**Phonological and Semantic Consolidation of Novel Words in Monolingual and Bilingual Children**

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**Introduction**

Complementary systems framework (e.g., McClelland et al., 1995)
- Children consolidate new words into existing networks (e.g., James et al., 2017)
- Requires time and sleep (e.g., Henderson et al., 2012)
- Consolidation for both phonological and semantic networks has yet to be examined

Weaker links hypothesis
- Bilingual children thought to have weaker links between phonology and semantics within each of their languages, as compared monolinguals (e.g., Gollan et al., 2008)
- If weaker language-specific networks affect consolidation, bilinguals would show reduced consolidation

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**Research Questions**

1. Do newly-learned English words consolidate within English phonological and semantic networks for monolingual children?
2. Do newly-learned English words consolidate within English phonological and semantic networks for bilingual children?

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**Experiment 1: Monolinguals**

<table>
<thead>
<tr>
<th>Participant Characteristics</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>34 (19 boys)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>4.79 (0.53)</td>
</tr>
<tr>
<td>Mother’s years of education</td>
<td>17.06 (1.66)</td>
</tr>
<tr>
<td>Nonverbal IQ</td>
<td>107.65 (14.31)</td>
</tr>
<tr>
<td>Numbers Reversed English</td>
<td>112.60 (9.90)</td>
</tr>
<tr>
<td>PLS Composite</td>
<td>115.35 (13.93)</td>
</tr>
</tbody>
</table>

**Word learning task**
- Monolingual children learned 6 English-like novel words (e.g., lipe, nem) in a teaching-to-criterion manner

**Example**
- Look at this nem. A nem is a type of food.
- A nem is very crunchy. You have to wash a nem to eat it.

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**Experiment 2: Bilinguals**

<table>
<thead>
<tr>
<th>Participant Characteristics</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>29 (17 boys)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>5.05 (0.46)</td>
</tr>
<tr>
<td>Mother’s years of education</td>
<td>17.15 (4.15)</td>
</tr>
<tr>
<td>Nonverbal IQ</td>
<td>100.89 (15.26)</td>
</tr>
<tr>
<td>Numbers Reversed English</td>
<td>103.37 (14.99)</td>
</tr>
<tr>
<td>Numbers Reversed Spanish</td>
<td>93.57 (16.85)</td>
</tr>
<tr>
<td>BESA Composite</td>
<td>106.00 (10.69)</td>
</tr>
</tbody>
</table>

**Word learning task**
- Bilingual children learned the same 6 English-like novel words (e.g., lipe, nem) in 6 teach-test blocks

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**Testing Procedure**

- Consolidation was tested via co-activation (e.g., Allopenna et al., 1998) with a visual world paradigm task immediately after learning (Day 1) and a day later (Day 2)
- At test, 4 images were presented: 2 represented familiar English words and 2 represented novel words
- Phonological consolidation: auditory target was an English word that shared phonological onset with the novel competitor (e.g., lightbulb – lipe)
- Semantic consolidation: auditory target was the novel word that shared semantic category with English word (e.g., nem, a type of food - orange)

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**Experiment 1: Results**

- Monolingual: Phonological Competition
- Monolingual: Semantic Competition

**Experiment 2: Results**

- Bilingual: Phonological Competition
- Bilingual: Semantic Competition

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**Discussion**

- Neither the complementary learning systems framework nor the weaker links hypothesis explain the findings
- We find little evidence of stronger co-activation on Day 2 in either bilinguals or monolinguals
- We infer consolidation based on competition between newly-learned novel words and familiar English words
- Competition likely depends on depth of encoding for novel words
- Future directions: controlling for word learning accuracy and language ability (Malins et al., 2019)

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