Word Learning by Adult Speakers of English: Does Practice Make Perfect?

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Background

• Practice Effect: When children are taught two sets of words sequentially, they learn the second set of words better than the first set of words (Gershkoff-Stowe & Hahn, 2007).

• The practice effect is thought to occur because the first set of words primes the child’s word learning system, facilitating learning of the second set of words.

• It is unclear whether the practice effect is observed in more advanced word learners (i.e., adults).

• It is unclear whether the practice effect is influenced by word characteristics.

• Neighborhood Density: The number of words that are phonologically similar to a given word.

• Neighborhood density influences word learning by children and adults such that high density words are learned more rapidly than low density words (Hoover, Storkel, & Hogan, 2012; Storkel, Armbruster, & Hogan, 2006; Storkel & Lee, 2011).

Method: Stimuli

• Each participant was taught one set of words across two days and then a second set of words on a third day.

• Each set consisted of 12 words.

• Set 1 and Set 2 words were phonologically related.

• Each word in Set 2 was a neighbor of a word in Set 1, either

• VC (C in 4 words):

• CVC (in 4 words):

• CV (in 4 words):

• Between participants, words were either sparse or dense.

• Novel objects were taken from Kroto and Fatter (1984) with the same objects being used across sparse and dense words.

• Analysis:

• Examine all data points for Set 1 to replicate prior findings that dense words are learned better more rapidly than sparse words.

• Compare equivalent test points (e.g., tests tested in red above for Set 1 versus Set 2) to address the main research questions.

Sample Stimulus

<table>
<thead>
<tr>
<th>Sparse</th>
<th>Dense</th>
</tr>
</thead>
<tbody>
<tr>
<td>• CVC</td>
<td>(Set 1)</td>
</tr>
<tr>
<td>• CVC</td>
<td>(Set 2)</td>
</tr>
</tbody>
</table>

Method: Procedures

• Training 1: Blockaded exposures to the word and object in standard carrier phrases (e.g., This is a ___).

• Training 2: Picture-name training (i.e., see picture, say trained name).

• Correct > 1 of 2 phonemes

• Incorrect = all other productions.

• Training 3: Screening for training and testing were administered.

• Day 1: Set 1: Test 1 (baseline): Training 1, Training 2, Training 3, Test 1.


• Day 1: Set 1: Test 2 (posttest): Training 1, Training 2, Training 3, Test 1.


• Day 1: Set 1: Test 3 (posttest): Training 1, Training 2, Training 3.


<table>
<thead>
<tr>
<th>Characteristics of the Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sparse: Set 1</td>
</tr>
<tr>
<td>Phonotactic Probability Segment Sum</td>
</tr>
<tr>
<td>Biphone Probability Segment Sum</td>
</tr>
<tr>
<td>Neighborhood Density</td>
</tr>
</tbody>
</table>

| Sparse: Set 2 | Dense: Set 2 |
|-----------------------------|
| Phonotactic Probability Segment Sum | 0.11 | 0.11 | 0.01 |
| Biphone Probability Segment Sum | 0.011 | 0.011 | 0.011 |
| Neighborhood Density | 2 | 2 | 2 |

Results: Set 1

• 4 Test (both) > 2 Density (between ANOVA)

• Significant effect of Test, F (1, 413) = 112.50, p < 0.001, η² = 0.22.

• Significant effect of Density, F (1, 59) = 22.40, p < 0.001, η² = 0.28.

• No interaction, F (1, 413) = 0.12, p > 0.15, η² = 0.003.

Results: Set 1 vs. Set 2

• 4 Test (both) > 2 Density (between ANOVA)

• Significant effect of Test, F (1, 413) = 118.37, p < 0.001, η² = 0.21.

• Significant effect of Density, F (1, 59) = 10.31, p < 0.002, η² = 0.16.

• Significant interactions of

• Test x Density, F (1, 413) = 1.83, p < 0.02, η² = 0.001.

• Test x Set, F (1, 413) = 10.35, p < 0.001, η² = 0.03.

Unpacking Interactions with Test

<table>
<thead>
<tr>
<th>Test 1</th>
<th>Test 2</th>
<th>Test 3</th>
<th>Test 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dense</td>
<td>Sparse</td>
<td>Dense</td>
<td>Sparse</td>
</tr>
<tr>
<td>Effect of Density</td>
<td>No Significant Effect</td>
<td>No Significant Effect</td>
<td>No Significant Effect</td>
</tr>
<tr>
<td>Effect of Set</td>
<td>No Significant Effect</td>
<td>No Significant Effect</td>
<td>No Significant Effect</td>
</tr>
</tbody>
</table>

Summary & Discussion

• Set 1 analysis, dense words were learned more rapidly accurately than sparse. Set 1 and 3 analyses generally show this same pattern.

• Replicates density effect observed in prior studies, which used a within-participant manipulation (Storkel, et al., 2006).

• Set 2 was more accurate than Set 1 at Test 1.

• Results support the practice effect observed in prior studies of children (Gershkoff-Stowe & Hahn, 2007).

• Extends these findings by suggesting that the practice effect does occur in adults but short lived.

• Set 1 was more accurate than Set 2 at Test 4.

• Suggests that the initial practice effect to recognize retention is tested.

• More recently learned Set 2 may be subject to competition interference from the earlier learned Set 1.

• Overall pattern of the effect of set is consistent with recent models of word learning that separate learning from input versus memory consolidation for retention (Ellis & Gaskell, 2009; Storkel & Gaskell, 2007; Gaskell & Durrant, 2002).

• Set 1 facilitates learning from input for Set 2.

• Set 1 interferes with memory consolidation for retention.

• Density did not appear to amplify or dampen the effect of set.

References


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