Phonotactic Probability and Grammatical Class in Word Learning

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Children Rapidly Acquire Words

- Diary/Checklist
  - Add ~2-5 words per day (expressive)
  - Add ~9 words per day (receptive)
- Fast mapping
  - Associate sound sequence with referent with 1 exposure
- Quick Incidental Learning
  - Form associations in discourse

Why so fast?

- Constraint Account
  - Born with innate principles
- Associationistic Account
  - Learn regularities in the environment
- Social-Pragmatic Account
  - Social context narrows interpretations
- Emergentist Coalition Account

Associationistic Account

- Initial word learning is slow
- First words give children a sample of distributional regularities
- Children learn the regularities
- Knowledge of regularities leads to fast word learning

Phonological Regularities

- Phonotactic probability
  - Likelihood of occurrence of a sound sequence
  - Positional segment frequency
  - Biphone frequency
- Common sound sequences
  - e.g., “sit” /sɪt/
- Rare sound sequences
  - e.g., “these” /ðiz/

Phonotactic Probability

- Learned early in development
  (e.g., Jusczyk, Luce, & Charles-Luce, 1994; Saffran, Aslin, & Newport, 1996)

- Influences nonword repetition in childhood
  (e.g., Beckman & Edwards, 1999; Gathercole et al., 1999)

- Influences word recognition and memory in adults
  (e.g., Frisch, Large, & Pisoni, 2000; Vitevitch & Luce, 1998; 1999)

Overview

- Evidence that children learn phonotactic probability

- Question: Does phonotactic probability influence word learning?
  - Study 1: Noun learning
  - Study 2: Verb learning

Study 1 (Storkel, 2001)

- Do pre-school children learn objects associated with common sound sequences more rapidly than objects associated with rare sound sequences?

- Does this vary across exposures and delays?

Method

- Participants: 34 children
  - Age 3 - 6 yrs (M = 4; 6)
  - *GFTA* 32nd - 99th percentile (M = 70)
  - *PPVT-R* 30th - 99th percentile (M = 74)

- Stimuli: 8 CVC nonwords
  - 4 common vs. 4 rare sound sequences

Sample Stimuli

Form		Referent	
Common	**Rare**	**Item 1**	**Item 2**
koʊf			
	jeɪp		

Procedure

Story Episode 1 — 1 exposure, 8 nonwords

Test 1

- Referent Identification
- Form Identification
- **Picture Naming**

Story Episode 2 — 3 exposures, 8 nonwords

Test 2

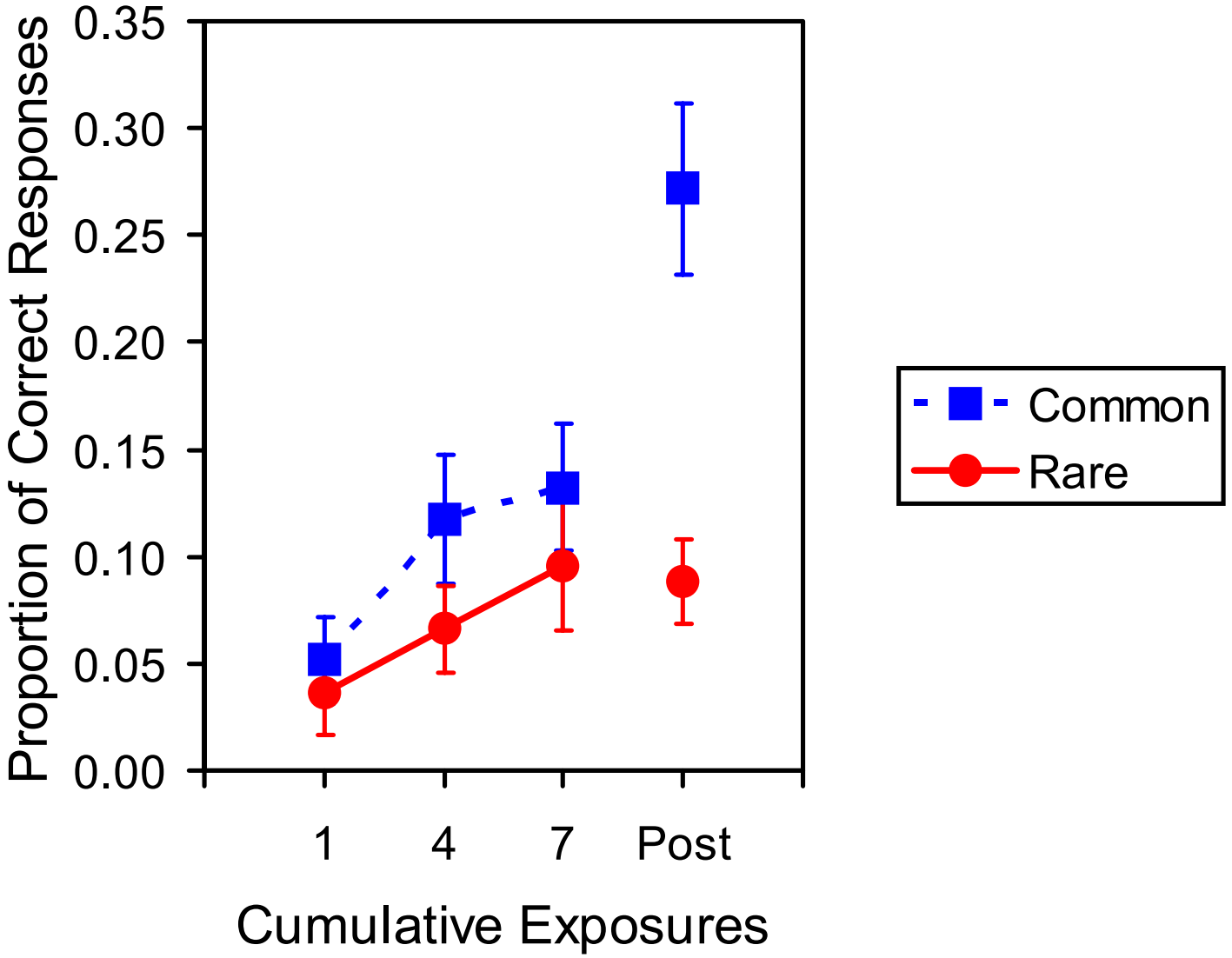
Story Episode 3 — 3 exposures, 8 nonwords

Test 3

Test 4

- Picture Naming

Results: Object Naming



Study 1: Summary

- Preschool children acquired common sound sequences more rapidly than rare
- Effect was consistent over 4-7 exposures and 1-week delay
  - Floor effect at 1 exposure

Noun-Verb Difference

- Nouns predominate early vocabulary
- Nouns learned more rapidly than verbs
- Accounts
  - Conceptual difference
  - Morphology (English)
  - Sentence position (English)

Study 2
Storkel (In Preparation)

- Do preschool children learn actions associated with common sound sequences more rapidly than actions associated with rare sound sequences?

Method

- Participants: 34 children
  - Age 3 - 6 yrs (M = 4; 3)
  - *GFTA-2* 21st - 97th percentile (M = 68)
  - *PPVT-3* 25th - 98th percentile (M = 75)

- Stimuli: 8 CVC nonwords
  - 4 common vs. 4 rare sound sequences

Sample Stimuli

Form		Referent	
Common	**Rare**	**Item 1**	**Item 2**
koʊf			
	jeɪp		

Procedure

Story Episode 1 — Test 1

1 exposure
8 nonwords

Story Episode 2 — Test 2

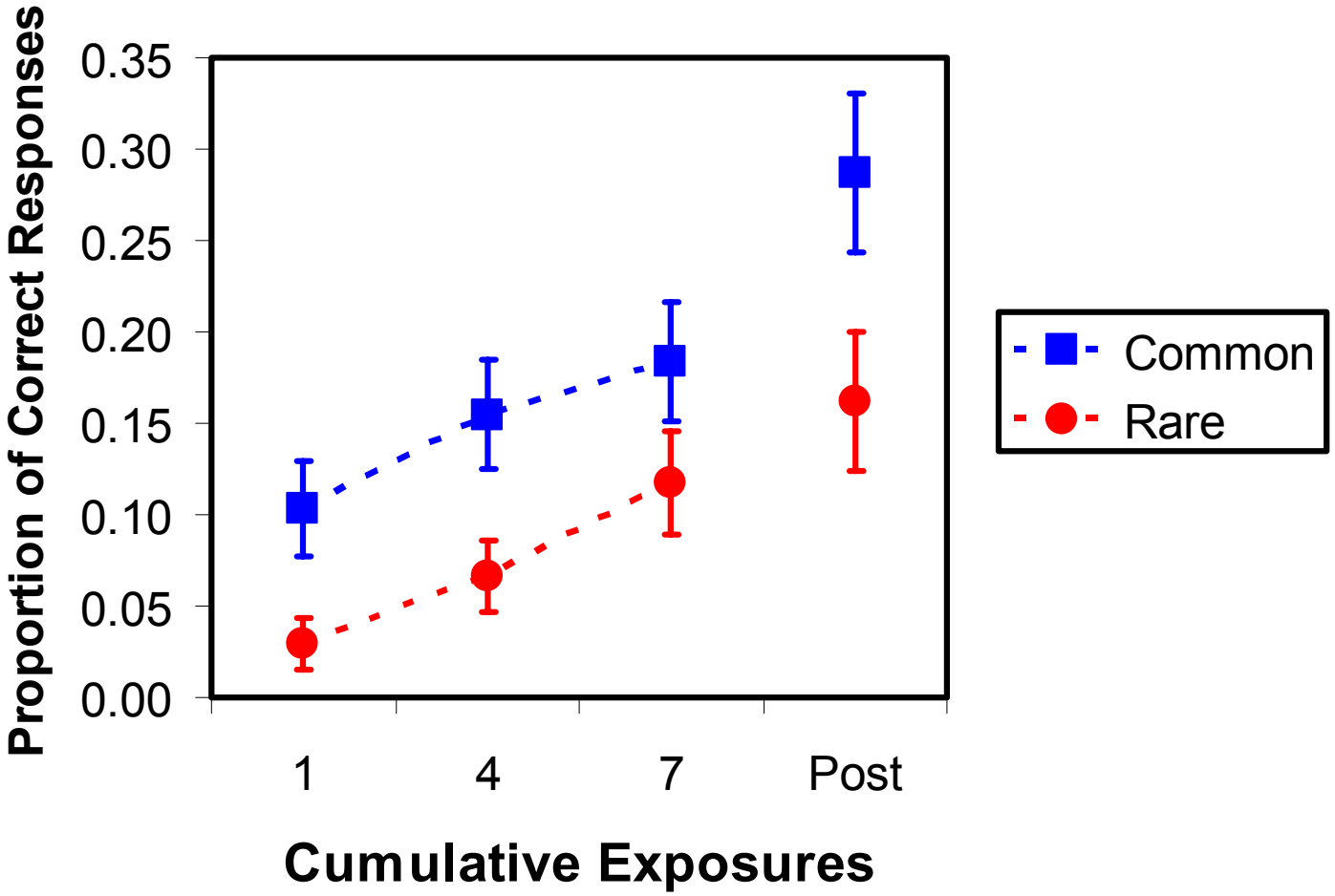
3 exposures
8 nonwords

Story Episode 3 — Test 3 — Test 4

3 exposures
8 nonwords

- Picture Naming

Results: Verb Naming



Study 2: Summary

- Common sound sequences learned more rapidly than rare
- Effect of phonotactic probability similar across words differing in grammatical class

Conclusion

- Learn sound based regularities in the environment
- Regularities influence word learning
- Effect is similar across words differing in grammatical class

Thank You

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