The Nature of Lexical-Semantic Access in Bilingual Aphasia
Swathi Kiran, Isabel Balachandran, and Jason Lucas
Department of Speech and Hearing Sciences, Boston University

Background Information

The nature of lexical semantic access has not been systematically examined in individuals with bilingual aphasia. Most studies thus far have been case study or small sample analyses of picture naming or description in individuals with Spanish-English bilingual aphasia (Roberts & Desaulesiers, 1999; Knuez & Marquardt, 2003).

Aims: Three goals of the study

1. To examine the nature of lexical-semantic access in bilingual aphasia and its normal controls.
2. To examine the nature of differential language proficiency and its influence on three lexical retrieval tasks.
3. To examine the effect of post-stroke impairment above and beyond the influence on pre-stroke proficiency on lexical retrieval in individuals with bilingual aphasia.

Materials and Methods

Picture Naming Scoring: For both naming tests, Boston Naming Test (BNT) and Bilingual Picture Naming Test (BNPT), all participants were shown the target stimuli and given up to thirty seconds to generate a response. Responses were counted as correct if they matched the target response. All other responses were coded as a 20-point error scale.

Category Generation (CG) Scoring: For the CG task, the responses of all participants were transcribed and tabulated separately for each category and each language. Four measures were obtained from this data: (a) the total number of words produced, (b) total correct words produced, (c) mean semantic cluster size, and (d) mean semantic switching in each subcategory for each language, Spanish and English (Troyer et al., 1997; Troyer et al., 2000).

Results: BNT & BNPT

CONTROLS:
For the BNT, there was a significant effect of language even after controlling for LAR (F(1,2) = 16.68, p = 0.001). Post hoc tests indicated that naming accuracy on the BNT was higher in English than Spanish (p < 0.005). For the BNPT, there was also a significant effect of language after controlling for LAR (F(1,2) = 8.87, p = 0.05).

RESULTS: For patients, the group analysis was not significant for either the BNT or BNPT when language ability was taken into account.

Results: Category Generation

Error production of BNPT for normal controls and participants with aphasia – English Error response types were similar in the BNPT for both normal controls and aphasic participants for English targets. The greatest errors made were naming no response (35%) in T5-S1, Circumlocution in T5-S1, Correct response in T5-S9, and Correct response in T5-S5.

Error production of BNPT for normal controls and participants with aphasia – Spanish Error response types were similar in the BNPT for both normal controls and aphasic participants for Spanish targets. The greatest errors made were naming no response (50%) in T5-S1, Circumlocution in T5-S1, Correct response in T5-S9, and Correct response in T5-S5.

Results: Correlation across tasks

Error correlations for controls

Table 1: Correlations for Controls

<table>
<thead>
<tr>
<th>Language</th>
<th>Name-Description</th>
<th>Semantic Switching</th>
<th>Semantic Cluster Size</th>
<th>Total Words Produced</th>
<th>Total Correct Words Produced</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>0.566</td>
<td>0.034</td>
<td>0.214</td>
<td>0.410</td>
<td>0.628</td>
</tr>
<tr>
<td>Spanish</td>
<td>0.550</td>
<td>0.023</td>
<td>0.222</td>
<td>0.407</td>
<td>0.619</td>
</tr>
</tbody>
</table>

Error correlations for Patients

Table 2: Correlations for Patients

<table>
<thead>
<tr>
<th>Language</th>
<th>Name-Description</th>
<th>Semantic Switching</th>
<th>Semantic Cluster Size</th>
<th>Total Words Produced</th>
<th>Total Correct Words Produced</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>0.574</td>
<td>0.032</td>
<td>0.215</td>
<td>0.412</td>
<td>0.629</td>
</tr>
<tr>
<td>Spanish</td>
<td>0.559</td>
<td>0.021</td>
<td>0.221</td>
<td>0.408</td>
<td>0.618</td>
</tr>
</tbody>
</table>

Discussion

Differences in performance between languages

For normal controls, naming on the BNT, BNPT and both correct words and mean semantic cluster scores on the category generation task differed between the languages even after controlling for the language proficiency. Overall, the data revealed that the normal controls were more proficient in English than Spanish and this difference drove the results on the tasks.

In contrast, for aphasic participants, there was no significant effect across languages or within the language across the three tasks.

Differences in performance between participant groups

Normal controls were significantly better at naming on the BNT and BNPT than patients with aphasia.

The number of correct words, and mean semantic cluster was also significantly higher for controls than patients.

Error and Clustering Strategies

At first glance this difference between the groups may suggest that aphasic participants and normal controls perform radically differently on the lexical access tasks.

However, analysis of errors show that both groups produce similar errors in both languages, with the difference being the rate of each error type between the groups.

Individual Patient Performance

Participants BUBAD1 and UTB1A1 produced more correct responses in English than Spanish across the three tasks. However, participants BUBA07, BUBA10, UTB1A9, UTB22, and UTB221 produced more correct responses in Spanish than English in all three tasks.

Two patients, BUBA01 and UTB18 received scores that were remarkably similar in both languages, while participant UTB222 produced either no correct responses or performed with very low accuracy in both languages, for all tasks.

In the case of some responses and scores were independent of category, however it was clear that the categories Animals and Food were easier to access than Clothing for the patients.

References


Acknowledgments

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