Necessary Conditional Growth Percentiles – A Way to Connect Growth to Achievement

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Overview

- The need to connect growth to achievement for accountability systems
- Conditional growth percentiles and adequate growth
- Share results

The need

- Measures of reporting growth often suffer from two issues:
  - No connection to achievement benchmarks
  - Nothing more than achievement but repackaged as growth

The need

- Accountability systems need to develop school level measures of growth that describe the amount of growth that is adequate for:
  - Bringing students that have fallen behind achievement benchmarks up-to-standard – catching up
  - Maintaining achievement levels for students that are already up-to-standard – keeping up

What do we want in a growth measure?

- 1. We would like to measure the growth necessary for a student to reach a benchmark - **necessary** growth.
- 2. We would like to establish how much growth is **adequate** in one year to reach the benchmark over an extended period of time (say, 3 years).
  - That is, if we divide the necessary growth over a longer period of time, what growth is adequate in the intermediate to reasonably predict that the student will reach the benchmark over a prescribed period.
- 3. We would like to account for the fact that some students start much further away than others (Catching Up v. Keeping Up).

The Current Status

- We use growth projections that cover only one year (e.g., spring to spring or fall to fall)
  - Not ideal for students who are far behind achievement benchmarks
  - Most assessment vendors are working on developing growth norms that cover multiple years

- What achievement benchmarks do we connect growth to?
  - Linking studies are being used to connect interim benchmark assessments to achievement levels on state assessments (NWEA MAP assessments with Michigan's summative state assessments –MSTEP)

Definition of Terms

- **Normal/projected growth** - The amount of growth based on similar starting scores, grade level and subject.

- **Necessary Growth** - The amount of growth necessary for a student to achieve or maintain the achievement norm for their subject and grade level.

- **Adequate Growth** - The proportion of necessary growth required to improve the chances that the student will maintain or reach the achievement norm within a selected period of time.

Methods

- Normal (projected) Growth – Amount of growth based on similar starting scores, grade level and subject.

- CGI (Fall to Spring) =

$$\frac{(Spring\ \ Score - Fall\ Score) - (Projected\ Fall\ to\ Spring\ gain)}{Standard\ deviation\ of\ growth}$$

- Necessary Growth – growth connected to a benchmark (e.g., grade level achievement norms, M-STEP – MAP linking scores)

- NCGI (Fall to Spring) =

$$\frac{(Spring\ benchmark\ score\ - Fall\ Score) - (Projected\ Fall\ to\ Spring\ gain)}{Standard\ deviation\ of\ growth}$$

Methods

- Adequate Growth – Proportion of necessary growth that is considered reasonable
- ACGI (Fall to Spring) =

$$\frac{Proportion\ (Spring\ benchmark\ score\ -\ Fall\ Score) - (Projected\ Fall\ to\ Spring\ gain)}{Standard\ deviation\ of\ growth}$$

- Proportion of growth can be .5, .7, .8, .9, or 1.0 (Thum, 2011)
- .7 seems reasonable and performs better than projected growth – Higher sensitivity and specificity rates for necessary growth than for projected growth (68.9% vs 20.5% specificity)

The Data

- School Years

  2016-2017, 2017-2018, 2018-2019

- Grades 3-8
- 12,325 students in reading and 12,371 students in math for 2018-19 school year
- 3362 students with Fall and Spring MAP scores in all three years for mathematics

Results

Group	Test	Sensitivity	Specificity
All	Projected Growth	20.5	95.5
All	Necessary Growth	68.9	97.9
Strong-Start	Projected Growth	18.0	99.6
Strong Start	Necessary Growth	77.0	91.4
Weak-Start	Projected Growth	27.2	94.9
Weak-Start	Necessary Growth	47.6	98.8

Proportions of students

Percent of Students making Adequate Growth in different categories: ABC Academy												
	GTS_70_N			GTS_80_N			GTS_90_N			GTS_100_N		
Subject	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
Reading	0.05	0.50	0.55	0.03	0.50	0.53	0.01	0.50	0.51	0.00	0.50	0.50
Math	0.08	0.54	0.61	0.05	0.54	0.59	0.03	0.54	0.56	0.00	0.54	0.54

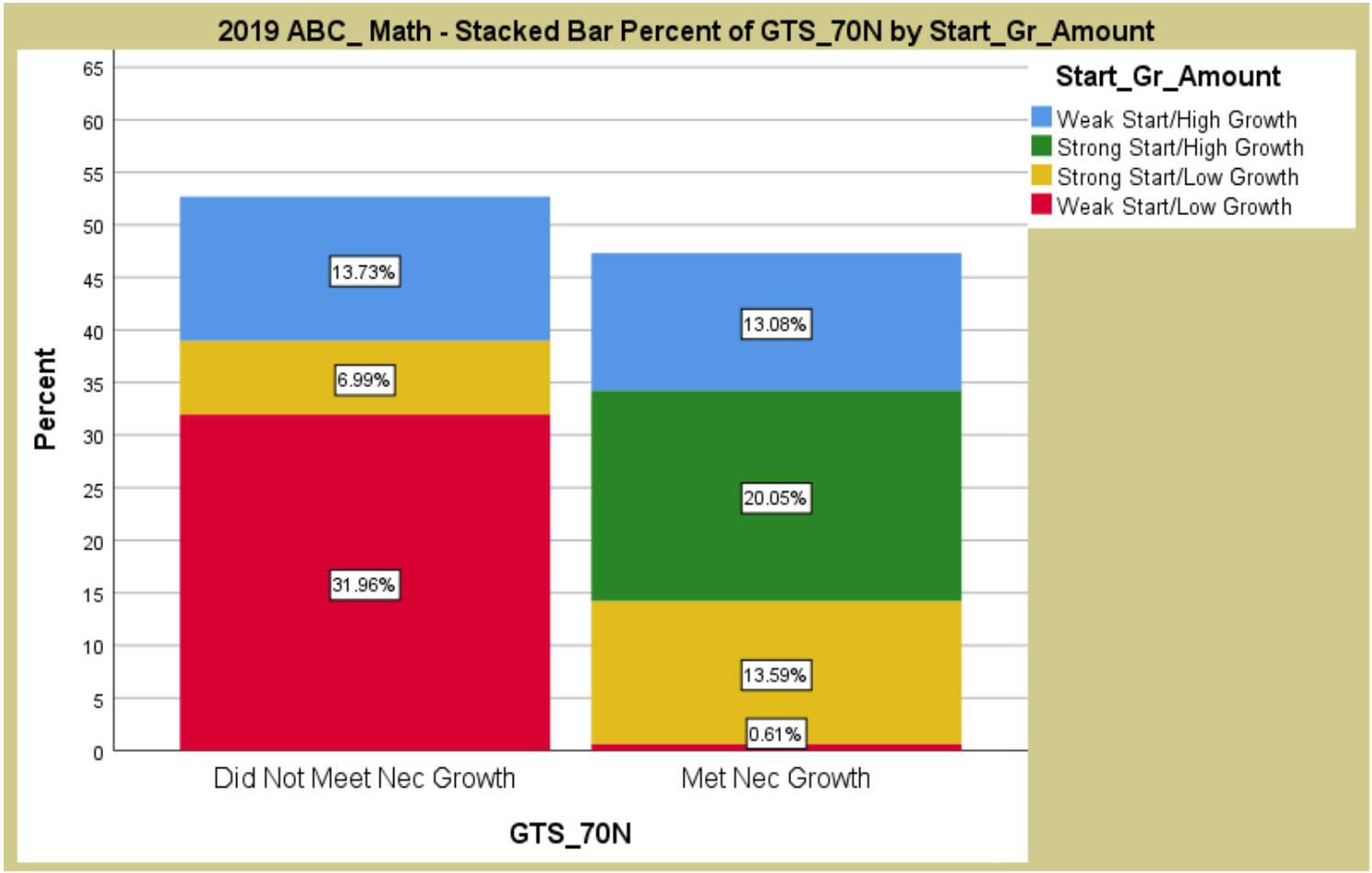
Notes

X is the percentage of students meeting adequate growth but not grade level achievement norms

Y is the percentage of students meeting adequate growth and grade level achievement norms

Z is the percentage of students meeting adequate growth regardless of whether they met grade level achievement norms

Results


2019 ABC_ Math - Stacked Bar Percent of GTS_70N by Start_Gr_Amount
Start_Gr_Amount
Weak Start/High Growth
Strong Start/High Growth
Strong Start/Low Growth
Weak Start/Low Growth
Percent
65
60
55
50
45
40
35
30
25
20
15
10
5
0
13.73%
6.99%
31.96%
13.08%
20.05%
13.59%
0.61%
Did Not Meet Nec Growth
Met Nec Growth
GTS_70N

Conclusions

- The need to use growth targets that are higher than projected growth targets and are connected to achievement benchmarks is more appealing especially in the ‘aftermath’ of the pandemic where educators need to accelerate students’ learning

- Easy to track data, can be easily communicated

Future Work

- Developing growth connections between interim assessments and state summative assessments

- Developing meaningful growth goals (targets) that provide schools a longer runway to accomplish while making students successful when they are still in school

Questions

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