Using multi-word utterances more flexibly in non-fluent aphasia: Findings from a case series investigation

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INTRODUCTION

Usage-based theories of grammar [1]

- Words ("*I*", "*like*", "*it*") **and** phrases ("*I like it*") are form-meaning pairings
- Importance of frequency of use (i.e. experience): more frequent word combinations are more likely to be accessed holistically

High-frequency word combinations

- High functional value
- Retained in non-fluent aphasia [2;3]
- From fixed to flexible:
  e.g. *I like it / I like coffee / [PERSON] like [THING]*

Aim of this study

To **develop** and **pilot** an intervention for people with non-fluent aphasia aimed at increasing the productivity of constructions

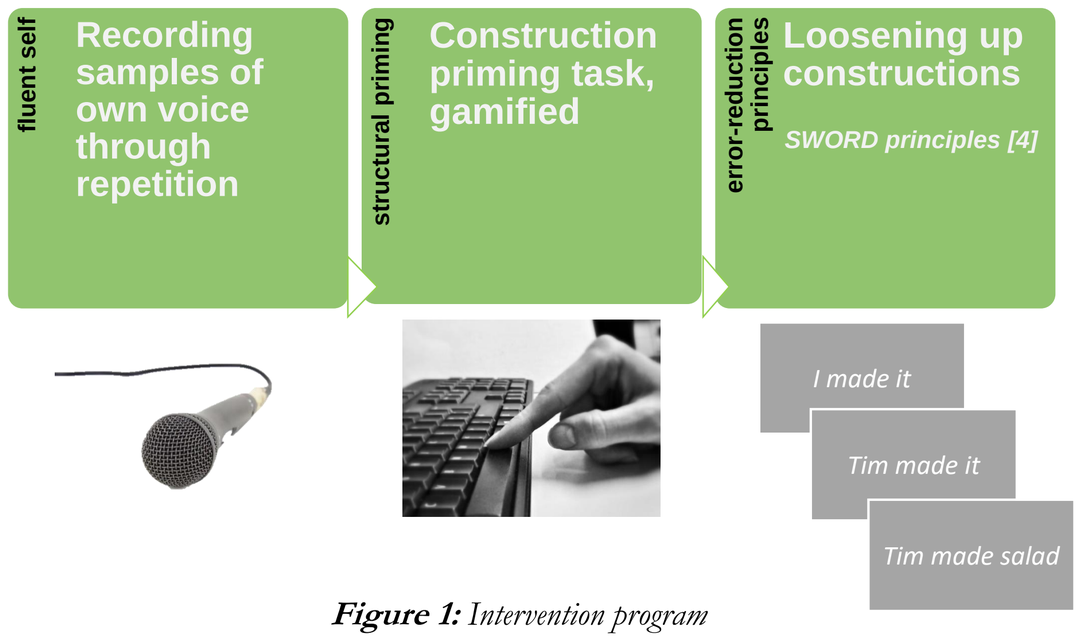


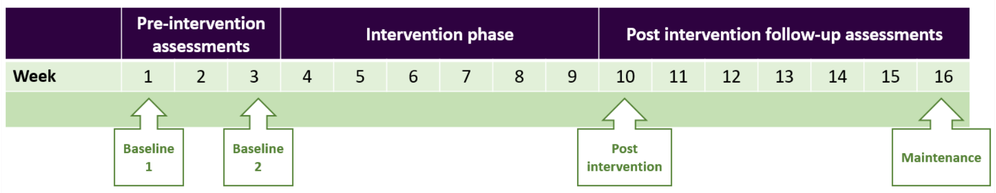
Figure 1: *Intervention program*

METHODS

Participants

Five participants with chronic non-fluent aphasia (NFA)
(MPO = 24 – 165; age range: 48-68 years; M = 59.80; SD = 7.36)

Design



Intervention

- 6-week computerized intervention, three phases (Fig. 1)
- 12 constructional frames, e.g.:

Giving an opinion
[REFERENT] like [THING]
I like it → you like it → you like tea

Function
Structure

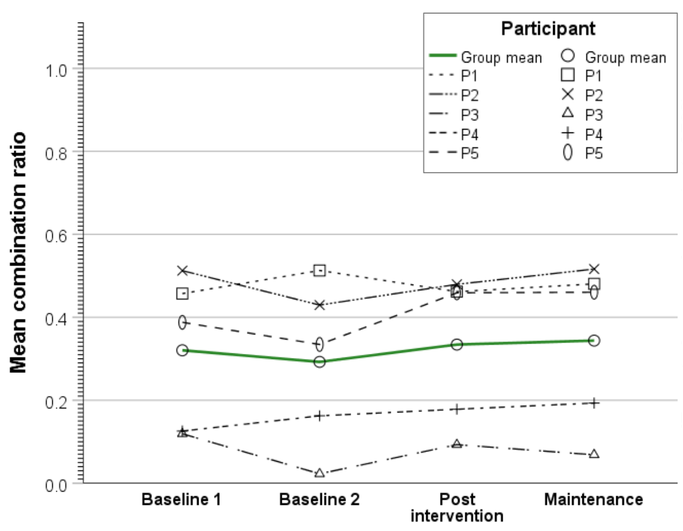
Outcome measures

Primary outcome measures	**Connected speech measures** Automated frequency-based analysis using the Frequency in Language Analysis Tool (FLAT [5]) **combination ratio** $= \frac{number\ of\ 3\text{–}word\ combinations}{number\ of\ single\ words}$ **Data:** • Narratives • Spontaneous Speech Samples (e.g., Last Holiday)
Secondary outcome measures	**Story Completion Test** Probing all 12 constructions, e.g.: *I baked a cake. My friend asks: "Did you buy this cake?", so I say …?* [Target: "I made it"]
	Spoken sentence comprehension (TROG-2 [6]**)**
	Aphasia Impact Questionnaire-21 (https://www.aiq-21.net/)

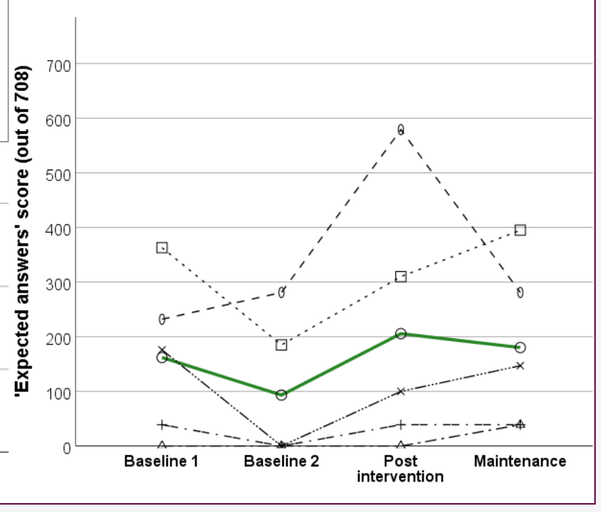
RESULTS

Is there evidence that after intervention participants with NFA demonstrate…

…enhanced connected speech?



…increased use of trained constructions?



SUMMARY & DISCUSSION

Using FLAT variables to evaluate sentence-level interventions

- Intervention enhanced ability to combine words into well-formed utterances for some participants
- Group means showed promising & sustained increase of combination ratio across participants

Story Completion Test

- Evaluating trained constructions is challenging
- Number of grammatically well-formed utterances (instead of expected answers score) might be more sensitive to communicative change following intervention?

A NEW TRIAL

UTILISE (Unification Therapy Integrating LexIcon and Sentences)

3-year project: Mar 2019 - Feb 2022
Funded by the Stroke Association

AIMS

- To test a new usage-based aphasia therapy for facilitating understanding & producing everyday sentences;
- To explore the effect of behavioural therapy in combination with brain stimulation (tDCS).

WHAT THE STUDY INVOLVES

- Computer therapy for aphasia + tDCS
  (N = 66 participants)
- Immediate and deferred trial entry group, with allocation to active- vs sham-tDCS

Trial registered with ISRCTN (study ID ISRCTN14466044)

More information can be found at:
www.cognitionandgrammar.net/utilise

References
[1] Bybee (2010). *Language, Usage and Cognition.* 1st ed. Cambridge: Cambridge University Press.
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[3] Bruns et al. (2019). "I don't know": a usage-based approach to familiar collocations in non-fluent aphasia. *Aphasiology, 33(2),* 140–162.
[4] Whiteside et al. (2012). Error reduction therapy in reducing struggle and grope behaviours in apraxia of speech. *Neuropsychological Rehabilitation, 22(2)*, 267–294.
[5] Zimmerer, Coleman, & Wibrow (2017). *Frequency in Language Analysis Tool.*
[6] Bishop (2003). *Test for Reception of Grammar, Version 2 (TROG-2).* London: Pearson.