

Comparing Growth Models with NCTM & CCSS Measures

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Five Research Questions

1. What is the average within-year growth based on NCTM benchmark measures?
2. What is the average within-year growth based on CCSS benchmark measures?
3. Do intercept estimates vary by EL status, SWD status, sex, ethnicity, or race?
4. Does average district EL status affect EL student outcomes and growth?
5. Does average district SWD status affect SWD student outcomes and growth?

Study Methods

- Hierarchical, three-level (*occasions-students-districts*) repeated measures model
- Used a random-effects pattern-mixture model to account for missingness in the data (Enders, 2011)
- ML estimation in *R* with *lme4* package (Bates, Maechler, Bolker, & Walker, 2014)
- Effect sizes for the average growth between time points were computed (Bloom, Hill, Black, & Lipsey, 2008)

Study Results

- Eleven Models (NCTM and CCSS); two presented here
 - Models 1: Unconditional
 - Models 10: Pattern-mixture model, including static EL, SWD, sex, race, ethnicity predictors and missingness patterns (Enders, 2011)
- Model fit evaluated with SRMR, CFI, and RMSEA (Hu & Bentler, 1999; Kline, 2013)
- Competing models evaluated with AIC and BIC (Akaike, 1973; Schwarz, 1978)

HLM Model 10 Results

Summary of Fixed and Random Effects for NCTM and CCSS Time Effects Models 10

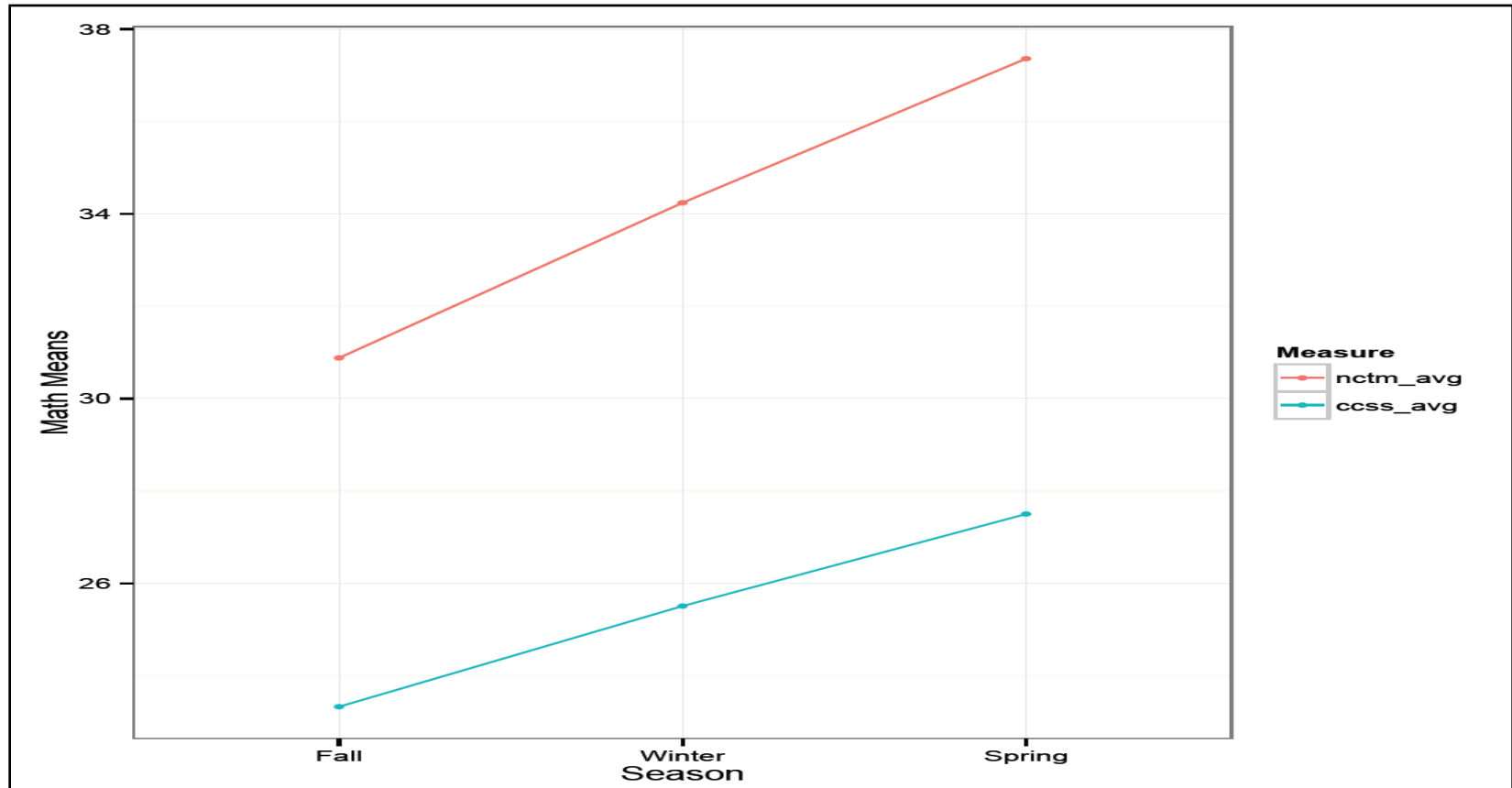
	NCTM	CCSS
<i>Fixed effects</i>		
Intercept	24.65 (1.11)**	22.04 (0.86)**
Time	3.77 (0.48)**	2.53 (0.32)**
Non-missing	8.58 (0.79)**	3.85 (0.66)**
SWD	-7.82 (0.30)**	-5.58 (0.25)**
Male	0.15 (0.17)	0.79 (0.16)**
EL	-4.69 (0.46)**	-2.45 (0.41)**
Hispanic	-1.24 (0.29)**	-1.54 (0.26)**
Non-white	-0.57 (0.26)	-0.07 (0.22)
Avg SWD	-0.92 (0.49)	-0.26 (0.31)
Avg EL	-0.54 (0.62)	-0.83 (0.42)
SWD : time	-0.58 (0.16)**	-0.77 (0.12)**
EL : time	-0.17 (0.23)	-0.38 (0.19)
Avg SWD : time	-0.16 (0.30)	-0.27 (0.17)
Avg EL : time	-0.09 (0.37)	-0.10 (0.24)
<i>Model fit</i>		
Deviance	110,253.10	95,878.60
χ^2	13.54	46.15
<i>df</i>	4	4
<i>p</i>	< .01	< .001
<i>AIC</i>	110,305.10	95,930.60
<i>BIC</i>	110,506.10	96,129.10

** $p < .001$.

Significant differences among covariates across measures (except for sex)

SWD grew at rates significantly lower than peers

Observed Means



Five RQ Answers

1. Controlling for SWD status, gender, EL status, ethnicity, and race, the average within-year growth based on NCTM benchmark measures was 3.77, with an average intercept of 24.65.
2. Controlling for SWD status, gender, EL status, ethnicity, and race, the average within-year growth based on CCSS benchmark measures was 2.53, with an average intercept of 22.04.
3. SWDs, ELs, Hispanic students, and students who are non-white had significantly lower intercepts. SWDs (NCTM: -7.80; CCSS: -5.87), ELs (NCTM: -4.65; CCSS: -4.09), Hispanic Students (NCTM: -1.60; CCSS: -1.51) Gender (CCSS: 0.54).
4. Average district EL status has slower EL rates overall; however, results are not significant.
5. Average district SWD status has slower SWD rates overall; however, results are not significant