Research to Practice: Influence of Form Characteristics on Word Learning

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DC04781, DC06545
Children Rapidly Acquire Words

- **Diary/Checklist**
  - Add ~2-5 words per day (expressive)
  - Add ~9 words per day (receptive)

- **Fast mapping**
  - Associate form with referent with 1 exposure

- **Extended mapping**
  - Initial representations retained and modified with subsequent exposure
Why so fast?

- **Constraint Account**
  - Born with innate principles

- **Associationistic Account**
  - Learn regularities in the environment

- **Emergentist Coalition Account**
  - Innate principles help learn first words
  - Extract cues or regularities from learned words
  - New principles emerge
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Phonological Regularities: Phonotactic Probability

- Likelihood of occurrence of sound sequence
  - Common = sounds frequently occur in that word position; Adjacent sounds frequently co-occur
  - Rare = sounds infrequently occur in that word position; Adjacent sounds infrequently co-occur

- Common (e.g., “coat”) vs. Rare (e.g., “watch”)

- See Storkel & Morrisette (2002), LSHSS, 33 (1), 24-37 for review
Phonotactic Probability Influences:

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

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

- Word learning in typically developing children
  (e.g., Storkel, 2001, 2003, 2004; Storkel & Rogers, 2000)

- Common > Rare
Does phonotactic probability influence word learning by children with phonological delays?

Storkel (2004), JSLHR, 47 (5)
## Participants

<table>
<thead>
<tr>
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<th>Phonological Delay (PD)</th>
<th>Normal Comparison (NC)</th>
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<tr>
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<tr>
<td>GFTA-2 Percentile Rank</td>
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Stimuli

- 16 CVC nonsense words
  - ½ common
  - ½ rare
- Paired with unfamiliar objects
- Incorporated into narrative and pictures
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<tr>
<th>Known</th>
<th>Form</th>
<th>Referent</th>
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**Procedure**

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<th>Story 1</th>
<th>Test 1</th>
<th>Story 1</th>
<th>Test 2</th>
<th>Story 1</th>
<th>Test 3</th>
<th>Test 4</th>
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<table>
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<th>Story 2</th>
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<th>Story 2</th>
<th>Test 3</th>
<th>Test 4</th>
</tr>
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- Picture Naming

![Images of creatures]
Naming Correct at Post-Test

Proportion Correct

Group

PD
CN

Common
Rare
Storkel (2004) Summary

- PD & CN groups learned a similar number of words, BUT
  - PD group learned rare sound sequences
  - CN group learned common sound sequences

- PD group may have difficulty differentiating common sound sequences

- PD lexicon may differ from the CN lexicon
Both groups scored within normal limits on vocabulary tests

Vocabulary tests may not be sensitive to underlying word learning mechanisms
Standardized Vocabulary Tests

- Reportedly insensitive to word learning differences
  (e.g., Gray, Plante, Vance, & Henrichsen, 1999)

- May be culturally biased

- Examine the *products*, not the *process* of learning
  (e.g., Dollaghan & Campbell, 1998)
  - Represents exposure & ability
Can the sensitivity of vocabulary tests be improved by examining the types of words that kids know?

Storkel & Perdue (in progress)
Examine Phonotactic Probability Subscale Scores

- Peabody Picture Vocabulary Test – 3A Expressive Vocabulary Test
- Code items as common or rare
- For each child, compute
  - % Common correct
  - % Rare correct
Peabody Picture Vocabulary Test - 3A

![Graph showing proportion correct for Common and Rare words in PD and CN groups.](chart.png)
Expressive Vocabulary Test

Proportion Correct

Group

PD
CN

Common
Rare
Are these subscale scores better predictors of word learning than overall scores?

Regression Analysis

Predictors:
CA, PPVT raw, PPVT common, PPVT rare, EVT raw, EVT common, EVT rare
## Significant Predictors of Word Learning

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Common</td>
<td>PPVT rare</td>
<td>PPVT raw score EVT common</td>
</tr>
<tr>
<td>Rare</td>
<td>$\emptyset$</td>
<td>PPVT raw score</td>
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</tbody>
</table>
Summary: Utility of Subscale Scores

- Show promise in predicting word learning in typically developing children

- Warrant further exploration
  - Not all outcomes were as expected
  - For PD, PPVT rare predicted learning of common

- Need to consider how correlated variables may affect outcome
  - Tests not designed to investigate phonotactic probability
Alternative Processing Measures

- Nonword repetition

- Nonword processing task (Storkel & Hoover, in progress)

- Still need sensitivity to factors that influence word learning
Conclusion

- Findings from basic science research can be used to build better diagnostic tools
- Increase the sensitivity of diagnostic tools
- Influence treatment planning in a more direct way
Acknowledgements

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