

## **Prosodic fluency in productions of *The Cat in the Hat* predicts reading comprehension skill in 6-10-year-olds**

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An important societal application for psycholinguistic research is improving interventions for successful reading acquisition. United States (US) national education policy considers successful reading acquisition to require five skills: phonemic awareness, phonics, vocabulary, fluency, and comprehension. Prior work has demonstrated that prosodic fluency predicts reading comprehension in both primary school readers [1] and high school readers [2], but previous studies have varied greatly in their operationalization of fluency. The current study assesses how prosodic fluency relates to reading comprehension by comparing durational variation in 6-to-10-year-old children's productions of a metrically-regular, rhyming book to those of a model trained on adult productions.

The text for the study is *The Cat in the Hat* by Dr. Seuss [3], one of the most commonly read books among children under five in the US and Canada [4]. The book has a consistent metric structure, composed of 72 4-line stanzas with rhyming alternating lines, and is written primarily with monosyllabic high-frequency English words, in simple syntactic structures.

Participants are fitted with a head-mounted microphone and instructed to read the book as if they were reading to a parent or teacher. They are encouraged to sound out words they are not familiar with, but also told they can skip them. The text is presented without pictures, over 47 trials, with 1-2 stanzas or partial stanzas per trial, in 18-pt fixed-width black font on a white screen. Trials time out after 60 seconds. Participants also complete standardized assessments of reading comprehension [5], phonological awareness and processing speed [6]. Each participant's productions are first cleaned of disfluencies, incorrect words, and repetitions, then force-aligned with the book text using the Montreal Forced Aligner [7]. Alignments are checked and corrected, and each word's duration is extracted using Praat [8].

A prior study fit a linear regression model to word durations from a corpus of adult productions of *The Cat in the Hat* [9] which included significant effects of metric and syntactic structure, in addition to lexical control variables of word length, frequency, word class, text emphasis, and intra-stanza repetition. In the current study, each child's word durations are fit with this regression model and the summed residuals comprise the child's prosodic error score. We then predict this score from each child's standardized reading comprehension score, phonological awareness score, processing speed score, and age, hypothesizing that prosodic error will be predicted by reading comprehension skill over and above the other factors.

We have collected data from 71 6-to-10-year-olds, all native speakers of American English, representing a diverse sample in terms of race, ethnicity, and language background. Five participants have been classified as non-readers due to 10 trial time-outs and removed from analysis. Productions from 34 participants have been processed, and 20 more will be processed by March, 2025. Initial analysis (Table 1) demonstrates that standardized reading comprehension is a marginally significant predictor of prosodic error ( $t = -1.97$ ): better comprehension predicts smaller error. The presentation will include analysis and discussion of the relative contribution of different aspects of prosodic fluency (metric and syntactic) to comprehension skill. Results will further clarify the contribution of prosodic fluency to successful reading acquisition, and inform the development of interventions for struggling readers.

Table 1: Linear regression model predicting the prosodic error score of 34 6-10-yr-olds' productions of *The Cat in the Hat* from their standardized reading comprehension score (as measured by KTEA), standardized phonological awareness score and standardized processing speed score (from CTOPP2) and age in months

<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>	<i>t</i>	<i>p</i>
(Intercept)	1085058.77	317344.03	3.42	0.002
Reading Comprehension	-2932.35	1488.32	-1.97	0.058
Phonological Awareness	1016.37	1215.11	0.84	0.410
Processing Speed	-1561.71	1246.94	-1.25	0.220
Age	-5198.58	1229.38	-4.23	<0.001

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