Semantic Neighborhood Effects in Stuttering

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Introduction

- People who stutter (PWS) are slower and make more errors during a phoneme monitoring task, suggesting pre-articulatory speech planning and/or monitoring deficits at the level of phonological encoding.
- This suggests theoretical accounts of stuttering as related to (perceived) errors in the phonological speech plan, such as the Covert Repair Hypothesis (CRH; Postma & Folk, 1990; see also Vasey & Wijten, 2005, but see Brockbush et al., 2011, for positions critical of the CRH).
- PWS substitute related words to avoid disfluencies.
- PWS show semantic interference spreading, as measured with ERP during picture naming, suggesting they may unintentionally activate related words (Mayfield et al., 2012).
- Purpose of the study: To propose and test the Neighbor Interference Hypothesis (NIH) as an account for the phoneme monitoring study findings, alternative to the CRH:
  - During a lifetime of word-substitution, repeated activation of related words leads to increased number of neighbors or a strengthening of connections between neighbors.
  - During phoneme monitoring, these neighbors may be interfering to increased RT and errors.

Methods

Participants:
- 24 PWS and 24 typically fluent adults (TFA), matched for age (M=34), gender (8 female), and education level (M=17 years).
- All: PPVT, EVT, Connors CPT, baseline visual-motor tasks

Tasks & Data Analysis:
- Two lexical decision tasks (Figure 3 and Figure 6)
  - Data analyzed with linear mixed effects regression modeling in R
- Primary outcome measures: reaction time (RT) and accuracy
- Within PWS analysis to examine effects of stuttering severity

Conclusions and Future Directions:
- Results tentatively support Neighbor Interference Hypothesis: PWS exhibited responses consistent with inefficient inhibition of semantic neighbors.
- If more words are automatically activated, then related words are not inhibited, this would lead to increased search time and errors on previous studies involving phoneme monitoring task (i.e., silent picture naming; e.g., Sassekaran et al., 2006; Garnett & Den Ouden, 2013).
- Decreased lateral inhibition: related words already activated at a high level, need more time to inhibit
- Decreased center surround inhibition: failure to suppress words that are related to a weakly-activated prime, increasing competition
- We submit that phoneme monitoring effects may not reflect the cause of stuttering (as suggested by the CRH), but rather that internal phonological planning errors may be the result of lifespan adaptation to stuttering (but see Sassekaran et al., 2013 for phoneme monitoring in children who stutter)
- No differences in attention (CPT), however STM phonological working memory not assessed
- Not a basic motoric slowness (visual baseline) but PWS were slower on choice baseline (visual baseline)
- Stuttering severity did not affect RT, but those who scored higher on BCL were more accurate

References