The discrimination of intonational contours in agrammatism

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Background

The comprehension deficit in Broca's aphasia

Damage to Broca's area triggers agrammatic comprehension, besides the typical production impairment reported in the literature. According to the Trace-Deletion Hypothesis (Grodzinsky, 2000), traces that result from movement of constituents are deleted from the agrammatic representations. Consequently, the thematic roles assigned to syntactic positions filled by traces cannot be transmitted to the displaced constituents and, hence, the theta-role assignment is disrupted.

In order to compensate the deficit, agrammatic individuals assign a theta-role to the nonthematic position through a linear and nonlinguistic strategy, the Default Principle. The basic word order of the language determines which default theta-role is going to be assigned and, therefore, it only suffices when the basic word order is preserved. This is not the case of sentence (1), where the theme occupies the initial position to which the Default Principle assigns an agent-role.

The underlying assumption here is that Broca's aphasics do not present problems at other linguistic levels, like prosody. Catalan has some interesting syntactic constructions that present a noncanonical word order (both involving traces [2b] and base-generated structures [26]) to test the TDH, and that are mainly characterized by a specific intonational contour related to them. We address this issue by a discrimination task that tests the phonological abilities of agrammatic individuals.

Research question

Is perception of intonation intact in Broca’s aphasia, as it is standardly assumed in syntactic analysis of agrammatism?

Experimental design

Subjects

10 Broca’s aphasics (age range: 23-81)
10 education- and age-matched control subjects

Materials

32 pairs of sentences that combined four syntactic constructions:

<table>
<thead>
<tr>
<th>Sentence</th>
<th>Thematic roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. En Pere toca el piano.</td>
<td>Normal assignment</td>
</tr>
<tr>
<td>b. En Pere toca el piano.</td>
<td>Thematic role of the piano is assigned to the Agent</td>
</tr>
<tr>
<td>c. En PERE toca el piano.</td>
<td>Contrasting the role of the piano</td>
</tr>
<tr>
<td>d. En Pere, toca el piano.</td>
<td>Assigning the role of the piano to the Agent</td>
</tr>
</tbody>
</table>

The Catalan nuclear configurations of the intonational contours associated with them are the following:

<table>
<thead>
<tr>
<th>Contour</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral declarative</td>
<td>a. En Pere toca el piano.</td>
</tr>
<tr>
<td>Neutral focus</td>
<td>b. En Pere toca el piano.</td>
</tr>
<tr>
<td>Topic focus</td>
<td>c. En PERE toca el piano.</td>
</tr>
<tr>
<td>Rising focus</td>
<td>d. En Pere, toca el piano.</td>
</tr>
</tbody>
</table>

Task

Subjects were instructed to listen carefully to the pairs of sentences and decide whether they sound different or the same.

References


Conclusions

The assumption that agrammatic patients are able to discriminate intonational contours is confirmed by our results.

Therefore, any deficit in comprehension has to be placed on their syntactic performance, not their inability to trace back the intonational contour of a sentence.

Acknowledgments

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Antecedents

Burchert et al., 2005

Results: Broca’s aphasics performed above chance on the first condition, but at chance on the second one. The agrammatic patients showed the same performance pattern on sentences produced with a neutral intonation (Burchert et al., 2000 and Schneider, 2002).

Conclusion: the contrastive stress “does not have a general beneficial influence on thematic role assignment for agrammatic comprehenders”.

Raithel, 2005

Results: agrammatic patients performed above chance on both conditions.

Conclusion: German-speaking agrammatic individuals are able to discriminate these contours; hence, they preserve their phonological abilities.

Results and discussion

Consider the results by item type, the agrammatic participants perform above chance on all conditions. However, a Chi-Square test revealed differences between the groups on the declarative/topic condition (χ²=8.11; p<0.05) and on the focus/declarative condition (χ²=2.07; p<0.05), where agrammatic subjects showed a slightly worse performance.

Neutral declarative (a), contrastive focus (b) and topic (c) contours share very similar prosodic features, as shown below, but contrast sharply with the yes-no question contour (d). This may explain why the agrammatic patients show a lower performance on conditions d-t, t-f and f-d:

As for the overall results, a statistical difference was also found between both groups (χ²=8.32; p<0.05), yet the agrammatic subjects’ performance is very high (89.1%).

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References


