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Linguistic parameters in an app-based assessment of German verbs and nouns in aphasia

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Introduction

In previous research, various linguistic parameters were found to influence action and object naming. Bastiaanse et al. (2016) reported that, when looked at parameters in combination, only **age of acquisition** and **imageability** were significant predictors of performance in action naming of Dutch-speaking people with aphasia. For object naming, also **frequency** played an important role. In the current study, we investigate the role of these and several other linguistic parameters in German aphasia with an app-based diagnostic tool.

Participants

Table 1. Demographic data of the participants with aphasia (PWA) & the non-brain-damaged participants (NBD).

	Age: average (range)	Gender: % female	Type of aphasia
PWA (n=11)	61;1 (40;5-73;1)	27%	27% fluent, 73% non-fluent
NBD (n=11)	61;2 (46;2-80;5)	27%	-

Procedure

- Tests administered on the iPad in fixed order
- Comprehension scored automatically, production audio-recorded
- Analysis:
  - Difference PWA-NBD (Mann-Whitney-U tests, 1-tailed)
  - For PWA:
    - Task comparisons: AN-ON, Fin-Inf (Paired t-tests, 2-tailed)
    - Role of linguistic parameters in AN and ON (separate *mixed model logistic regressions* for AN & ON)
    - Automatic within-app analysis of separate parameters for individual PWA (Chi-Square and Mann-Whitney-U tests)

Material

6 Tests:

- Action Naming (AN, n=50)
- Object Naming (ON, n=50)
- Finite insertion (Fin, n=20)
- Infinitive addition (Inf, n=20)
- *Verb comprehension (Comp, n=40)*
- *Semantic association (actions) (Assoc, n=20)*

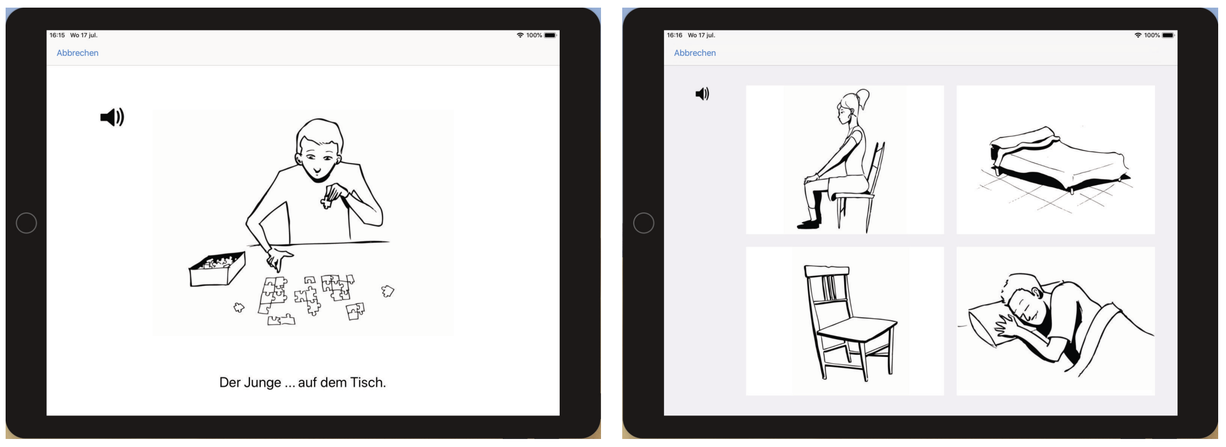

Figure 1. (a) Finite insertion task; (b) Verb comprehension task.

Controlled variables:

Lemma frequency, age of acquisition (AoA), imageability, length in phonemes, visual complexity, instrumentality*, transitivity*, animacy†, compound†

(: only for verbs; †: only for nouns)*

Results

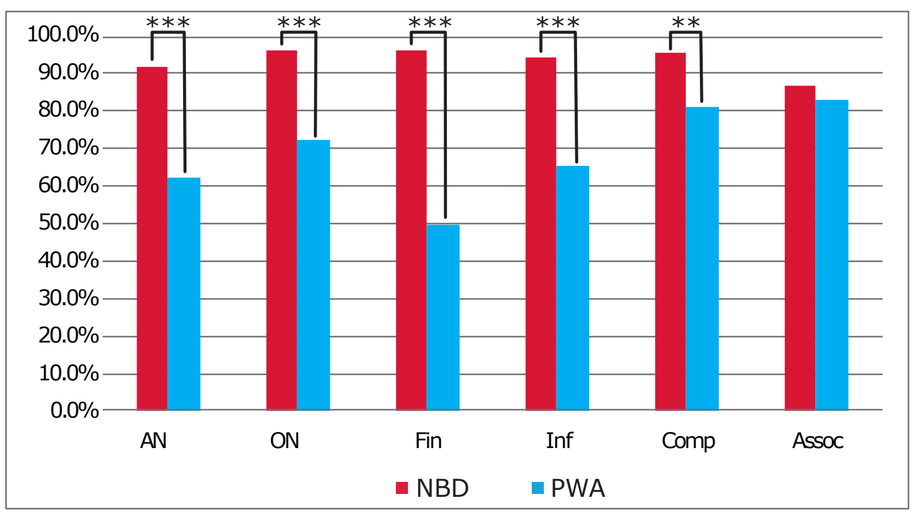

*Figure 2. Difference NBD-PWA per subtest; **: p<.01; ***: p<.001*

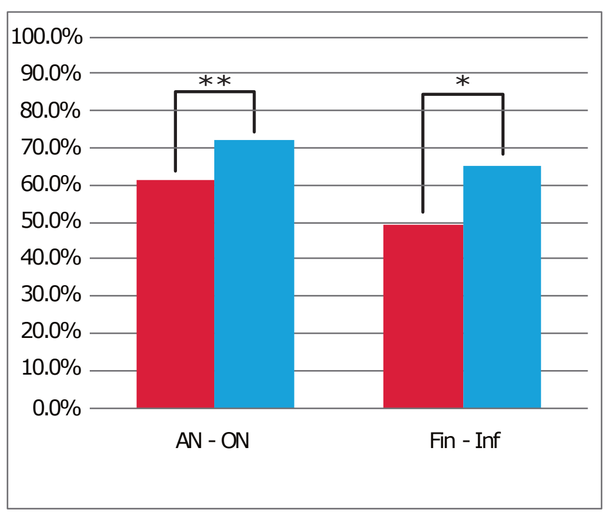

*Figure 3. Task comparisons for PWA; *: .05, **: p<.01*

	Action naming	Object naming
Frequency	n.s.	n.s.
AoA	***	marg.
Imageability	***	n.s.
Length	**	***
Vis. complexity	n.s.	*
Instrumantality	*	-
Transitivity	*	-
Animacy	-	n.s.
Compound	-	n.s.

*Table 2. Influence of parameters; *: p<.05, **: p<.01, ***: p<.001*

Discussion & Conclusion

- PWA perform significantly worse than NBD & they are worse in AN than in ON and with finite verbs than infinitive verbs.
- On group level, relevant parameters for AN are similar to those found by Bastiaanse et al. (2016): **AoA** and **imageability** (lower AoA & higher imageability are easier) and additionally **length**, **instrumentality** and **transitivity** (shorter, instrumental & transitive words are easier)**.** For ON, only **length** and **vis. complexity** significantly influence naming (shorter & less complex items are easier).
- On an individual level, each separate parameter influences the performance of at least one participant in either AN or ON → **all included parameters contribute** to the diagnostic tool.

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References: Bastiaanse, R., Wieling, M. & Wolthuis, N. (2016). The role of frequency in the retrieval of nouns and verbs in aphasia. *Aphasiology, 30* (11), 1221-1239.