Can agreement and case morphology serve as cues for comprehension in agrammatism? A study of German and Hebrew

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Introduction: Agrammatism in Broca's aphasia is a language disorder that is characterized by a selective syntactic deficit, often in comprehension as well as in speech production. According to the Trace Deletion Hypothesis (TDH, Grodzinsky, 1990, 1995, 2000), the deficit in comprehension in agrammatic aphasia is attributed to impaired representation of structures with non-canonical word order derived by syntactic movement.

The central research question of our study was whether this generalisation holds in languages that have richer morphology than English. The generalisability of the TDH to morphologically rich languages is not obvious, given that case or gender morphology can provide explicit cues to the detection of the Agent in a sentence and thus might help the agrammatic individual to decide notwithstanding syntactic problems who is doing what to whom in a sentence comprehension task. Our previous studies have shown that an impairment in movement-derived structures is evident in Hebrew when morphological cues are not available (Friedmann & Shapiro, 2003). In German agrammatic patients, comprehension patterns were similar for sentences with and without morphological cues (Burchert, De Bleser, & Sonntag, in press).

The current study investigated the comprehension of German-speaking and Hebrew-speaking agrammatic aphasics for movement-derived non-canonical sentences with and without morphological cues. Compared to English, in which most studies on agrammatic comprehension have been done, German and Hebrew have the clear advantage of allowing the study of the interaction of syntactic movement (e.g. topicalisation) and morphological devices (e.g. case and gender inflection) in the interpretation of sentences.

Method: The German and the Hebrew study both used a binary sentence-picture matching task, in which the patient heard a sentence and had to choose between two pictures – one matching the sentence, the other depicting the reversed roles (see Figure 1).

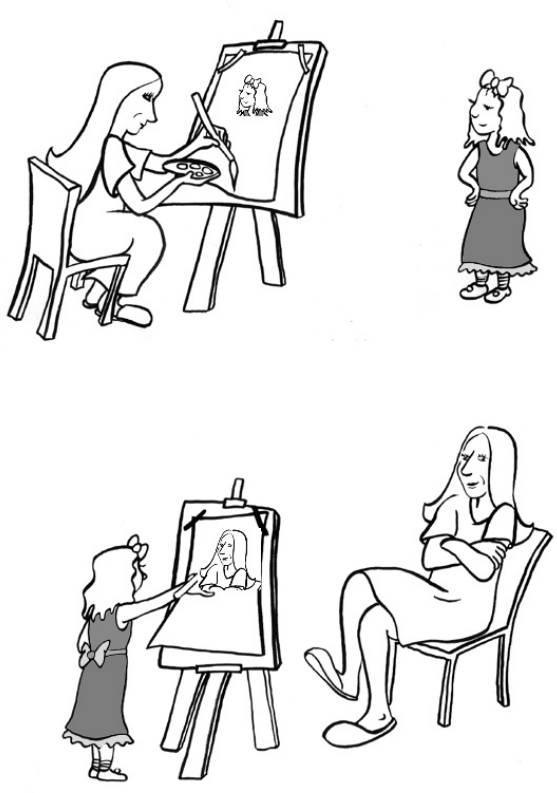

Figure 1: An example for a picture pair used in the sentence-picture matching task

Participants and materials: In each of the German and the Hebrew study, eight agrammatic patients participated and eight healthy participants without language deficits.

The German test set contained 22 unambiguously case marked object relatives. In German, case is expressed on the definite article of masculine nouns. Filler items were SVO- and OVS-actives as well as subject relatives with 22 items each, giving a total of 88 test items. In addition, 22 case ambiguous relative clauses were used as a baseline to see whether case morphology makes a difference. They were of the type NNV, in which the Ns were feminine or neuter and thus the definite article was ambiguous with respect to case. They thus allow either a canonical (SOV) or a non-canonical (OSV) reading.

The Hebrew study tested topicalisation structures (OVS, OSV) compared to simple SVO, and object relatives compared to subject relatives. There were 40 target sentences per condition, with a total of 200 sentences per participant. The gender of the agent and the patient was manipulated in order to compare sentences with and without gender cue. In the sentences with gender cue the subject and object differed in gender, and the verb that agrees in gender with the subject but not with the object could be used as a cue for the agent. In the non-gender marked sentences, both agent and patient were of the same gender, and thus verb inflection could not provide a cue for comprehension.

Results: In German, the group results for case ambiguous sentences showed a clear preference for a canonical SOV- over a non-canonical OSV-reading. Individually, four agrammatics are at chance, the other half is below chance. The results for object relatives in the case marked condition revealed chance performance for the group and the participants. The comparison between case ambiguous and unambiguous object relatives revealed a significant difference, $t(7) = 2.97$, $p = .02$ for the group. At an individual level, this difference is not observable in four of the eight agrammatics (using Fisher's exact) and three of these four are at chance in both conditions.

The results of the Hebrew study showed impaired performance on OVS, OSV and object relatives, and showed no effect of gender cue. The comparison between the gender marked and the non-gender marked sentences in each of the impaired sentence types yielded no significant difference ($t(5) = 1.26$, $p = .26$ for the OVS sentences, $t(7) = 2.42$, $p = .06$ for the OSV, $t(7) = 0.32$,$p = .76$ for the object relatives). Seven out of the eight participants showed no significant improvement with agreement cues on object relatives (using Fisher's exact test).

Conclusion: The results of both German and Hebrew studies indicate that morphology does not generally assist interpretation given a deficit in the comprehension of syntactic movement. As a rule, case marking in German did not improve comprehension of non-canonical object relatives, in Hebrew gender agreement did not improve comprehension of movement derived topicalisation and object relative sentences.

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