

Phonological & Lexical Cues in Word Learning by Preschool Children

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Word Learning

- Children learn words rapidly
 - ~1 - 10 words day (Bloom, 2000)
 - Fast mapping of novel words after limited exposure (e.g., Dollaghan, 1985)
- An array of cues are available and used by children in their word learning
 - e.g., linguistic, social
- Although available to all word learners, these cues are utilized differently across development (Hirsh-Pasek, Golinkoff & Hollich, 2000)



Phonological Characteristic

- Phonotactic Probability (Vitevitch & Luce, 1999)
 - Sound characteristic
 - The frequency with which a particular sound or sound pattern occurs in a language
 - e.g., /f i t/
- Common → “coat”
- Rare → “watch”



Lexical Characteristic

- Neighborhood Density (Luce & Pisoni, 1998)
 - Characteristic of whole word forms
 - The number of similar sounding words based on a one sound substitution, addition, or deletion.
 - e.g., /f i t/
 - /tʃ i t/ /f l i t/ /i t/
 - Dense → “sit”
 - Sparse → “these”



A Relationship Exists

- Phonotactic probability and neighborhood density are correlated (Vitevitch et al., 1999; Storkel, 2004).
 - Common sound sequences ~ dense neighborhoods
 - e.g., “coat” “sit”
 - Rare sound sequences ~ sparse neighborhoods
 - e.g., “watch” “these”



Child vs. Adult Word Learning

- **Preschool word learning** (Storkel, 2001, 2003, 2004; Storkel & Rogers, 2000)
 - Common/dense > Rare/sparse
- **Adult word learning** (Storkel, Armbruster & Hogan, 2006)
 - Rare sound sequences > Common sound sequences
 - Dense > Sparse

Purpose

- To examine the unique and interactive contributions of phonotactic probability and neighborhood density to word learning by including correlated and dissociated stimuli
- To uncover the individual effects of phonotactic probability and neighborhood density across development

Participants

- 3 year olds (N=17; 43 months)
- 4 year olds (N= 31; 54 months)
- 5 year olds (N=20; 62 months)
- Monolingual native English speakers
- Normal hearing
- Children scored WNL on standardized measures of articulation, receptive and expressive vocabulary

Stimuli

Correlated		Dissociated	
Common-Dense	Rare-Sparse	Common-Sparse	Rare-Dense
paʊn	wʌp	paɪb	nʌd
jæt	nɪb	hʌn	wud
nɪd	tɔɪm	jaʊn	jeɪm
woun	hub	meɪb	haud

Procedure

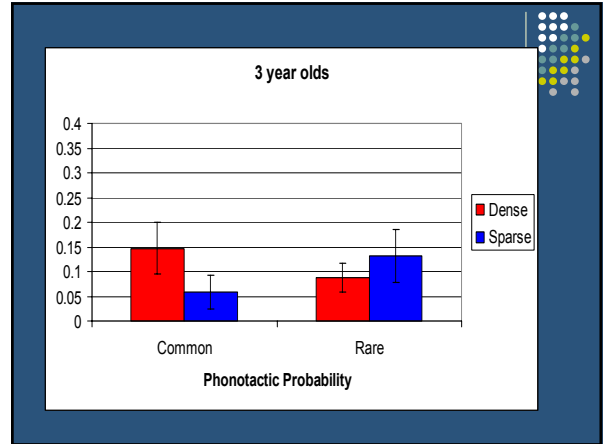
- Nonword stimuli were paired with novel object referents from 4 semantic categories
 - Toys, pets, candy machines, horns
- Embedded in the context of a three-episode story
- Number of exposures increased with each story episode
- Learning was measured via picture naming after 24 exposures

Results

- 2 neighborhood density x 2 phonotactic probability x 3 age repeated measures ANOVA
- Significant neighborhood density x age interaction
 - $F(2, 65) = 3.3, p = .044$
- Significant phonotactic probability x age interaction
 - $F(2, 65) = 4.0, p = .024$

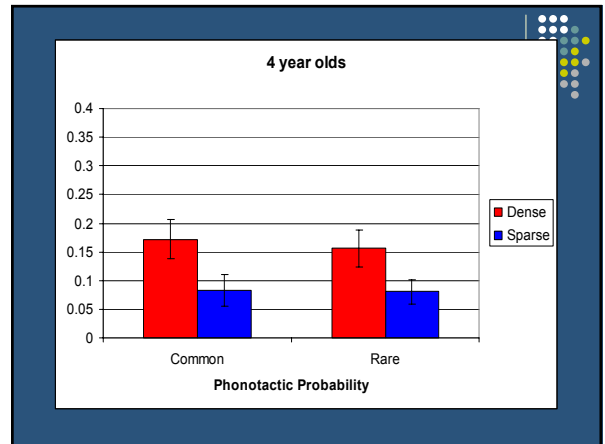
3 year olds

- No significant main effects of phonotactic probability or neighborhood density



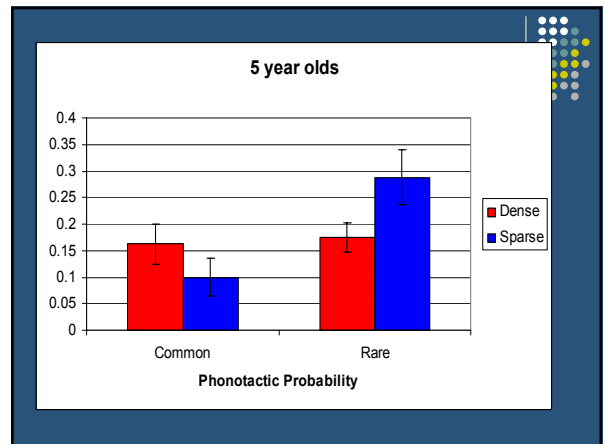
4 year olds

- No significant main effect of phonotactic probability
- Significant main effect of neighborhood density
 - $F(1, 30) = 9.7, p = .004$
 - Dense advantage



5 year olds

- Significant phonotactic probability x neighborhood density interaction
 - $F(1, 19) = 4.6, p = .044$
- No main effect of neighborhood density
- Significant main effect of phonotactic probability
 - $F(1, 19) = 10.8, p = .004$
 - Rare sound sequence advantage for sparse nonwords only



Summary

	3 years	4 years	5 years	Adults (Storkel et al. 2006)
Phonotactic Probability	NS	NS	Rare > Common (Sparse only)	Rare > Common
Neighborhood Density	NS	Dense > Sparse	NS	Dense > Sparse

Conclusions

- The use of phonological and lexical cues in word learning changes from 3- to 4- to 5-years
- Adults use phonological and lexical cues in tandem (Storkel et al., 2006)
- Ongoing Research:
 - Change in the use of phonological, lexical, and semantic cues across preschool, school-age and adult word learners

Thank you!

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