



Exploration of Language, Reading, and Speech Fluency In Normal Adults

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Introduction

• The term *fluency* has been used across disciplines including in the fields of literacy, psychology, and English language acquisition with larger variations in the operational definition of the term. Consistent across definitions of fluency are the terms *ease of production* and *rate commensurate with task* (Bloodstein & Ratner, 2008; National Reading Panel, 2000; Segalowitz, 2010; Starkweather, 1987; Wiederhold & Bryant, 2001; Woodcock, McGrew, & Mather, 2001).

• Recent studies have identified individual differences in cognitive ability (e.g., inhibition) and fluency of speech/language production (Engelhardt et al. 2013). However, most studies that test for the interactions between different domains (cognition, language, speech) for the purposes of fluent speech production use tasks that are not ecologically valid.

• Despite detailed studies on the linguistic analysis of disfluency or speech errors in normal speakers (Postma, 2000), there are no studies that directly compare language fluency and speech fluency scores in normal speaking individuals using a spontaneous speech production task.

• Given the interaction between reading, language, and speech production, the likelihood of a supra-ordinal control mechanism that coordinates fluent speech and language production is possible.

• The **purpose** of this exploratory study is to examine shared relationships among fluency measures across language, speech, and reading constructs to better understand if a supra-ordinal mechanism for fluency exists. The **research question** was:

Are there relationships among measures of speech, language, and reading fluency across phonological word, sentence, and text level measures?

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Sample

N = 20	M (SD)
Age in Years	18.4 (.60)
Female : Male	10 : 10
Clinical Evaluation of Language Fundamentals <small>Fourth Edition (Semel, Wiig, & Secord, 2003)</small>	
Recalling Sentences	10.20 (2.73)
Understanding Spoken Paragraphs	9.70 (2.92)
Peabody Picture Vocabulary Test <small>Fourth Edition (Dunn & Dunn, 2007)</small>	
Standard Score	110.45 (9.15)
Expressive Vocabulary Test <small>Second Edition (Williams, 2007)</small>	
Standard Score	113.50 (10.54)

• Freshmen in good standing were recruited to participate in the study and completed standardized and experimental tasks including retell of an expository passage and reading of a phonemically balanced passage, both of which were audio-recorded for analysis.

Table 1. Measures of interest	Language Levels				
	Phonological	Word	Sentence	Text	
Speech	Intra-Phonological - Prolongations - Blocks	Inter-Phonological - Interjections - Filler	Word Fluency - Part-word Repetition - Single Syllable Word Repetition - Multisyllabic Whole Word Repetition	Sentence Fluency - Phrase repetitions - Revisions - Abandoned/Incomplete phrase or sentence	
Language		Fillers per T-unit	Number of Different Words	Clauses per T-unit	Total Number of Words
Reading					Reading Fluency

Discussion

• This exploratory study demonstrated no relationships among measures across constructs except for the phonological language and speech level measures, which represented similar skill.

• There was a strong correlation ($r = .93$) between phonological inter-fluency measures (interjections and fillers) and phonological language level measures. This validates and provides reliability to the analysis process used in this project as the two measures were essentially testing the same construct within a sample, conducted by two different researchers.

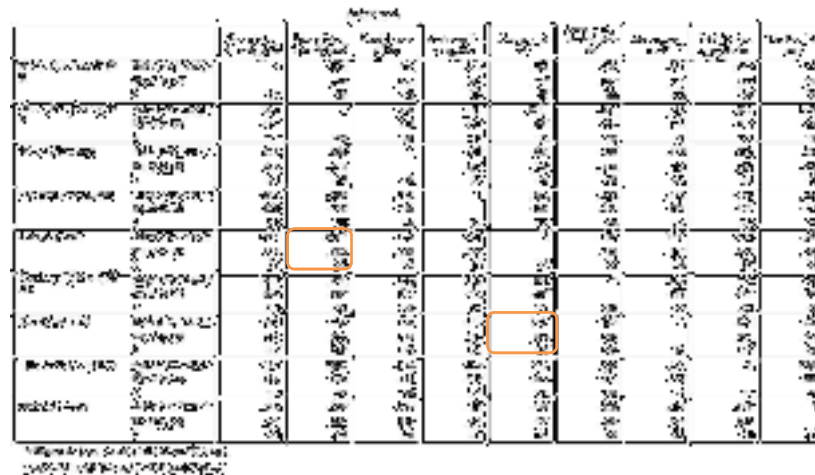
• Although no significant correlations were found across constructs (i.e., between measures of speech fluency, language fluency and reading fluency), the following trend was observed:

• A positive correlation ($r = .44$; $p = .052$) was observed between phonological inter-fluency measures (phonological level speech measure) and clauses per T-unit (sentence level language measure) suggesting that participants in this study demonstrated an increase in disfluency rates as they produced more complex language.

• These findings are in line with findings in dual-task paradigms and other protocols whereby sharing cognitive resources result in a net facilitative effect on one task at the expense of another task (e.g., Eichorn & Marton, 2014).

• Future studies will explore these relationships in a larger and more diverse participant pool; likewise, future studies will include protocols testing higher order executive functions alongside language competency so as to find individual and combined influences on speech fluency.

Results



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- Correspondence about this project should be directed to anthony.koutsoftas@shu.edu

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