
Mathematics Achievement Growth and Achievement Gaps for Students With Disabilities

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Presentation Purpose

- Describe recent work examining growth for Students With Disabilities (SWD) and Students Without Disabilities (SWoD) by specific exceptionality category
- Provide effect size information on change over time and achievement gaps as additional interpretive context for achievement growth

Background

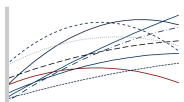
- Limited number of studies that examine academic achievement growth of Students With Disabilities (SWD)
- Of those that do, most only examine SWD vs. SWoD
- A few studies examine specific exceptionalities, usually students with Specific Learning Disability or Speech/Language Impairment
- Only a handful have examined students across multiple exceptionality categories (e.g., Carlson et al., 2011; Wei et al., 2011; 2013)

North Carolina Sample

- North Carolina database of all students in third grade present in 2000-01; we excluded students not on grade; students with no math score in any Grade 3-7; students with missing values on predictor variables; students in exceptionality categories with a sample size smaller than 100
- Analytic sample ($N = 92,045$), 89.3% of database; significantly fewer students with autism, emotional disturbance, intellectual disabilities, and hearing impairments, otherwise no differences

Method and Analysis

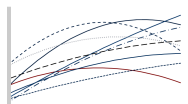
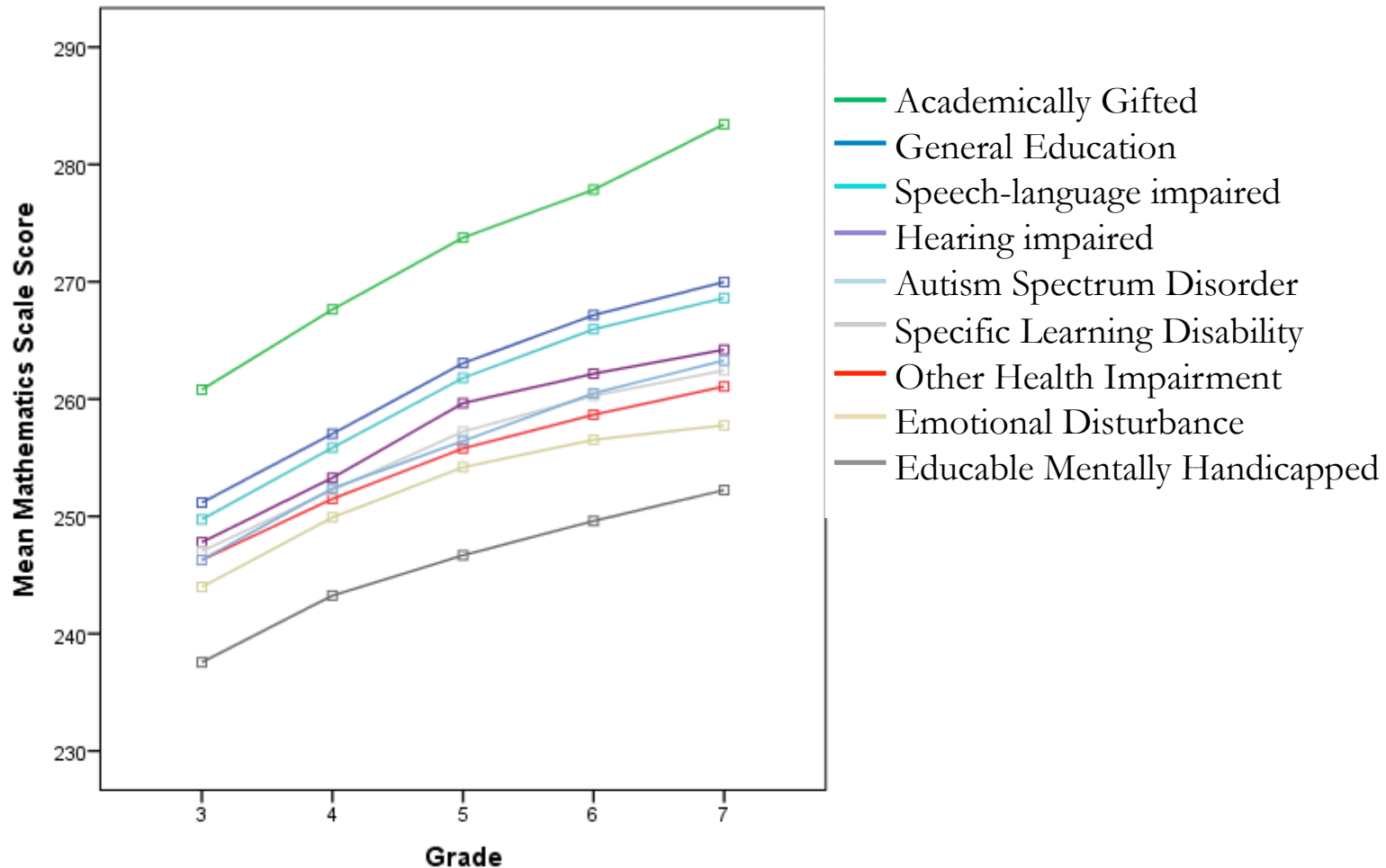
- Outcome measure used was the standardized, second edition North Carolina EOG test score in mathematics
- Forward matching of students Grades 3-7
- Two-level curvilinear HLM of student math growth looking at 7 specific exceptionality groups
- For further interpretation also calculated growth effect size and achievement gap effect size (see Bloom et al., 2008)



Results

- Math growth over Grades 3-7 best represented as a curvilinear function with achievement growth decelerating over time
- Same pattern of significant, but diminishing growth across the 7 exceptionality subgroups
- All subgroups of students with disabilities showed lower initial achievement than their nondisabled peers
- Our estimates of growth effect size showed that, for all student subgroups, the magnitude of growth from earlier grades into middle school decreased
- Our results agree with those of Wei et al. (2013) who found relatively stable maintenance of achievement gaps for almost all exceptionality categories

Mean Mathematics Achievement by Grade and Exceptionality Category

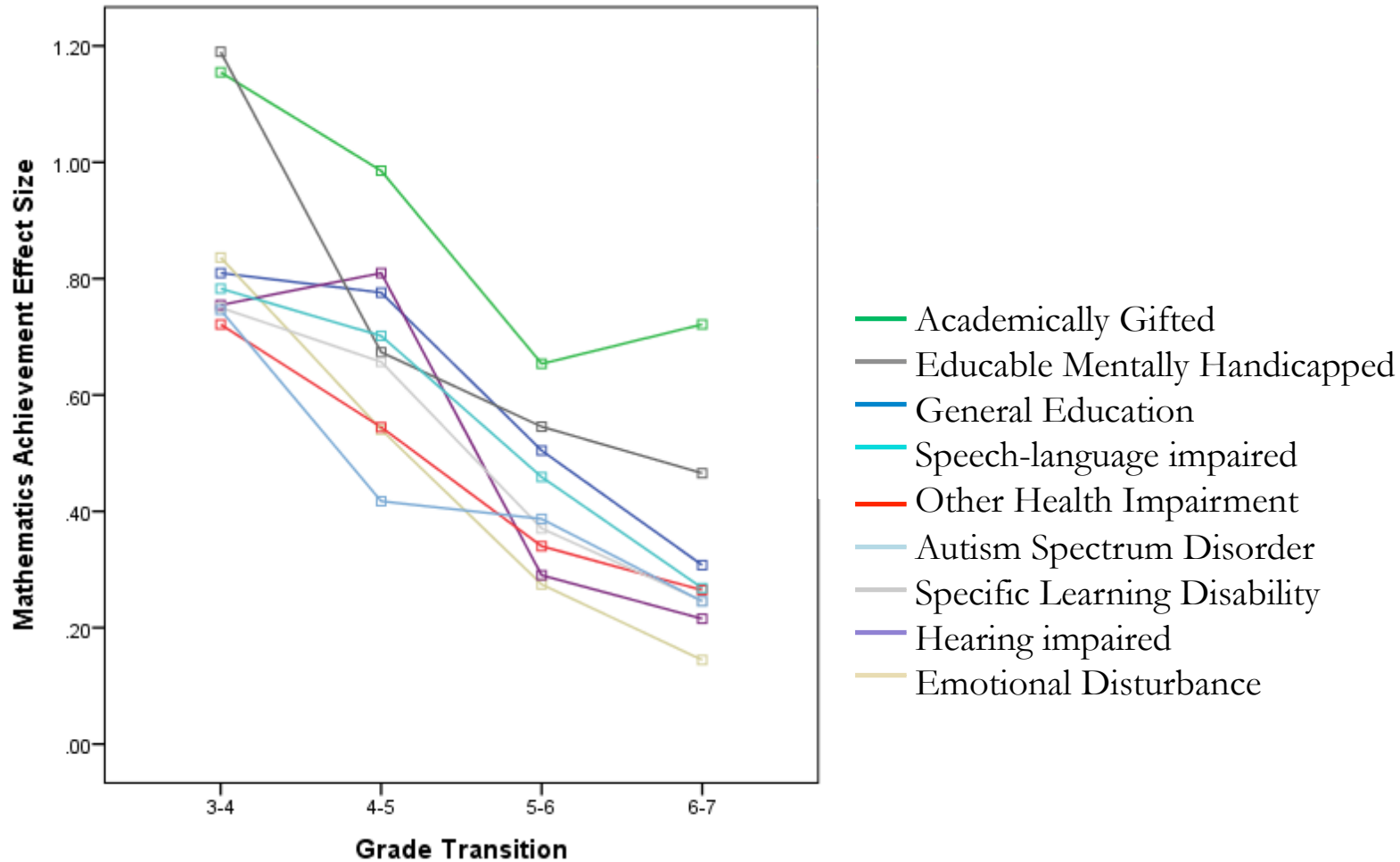


Mathematics Growth Effect Size Over Time by Student Group

Student Group	Grade Transition			
	3-4	4-5	5-6	6-7
Students Without Disabilities	0.78	0.74	0.48	0.32
Students With Disabilities	0.74	0.54	0.32	0.24
General Education	0.81	0.78	0.50	0.31
Academically Gifted	1.15	0.99	0.65	0.72
Autism	0.75	0.42	0.39	0.25
Educable Mentally Handicapped	1.19	0.67	0.55	0.47
Emotional Disturbance	0.84	0.54	0.27	0.14
Hearing Impairment	0.75	0.81	0.29	0.22
Other Health Impairment	0.72	0.54	0.34	0.26
Specific Learning Disability	0.75	0.66	0.37	0.25
Speech Language Impairment	0.78	0.70	0.46	0.27

Note. Students Without Disabilities group is composed of the combination of General Education and Academically Gifted students.

Mathematics Effect Size by Exceptionality Category Over Grades

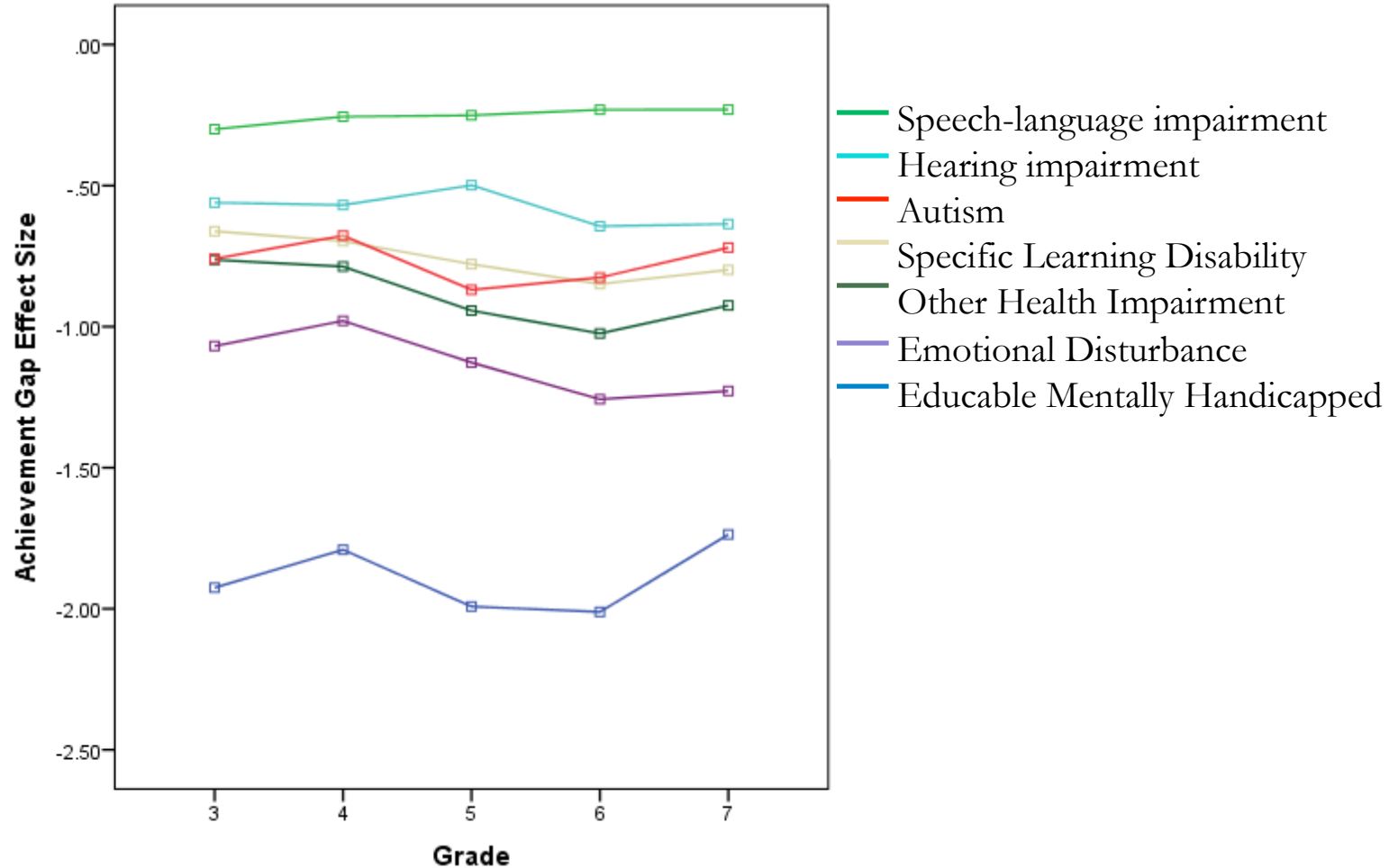


Mathematics Achievement Gap Effect Size by Exceptionality

Category in Comparison to General Education Students

Student Group	Grade				
	3	4	5	6	7
Academically Gifted	+1.28	+1.29	+1.23	+1.16	+1.24
Autism	-0.65	-0.57	-0.76	-0.73	-0.61
Emotional Disturbance	-0.96	-0.87	-1.02	-1.16	-1.12
Hearing Impairment	-0.45	-0.46	-0.39	-0.54	-0.53
Educable Mentally Handicapped	-1.82	-1.68	-1.89	-1.91	-1.63
Other Health Impairment	-0.65	-0.68	-0.84	-0.93	-0.82
Specific Learning Disability	-0.55	-0.59	-0.67	-0.75	-0.69
Speech Language Impairment	-0.19	-0.14	-0.15	-0.13	-0.13

Mathematics Achievement Gap Effect Size by Exceptionality Category Over Grades



Oregon Sample

- (Note that Oregon results are preliminary)
- Oregon database of all students in third grade present in 2007-08; we excluded students not on grade; students with no math score in any grade 3-8; students with missing values on predictor variables; students in exceptionality categories with a sample size smaller than 100
- Analytic sample ($N = 39,227$)
- Sufficient sample sizes to allow examination of 7 exceptionality groups for descriptive analyses, 5 exceptionality groups for HLM

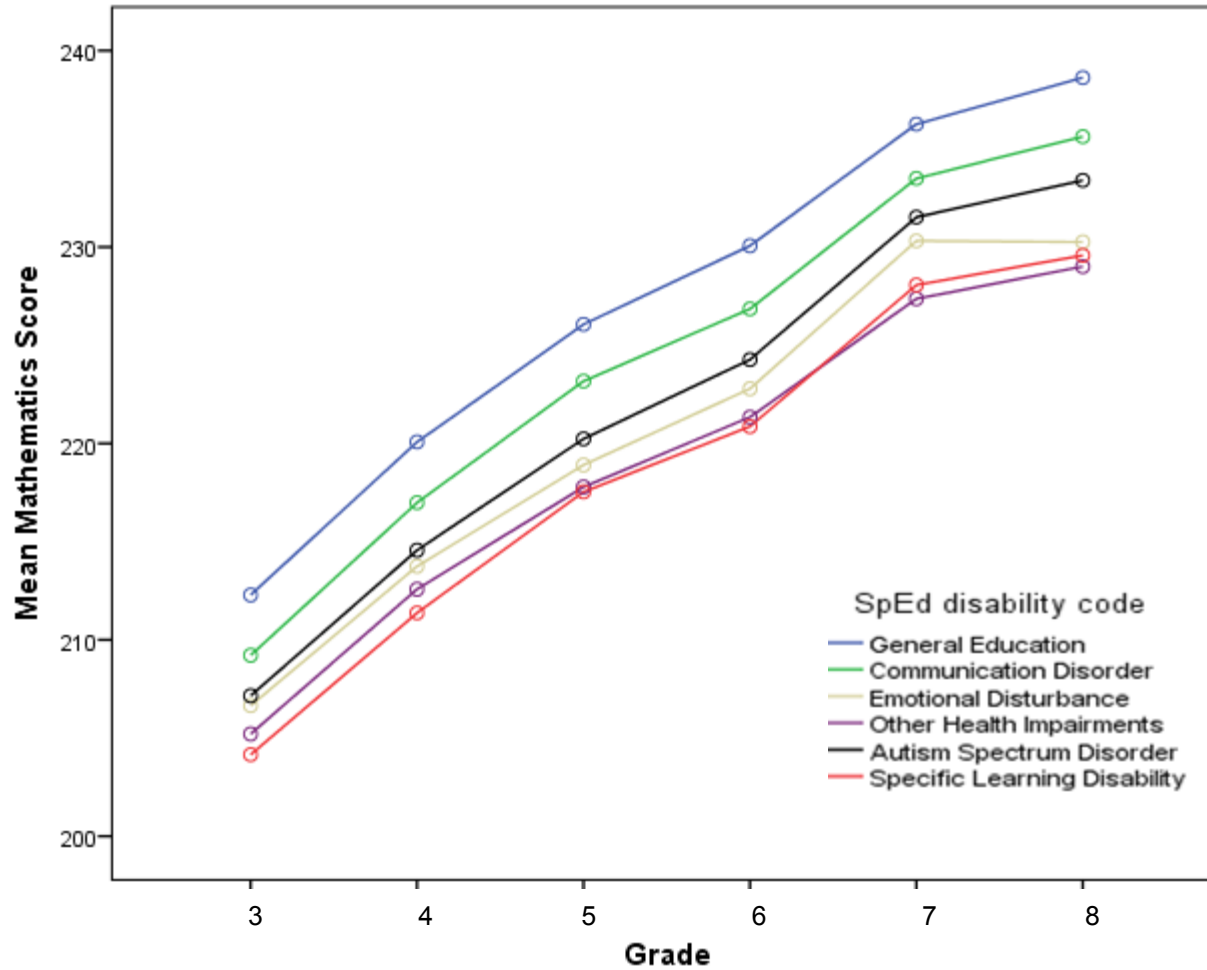
Method and Analysis

- Outcome measure used was the standardized, Oregon test score in mathematics
- Forward matching of students Grades 3-8
- Same analytic methods as the NC analysis: two-level curvilinear HLM of student math growth followed by growth ES and achievement gap ES

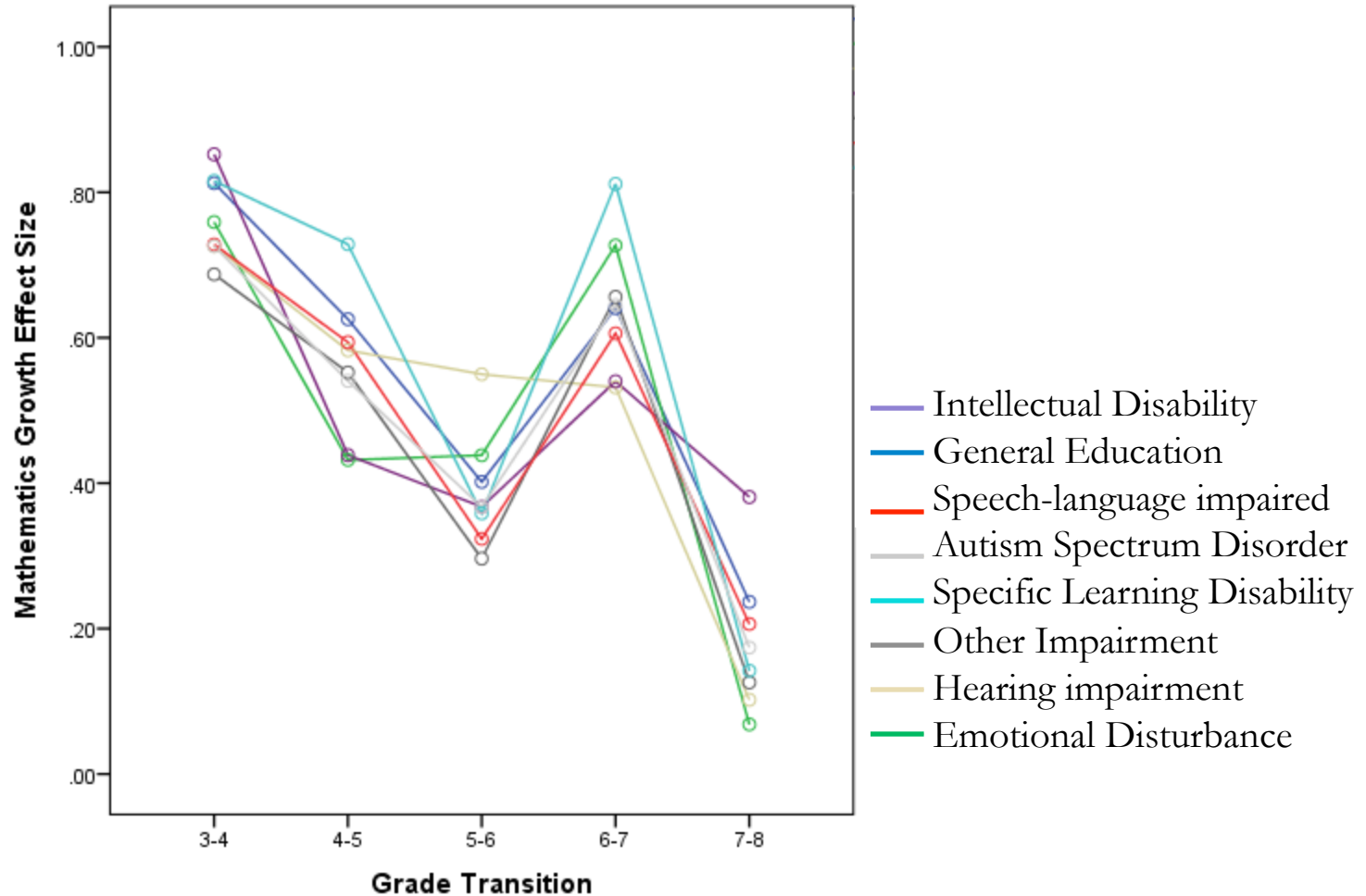
Results

- As with NC, math growth over Grades 3-8 best represented as a curvilinear function with achievement growth decelerating over time
- Same pattern of significant, but diminishing growth across the 5 exceptionality subgroups
- All subgroups of students with disabilities showed lower initial achievement than their nondisabled peers
- Estimates of growth effect size showed that, for all student subgroups, the magnitude of growth tended to decrease over grades, but some discontinuity in middle school transition (note state changed test in Grade 6)
- Achievement gaps substantial, do not close over time, most pronounced for students with intellectual disability (note small n)

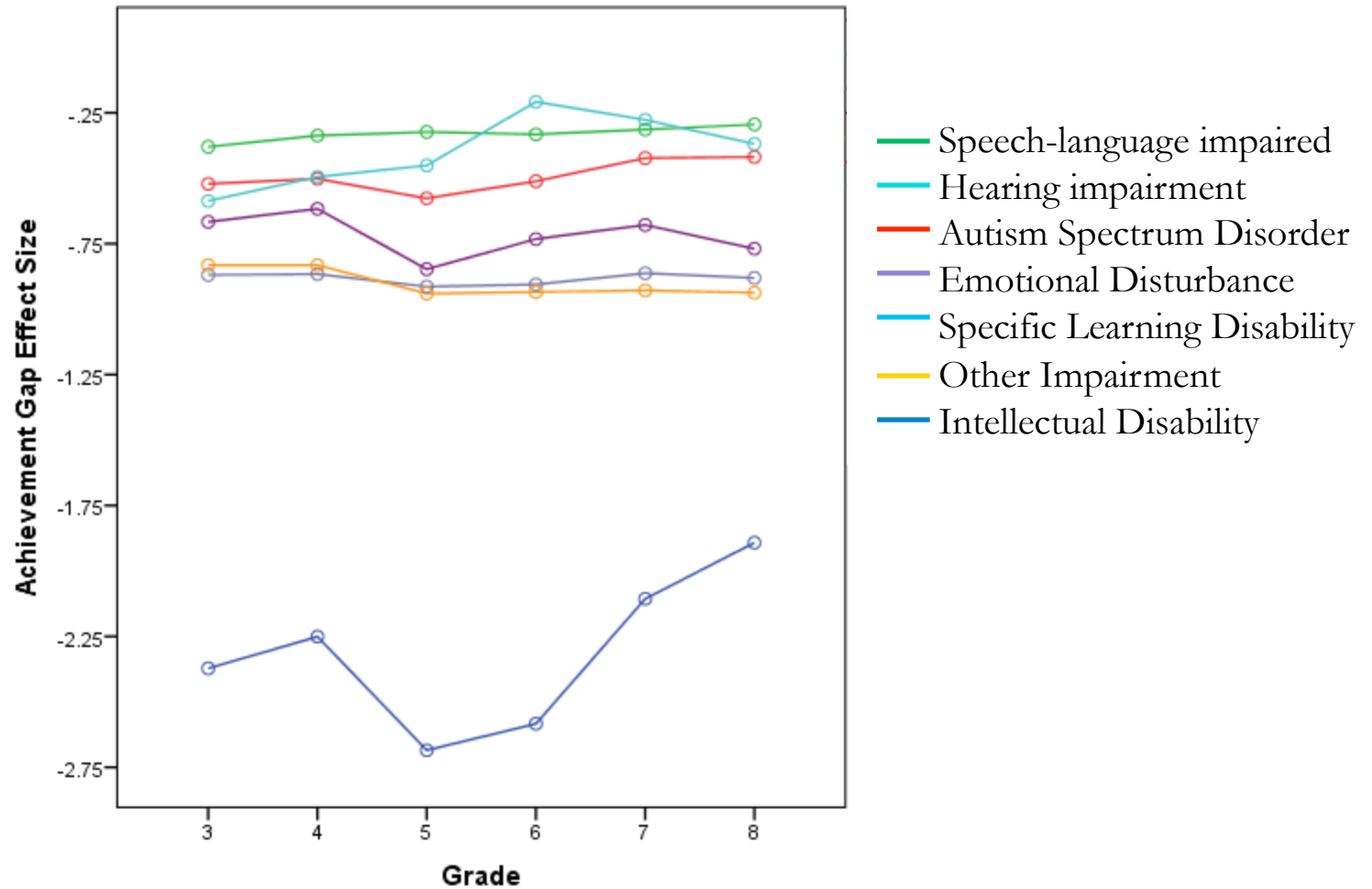
Mean Mathematics Achievement by Grade and Exceptionality Category



Mathematics Effect Size by Exceptionality Category Over Grades



Mathematics Achievement Gap Effect Size by Exceptionality Category Over Grades



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