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Relations between executive function, language and functional communication in severe aphasia

Olsson, C., Arvidsson, P., & Blom Johansson, M. (2019). Relations between executive function, language, and functional communication in severe aphasia. *Aphasiology*, 33(7), 821-845.

Background

Intervention in severe aphasia often means aiming for access to meaningful social interaction in spite of linguistic barriers that might not be treatable. This demands knowledge about the factors that influence functional communication. Apart from linguistic ability, executive functions are thought to play an important role.

Aim

To expand understanding of the relations of executive functions and linguistic ability to functional communication in severe aphasia.

Results

- 85% of participants showed executive dysfunction, according to CLQT.
- Moderate to strong correlations between all measures of executive function and linguistic ability.
- Strong partial correlations between executive function and functional communication in the nonverbal subgroup (table 1).
- Relations between executive function and functional communication are presented in figure 1 and 2.

Table 1. Spearman's partial rank correlations of executive function (CLQT), language comprehension (LC) and verbal output (VI) with functional communication (ST). Total sample and subgroups. *P*-values in parentheses. Significant correlations ($p \leq .01$) are indicated in bold text.

Partial correlation with functional communication	Total sample (n=46)	Verbal subgroup (n=23)	Nonverbal subgroup (n=23)
Executive function ^a	.26 (.089)	.01 (.958)	.59 (.005)
Language comprehension ^b	.32 (.034)	.40 (.074)	.32 (.163)
Verbality index ^c	.46 (.002)	.37 (.103)	.34 (.129)

^a Controlling for language comprehension and verbality index

^b Controlling for executive function and verbality index

^c Controlling for executive function and language comprehension

Conclusions and implications

Executive function seem to be an important factor for functional communication for people with extreme limitation or total absence of verbal output due to aphasia.

Hence:

- People with severe aphasia should have a proper assessment of their cognitive abilities, including executive functions.
- It is important that we understand the executive (and other cognitive) demands of real life communication tasks and how to minimise them.
- Executive function needs to be addressed in interventions for people with severe aphasia.

How could this be done? Some suggestions:

- Work with neuropsychologists about cognitive assessment for people with severe aphasia.
- Thorough analysis of executive demands of communicative situations.
- Assess and address other possible obstacles to functional communication (semantic knowledge, apraxia, motivation, lack of confidence etc)
- Metacommunicative training – e. g. modality shifting, structured training of multimodal strategies
- Indirect intervention – communication partner as initiator of strategies

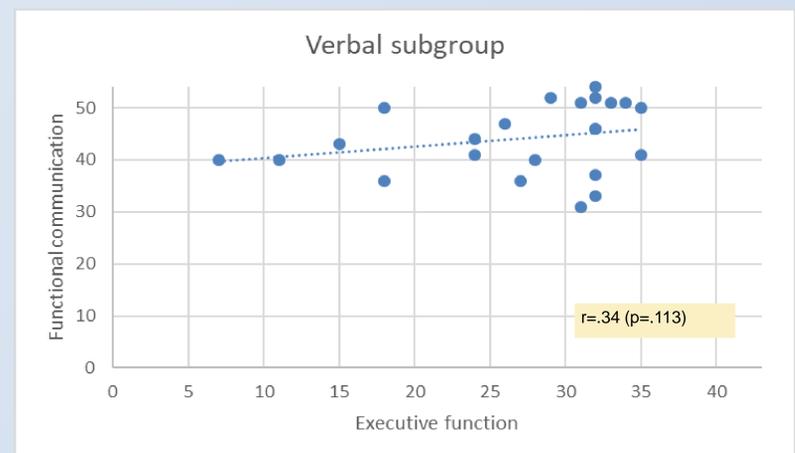


Figure 2. Executive function (CLQT score) and functional communication (ST) of verbal subgroup, with Spearman's rank correlation coefficient.

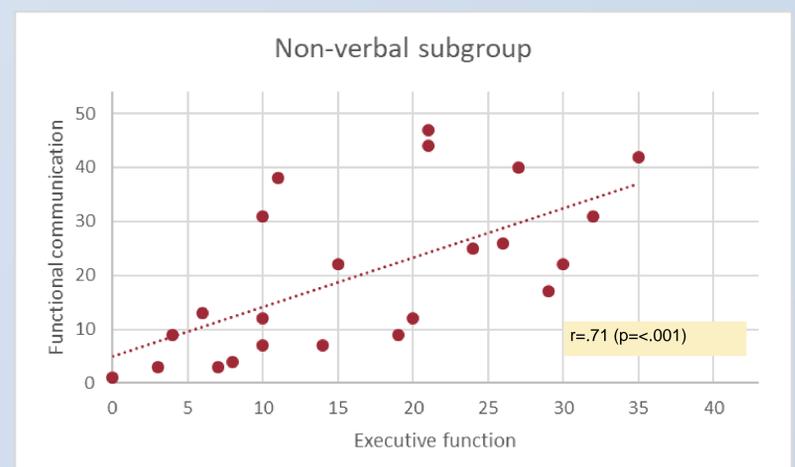


Figure 3. Executive function (CLQT) and functional communication (ST) of non-verbal subgroup, with Spearman's rank correlation coefficient.

Method

Participants

46 participants with chronic, severe aphasia after stroke. 23 were classified as non-verbal, the other 23 had limited verbal output.

Material

Executive function: Four subtests from Cognitive Linguistic Quick Test (CLQT): Symbol cancellation, Symbol trails, Mazes, Design generation.

Linguistic ability: Comprehensive Aphasia Test (CAT)

Functional communication: Scenario Test (ST)

Data analysis

Conducted on total sample and on the verbal and non-verbal subgroups.

Bivariate and partial, nonparametric correlations.

Significance level $p = .01$.