The working memory basis of normal and pathological speech dysfluencies

L. Van der Linden, A. Szmalec, C. Moerenhout, G. Reunes & R. Hartsuiker

1 Psychological Sciences Research Institute, Université Catholique de Louvain, Belgium
2 Department of Speech, Language and Hearing Sciences, Vesalius University College Ghent, Belgium
3 vzw BEST, Ghent, Belgium
4 Department of Experimental Psychology, Ghent University, Belgium

Theoretical background

- We aim to investigate the involvement of working memory (executive control) resources in the production of speech dysfluencies.
- Some dual-task studies report an increase in stuttering behaviors under conditions of divided attention (e.g., Bosshardt, 2002), while other studies rather claim that stuttering is reduced under dual-task demands (e.g., Vasic & Wijnen, 2005).
- Assumption that stuttering is a consequence of hypervigilant speech-monitoring system, at the level of brain areas responsible for executive control (e.g., right Inferior Frontal Gyrus, rIFG; Loucks, Kraft, Choo, Sharma, & Ambrose, 2012).

Predictions

- If stuttering is a consequence of hypervigilance in speech-monitoring, we predict:
  1. Decrease of speech dysfluencies under conditions of divided attention in diagnosed stutterers (≠ matched controls), using a picture-network description task (EXPERIMENT 1).
  2. Better performance for diagnosed stutterers in an executive control task, a color-matching task involving inhibition and updating, that has been shown to rely on the inferior frontal cortex (IFC; Verbruggen, Aron, Stevens, & Chambers, 2010) (EXPERIMENT 2).

Participants

Twenty (n=20) adult diagnosed stuttersers (M = 26.10 years, SD = 8.50) and controls (M = 26.95, SD = 8.48) matched on age, gender and education level.

Design

2 (group: control vs. stutterer) x 2 (condition: single task vs. dual task)

Dual task = divided attention using executive control secondary task (i.e., sound discrimination task).

Dependent variables: total # dysfluencies in general, self-corrections, repetitions, extensions and stuttering during network description.

Conclusion

Divided attention increases dysfluencies in normal speakers but decreases stuttering in diagnosed stuttersers, in line with hypervigilant speech monitoring account.

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