Ascending the ORF Slope: Three Two Methods to Identify Meaningful ORF Plateaus

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Abstract

Oral reading fluency (ORF) is a ubiquitous classroom assessment used in Response to Intervention (RTI) models across the country to identify struggling readers and inform instructional decisions (Tindal, 2013). Although ORF scores have shown to be reliable predictors of reading proficiency through middle school, the point at which ORF assessments fail to provide additional information about reading ability is unclear (Francis et al., 1996). The purpose of this study is to estimate an ORF score plateau range that represents the transition from acquisition to mastery for different groups of students.

Method

Measure. easyCBM (Alonzo et al., 2006) Passage Reading Fluency (PRF) benchmark measures (fall, winter, spring) used at each of Grades 3-8 (18 occasions). Scores are number of words read correctly per minute (wcpm).

Sample. Sequential cohort design with a convenience sample of 13,965 Grade 3-8 students from 2009/10 – 2013/14.

Results

Quadratic Latent Growth Curve Models

Estimated separately for each class, using the BAYES estimator (default, non-informative prior distributions), and applied two methods to derive ORF plateaus.

Results Table

Class 1

Class 2

Class 3

Class 4

ORF Plateau

86 (1)

209 (2)

241 (2)

12957 (93)

Grade + season

-6

-6

-6

-6

CI Overlap

First Derivative

First Derivative

First Derivative

First Derivative

First Derivative

Analytical. We compared these two methods to derive the ORF plateau (Mplus 7.3, BAYES estimator; Muthén & Muthén, 1998-2012).

(1) CI Overlap: ORF plateau defined as the time \( t \) at which the estimated mean is not credibly different than that at \( t_{\text{plateau}} \).

(2) First Derivative: ORF plateau defined using the credible interval of the first derivative (i.e., slope of tangent equals zero; Singer & Willett, 2003) as a model parameter.

(X) A piecewise linear-linear GMM with unknown knots in which the knot is a parameter to be estimated (Kohli et al., 2013). Unfortunately, we could not get this model to estimate properly given our data. Please try!

References

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Further Information

Contact: Joe Nese (jneser@uoregon.edu). More information on this and related projects can be obtained at http://brtp projects.org and http://ncaase.com.

Discussion

The average ORF plateau range for the majority of the sample was approximately 159-167 wcpm, or more conservatively, 146-168 wcpm.

Methodological Implications:

• First Derivative is perhaps most intuitive method. BUT
• Will not work for linear slopes (Class 1).
• ORF plateau may be beyond measured time (Class 4).

• CI Overlap plateau mean(s) not necessarily credibly different from mean(s).

• Piecewise latent GMM with estimated knots an appealing alternative (Kohli et al., 2013).

Practical Implications:

• Results converge on similar past research: Less predictive utility around 150 wcpm, generally achieved by Grade 5-6 (Hosp & Fuchs, 2005).

Limitation:

• Many approaches to determine the point (ORF score or time) from acquisition to mastery for different groups of students to signal cessation of ORF assessment, saving resources and moving to more appropriate measures.

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