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Ambiguous Referential Processing in Broca's Aphasia: Evidence from Eyetracking

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Introduction

This study reports preliminary analyses of ambiguous subject pronoun resolution to investigate online referential processing in Broca patients using eyetracking. Greek distinguishes between null and overt subject pronouns. Previous work has shown that the preferred antecedent of an ambiguous null pronoun is the grammatical subject. Overt pronouns are in turn predicted to display a division-of-labor effect (Gundel et al., 1993), preferring referents distinct from those preferred by a null in order to achieve a [+topic-shift] effect in discourse. We conducted a visual world eyetracking experiment to test whether Broca's patients are able to integrate in real-time the discourse constraints claimed to regulate subject pronoun interpretation in ambiguous SVO and OclVS contexts.

Methods

Participants. Six Greek-speaking individuals with agrammatic Broca's aphasia (ages:32;5-69), and ten unimpaired age-matched participants were tested.

Procedures. Eye movements were recorded while participants looked at a computer screen with three referents (syntactic subject, object, extra-sentential entity) during the auditory presentation of main clauses followed by a subordinate. The main clause included an animate subject and object carrying the same number and gender features, while the subordinate clause was introduced with a connective followed by either a null or an overt subject pronoun carrying the same phi-features with the subject/object of the main clause. Referent preference rates and proportion of observation lengths on the depicted referents were recorded.

Results

Referent preference rates. In the SVO-null pronoun trials, both groups tended to prefer the referent corresponding to the syntactic subject relative to rest of the referents (p<.000), with controls yet providing higher rates than the Broca group in the extra-sentential referent condition (p<.005). On the other hand, in the SVO-overt pronoun trials, controls tended to prefer the syntactic object considerably more times than the Broca patients (p<.005) who appeared to oscillate between the subject and the object referent. Finally, controls were found to opt significantly more times for the object antecedent in both OclVS-null and overt pronoun trials (p<.000) with respect to the patients who opted for the syntactic subject (p<.000).

Proportions of observation lengths. Analysis of eye movements showed that both participant groups showed similar eye movements for the SVO trials irrespective of pronoun type (null vs. overt), with the aphasic group

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showing slower eye movement latencies compared to controls for the OclVS trials (p<.001). More specifically, while the highest proportion of fixations for the controls was detected at the null pronoun gap or the overt pronoun site in the OclVS trials, increased fixations for the patients were detected at a late successive temporal window, i.e. at the verb region after the critical pronoun site.

Conclusions

These results provide evidence against representational differences between Broca patients and language-unimpaired controls. Instead findings are discussed in terms of the structural complexity caused by the OclVS word order and verbal working memory measures administered to the patients.

References

Gundel, J. K., Hedberg, N., & Zacharski, R. (1993). Cognitive status and the form of referring expressions in discourse. *Language, 69*, 274-307.