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/, /l/, /h/)
• 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/ — /fot/, /bair/, /bain/)

Questions

• Which representations, sublexical or lexical, are involved in word learning by preschool children?
• Does this vary by 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

Short-Term Word Learning Task

• 16 nonwords that fully crossed low/high phonotactic probability and low/high neighborhood density

Long-Term Word Learning Task

• 121 real words that fully crossed low/high phonotactic probability and low/high neighborhood density

Short-Term Word Learning Results

• 2 Phonotactic Probability x 2 Neighborhood Density x 2 Group (phonological delay, typically developing) ANOVA
  - Phonotactic Probability was significant, F(1, 32) = 5.34, p = 0.03, η² = 0.14
  - Density x Group interaction was significant, F (1, 32) = 4.44, p = 0.04, η² = 0.12

Children with phonological disorders

• No statistically significant results

Children with typical development

• No statistically significant results

Long-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 x Group interaction was significant, F (1, 32) = 6.11, p = 0.02, η² = 0.16
  - Neighborhood Density was significant, F (1, 32) = 21.42, p < 0.001, η² = 0.40

Children with phonological disorders

• Neighborhood Density was significant, F(1, 32) = 10.83, p = 0.005, η² = 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

This research was supported by NICHD 06545 and the staff of the Word and Sound Learning Lab. A copy of this poster is available at www.ku.edu/~wrdlrn. For additional inquiries, contact hstorkel@ku.edu.