



Syntactic and narrative structure in focal aphasia and fronto-temporal dementia

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Background:

Questions about the relationship between language and thought structure lie at the core of understanding human thinking and evolution ¹⁻³. Data from aphasia suggest that non-verbal reasoning systems may be spared even in individuals with severe language impairment ⁴⁻⁷. At the same time, changes in linguistic capacity can be a sign of general cognitive disorder ⁸⁻¹². The relationship between verbal and non-verbal aspects of cognition appears to differ depending on population and specific variables investigated, with clinical and theoretical implications. In the current study we examine language samples from people with focal aphasia, fronto-temporal dementia and healthy controls. We compare narrative ("macrolinguistic") structure ¹³ as an indicator of propositional thought to lexical and syntactic ("microlinguistic") properties of the language. Our research questions are:

- To what degree do populations differ, and how do micro- and macrolinguistic measures correlate across different populations?
- For each population, do altered micro- or macrolinguistic profiles best characterize the condition?
- To what degree do models of cognitive pathology support dualistic hypotheses?

Methods:

We report results from two data sets: (a) "Dinner Party" comic strip descriptions from 20 people with aphasia and 30 healthy controls, and (b) "Cookie Theft" picture descriptions from 83 people with fronto-temporal dementia (behavioral variant = 18, logopenic aphasia = 20, progressive non-fluent aphasia = 19, semantic dementia = 26) as well as 30 healthy controls. People with focal aphasia were profiled on a range of standardized language and reasoning tests.

Microlinguistic variables include word and error counts, degree of connected language, depth of clausal embedding, content/function word ratio and reliance on formulaic language as estimated by the automated Frequency in Language Analysis Tool ⁸.

Macrolinguistic variables include proposition counts and a new measure which adapts the concept of associate chunk strength ¹⁴ to quantify if the narrative/propositional structure of an individual sample deviates from structures observed in a control sample.

Results:

Sample (a): Compared to controls, people with focal aphasia produced fewer embeddings and more function words, made more errors, had less connected language and were more formulaic. At the macrolinguistic level, groups did not differ with regards to the number of propositions produced. However, there were differences in narrative structure.

Correlational analyses showed that speakers with aphasia whose structures were more similar to controls' had more connected speech, made fewer errors and were better at picture naming. Differences, characterized as effect sizes, were considerably larger for microlinguistic measures, suggesting that syntactic and lexical impairment was much more characteristic for the sample than deviations in narrative structure.

Data from sample (b) are under analysis at the time of abstract submission. We will present the complete analysis and discuss implications for dualistic hypotheses.

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