In the Running for Successful Outcomes:
Latent Profiles and Growth Curve Analyses of Students from Kindergarten through Eighth Grade

Elizabeth Hair, Tamara Halle, and Lele Yang

2012 Head Start Conference

Washington, DC

June 19, 2012

www.childtrends.org ▪ Twitter/childtrends ▪ www.facebook.com/childtrends:

Acknowledgements

The *In the Running* Team

- Tamara Halle
  - Child Trends, PI
- Elizabeth Hair
  - NORC, co-PI
- Peg Burchinal
  - UNC-CH, Senior Advisor
- Martha Zaslow
  - SRCD& Child Trends, Senior Advisor
- Rachel Anderson
  - Child Trends, Project Manager

Technical Expert Panel Members

- Linda Espinosa
  - University of Missouri-Columbia, Retired
- Sue Hegland
  - Iowa State University
- Stephanie Jones
  - Harvard Graduate School of Education
- Katherine Magnuson
  - University of Wisconsin-Madison

In the Running for Successful Outcomes
Tamara Halle

Acknowledgements

Project Officers

- **Amy Madigan**
- **Laura Radel**
    - ASPE/HHS

- *The contents of this presentation are solely the responsibility of the authors and do not necessarily represent the official views of the Office of the Assistant Secretary for Planning and Evaluation, or the U.S. Department of Health and Human Services.*

The *In the Running* Project

In the Running for Successful Outcomes was funded by ASPE/HHS to answer the following questions:

- **Are there particular school readiness skills or a level of development that children need to attain in early childhood in order to meet later measures of success?**
  - Do children with different patterns of school readiness skills have different developmental trajectories?

- **Do outcomes in elementary or later schooling depend on the school readiness skills and competencies in various domains at school entry?**

Analytic Approaches

➢Analytic Strategies:

   •**Latent Profile Analyses** of school readiness skills and longitudinal analyses of school-age outcomes

   •**Quadratic** analysis of school readiness skills and longitudinal analyses of school-age outcomes

   •**Piecewise** analysis of school readiness skills and longitudinal analyses of school-age outcomes

Analytic Approach: School Readiness Skills	Representation of "thresholds" of School Readiness Skills in Analyses	Analytic Approach: School-age Outcomes
Person-centered	Latent Profiles	Longitudinal: Growth curve analysis of academic and behavioral skills
Variable-centered	Nonlinear (linear and quadratic) of individual school readiness skills Piecewise spline of individual school readiness skills	Retrospective: Fifth grade status in terms of being "in the running"

Data Sets and Analytic Samples

- **Data Sets:**
  - NICHD Study of Early Child Care and Youth Development (NICHD SECCYD)
  - Early Childhood Longitudinal Study- Kindergarten Class 1998-1999 (ECLS-K)
- **Analytic Sample Characteristics:**
  - First-time kindergartners (ECLS-K)
  - Children who could not complete assessments in English were excluded

School Readiness Measures used in Analyses

School Readiness Constructs	SECCYD	ECLS-K
Social-emotional	Composite ratings of SSRS & TRF externalizing (reversed) at Fall K (teacher ratings)	Composite ratings of SSRS, externalizing (reversed), self-control at Fall K (teacher ratings)
Attention	CPT Continuous performance task at 54 months	NA
Task persistence	CBQ Task Persistence fall K (teacher rating)	Approaches to Learning - Fall K (teacher rating)
Health	Mother rating at 54months	Mother rating at Fall K
Reading	WJR-Letter Word Standard Score at 54 months	ECLS-K Reading – IRT score at Fall K
Math	WJR-Applied Problems Standard Score at 54 months	ECLS-K Math – IRT score at Fall K
Language	Language composite of PLS Auditory Comprehension, PLS Expressive, WJ-R Picture Vocabulary	NA
General Knowledge	NA	ECLS-K General Knowledge IRT score at Fall K

Child TRENDS

Outcome Measures used in Analyses

Outcome Measures	SECCYD	ECLS-K
Reading	WJ-R Passage Comp W Scores (at grades 3 and 5 and age 15)	ECLS-K Reading IRT scores (at Spring of kindergarten and grades 1, 3, 5, and 8)
Math	WJ-R Applied Problems W Scores (at grades 1, 3, and 5 and age 15)	ECLS-K Math IRT scores (at Spring of kindergarten and grades 1, 3, 5, and 8)
Language	WJ-R Picture Vocabulary W Scores (at grades 1, 3, and 5 and age 15)	NA
Externalizing	TRF Externalizing t scores (at kindergarten, grades 1, 2, 3, 4, and 5)	Externalizing (at Spring of kindergarten and grades 1, 3, and 5)
Social Skills	T-rating SSRS St Scores (at kindergarten and grades 1, 2, 3, 4, and 5)	Self control composite(at Spring of kindergarten and grades 1, 3, and 5)

Child TRENDS

Covariates used in Analyses

Covariates	SECCYD	ECLS-K
Sampling	Include Site	Use K weights
Race/ethnicity	Race/Ethnicity	Race/Ethnicity
Gender (female=1)	Female (0/1 variable)	Female (0/1 variable)
Maternal Education	M Education	M Education
Low-income status	Mean of Income/needs 6m-54m < 2	Income/needs Fall of kindergarten < 2
Marital Status	Proportion of time mother married 1-54m	Whether mother is married at fall of kindergarten
Child age	Age on Sept 1 of Kindergarten	Age on Sept 1 of Kindergarten
Disability status	Mother report of disability	Mother report of doctor diagnosis of disability
Home Language	NA	Whether home language is English

Child TRENDS

Latent Profile Analyses

Phase I
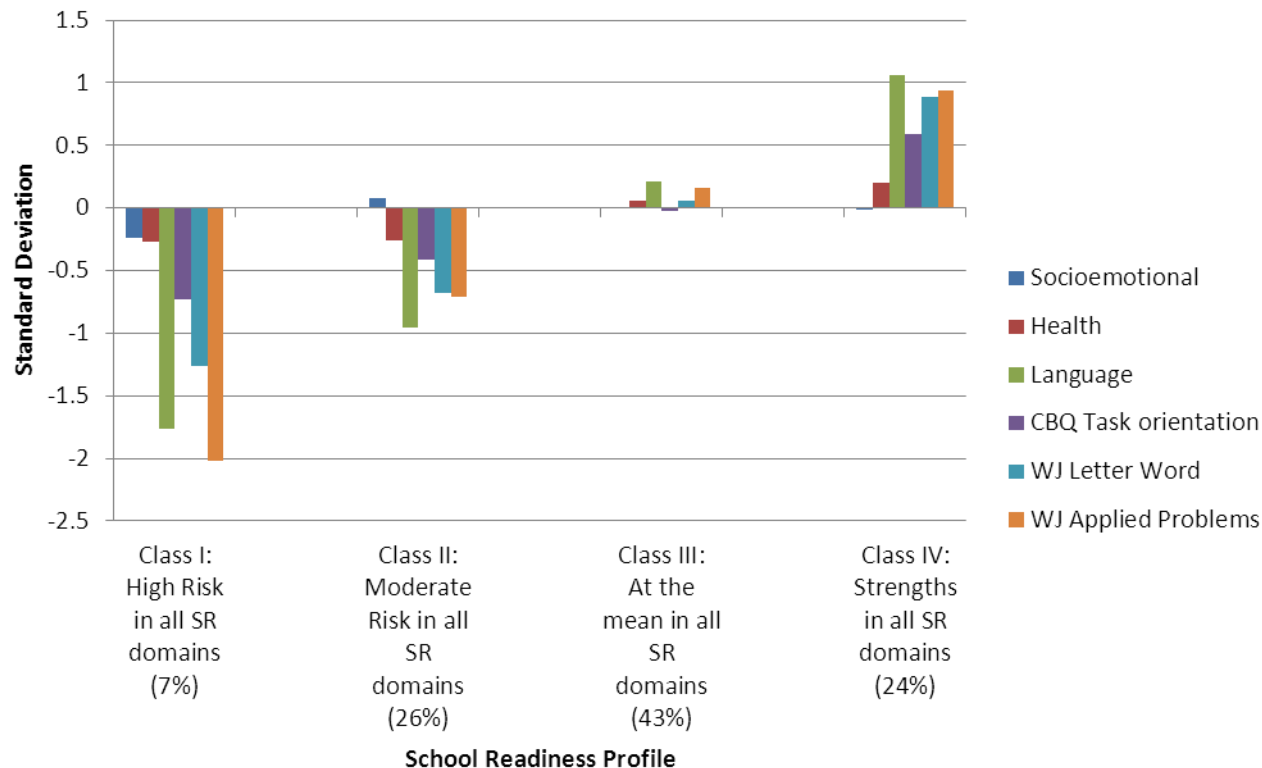- Determine Latent Class (LCA)

Phase II
- Multi-nominal regression predicting the latent classes

Phase III
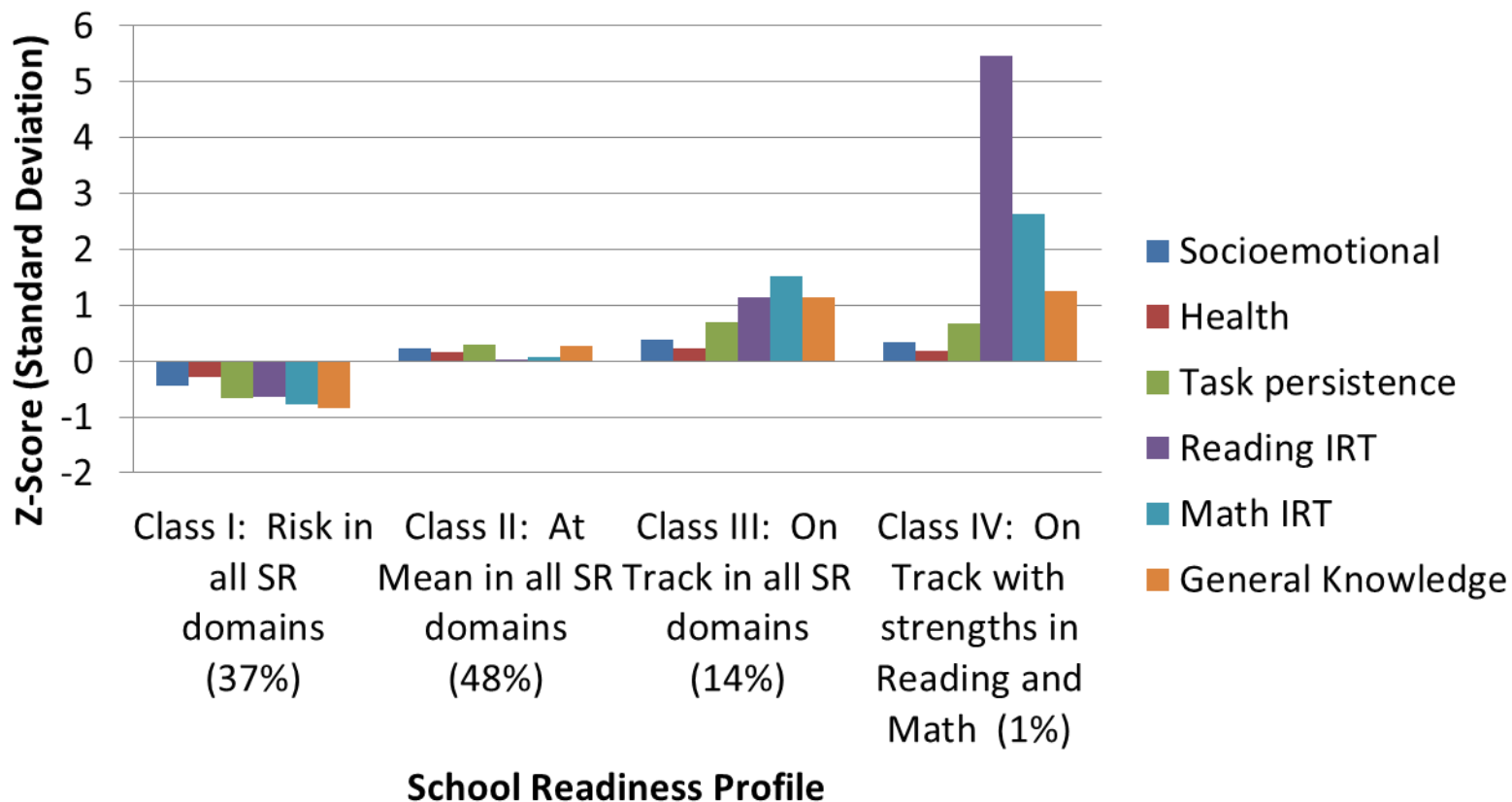- Growth Curve Analyses

Child TRENDS

Phase I: Z Scores for Each Profile

Figure 1. Latent Class Analyses of School Readiness at 54 months in the NICHD SECCYD

Phase I: Z Scores for Each Profile

Figure 2. Latent Class Analyses of School Readiness at Kindergarten entry in the ECLS-K

Phase II: Multinominal Regression Predicting Latent Profiles

Compared to children in Class I (Risk in all School Readiness domains), children in the other Classes were:

- More likely to be female, White, have a mother with higher educational attainment, and be from a family with a higher income-to-poverty threshold (both NICHD SECCYD & ECLS-K)

- More likely to be older, to be from a two-parent family, have both parents employed, and less likely to have a disability (ECLS-K only)

Phase III: Growth Curve Analyses

Figure 3. Developmental Trajectories for Math from the 1st grade to age 15 by School Readiness Profile, NICHD SECCYD
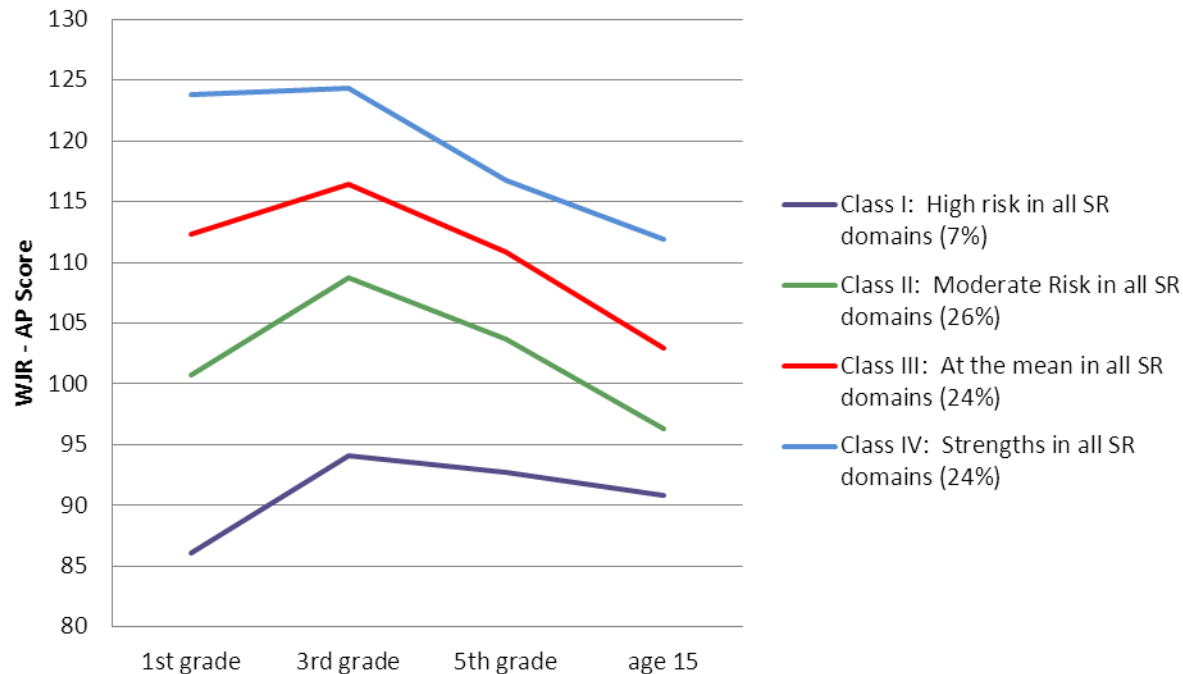
Figure 4: Developmental trajectories for social skills from the first grade through fifth grade by school readiness profile, NICHD SECCYD
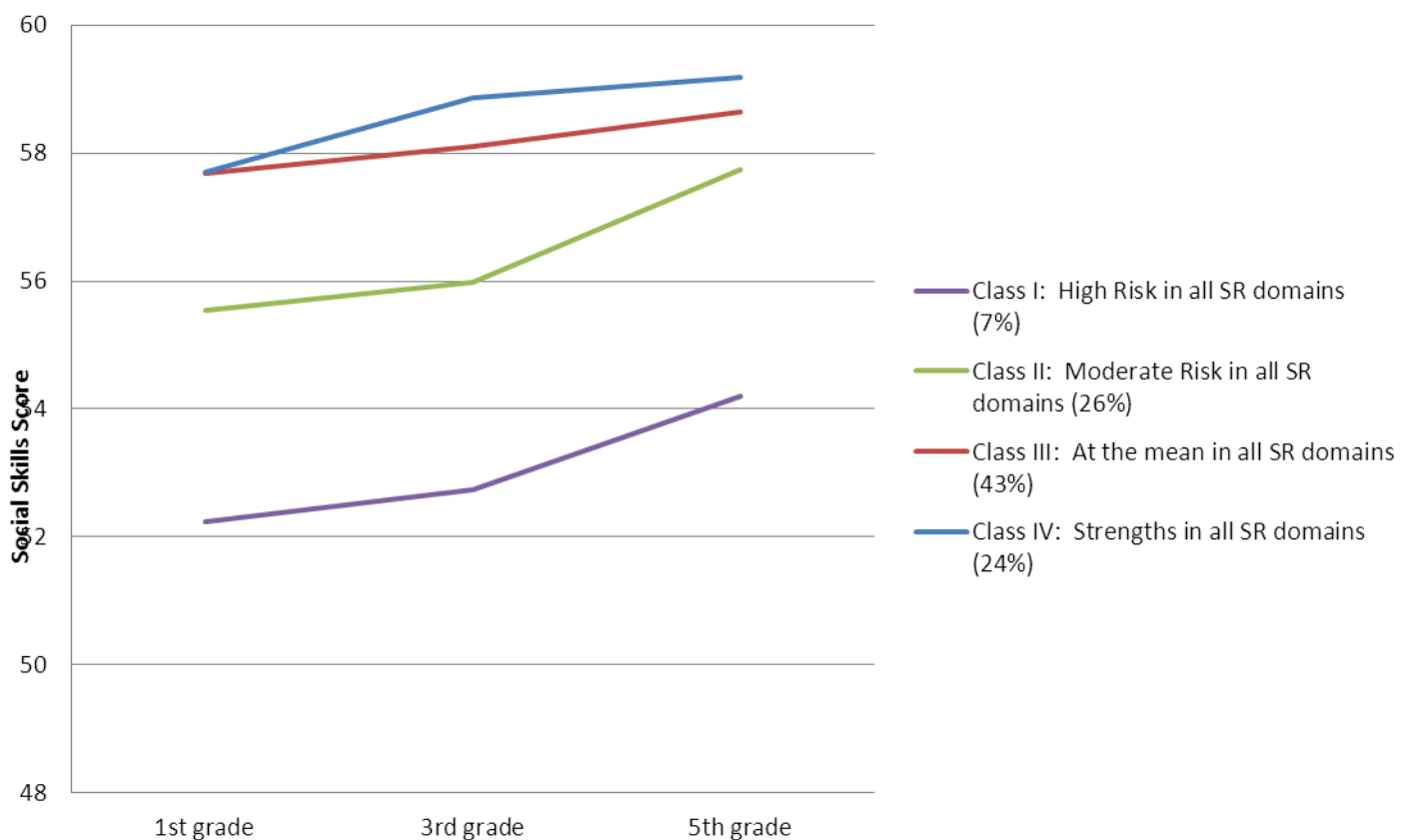
Figure 5. Developmental trajectories for reading from the spring of kindergarten to eighth grade by school readiness profile, ECLS-K
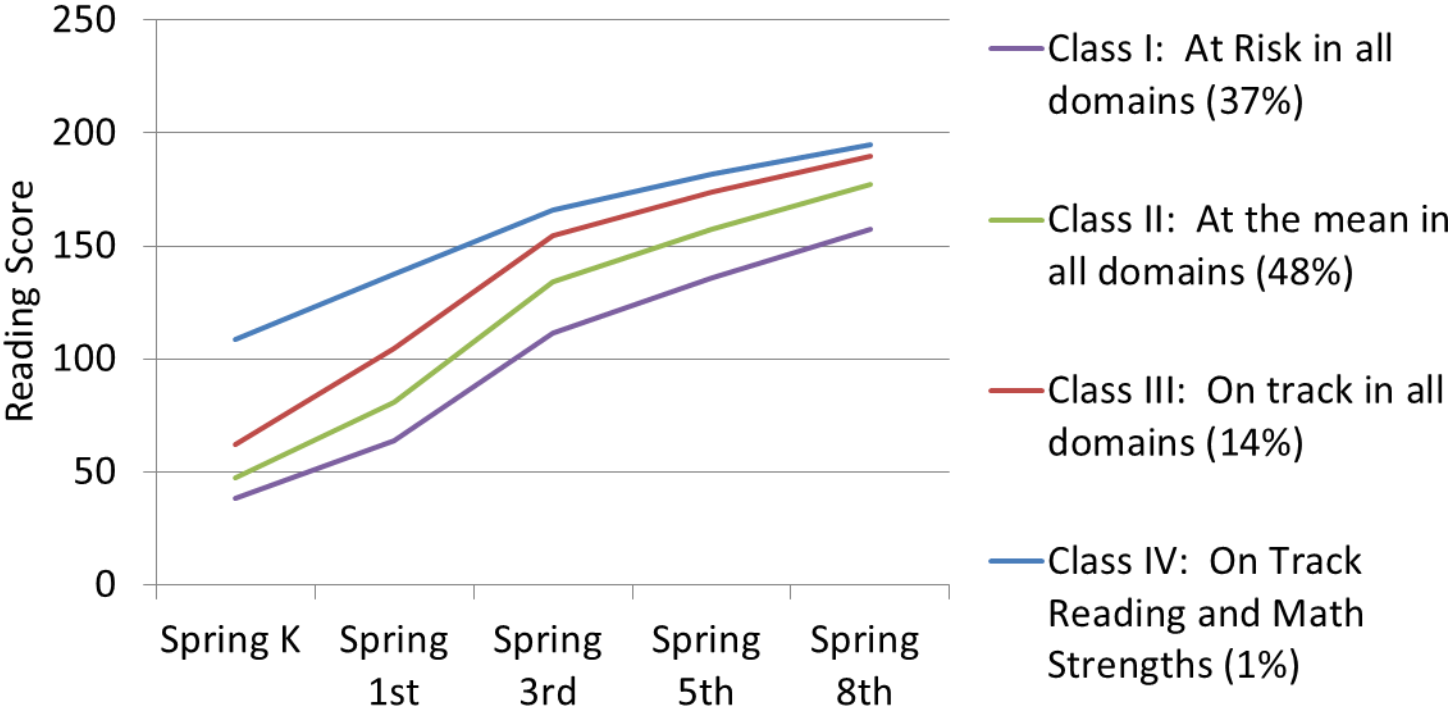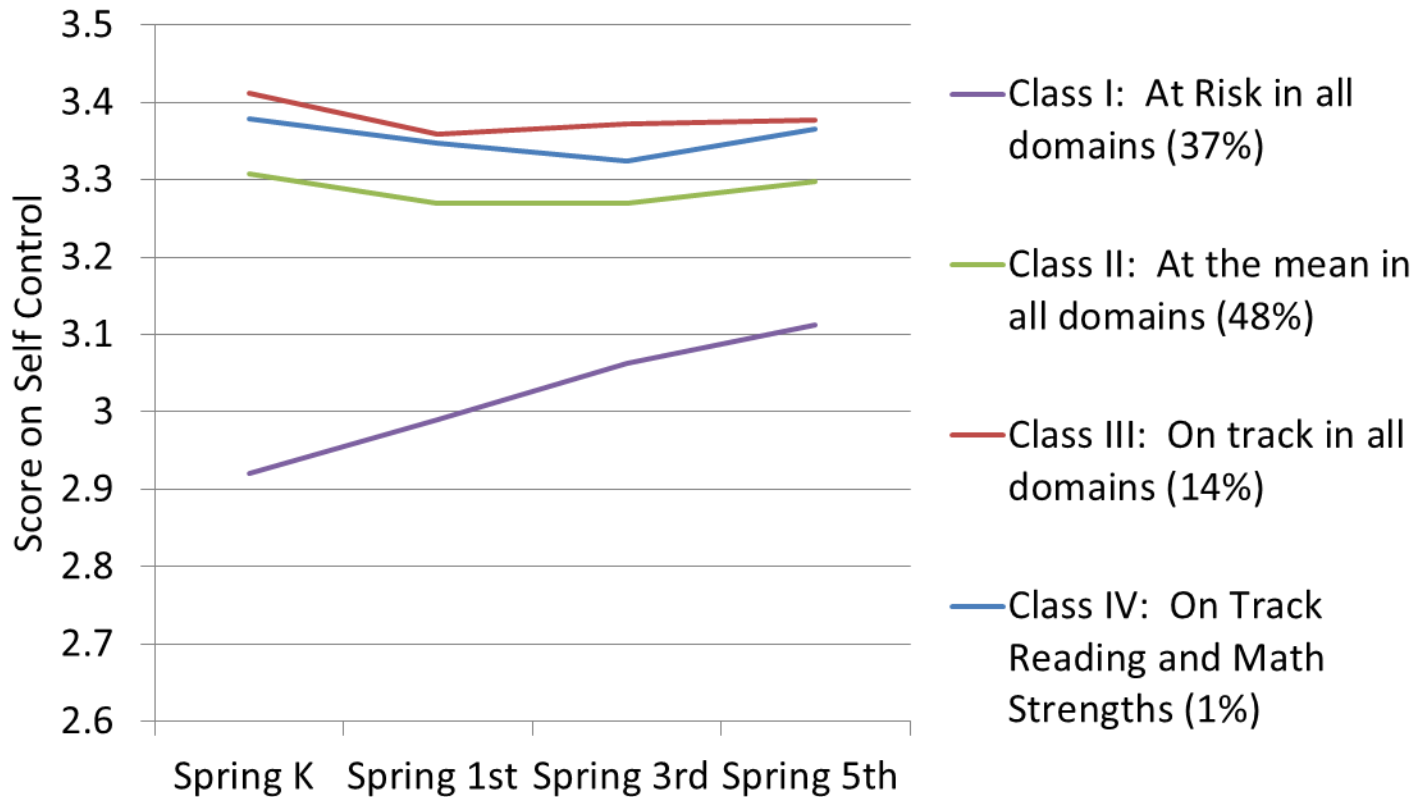
Figure 6. Development trajectories for self-control by school readiness class, ECLS-K

Key Findings:

> Do children who show qualitatively different patterns of school readiness skills have qualitatively different trajectories of performance on academic and social outcomes during elementary school?

- Children **do** show qualitatively different developmental profiles at kindergarten entry

  - Found 4 distinct School Readiness profiles in each dataset

- **However**, these distinct groups have similar developmental trajectories in academic and social outcomes over time

  - Generally linear growth for each outcome measure; scant evidence of accelerated growth (i.e., threshold) for any particular school readiness profile

  - A hierarchical progression was apparent with each latent class performing better than the previous group at spring of kindergarten and during the later school years

Take-Away Messages

- **School Readiness skills matter**
  - Evidence that entry skill levels predicted the level of skills during the school years
  - Children who enter school with higher skills tend to maintain this advantage over time
- **No evidence of a "compensatory" relationship between school readiness skills and cross-domain outcomes in later schooling**

Child TRENDS