Frontal Lobe Contributions in a Verbal Switching Task
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Abstract

This study investigated the role of the frontal lobes (FL) in verbal task switching.

Based upon their scores on a composite measure of frontal function (Glisky et al., 1995), 24 older adults were placed in one of two cells, such that people were either above or below the mean, and were classified as possessing either high- or low-frontal function.

Results suggest that the diminished frontal function seen in a subset of older adults contributes to age-related decline in verbal switching.

Introduction

Verbal fluency tasks are thought to rely heavily on frontal lobe function, and therefore are often used as a measure of frontal lobe dysfunction.

A meaning generation task is one such task that may be especially sensitive to switching ability, and has been shown to distinguish patients with anterior lesions from those with posterior lesions (Warrington, 2000).

Among older adults, a reliance upon frontal lobe function in verbal switching tasks is of interest given findings that suggest an age-related decline in frontal lobe function (Fuster, 1997; West, 1996).

Thus, the primary aim of the current study was to investigate the role of the frontal lobes, as characterized by performance on neuropsychological tests, in a meaning generation task.

Method

Subjects

A total of 24 older adults (age 65 or older) were recruited from the subject pool of the Aging and Cognition Unit at the University of Arizona.

All older adults were categorized as above (High) or below (Low) average in executive functioning based on their performance on a battery of neuropsychological tests (FL factor; Glisky et al., 1995).

Method (cont.)

Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>High FL function</th>
<th>Low FL function</th>
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</thead>
<tbody>
<tr>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Age (years)</td>
<td>77.83</td>
<td>3.81</td>
</tr>
<tr>
<td>Education (years)</td>
<td>16.42</td>
<td>2.31</td>
</tr>
<tr>
<td>MMSE</td>
<td>28.75</td>
<td>1.22</td>
</tr>
<tr>
<td>FL score*</td>
<td>.22</td>
<td>.40</td>
</tr>
</tbody>
</table>

Note. FL = frontal lobe; MMSE = Mini-Mental Status Examination. * z scores.

Procedure

Participants were tested individually in a single session.

The task required participants to listen to a list of 16 homophones, e.g., slip, bank, tip, etc.

Participants were asked to generate as many definitions as possible for each of the 16 words. They were given approximately 1 minute per word.

Results

Total Definitions Generated

Results (cont.)

A main effect of FL status was revealed such that the high-FL group (M=52.33) generated significantly more definitions than the low-FL group (M=41.75), t(1,22) = 3.2, p < .005.

Discussion

Older adults characterized as possessing high frontal lobe function generated significantly more definitions than did older adults characterized as possessing low frontal lobe function.

Consistent with a previous study (Warrington, 2000), the results of this study suggest that the FLs may be involved in switching, whereby older adults with above average frontal function are able to spontaneously switch between multiple definitions, whereas older adults characterized as possessing below average frontal function were not able to do so as efficiently.

Future studies will investigate whether FL function predicts performance in visual as well as verbal switching tasks.

References


