



Representations involved in short-term versus long-term word learning by preschool children with and without phonological disorders

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Types of Representations

- Sublexical: individual sounds (e.g., /b/, /i/, /t/)
 - ♦ Indexed by phonotactic probability
 - ♦ Phonotactic probability: likelihood of occurrence of a sound sequence
- Lexical: sound sequence corresponding to a whole-word form (e.g., /bit/)
 - ♦ Indexed by neighborhood density
 - ♦ Neighborhood density: number of words that differ by one phoneme from a given word (e.g., /bit/ -- /fit/, /but/, /bin/)

Questions

- Which representations, sublexical or lexical, are involved in word learning by preschool children?
 - ♦ Does this vary across short- versus long-term word learning?
 - ♦ Does this vary by phonological development status?

Participants

- 17 preschool children with phonological disorders, but normal development in other areas of language and cognition
- 17 preschool children with typical development matched in age and vocabulary to the children with phonological delays

	Children with phonological disorders	Children with typical development
Goldman-Fristoe Test of Articulation Percentile Rank	7* (1-16)	62* (27-93)
Chronological Age	58 months ¹ (41-79 months)	56 months ¹ (36-68 months)
Receptive One Word Picture Vocabulary Test Standard Score	103 ¹ (88-118)	105 ¹ (90-115)
Expressive One Word Picture Vocabulary Test Standard Score	102 ¹ (79-117)	104 ¹ (84-126)

*Significant difference, $t(32) = 9.52, p < 0.001$
¹Comparison not statistically significant, $t(32) < 0.90, p > 0.35$

Short-Term Word Learning Task

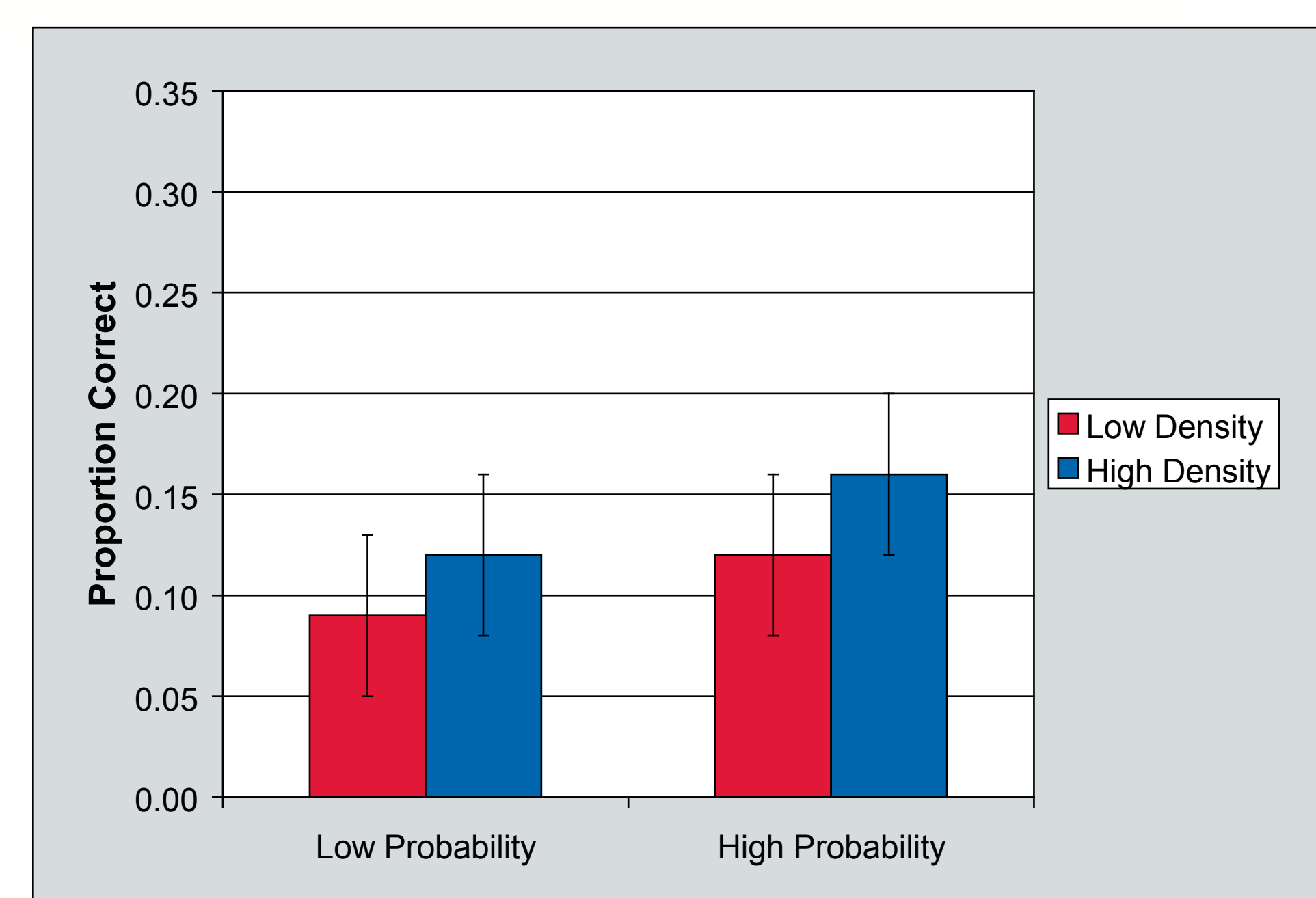
- 16 nonwords that fully crossed low/high phonotactic probability and low/high neighborhood density (n = 4 per probability/density condition)
- Nonwords randomly paired with 16 novel objects, balancing semantic category across probability/density conditions
- Nonword-object pairs embedded in a story context, providing 24 exposures to each nonword-object pair
- Learning was measured in a picture-naming test 1-week post-exposure

Short-Term Word Learning Results

- 2 Phonotactic Probability (low, high) x 2 Neighborhood Density (low, high) x 2 Group (phonological delay, typically developing) ANOVA
 - ♦ Phonotactic Probability was significant, $F(1, 32) = 5.34, p = 0.03, \eta_p^2 = 0.14$
 - ♦ Density x Group interaction was significant, $F(1, 32) = 4.44, p = 0.04, \eta_p^2 = 0.12$

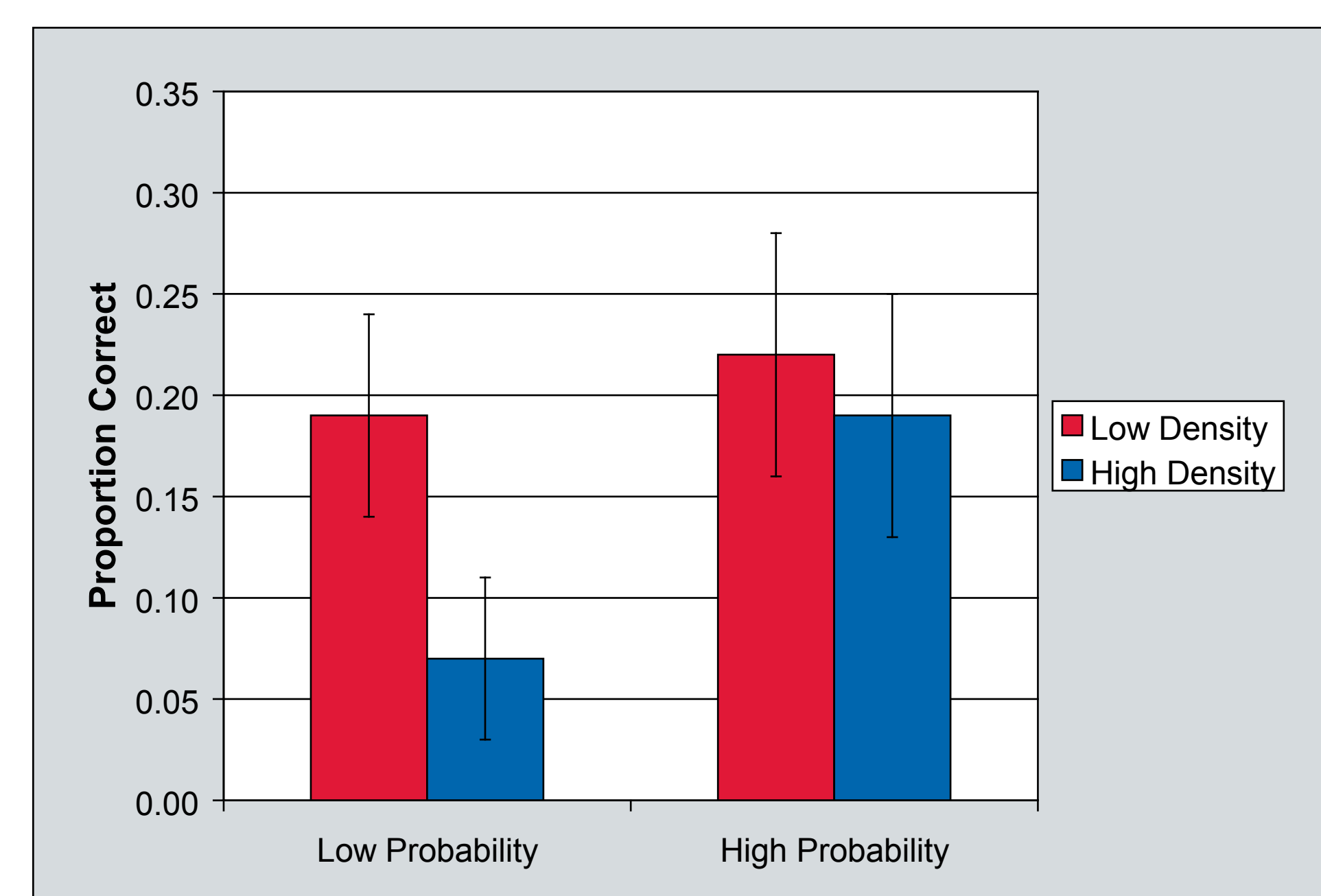
Children with phonological disorders

- ♦ No statistically significant results



Children with typical development

- ♦ No statistically significant results



Long-Term Word Learning Task

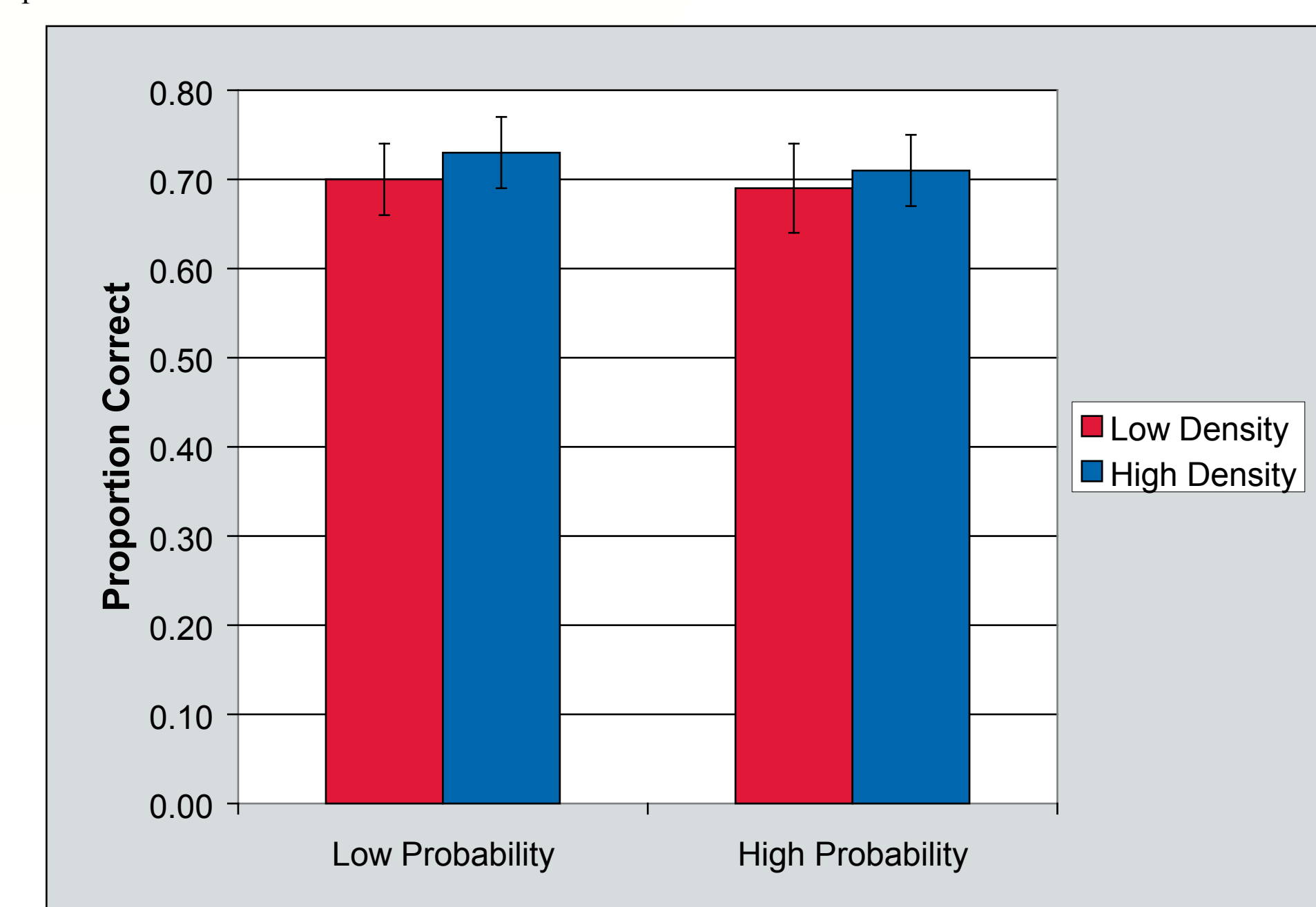
- 121 real words that fully crossed low/high phonotactic probability and low/high neighborhood density
 - ♦ Across probability/density conditions, words were matched for canonical structure, word length (syllables and segments), age-of-acquisition, and word frequency
- Learning was measured in an expressive picture-naming test and a receptive picture-pointing test

Long-Term Word Learning Results

- 2 Phonotactic Probability (low, high) x 2 Neighborhood Density (low, high) x 2 Test (expressive, receptive) x 2 Group (phonological delay, typically developing) ANOVA
 - ♦ Phonotactic Probability x Group interaction was significant, $F(1, 32) = 6.11, p = 0.02, \eta_p^2 = 0.16$
 - ♦ Neighborhood Density was significant, $F(1, 32) = 21.42, p < 0.001, \eta_p^2 = 0.40$

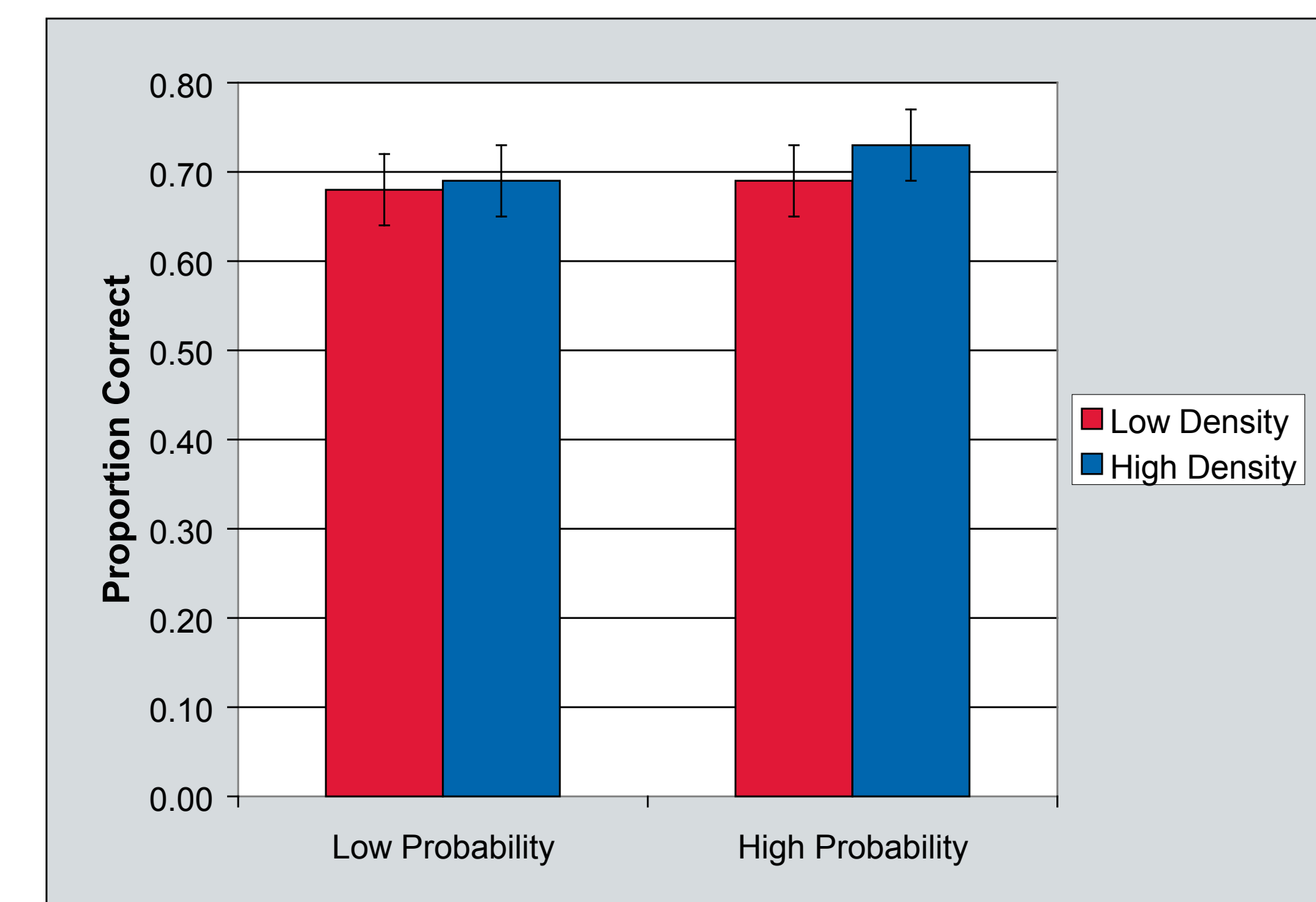
Children with phonological disorders

- ♦ Neighborhood Density was significant, $F(1, 32) = 10.83, p = 0.005, \eta_p^2 = 0.40$



Children with typical development

- ♦ Phonotactic Probability was significant, $F(1, 32) = 4.47, p = 0.05, \eta_p^2 = 0.22$
- ♦ Neighborhood Density was significant, $F(1, 32) = 10.67, p = 0.005, \eta_p^2 = 0.40$



Summary & Conclusions

- Both sublexical and lexical representations are involved in word learning by preschool children
 - ♦ Sublexical representations affect short-term or immediate word learning regardless of phonological development status
 - May be critical in initiating word learning and forming an initial representation in long-term memory
 - ♦ Lexical representations affect long-term word learning regardless of phonological development status
 - May be critical in integrating a new representation with existing representations in long-term memory
- Differences in word learning were observed based on the status of phonological development
 - ♦ Potential differences in the use of lexical representations for short-term word learning but results not statistically significant within group
 - ♦ Differences in the use of sublexical representations for long-term word learning
 - Children with normal phonological development appear to show residual effects of phonotactic probability in long-term word learning
 - Children with phonological disorders do not show an effect of phonotactic probability on long-term word learning
 - Different types of representations may be used in parallel in long-term word learning by children with typical development but sequential in children with phonological disorders



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