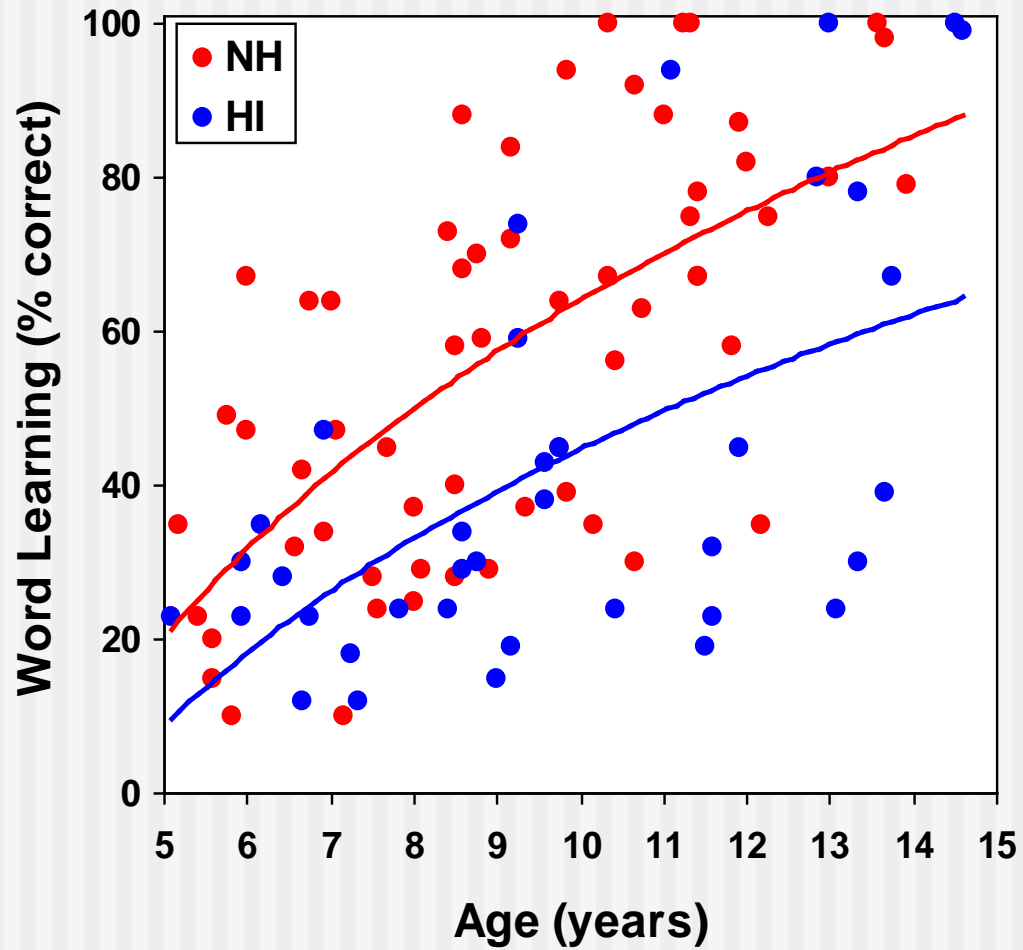


- Estimated receptive vocabulary (PPVT III)

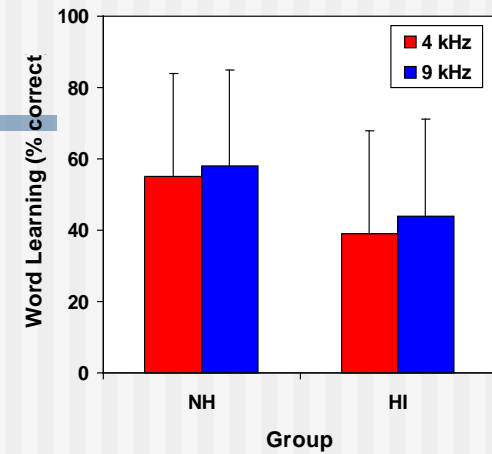
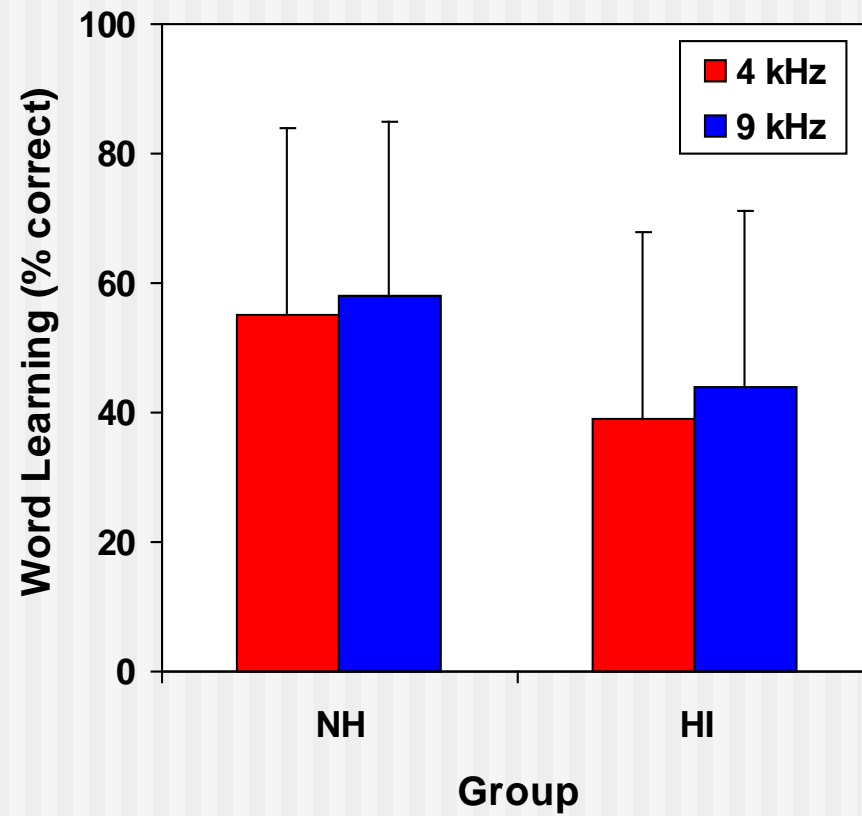
Results



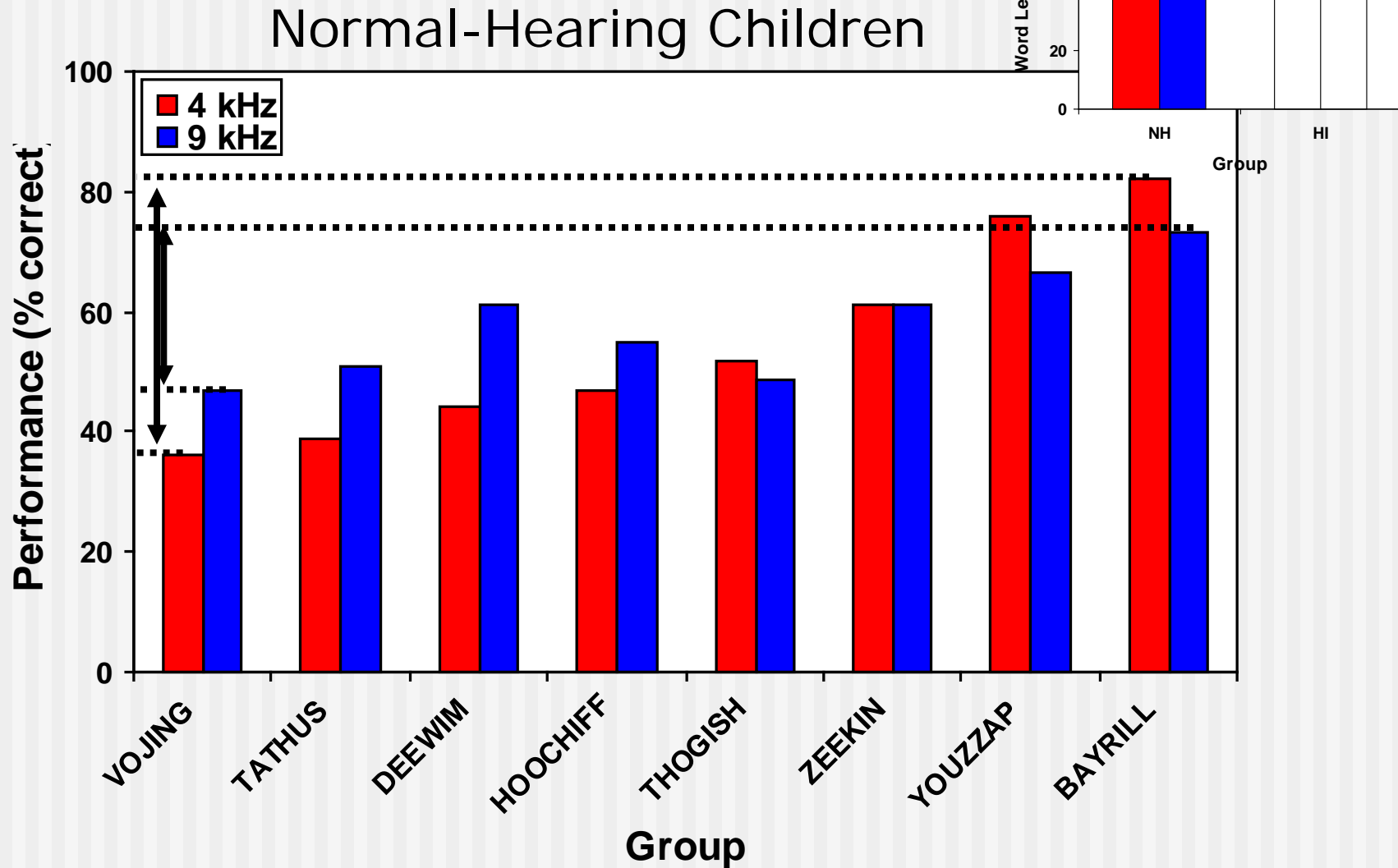
Results



Results

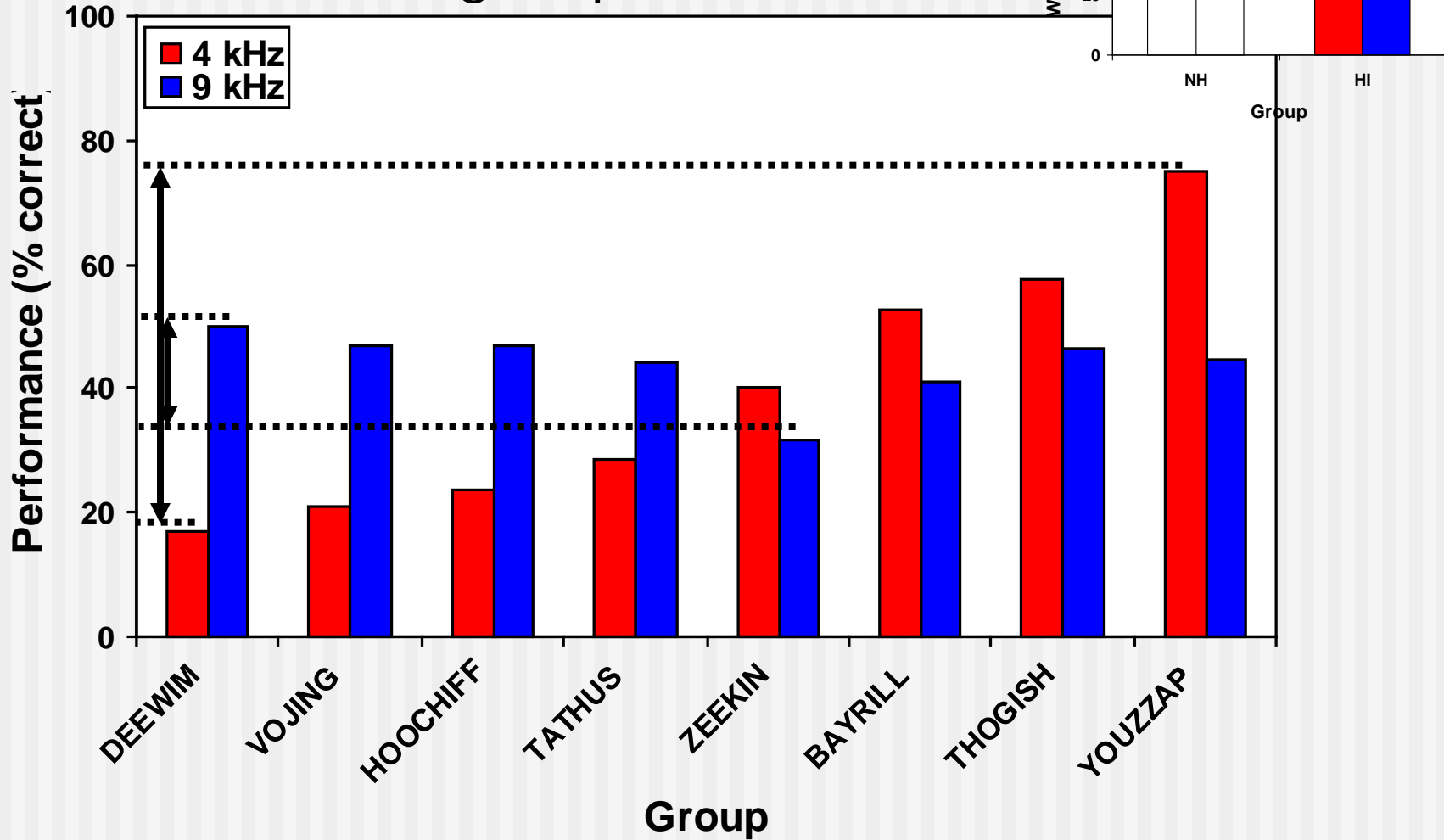


Results



Results

Hearing-Impaired Children



Conclusions

- On average, performance improved slightly in the extended bandwidth condition for both groups
- Both groups demonstrated more consistent word learning in the extended bandwidth condition
- Consistent word learning was more apparent for the children with hearing loss