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## Discourse-linking in agrammatic and fluent aphasia

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### Introduction

Agrammatic speakers have problems with grammatical encoding and decoding. However, not all syntactic processes are equally problematic: present-time-reference/*who*-questions/reflexives can be processed by narrow syntax alone and are relatively spared compared to past-time-reference/personal pronouns/*which*-questions that need additional access to discourse and information structures to link to their referent outside the clause (Avrutin, 2006). Linguistic processing that requires discourse linking is difficult for agrammatic individuals: reference to the past is more difficult than to the present (Bastiaanse et al., 2011). The same holds for *which*-questions compared to *who*-questions and for pronouns compared to reflexives (Avrutin, 2006). These results were found in different populations in different languages. The current study for the first time tested all conditions within the same population. The research questions were:

1. Are agrammatic and fluent aphasic speakers impaired in discourse-linked processes?
2. Are discourse-linked processes similarly impaired in the domains of time reference, *Wh*-questions and pronouns/reflexives?

### Methods

Three sentence-picture-matching tasks were administered to 10 agrammatic and 10 fluent aphasic Russian speakers: (1) Test for Assessing Reference of Time (TART) for Present-Imperfect (reference to present)/Past-Perfect (reference to past), (2) Wh-Extraction Assessment Tool (WHEAT) for *which*/*who*-subject-questions, (3) Reflexive-Pronoun Test (RePro) for reflexive/pronominal reference.

### Results and Discussion

The results are given in Figure 1. A mixed model regression showed similar overall accuracy of agrammatic and fluent aphasic participants ( $z=-0.21, p>.05$ ).

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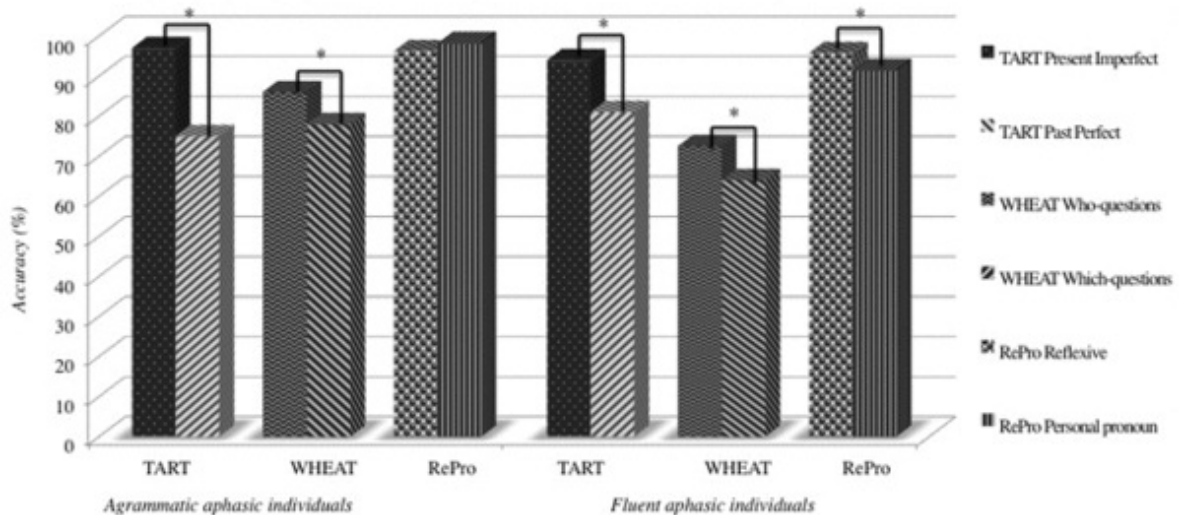


Figure 1: Accuracy of the agrammaticic (left) and fluent (right) aphasic participants on the three tests.

The discourse-linking effect was larger on the TART than on the WHEAT ( $z=3.27, p<.001$ ), which was larger than on the RePro ( $z=2.62, p<.01$ ). The overall discourse-linking effect was smaller in agrammaticic than in fluent aphasic speakers ( $z=-2.83, p<.01$ ). Past was impaired compared to present (agrammaticic:  $z=-5.62, p<.001$ ; fluent aphasia:  $z=-2.80, p<.01$ ). *Which*-subject questions were more difficult than *who*-subject questions (agrammaticic speakers:  $z=-2.30, p<.05$ ; fluent aphasic speakers  $z=-2.08, p<.05$ ). Only fluent aphasic speakers were more impaired on pronouns than reflexives ( $z=-2.74, p<.01$ ; agrammaticic:  $z=1.81, p>.05$ ).

The results show that processing discourse-linking is not only affected in agrammaticic but also in fluent aphasia. The effect was even larger in this fluent aphasic population and only in this group it is visible in all three conditions. This similar performance in agrammaticic and fluent aphasia is in line with Bastiaanse & Edwards (2004) and is interpreted by presuming that complex linguistic operations are more difficult when language is impaired due to brain damage. We do not propose that the underlying deficit in both populations is similar, but we think that different underlying deficits affect similar grammatical operations. We assume that in agrammaticic aphasia grammatical decoding is impaired, whereas in fluent aphasia lexical access is compromised. For optimal sentence comprehension, both processes should be impeccable, otherwise complex syntactic operations, for example the ones that require discourse processing, are not comprehended correctly.

## References

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