Economy hierarchy and pronoun interpretation in patients with Broca's aphasia
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Reuland (2001) proposes the following hierarchy of levels at which reference can be established:
Syntax<Semantics<Discourse. The syntactic-dependencies are the most economical and block the less economical ones, semantic and discourse-dependencies. Our previous findings show that this hierarchy is disturbed in agrammatism: syntax is "weakened" and no longer blocks the establishment of dependencies at other levels. For non-brain-damaged speakers, it has been demonstrated that semantic-dependencies are less costly than discourse-dependencies (e.g. Frazier and Clifton, 2000, Shapiro et al., 2003).

We investigated how is the economy-hierarchy in agrammatism is different with regard to the semantic and discourse level from that in the unimpaired population?

We investigated patients' comprehension of pronouns in VP-ellipsis:
(1) Bill touched his dog and John did too [e].
This sentence has two possible interpretations representing the focus of our study:
-SEMANTIC interpretation (bound-variable)- pronoun is treated as a variable assigned reference locally (in the first conjoint local NP Bill and in the second NP John)
-DISCOURSE-interpretation (coreference) -pronoun is assigned a discourse referent in the first conjunct (NP Bill) then the whole VP is copied in the second conjunct.

Subjects: 6 agrammatic patients; 11 non-brain-damaged adults.
Materials: Picture-selection task; 3 conditions; 20 items per condition; 60 fillers

In the first half of the experiment patients were presented with the following conditions in Dutch:
TARGET sentence: The boy touches his dog and the man does that too

BOUND-VARIABLE-ONLY (BVonly) condition
Picture1: boy touching boy's dog and the man touching man's dog (bound-variable);
Picture2: boy touching boy's dog and man touching grandfather's dog;
Picture3: filler. (If the bound-variable interpretation is available Picture1 should be chosen; otherwise they could chose action related filler - Picture2 or an unrelated distracter Picture3)

COREFERENCE-ONLY (COonly) condition
Picture1: boy touching boy's dog and the man touching boy's dog (coreference);
Picture2: boy touching boy's dog and man touching grandfather's dog;
Picture3: filler. (If the coreference interpretation is available Picture1 should be chosen; otherwise they could chose action related filler - Picture2 or an unrelated distracter Picture3)

In the second half of the experiment they could choose between the two possible interpretations:
BOUND-VARIABLE vs. COREFERENCE (BVCO) condition
Picture1: bound-variable-interpretation;
Picture2: coreference-interpretation;
Picture3: filler.

The agrammatic patients score significantly above chance in BVonly and are at chance in COonly conditions. Their overall performance is worse than the controls. Unlike the controls, agrammatic patient prefer bound-variable-interpretation above coreference.

Discussion
* The hierarchical order between semantic and discourse-dependencies is the same in agrammatism as in non-brain-damaged adults.
* Unlike controls, agrammatics show a preference for the bound variable interpretation. The processing considerations (e.g. cheaper dependencies are preferred over the more expensive ones) play a more important role for them than for controls, for which even the dependencies at a higher level of the hierarchy are equally accessible.
* In combination with previous results, we claim that the brain damage in agrammatic aphasia results in a decrease of processing resources and consequently in a selective weakening of the syntactic machinery and affecting all other levels that rely on syntax.

References