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The Plateau of Oral Reading Fluency Growth: A Preliminary Investigation*

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ABSTRACT

The use of oral reading fluency (ORF) as a predominant measurement tool for identifying struggling readers has grown exponentially over the past 30 years. ORF growth using curriculum-based measures (CBM) has also become an important practical and empirical issue influencing the field. Although fluency scores have shown to be reliable predictors of reading performance up through middle school for poor readers, the point at which assessments of ORF fail to provide additional information is currently unknown. The purpose of our paper was to explore a range of fluency scores at which ORF growth plateaus as a potential guide to educators and researchers for ceasing ORF assessments. Results showed that the growth trajectory sharply increased in Grades 3 – 5, whereas the growth trajectory slightly increased from Grade 5 to Grade 6. The plateau range of ORF scores was 137.72 – 170.94 words read correctly per minute (wcpm). Grades 7 and 8 data are needed to further investigation as we found the time point for peak growth was beyond our current data.

Introduction

In practice, ORF scores are typically used as a decision-making tool for classifying students into different levels of risk for reading difficulties, and are considered a global index of reading proficiency (e.g., Stecker, Lembke, & Foegen, 2008). It would be worthwhile to investigate the possibility of an ORF plateau to signal a stopping point for administering ORF screening assessments. In seeking such a plateau here, we referred to a range of words read correctly per minute (wcpm).

This study has the potential to be useful across educational stake-holders. An ORF plateau range may save instructional time and school resources. This would result in more meaningful assessments for students, who would not be subject to redundant ORF assessments and could move to more appropriate reading tests such as comprehension.

Methods

Sample

A convenience sample of 89,465 students in grades 3–6 from 2009/10 through 2011/12 from the easyCBM® assessment system – an online benchmarking and progress monitoring system used as part of a response to intervention (RTI) framework. The sample combined 6 cohorts, making it longitudinal and cross-sectional. Three within-year testing occasions (i.e., fall, winter, and spring) were used at each of the four grades, for a total of 12 testing occasions (time points).

Measure

The easyCBM® ORF measures from grades 3 – 6 were used in this current study. The measures, approximately 250 words in length, were written according to word count and grade-level guidelines and reviewed by researchers as well as experienced teachers (CITE). The ORF measures are individually-administered by classroom teachers and instructional assistants trained in standardized test administration. On these measures, students read aloud for 60 seconds from a grade-level appropriate original work of narrative fiction while test administrators followed along on their own copy of the material. Self-corrections were counted as correctly read words, and any word a student skipped or read incorrectly is counted as an error. After one minute the assessor calculated the total number of words read correctly to arrive at the student's score, words read correctly per minute (wcpm).

Analysis

To determine the ORF plateau range, we began by determining the functional form that best fits our data, either linear growth or quadratic growth. The Deviance (DIC) was used for selecting the best model, in which smaller values indicate better fit. All parameters were estimated under a structural equation modeling framework using the M*plus* 7.0 software using the Bayesian estimator.

Assuming the quadratic model would fit best, the fixed effects of the best model were then used to compute the time point for peak growth using the following formula: π_{1i}

Time point for peak growth = $\left|\frac{\pi_{1i}}{2\pi_{2i}}\right|$ when π_{1i} is the linear slope parameter and π_{2i} is the quadratic slope parameter. The plateau of the ORF trajectory is computed using the following formula:

ORF plateau = intercept + (time)(linear) + (time2)(quadratic).

In order to construct a range around the plateau, we computed the standard error of the measurement *(SEM)* using the following formula: SEM = $SD\sqrt{1 - r_{xx'}}$ where *SD* represents the standard deviation of the observed test values, and $r_{xx'}$ represents the reliability of the test. In order to derive the test reliability, we used the unique measure residual variances for each time point to first derive the unique reliability for each time point (i.e., $\frac{\text{true score variance}}{\text{observed score variance}}$; Yeo, Kim, Branum-Martin, Wayman, & Espin, 2011). We then averaged the reliabilities of the 12 time points for an estimate of the test reliability, and used the SEM to construct a 95% confidence interval around the ORF plateau.

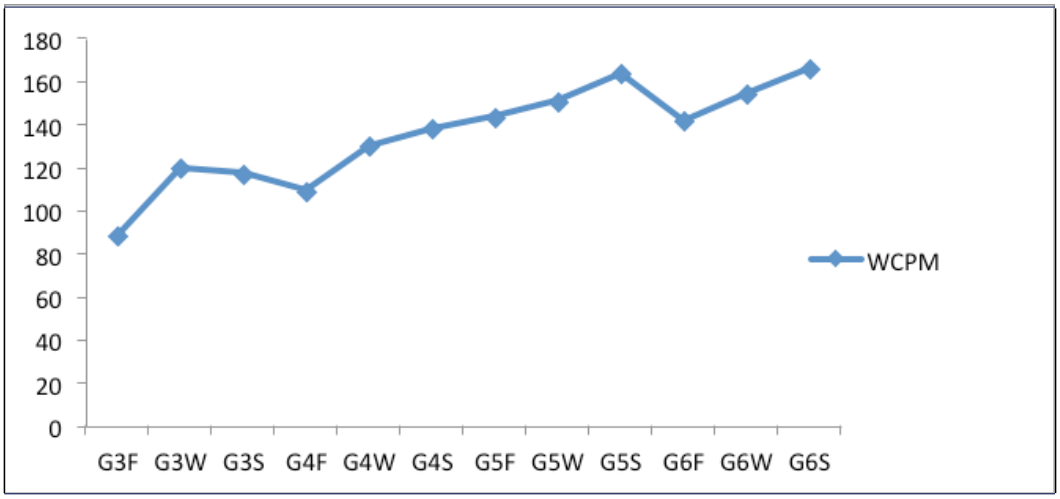
Results

The observed scores across 12 time points were shown on figure 1. The averages scores increased from Grades 3 to 5, indicating students constantly improved their ORF scores when they were in Grades 3 to 5. The growth trajectory slightly increased from Grade 5 to Grade 6. There was also summer effect from Grade 3 to Grade 4 and Grade 5 to Grade 6.

As expected, a quadratic model (DIC = 2,770,858) fit the data better than the linear model (DIC = 2,802,232). The means of intercept, linear, and quadratic term were 81.13, 11.62, and – 0.46, respectively. The derived time point for peak growth was thus 12.6, indicating the peak occurred beyond the range of our data and that results are to be interpreted with caution.

Finally, the derived ORF plateau was 154.33 wcpm, with an SEM of 16.61 wcpm (SD = 41.53, $r_{xx'}$ = .84), the range of ORF plateau scores was 137.72 – 170.94 wcpm. This ORF plateau range may be a potentially useful starting point for considering when to stop assessing ORF for the purpose of indicating reading skill growth because it indicates a more stable reading rate level. Our findings suggest that for students who can read approximately 138 – 171 wcpm after Grade 6, less and less growth will be observed over time, rendering the regular assessment of ORF less informative for making instructional decisions.

Figure 1 Observed score for each time point



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[1]Patarapichayatham, C., Nese, J. F. T., Saez, L. (2013, April). *The plateau of Oral Reading Fluency growth: An initial recommendation when to stop assessing.* Paper presented at the annual meeting of the American Educational Research Association (AERA), San Francisco, CA.

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