

## Abstract

Piecewise latent class growth analysis (LCGA) with distal outcome models were used to examine growth patterns in Grade 3-5 reading comprehension and passage reading fluency on easyCBM. LCGA assumes heterogeneity of growth and may provide reliable predictions for later development. Current classification methods for identifying at-risk students are still questionable, this modeling technique could be a viable alternative classification method to identifying students at risk for reading difficulty.

## Research Questions

- Are there multiple latent classes and reading growth trajectories based on grades 3-5 reading comprehension and passage reading fluency easyCBM benchmark measures.
- If latent classes exist, do they predict students' initial risk status in the following grade and do they align with the easyCBM's risk rating system?

### Acknowledgement

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 Note: The author first presented this study at the 2013 Annual Convention of the National Association of School Psychologists, Seattle, WA.

## Materials and Methods

easyCBM benchmark measures

- Multiple-choice reading Comprehension

- Passage reading fluency

## Setting and Participants

- 2 districts in Pacific Northwest
- 46 schools
- Implements RTI model
  - Benchmark 3x in a year
- Cohorts in Grades 3-5

Cohort	N	Year		
		Grade 3	Grade 4	Grade 5
3rd Grade	1737-1774	2009	2010	
4th Grade	1759-1760		2009	2010
5th Grade	908-912			2009

- 50-51% male, 15-21% SPED, and 2-3% ELL

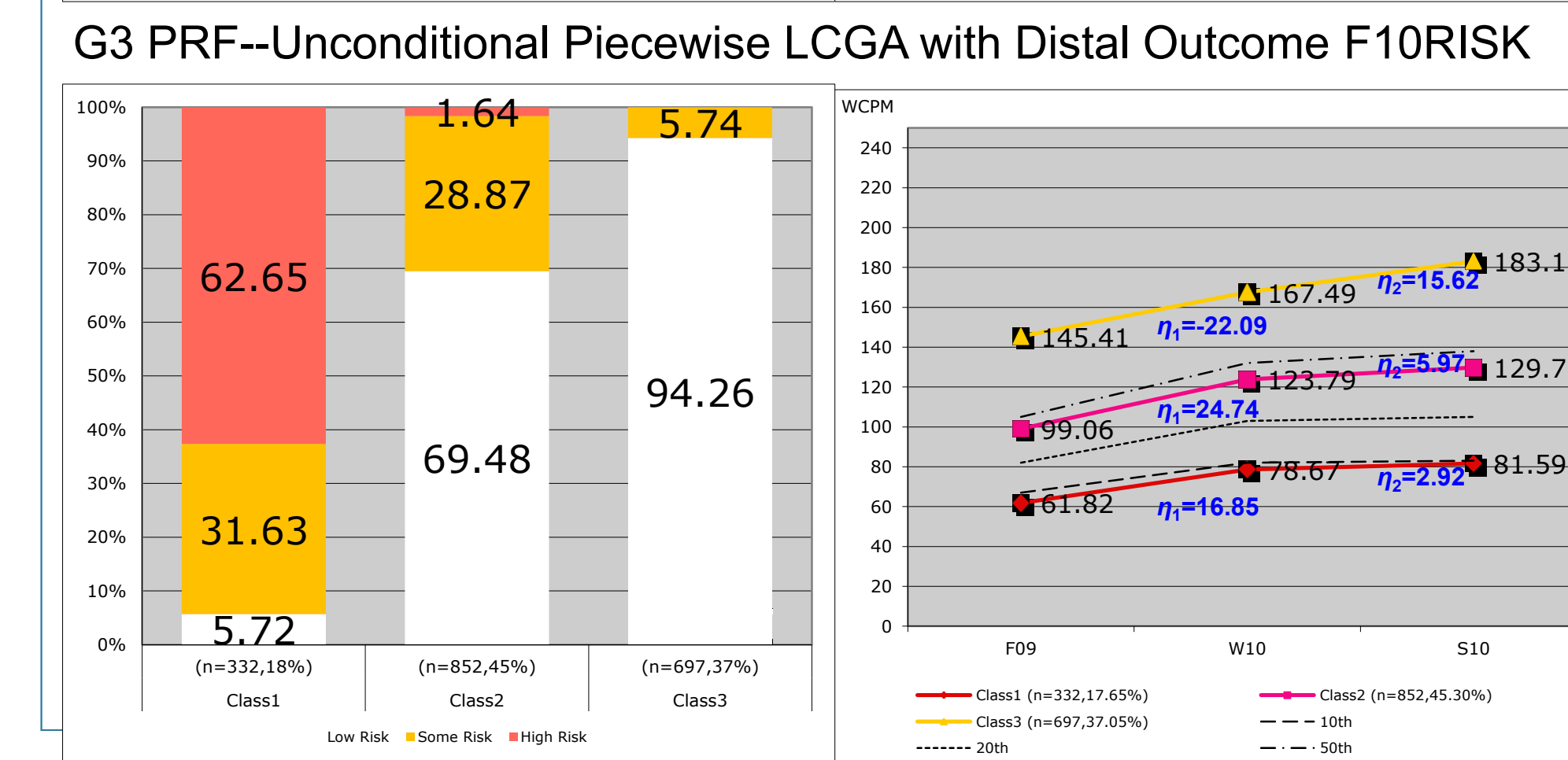
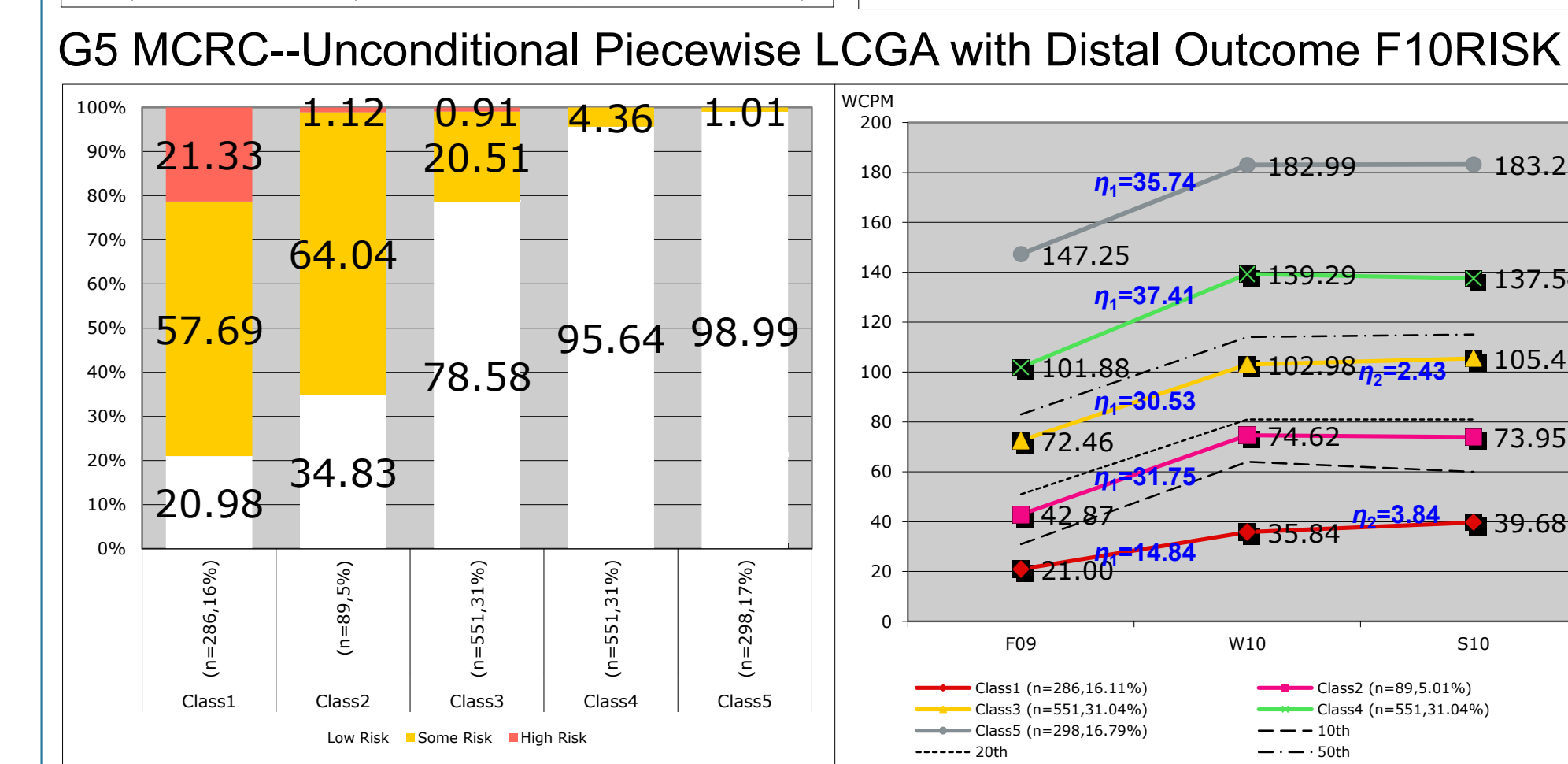
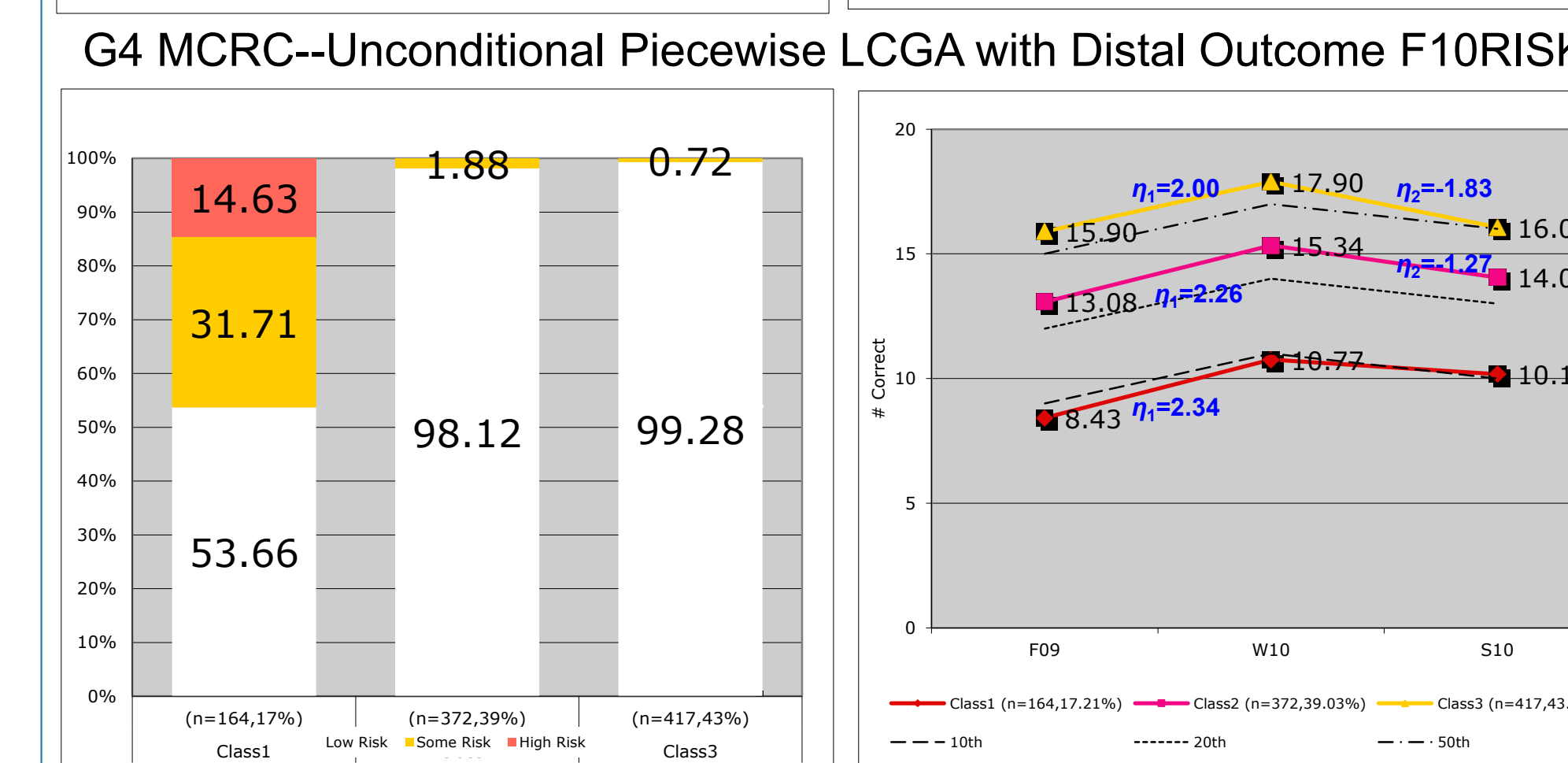
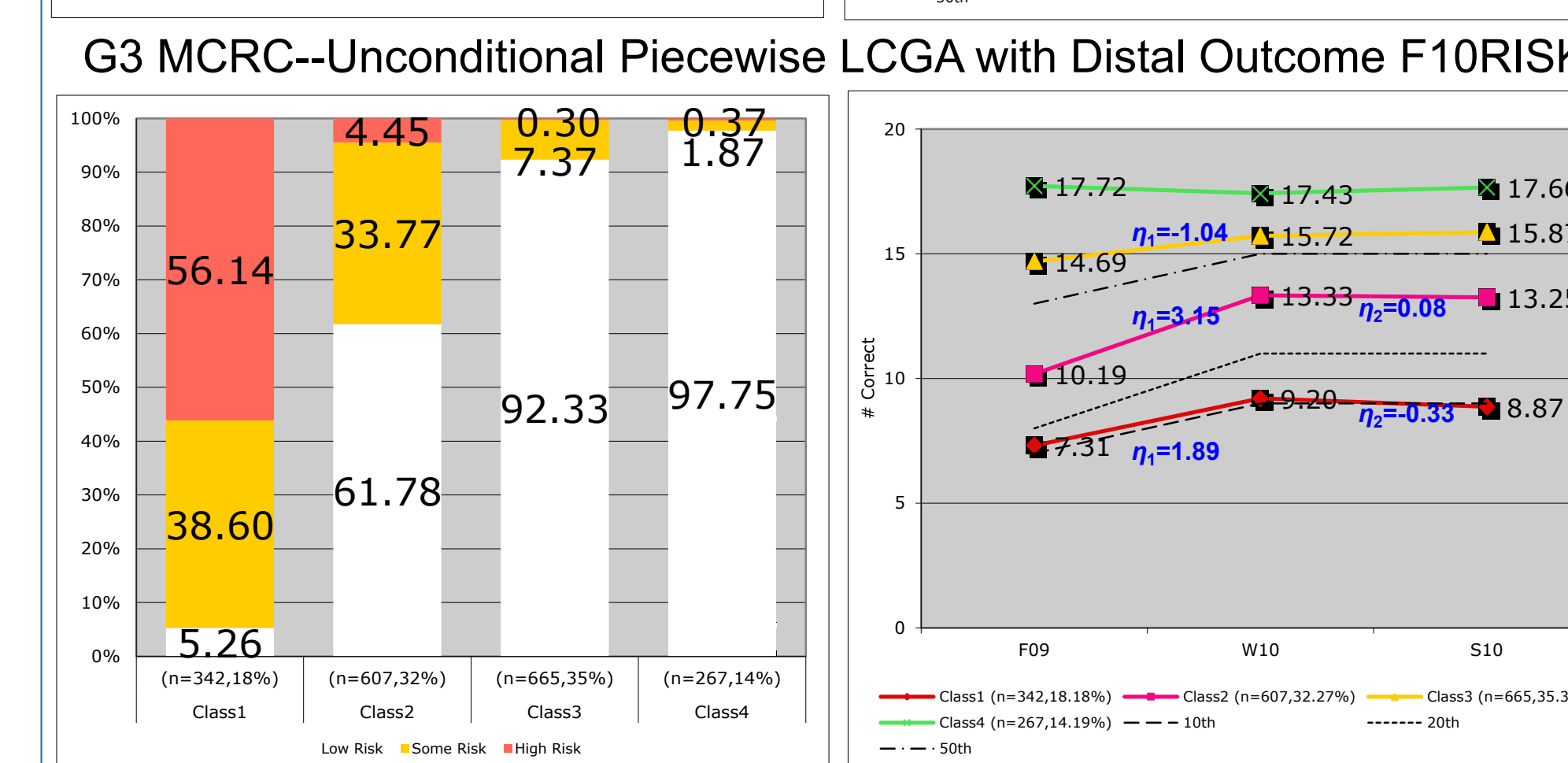
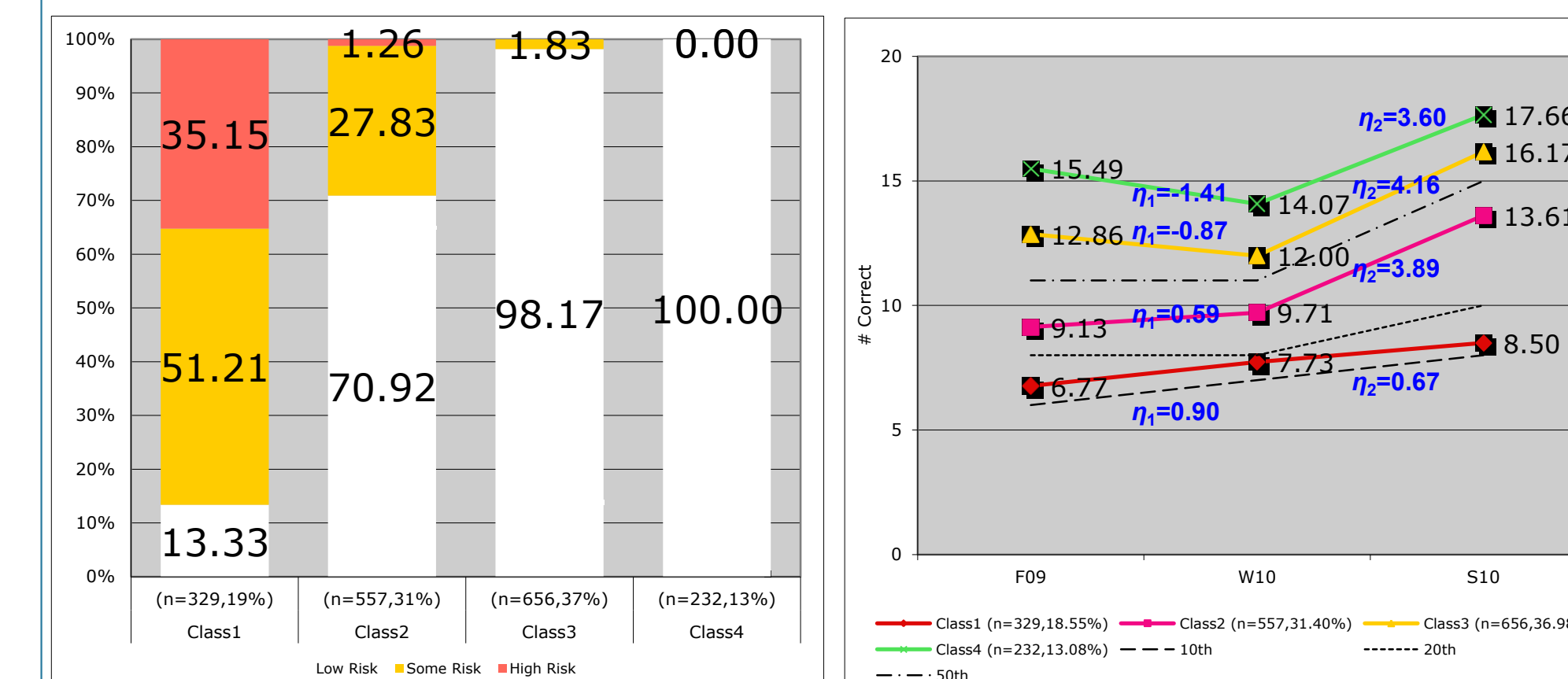
## Analyses

- Piecewise growth modeling
  - Non-linear nature of data with three occasions (Christ et al., 2010 & Nese et al., 2012)
- Unconditional latent class growth analysis (LCGA) with distal outcome
  - Capture heterogeneity in growth patterns
  - Allows for the examination of the individual growth trajectories and class distribution (Jung & Wickrama, 2008)
- Mplus v6 (Muthen & Muthen, 2008)

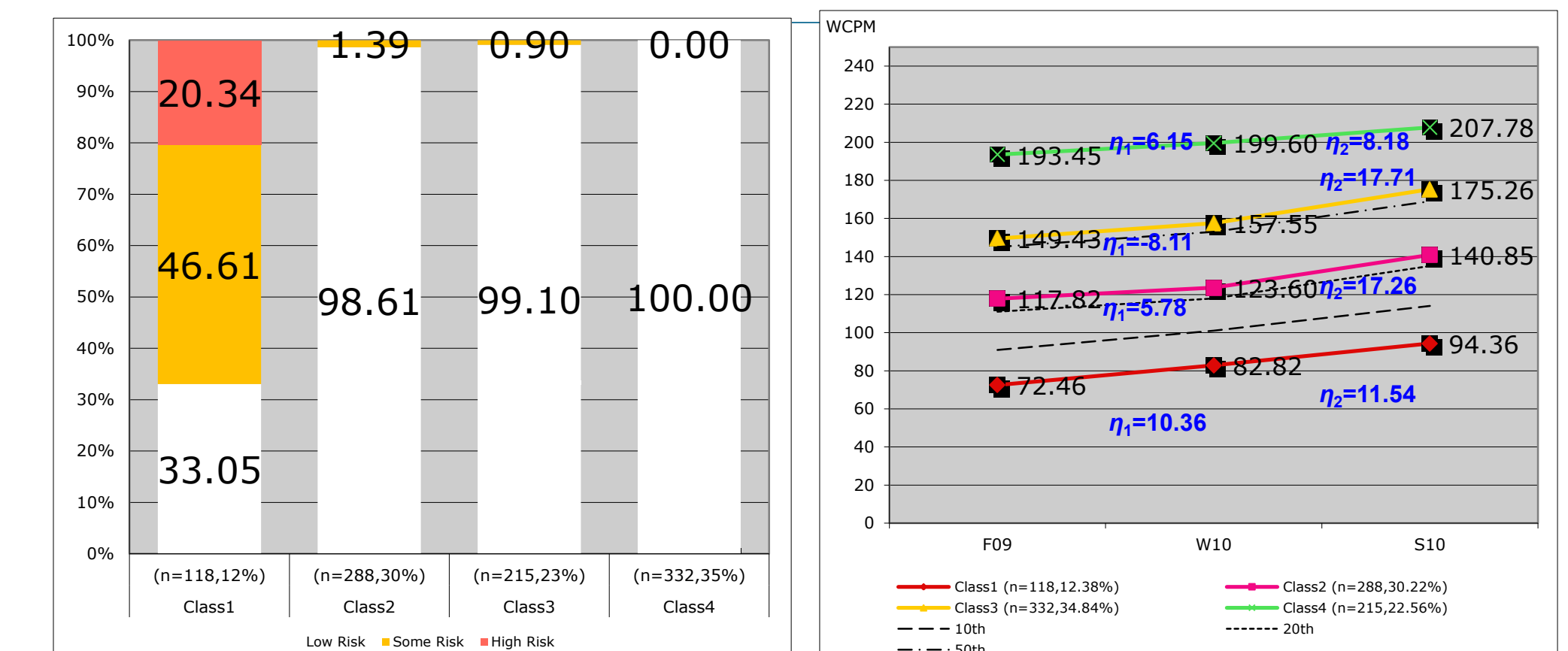
## Model Selection

- Information Criterion (AIC, BIC, ABIC)
- Goodness of fit statistics (LMR, Adjusted LMR)
  - Likelihood ratio test  $p < .05$  indicate model with  $k+1$  latent class is a better model fit
- Other factors
  - Overall interpretability of the class(es)

## Results



G4 PRF--Unconditional Piecewise LCGA with Distal Outcome F10RISK



G5 PRF--Unconditional Piecewise LCGA with Distal Outcome F10RISK

Classification functions of the piecewise LCGA models.

Measures	Grade	# Latent Classes	N	Missing Data	% Missing	Sensitivity	Specificity	Classification Accuracy	% High Risk in sample captured by Class 1
MCRC	3	4	1775	262	0.13	0.94	0.87	0.88	94.31
	4	4	1881	236	0.11	0.86	0.91	0.90	86.49
	5	3	953	1280	0.57	1.00	0.85	0.85	100.00
PRF	3	5	1775	262	0.13	0.91	0.87	0.87	91.04
	4	3	1881	236	0.11	0.94	0.93	0.93	93.69
	5	4	953	1280	0.57	1.00	0.90	0.90	100.00

## Implications

- Viable alternative classification method
- Reading comprehension in later elementary grades
- Acceptable sensitivity, specificity, and classification accuracy
- Preliminary predictive validity of the easyCBM 2-tests risk ratings

## Literature cited

Christ, T. J., Silbergliitt, 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.  
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 Muthén, L. K., & Muthén, B. O. (1998-2012). *Mplus User's Guide. Seventh Edition*. Los Angeles, CA: Muthén & Muthén.

## For further information

Please contact clai1@uoregon.edu. More information on this and related projects can be obtained at <http://brt.uoregon.edu>.