Speeded Source Memory Performance in Young Adult Bilinguals

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Background

Recent research\(^1\) suggests that bilingual experience may affect non-linguistic cognition.

Language selection in bilinguals requires additional cognitive control.\(^2\)

• This additional practice appears to strengthen the cognitive control system.\(^3\)

• Less is known about how these effects ripple out to other systems, such as memory

Current research has focused on item memory.

• Advantages for older adult bilinguals compared with older adult monolinguals\(^4\)

• Memory advantages in bilinguals are correlated with their executive control performance.\(^5\)

• As yet, no one has examined source memory, a form of memory that is known to rely on cognitive control

Source memory engages left prefrontal cortex to a greater degree than item memory.\(^6\) Similarly, bilinguals recruit left prefrontal cortex more than monolinguals when cognitive control is required.\(^7\)

Consequently one may expect differential performance by bilinguals due to neuroplastic training of this brain region.

Aims

Evaluate source memory performance in monolinguals and bilinguals

Assess the generator of the effect via a new source memory task

• Simple source memory

• Source memory under working memory stress

• Source memory under inhibitory control stress

• Source memory under combined stress

Methods

Participants

All participants were recruited through the Psychology subject pool.

English Monolinguals:

• n=25 (19 female)

• Mean age=19 years

Bilinguals:

• n=26 (20 females)

• Mean age=20 years

• L1 English (33%)

• Other L1s: Chinese, Korean, Czech, Nepali, Thai, Polish, Malayalam, Spanish, Hebrew, Russian

• L2s: English, Spanish, French, German, Malay, Hungarian

Materials & Procedure

Language History Questionnaire

Peabody Picture Vocabulary Test

Source Memory Task

• 4 conditions across 2 factors

• IC vs. Relationalism

• WM vs. Colors

• 20 objects per condition, spread across two encoding blocks

• Each encoding block was followed by a testing block

• Testing blocks contained 12 trials with 6 old items, 4 distractor items, and 2 new items

Source Memory Strategy Questionnaire

• Passive viewing, repetition, sentence generation, imagery, meaningful grouping, other

Flanker

Letter-Number Sequencing

1x65 → 1x156

Logical Memory I

Spatial Span Forward and Backward

Results

Participant Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Monolingual Mean (SD)</th>
<th>Bilingual Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Proficiency</td>
<td>0.70 (.29)</td>
<td>0.69 (.08)</td>
</tr>
<tr>
<td>Hours of L2 use</td>
<td>0.53 (1.1)</td>
<td>0.57 (1.9)</td>
</tr>
<tr>
<td>Strategy Use</td>
<td>2.26 (1.3)</td>
<td>2.36 (1.0)</td>
</tr>
<tr>
<td>Flanker Effect</td>
<td>17.17 (10.97)</td>
<td>46.72 (32.21)</td>
</tr>
<tr>
<td>Letter-Number Sequencing</td>
<td>0.46 (.16)</td>
<td>0.43 (.20)</td>
</tr>
<tr>
<td>Logical Memory I</td>
<td>37.5 (9.2)</td>
<td>33.08 (9.84)</td>
</tr>
<tr>
<td>Spatial Span Forward</td>
<td>9.89 (2.24)</td>
<td>9.32 (1.79)</td>
</tr>
<tr>
<td>Spatial Span Backward</td>
<td>9.67 (3.13)</td>
<td>8.1 (1.7)</td>
</tr>
</tbody>
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Fixed effect modeling

Fixed effects:

• Condition (F=52.327, p<.001)

• Language Background (F=4.476, p=.04)

Covariates: PPVT, LNS, Flanker, LogMem, Hours of L2 Use

Conclusions

Our results suggest that the effect of bilingualism extends to source memory.

• Specifically, bilinguals appear to be able to retrieve source memory faster than monolinguals, without compromising accuracy.

Furthermore, this effect is apparent across each of the conditions of our task, suggesting that the effect of bilingualism is not limited to inhibitory control.

References


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