Within-Year Growth on Interim Assessments

Joseph F. T. Nese
Gerald Tindal

University of Oregon
Behavioral Research and Teaching

Introduction

- Measuring the trajectory of individual students allows for more precise estimation of student and program performance
- Enables the partition of effects due to individual differences from schools and programs
- Serves as a means for assessing the effect of interventions on changes in student performance

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(Boyle & Willms, 2001; Linn & Haug, 2002; Raudenbush, 2001; Stevens, 2005; Zvoch & Stevens, 2003)

Interim Assessments

- Early and specific achievement growth.
- Provide teachers instructional feedback about students' knowledge and skills.
- Natural developmental progress in achievement for students with disabilities.
- Results of interim assessments of students' achievement meaningfully contribute to a model of academic growth for students with disabilities.

Oral Reading Fluency (ORF)

- Used across the country at all grade-levels
- ORF an essential part of reading proficiency
  - Indicator of future comprehension and reading achievement
- ORF growth has been found to be predictive of future reading proficiency

(Baker et al., 2008; Crawford, et al., 2001; Deno, 1985; Fuchs, Fuchs, & Maxwell, 1988; Hintze & Silberglitt, 2005; Hosp & Fuchs, 2005; Jenkins et al., 2003; Kim, et al., 2010; Klein & Jimerson, 2005; Pinnell, et al., 1995; Marston, 1989; Riedel, 2007; Shinn, 1998; Speece & Ritchey, 2005; Spear-Swerling, 2006)

Purpose

- Explore the effects of:
  - Status and growth of ORF interim assessments as predictors of status on a state reading test
  - SpEd status on a statewide reading test
  - SpEd status on status and growth of ORF

easyCBM

- Online benchmark and progress monitoring tool
- Designed for use within a response to intervention (RTI) framework
- Available in Reading and Math
  - 3 benchmark (screening) measures; fall, winter, spring
  - 17 progress monitoring forms in Reading
  - 10 progress monitoring forms in Math
    - All forms constructed to be of equivalent difficulty using a Rasch model

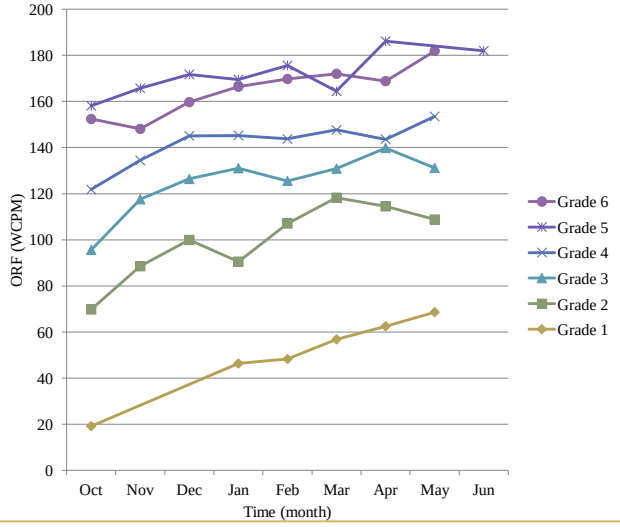
Data

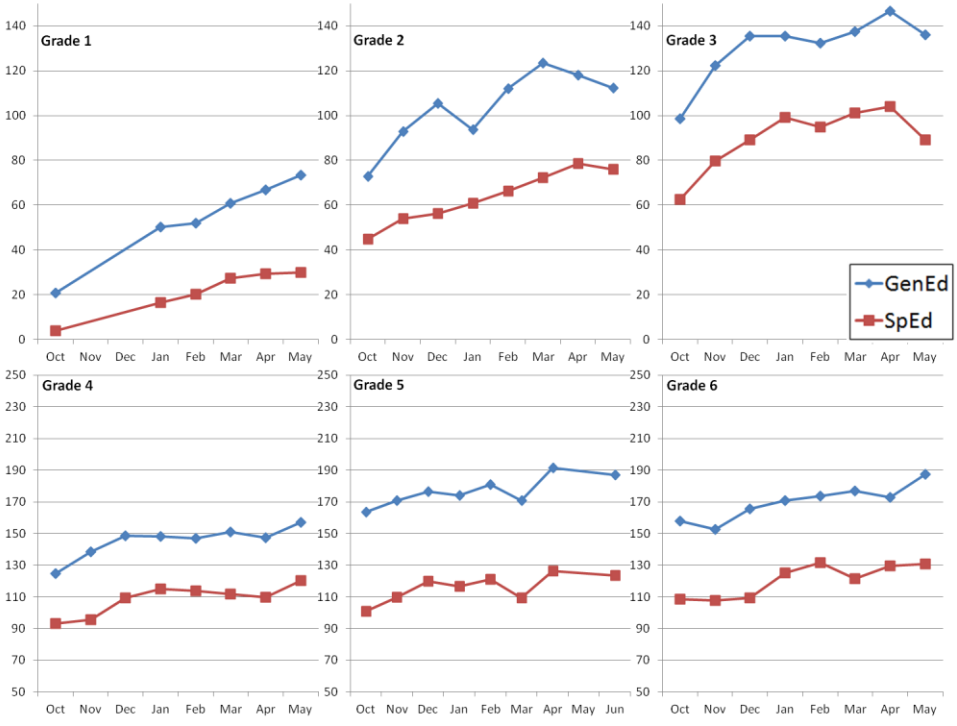
- Oral Reading Fluency (ORF)
- Grades 1-6
- Assessed 8 times across one year (except gr1)
  - Oct, Nov, Dec, Jan, Feb, Mar, Apr, May (benchmark)
  - 0 1 2 3 4 5 6 8
  - At least 4 data points for inclusion

Descriptive Statistics for Sample

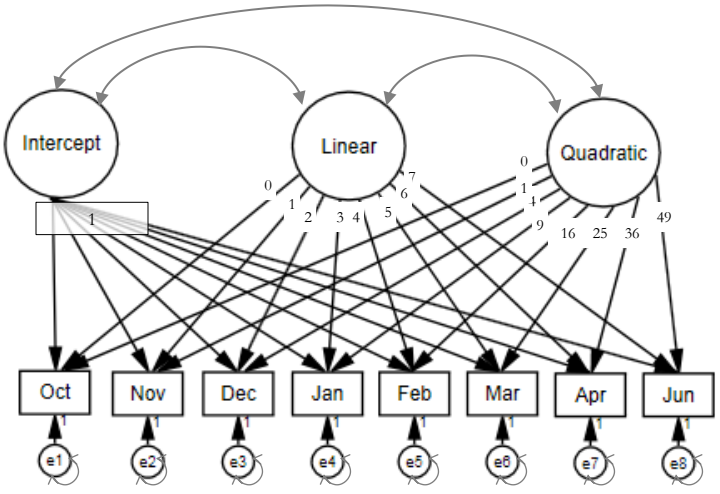
	Grade					
	1	2	3	4	5	6
n	116	199	183	194	199	178
Ethnicity						
AmInd/AK Native	4 (3%)	8 (4%)	4 (2%)	44 (22%)	33 (16%)	45 (25%)
Asian	7 (6%)	11 (5%)	7 (4%)	7 (4%)	8 (4%)	8 (4%)
Black	5 (4%)	5 (2%)	-	1 (1%)	4 (2%)	2 (1%)
Hawaiin/Pac Isl	1 (1%)	2 (1%)	1 (1%)	1 (1%)	1 (1%)	1 (1%)
White	92 (77%)	135 (66%)	121 (64%)	130 (66%)	140 (69%)	108 (59%)
Multiple	7 (6%)	12 (6%)	16 (9%)	10 (5%)	12 (6%)	13 (7%)
Unknown	-	-	34 (18%)	-	-	1 (1%)
Female	56 (47%)	110 (53%)	88 (47%)	98 (50%)	96 (48%)	90 (50%)
LEP	8 (7%)	26 (13%)	20 (11%)	21 (11%)	9 (5%)	10 (6%)
SpEd	12 (10%)	18 (9%)	19 (10%)	20 (10%)	16 (8%)	19 (10%)

Observed Fluency Growth



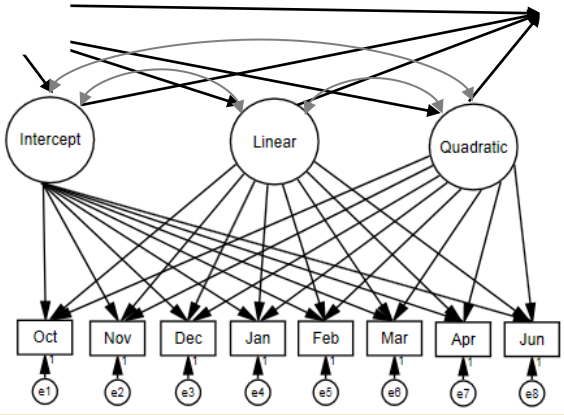


Within-Year ORF Growth Model

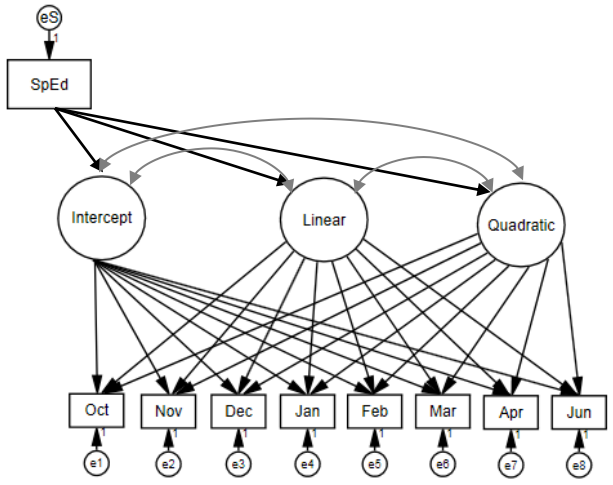


Nese, J. F. T., Biancarosa, G., Cummings, K., Kennedy, P., Alonzo, J., Tindal, G. (no date). *In search of average growth: Describing within-year oral reading fluency growth for grades 1-8.* Manuscript submitted for publication.

Final Model, Grades 3-6



Final Model, Grades 1-2

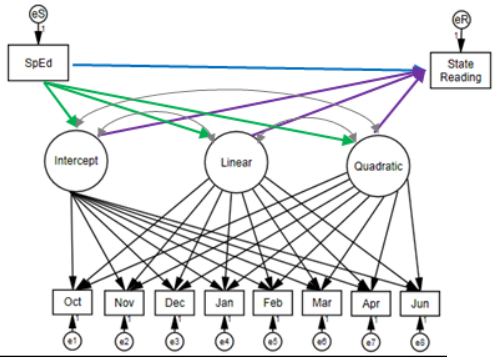


Model Fit Indices

	1		2		3		4		5		6	
	Growth	Final	Growth	Final	Growth	Final	Growth	Final	Growth	Final	Growth	Final
CFI > .95	.94	.94	.90	.90	.90	.91	.94	.94	.93	.94	.94	.94
RMSEA < .06	.25	.23	.19	.19	.18	.16	.17	.15	.19	.16	.16	.13
SRMR < .08	.08	.07	.07	.07	.09	.07	.07	.06	.05	.04	.07	.06

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1-55.

Results



	1		2		3		4		5		6	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
State on SpEd	-	-	-	-	-1.49	2.25	-1.60	4.07	-0.69	2.68	-1.89	1.77
Int. on SpEd	-17.07	7.18	-35.12	9.35	-35.78	8.64	-36.25	8.96	-61.48	10.48	-46.91	9.14
Lin. on SpEd	-4.96	2.45	0.03	0.64	-0.65	0.63	-0.25	0.52	1.58	1.99	-0.93	0.77
Quad. in SpEd	0.22	0.29	-	-	-	-	-	-	-0.24	0.23	-	-
State on Int.	-	-	-	-	0.18	0.02	0.20	0.18	0.16	0.02	0.12	0.03
State on Lin.	-	-	-	-	0.01	1.18	-2.06	12.46	0.08	0.60	0.85	0.72
State on Quad.	-	-	-	-	-	-	-	-	3.48	3.57	-	-

$p < .05$.

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Variance Explained in Final Models

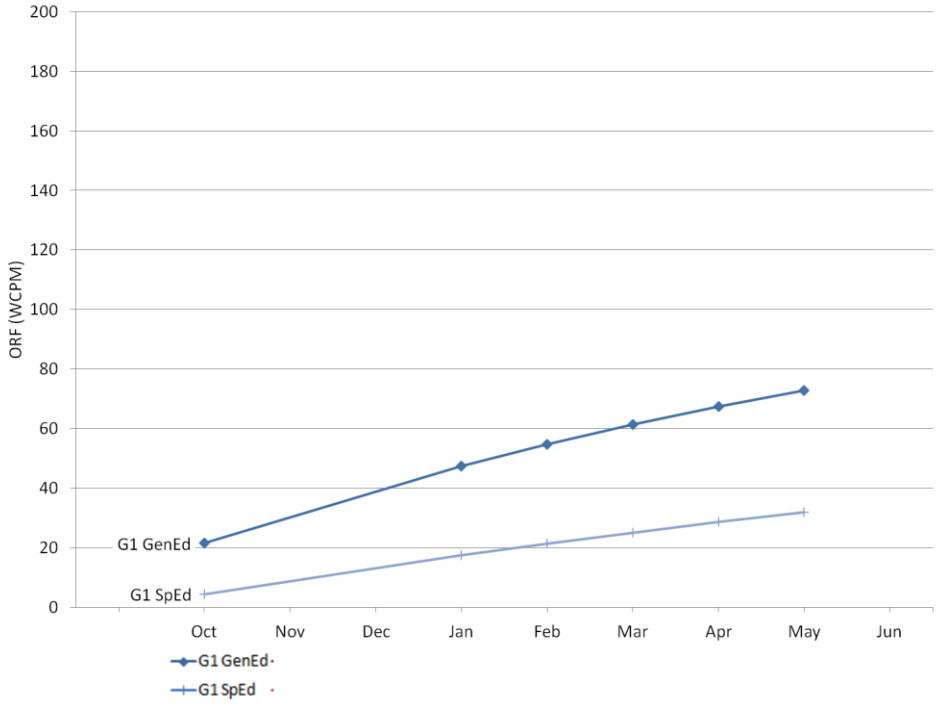
Grade	Intercept	SE	Linear	SE	Quadratic	SE	State Reading Test Score	SE
1	.06	.05	.06	.06	.01	.03	-	-
2	.07	.04	.00	.00	.00	-	-	-
3	.09	.04	.03	.05	.00	-	.39	.06
4	.08	.04	.01	.06	.00	-	.47	.09
5	.16	.05	.01	.03	.02	.03	.50	.07
6	.14	.05	.03	.04	.00	-	.46	.06

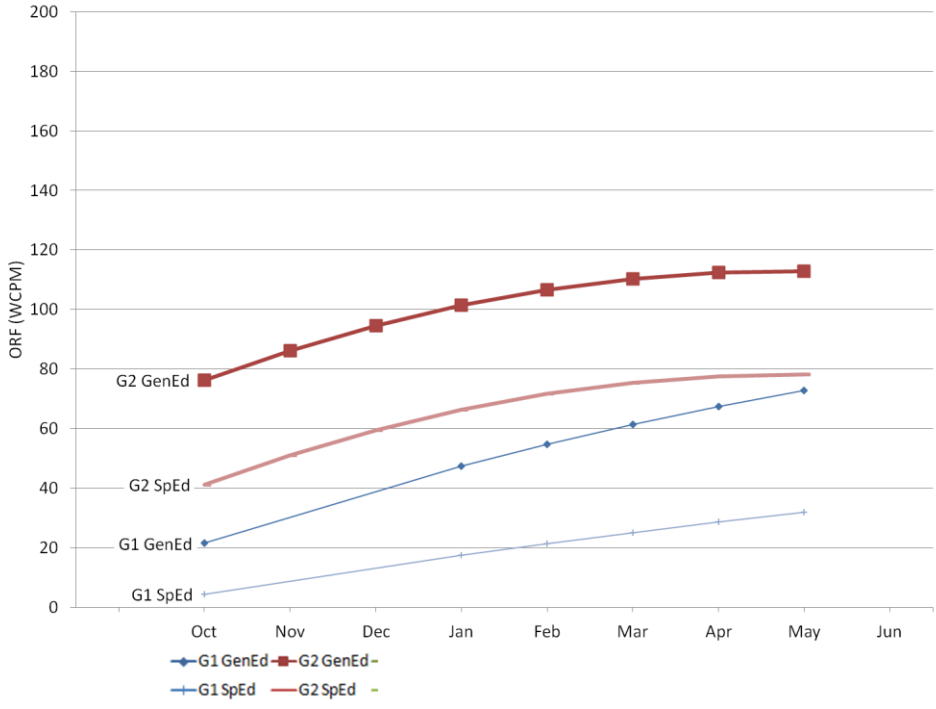
$p < .05$.

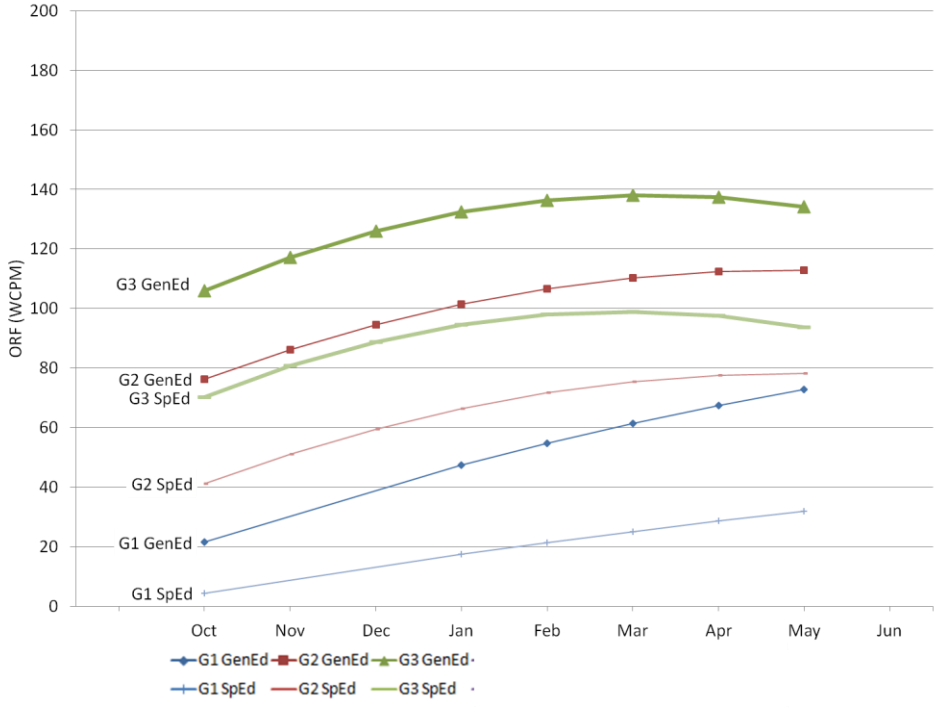
Predicted Within-Year ORF Growth

Grade	Group	Intercept Mean	Linear Mean	Quadratic Mean
1	GenEd	21.52	9.59	-0.32
	SpEd	4.46	4.63	-0.10
2	GenEd	76.29	10.71	-0.78
	SpEd	41.17	10.74	-0.78
3	GenEd	105.92	12.41	-1.20
	SpEd	70.14	11.76	-1.20
4	GenEd	129.00	7.69	-0.63
	SpEd	92.75	7.44	-0.63
5	GenEd	164.89	4.12	-0.17
	SpEd	103.41	5.70	-0.40
6	GenEd	152.27	6.43	-0.35
	SpEd	105.35	5.50	-0.35

$p < .05$.




200
180
160
140
120
100
80
60
40
20
0
ORF (WCPM)
G2 GenEd
G2 SpEd
G1 GenEd
G1 SpEd
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
G1 GenEd
G2 GenEd
G1 SpEd
G2 SpEd


200
180
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ORF (WCPM)
G3 GenEd
G2 GenEd
G3 SpEd
G2 SpEd
G1 GenEd
G1 SpEd
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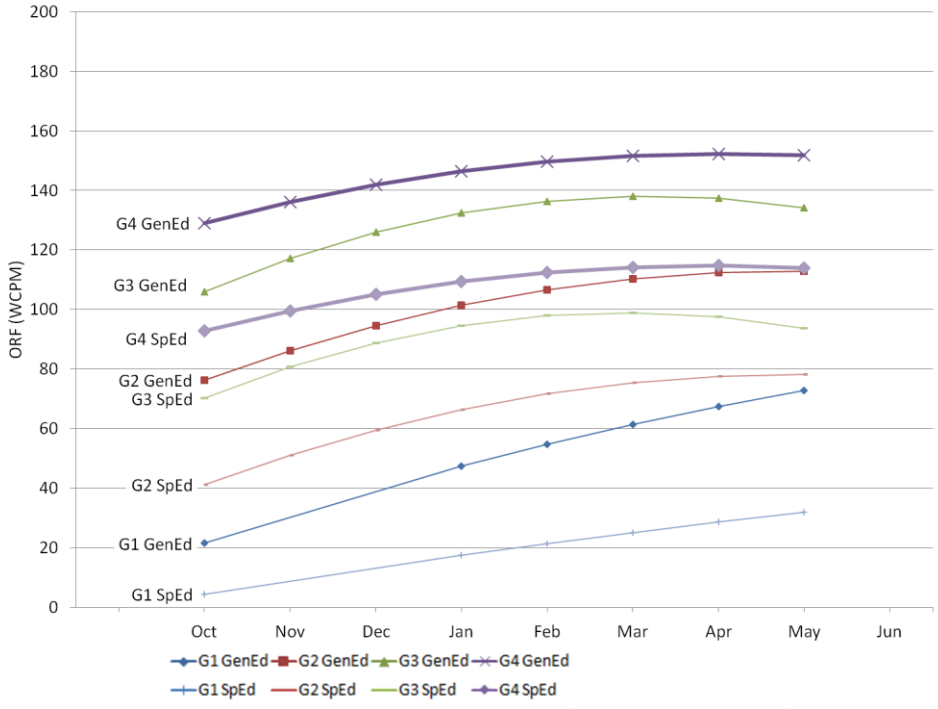
G1 GenEd
G2 GenEd
G3 GenEd
G1 SpEd
G2 SpEd
G3 SpEd


ORF (WCPM)
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G4 GenEd
G3 GenEd
G4 SpEd
G2 GenEd
G3 SpEd
G2 SpEd
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Oct
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G1 GenEd
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G3 GenEd
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G1 SpEd
G2 SpEd
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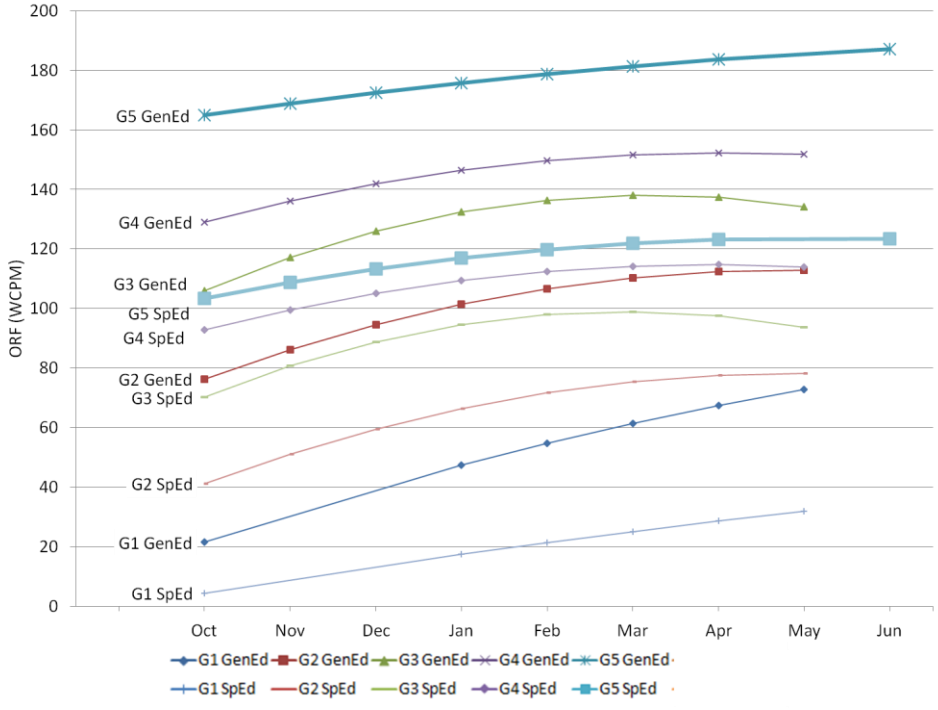
G4 SpEd


ORF (WCPM)
200
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100
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20
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G5 GenEd
G4 GenEd
G3 GenEd
G5 SpEd
G4 SpEd
G2 GenEd
G3 SpEd
G2 SpEd
G1 GenEd
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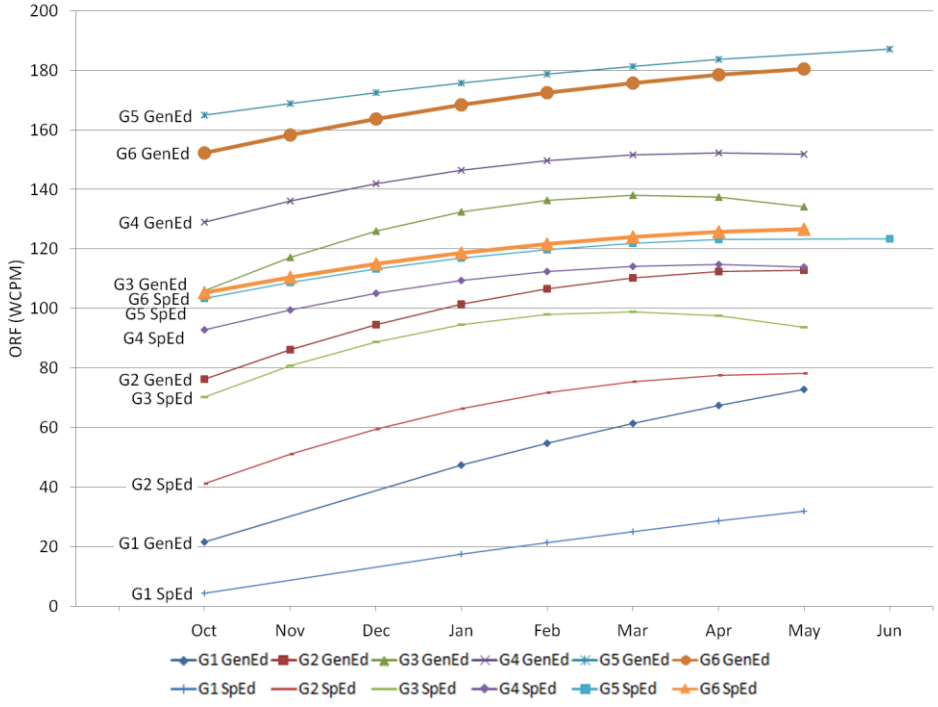
G1 SpEd
G2 SpEd
G3 SpEd
G4 SpEd
G5 SpEd



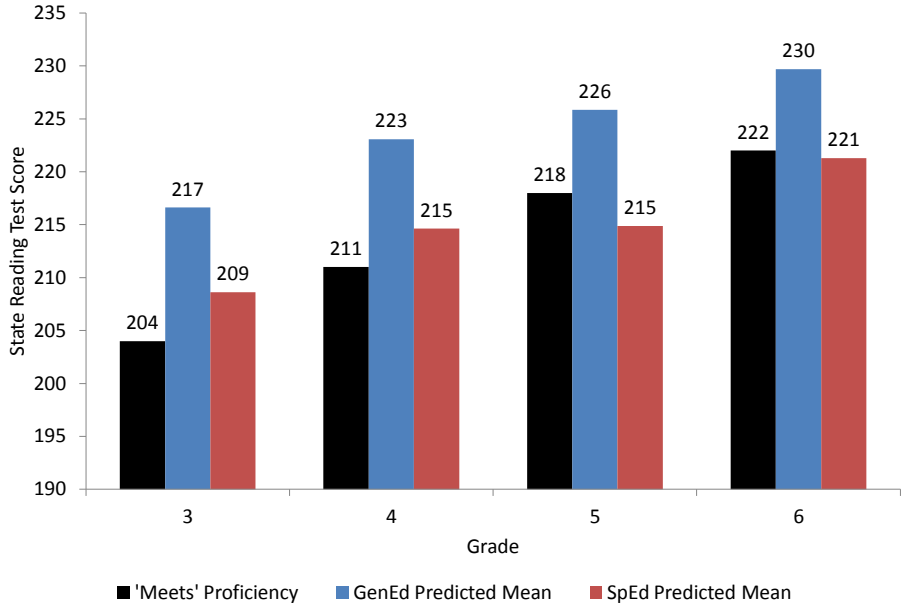
Predicted State Reading Test Score

Grade	Group	State Reading Test Score Mean	Difference	Effect Size[a]
3	GenEd	217	8	0.75
	SpEd	209		
4	GenEd	223	8	0.84
	SpEd	215		
5	GenEd	226	11	1.21
	SpEd	215		
6	GenEd	230	8	0.99
	SpEd	221		

$p < .05$.

[a] = Cohen's *d*.

Predicted State Reading Test Score



Discussion

- Importance of intercept, not growth, in predicting future performance
  - Growth for specific exceptionality groups (e.g., LD)
- SpEd growth results differ from most previous research
- Average SpEd student "meets" state reading proficiency standard in grades 3-4, but not in 5-6

(Deno, Fuchs, Marston, & Shin, 2001; Graney, Missall, Martinez, & Bergstrom, 2009; Nese, Biancarosa, Anderson, Lai, Alonzo, Tindal, 2012; Wang, Algozzine, Ma, Porfeli, 2011; Wang, Porfeli, Algozzine, 2008)

Future NCAASE Research

- Use trajectory of interim assessments as predictors of both status and growth on the statewide tests
- Compare the trajectories over years obtained from the summative and the interim assessments
- Model within- and across-years growth trajectories
- Examine various predictors of student and school characteristics to model growth on the interim assessments and opportunity-to-learn (OTL)

Acknowledgement

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.