The Phonological Similarity Effect and the Word Length Effect: Hints for Maintenance Mechanisms in Working Memory

Phonological loop model
Baddeley, 1986

- verbal information are stored as phonological codes
- verbal information are maintained by subvocal rehearsal
- articulating irrelevant material impedes rehearsal
- recall of phonologically similar words suffers from acoustic confusion = PSE
- recall of long words suffers from longer articulatory duration = WLE

Extended Time-Based Resource-Sharing model
Camos, Lagner, & Barrouillet, 2009

- maintenance and processing require attention
- attention rapidly switches over maintenance and processing
- traces decay with time as soon as attention is switched away
- traces are refreshed by attentional focusing

Are words maintained differently at peripheral and central levels?

Material & Method

Exp. 1 PSE
32 lists of 6 monosyllabic words to remember

<table>
<thead>
<tr>
<th>Similar</th>
<th>Dissimilar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same central phoneme</td>
<td>No common phoneme</td>
</tr>
<tr>
<td>col note roche gomme</td>
<td>nage bosse mec chute ronde couche</td>
</tr>
</tbody>
</table>

Processing varied according to 4 conditions

A: No processing
B: Articulatory suppression
- Articulatory suppression
- Articulatory suppression
- Articulatory suppression
- Articulatory suppression

C: Attention capture
D: Location judgment

Participants: 20 adults

% of words recalled in correct position

Effect of similarity, F(1,20) = 15.96, p < .001,
and articulatory suppression, F(1,20) = 71.05, p < .001,
no interaction similarity x attention, F(1,20) = 12.71, p < .001

Exp. 2 WLE
32 lists of 6 words to remember

<table>
<thead>
<tr>
<th>Short</th>
<th>Long</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 syllable</td>
<td>2 syllables</td>
</tr>
<tr>
<td>3 phonemes</td>
<td>5 phonemes</td>
</tr>
<tr>
<td>4 letters</td>
<td>6 letters</td>
</tr>
</tbody>
</table>

Participants: 27 adults

% of words recalled in correct position

Effect of length, F(1,26) = 11.71, p < .01,
and articulatory suppression, F(1,26) = 60.62, p < .001,
no interaction length x attention, F(1,26) = 1.20, p = .28,
interaction similarity x articulatory suppression, F(1,26) = 6.85, p < .05

Conclusion

- Rehearsal and refreshing could work separately or jointly, and their effects on recall are additive.
- Words are stored as phonological codes when rehearsal is available and as non-phonological codes when rehearsal is impeded,
- Argue for the independence of peripheral and central levels assumed by the Extended TBRS model