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Effects of Truncation on Language Sample Analysis in Aphasia

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Effects of truncation on language sample analysis in aphasia

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Introduction

The goal of this study is to determine if the length of a language sample elicited from a person with aphasia (PWA) is of consequence when making inferences about the patient's functional language ability. When conducting a language sample analysis, a sample representing a snapshot in time is used to make inferences about an individual's language capacity in general. However, current findings are inconclusive regarding the ideal length of the language sample necessary to draw valid conclusions about patients (e.g., Heilman, Nockerts, & Miller, 2010).

To answer this fundamental methodological question, lexical diversity (LD; i.e., a speaker's breadth of vocabulary) was used as proof of concept because of its clinical and research relevance in aphasiology. This study seeks to answer the following question: does the length of a language sample influence our ability to draw valid conclusions about a speaker's range of vocabulary based on the LD we observe in their samples?

Method

Language samples from 120 PWA have been included. Language samples were elicited with free speech, eventcasts, and storytelling tasks. Samples have been digitally recorded and orthographically transcribed. LD was estimated using the measure of textual lexical diversity (MTLD, McCarthy, 2005) for each type of discourse.

Data will be modeled using structural equation modeling. First, the LD of each individual (LD_i) will be modeled based on the full samples (Figure 1). Then, the language samples will be truncated to a 'standard' length of 300 tokens (Prins & Bastiaanse, 2004) and the same model will be estimated (Model B). If truncation does not threaten validity, model parameters should be similar before and after truncation. If truncation leads to less informative, noisier, and less reliable scores, the parameters in Model B should be smaller.

Preliminary Analysis & Discussion

Preliminary analyses have been performed on 80 out of 120 language samples. A unidimensional factor analytic model demonstrated excellent fit to the data ($\chi^2 = 2.54$, $p = .23$) providing good support for the estimation of Model A once all LD have been included. The analysis of the remaining language samples, statistical modeling, and interpretation will be completed next.

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This study will address whether discourse-based scores from truncated language samples lead to conclusions that are meaningless, inappropriate, or of limited usefulness for clinicians and researchers. The findings will be discussed within a modern psychometric theory framework (Mislevy & Yin, 2009) with an emphasis on their research and clinical implications.

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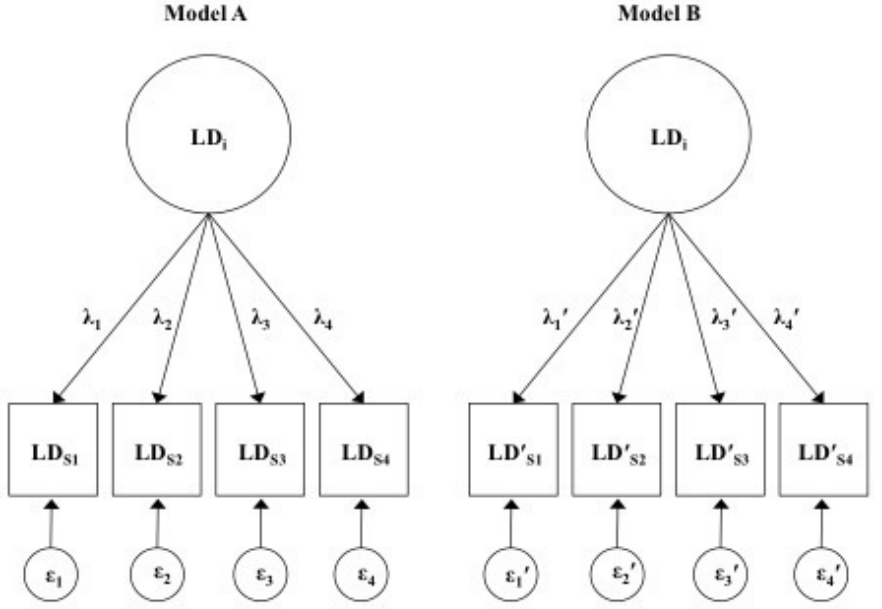

Figure 1. A single latent variable underlies the observed variables before and after truncation. LD_{S1}-LD_{S4} correspond to LD scores based on procedures, eventcasts, storytelling, and recounts, respectively. Prime parameter values are based on truncated language samples. For each model, the variables are conditionally independent after accounting for the common factor. A comparison of the of loadings of the two models (λ_1-λ_4 and λ_1'-λ_4') will be used to assess the impact of truncation on the inferences on draws about the LD of an individual based on LD of his or her sample.