Describing the Reading Fluency Growth of Progress Monitored Students

Joseph F. T. Nese, Julie Alonzo, Gerald Tindal
National Center on Assessment and Accountability for Special Education, 2013

NCAASE National Center on Assessment and Accountability for Special Education
Advancing research on growth measures, models, and policies for improved practice

behavioral research & teaching

Abstract

In a response to intervention (RTI) model, educators in both general and special education use curriculum-based measurement (CBM) oral reading fluency (ORF) assessments across grades to monitor progress of students receiving reading intervention.

Researchers have explored average growth in ORF and found decelerating, nonlinear growth rates across grade-levels (e.g., Christ et al., 2010; Nese et al., 2012; Nese et al., 2013).

In this study, we examine growth for those students in Grades 1-8 specifically identified for reading intervention and receiving regular progress monitoring, and explore two growth models to determine (a) the within-year ORF growth, and (b) the growth across Tier II/III intervention.

Method

We conducted two latent growth models for each grade using Mplus version 7.11 (Muthén & Muthén, 1998-2013):

(a) **Within-year growth**, where the time metric was the calendar year, such that the intercept was either late September or early October;

(b) **Tier II/III growth**, where the time metric was the assessment occasion, such that the intercept was the first assessment occasion.

Selection Rules for ORF Progress Monitoring Sample

Step	Rules	Students	Scores
	Original data	139,165	495,174
1)	Delete out of range scores (e.g., < 0 and > 365)	-	495,112
2)	Delete students in grades other than 1-8	137,848	-
3)	Delete students with any instance of off-grade-level testing	129,617	-
4)	Delete students who scored > 30th percentile on first benchmark or progress monitoring assessment	35,923	-
5)	Delete scores from assessments > 20th testing occasion	-	145,478
	Delete "invalid" scores	-	-
	If two scores are less than two weeks (14 days) apart AND are different by > 35 WCPM, delete the score that is least like adjacent scores. Based on the following rule of growth:		57,787
	$[(\text{Expected growth per week}+SE_g) * 2 \text{ weeks})] + (SEM * 2 \text{ weeks})$	-	-
	$[(1.5\text{wcpm}+1.0SE_g) * 2] + (15*2)$	-	-
	$5 + 30$	-	-
6)	Take the median of scores that are within 7 days keep scores that are >7 and <28 days of each other, and delete scores that > 28 days apart.		34,550
7)	Delete students with < 3 progress monitoring tests	5,373	30,628

Table 1. *Fixed Effects and Within- and Between-Model Correlations for the Quadratic Within-year and Tier II/II Growth Models*

Grade		Parameters			Correlation Within-model			Correlation Between-models		
(*n*)	Model	Intercept	Linear	Quadratic	I-L	I-Q	L-Q	I-I	L-L	Q-Q
1	Within-year	2.38**	0.42**	0.01**	.52	.76	-.01			
(540)	Tier II/III	8.22**	1.16**	-0.01*	.66**	-.42	-.79**	.60	.66	-.58
2	Within-year	24.50**	1.22**	0.00	.34**	-.15**	-.89**			
(1170)	Tier II/III	28.03**	1.55**	-0.01**	.59**	-.54**	-.92**	.70	.85	.73
3	Within-year	44.06**	2.39**	-0.04**	.15**	-.11*	-.97**			
(1180)	Tier II/III	48.70**	2.44**	-0.04**	.42**	-.43**	-.96**	.86	.88	.84
4	Within-year	69.36**	1.50**	-0.02**	.36**	-.28**	-.97**			
(1165)	Tier II/III	71.17**	1.63**	-0.02**	.47**	-.42**	-.97**	.96	.95	.92
5	Within-year	96.68**	0.82**	0.00	.56**	-.53**	-.72**			
(941)	Tier II/III	96.61**	1.26**	-0.02**	.29*	-.24*	-.91**	.98	.89	.76
6	Within-year	92.09**	0.68**	-0.01	.35	-.28	-.91**			
(197)	Tier II/III	94.67**	0.57**	0.00	.13	.01	-.93**	.97	.82	.69
7	Within-year	109.99**	0.25	0.01	.64**	-.64**	-.86**			
(107)	Tier II/III	110.30**	0.45*	0.00	.63**	-.71**	-.95**	.98	.97	.92
8	Within-year	114.44**	-0.50*	0.03**	.20	-.07	-.98**			
(72)	Tier II/III	114.37**	0.11	0.01	.40*	-.42	-1.00**	.98	.64	.49

Figure 1. *Percent of Students First ORF Assessment for Each Month Across Grades 1-8*

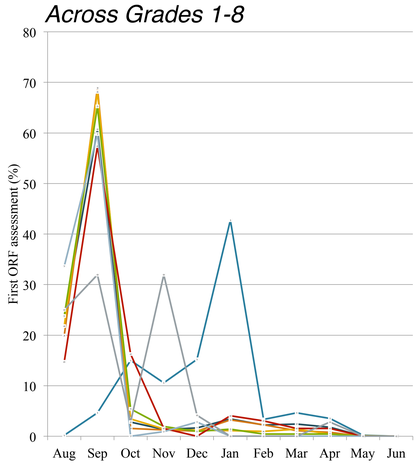
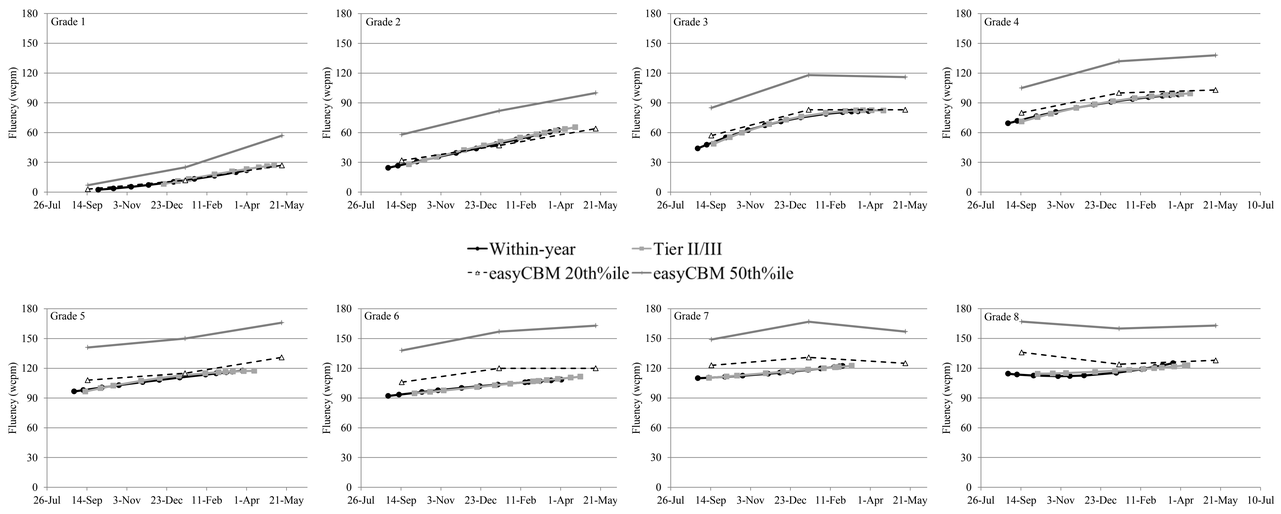


Figure 2. *Predicted mean ORF scores in words correct per minute (wcpm) by grade based on the Within-year and Tier II/II time metrics, and observed mean ORF benchmark scores at the 20th and 50th percentiles for the easyCBM system.*



Results

- ***Table 1***: Trajectory fixed effect parameters (intercept and slopes) were similar across **Within-year** and **Tier II/II** growth models.
  - ***Figure 1***: The first testing occasion for Tier II/II students was nearly always in the early fall for all grades but first (winter).
- ***Figure 2***
  - Decelerating **Tier II/II** growth in Grades 1-5.
  - Linear **Tier II/II** growth in Grades 6-8.
  - Growth of progress monitored students similar to that of easyCBM 20th percentile group, but with lower intercepts and greater yearly gains in most grades.

Discussion

- Tier II/III interventions begin in the fall; less identification of at-risk students beyond fall.
  - Implications for winter/spring benchmarks in RTI system: Lost opportunities for educators and students for lack of RTI system training?
- As hypothesized, growth rates are lower than 50th percentile and average empirical trajectories (e.g., Nese et al., 2013), except for Grades 4 & 5.
- In all grades but sixth, linear growth rates greater in magnitude for the **Tier II/II** metric than the **Within-year** metric.
  - Tenuous evidence for effective interventions.
- Limitations
  - Selected sample very specific.
  - Intervention information (if any) unknown.

Funding Source

This project was funded through the **National Center on Assessment and Accountability for Special Education (NCAASE)** grant (R324C110004) from the U.S. Department of Education, Institute of Education Sciences. Opinions expressed do not necessarily reflect the opinions or policies of the U.S. Department of Education.

For More Information

Please contact Joe Nese: **jnese@uoregon.edu**. More information on this and related projects can be obtained at **http://ncaase.com**.

References

Christ, T. J., Silberglitt, B., Yeo, S., & Cormier, D. (2010). Curriculum-based measurement of oral reading: An evaluation of growth rates and seasonal effects among students served in general and special education. *School Psychology Review, 39*, 447-462.

Muthén, L. K., & Muthén, B. O. (1998-2013). *Mplus user's guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.

Nese, J. F. T., Biancarosa, G., Anderson, D., Lai, C. F., & Tindal, G. (2012). Within-year oral reading fluency with CBM: A comparison of models. *Reading and Writing, 25*, 887-915. DOI: 10.1007/s11145-011-9304-0

Nese, J. F. T., Biancarosa, G., Cummings, K., Kennedy, P., Alonzo, J., Tindal, G. (2013). *In search of average growth: Describing within-year oral reading fluency growth for Grades 1-8*. DOI: 10.1016/j.jsp.2013.05.006