Appendix A to the 2015 Hawaii Growth Model Report
Hawaii Student Growth Model Fit Plots

December 2015

1 Student Growth Percentile Fit Plots

A goodness of fit plot is produced for each unique analysis run in 2015. Each analysis is defined by the grade and content area for the grade-level analyses and the unique course progression sequences for the end of course test (EOCT) subjects.

Each fit plot contains four panels. The top panel is a mosaic plot that shows the percentage of students that fall into each proficiency level, and the location of the 10th through 90th quantiles of the Student Growth Percentile (SGP) distribution represented as dashed white lines (with the exception of the solid white line for the median/50th percentile).

The "Ceiling/Floor Effects Test" panel is intended to help identify potential problems in SGP estimation at the Highest and Lowest Obtainable (or Observed) Scale Scores (HOSS and LOSS). If is is relatively typical for extremely high (low) achieving students to consistently score at or near the HOSS (LOSS) each year, the SGPs for these students may be unexpectedly low (high). The table of values shows whether the current year scale scores at both extremes yield the expected SGPs[1]. The expectation is that the majority of SGPs for students scoring at or near the LOSS will be low (preferably less than 5 and not higher than 10), and that SGPs for students scoring at or near the HOSS will be high (preferably higher than 95 and not less than 90). Because few students may score *exactly* at the HOSS/LOSS, the top/bottom 50 students are selected and any student scoring within their range of scores are selected for inclusion in these tables. Consequently, there may be a range of scores at the HOSS/LOSS rather than a single score, and there may be more than 50 students included in the HOSS/LOSS row if the 50 students at the extremes only contain the single HOSS/LOSS score. Appendix C provides a more detailed analysis of potential ceiling and floor effects.

The bottom left panel shows the empirical distribution of SGPs given prior scale score deciles in the form of a 10 by 10 cell grid. Percentages of student growth percentiles between the 10th, 20th, 30th, 40th, 50th, 60th, 70th, 80th, and 90th percentiles were calculated based upon the decile of the prior year's scaled score (the total students in each for the analyses varies depending on grade and subject). Deviations from perfect fit are indicated by red and blue shading. The further above 10 the darker the red, and the further below 10 the darker the blue. A more detailed discussion about the reasons for and implications of model misfit for the various SGP analysis types can be found in the "Goodness of Fit" section of the 2015 Hawaii Student Growth Model report. The bottom right panel of each plot is a Q-Q plot which compares the observed distribution of SGPs with the theoretical (uniform) distribution.

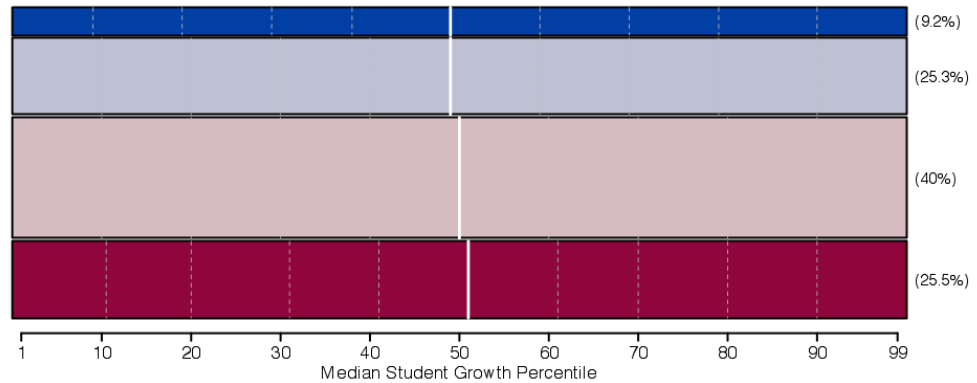# 2 Hawaii Smarter Balanced Assessment (SBA) Grade-Level Plots

2.1 Reading

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[1]Note that the prior year scale scores are not represented here, but are critical in the SGP calculation of all students

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Reading SGP, Grade 4 (N = 13,596)

Prior Achievement Level (Reading)

(9.2%)

(25.3%)

(40%)

(25.5%)

Median Student Growth Percentile

Ceiling / Floor Effects Test

Student Growth Percentile Range

Current Observed Score Extremes (Range)

		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2131,2208)	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 24
	[2208,2230]	96.2	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 26
Highest OSS:	[2663]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	19.3	17.9	55.9	N = 145

Student Growth Percentile Range

Prior Scale Score Decile/Range

	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[195,267)	10.41	9.80	10.33	10.71	10.18	9.73	9.27	9.65	9.57	10.33	(9.7%)
2nd/[267,282)	8.60	9.93	9.85	9.41	10.00	10.29	10.00	10.88	10.96	10.07	(10%)
3rd/[282,294)	9.50	10.24	9.50	9.73	9.50	9.95	10.99	9.80	9.35	11.43	(9.9%)
4th/[294,305)	9.02	10.21	9.99	10.58	10.66	10.28	9.61	9.46	10.95	9.24	(9.9%)
5th/[305,314)	10.62	9.54	10.46	9.38	10.15	10.23	9.54	9.77	9.77	10.54	(9.6%)
6th/[314,323)	9.10	10.30	10.52	9.85	9.70	9.48	11.64	10.07	8.73	10.60	(9.9%)
7th/[323,333)	9.19	10.43	9.33	10.15	9.81	9.67	9.26	10.08	10.84	11.25	(10.7%)
8th/[333,344)	9.93	8.90	9.93	10.53	10.97	10.30	9.56	9.86	10.67	9.34	(9.9%)
9th/[344,360)	9.95	10.38	10.31	10.17	9.52	10.09	9.95	10.31	9.30	10.02	(10.2%)
10th/[360,446]	9.45	9.88	9.81	9.52	9.95	9.81	10.38	9.59	10.45	11.17	(10.3%)

*Prior score deciles can be uneven depending upon the prior score distribution

QQ-Plot: Student Growth Percentiles

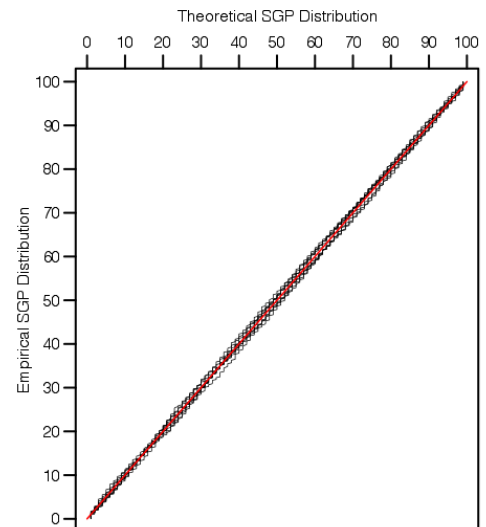Theoretical SGP Distribution
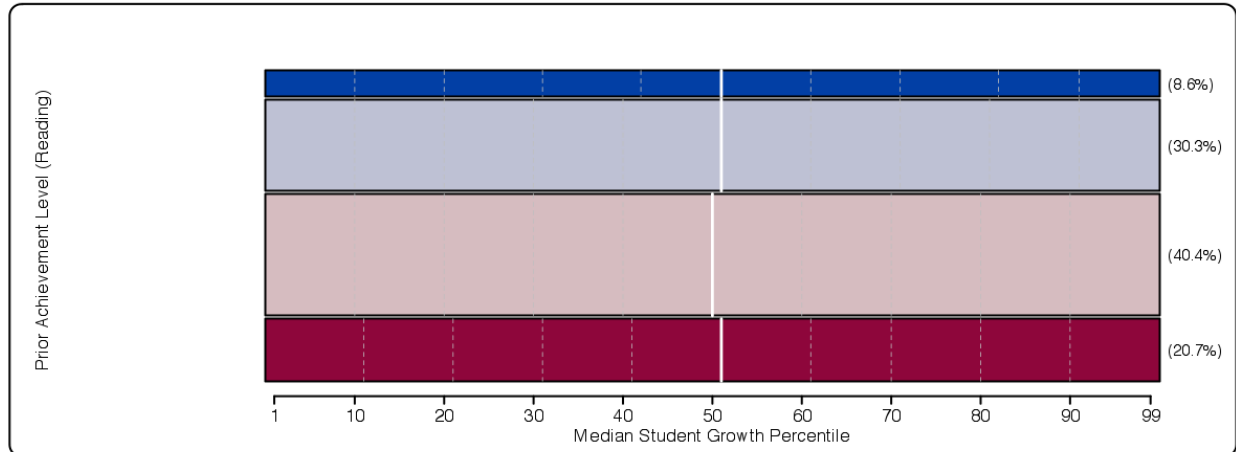
Empirical SGP Distribution

Figure 1: Goodness of Fit Plot for Grade 4 Reading, 2015.

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Reading SGP, Grade 5 (N = 13,357)

Prior Achievement Level (Reading) — Median Student Growth Percentile:
(8.6%), (30.3%), (40.4%), (20.7%)

Ceiling / Floor Effects Test

Student Growth Percentile Range

Current Observed Score Extremes (Range)		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2201,2258)	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 26
	[2258,2270]	88.5	11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 26
Highest OSS:	[2701]	0.0	0.0	0.0	0.7	0.0	0.0	4.1	4.8	8.3	17.9	13.1	51.0	N = 145

Student Growth Percentile Range

Prior Scale Score Decile/Range	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[222,273)	9.25	9.49	10.03	9.25	10.19	9.95	10.03	10.11	10.89	10.81	(9.6%)
2nd/[273,288)	9.49	10.09	10.17	9.79	9.49	9.11	9.41	10.69	10.32	11.45	(9.9%)
3rd/[288,300)	8.23	9.31	9.38	10.77	10.85	11.15	10.69	9.38	9.69	10.54	(9.7%)
4th/[300,309)	10.00	10.08	11.07	9.69	9.16	9.39	9.16	10.92	9.69	10.84	(9.8%)
5th/[309,317)	9.20	10.29	9.06	9.13	10.29	9.86	9.57	9.57	12.10	10.94	(10.3%)
6th/[317,325)	9.34	9.85	10.15	10.29	9.04	10.15	10.44	9.78	8.38	12.57	(10.2%)
7th/[325,333)	9.53	8.03	10.20	10.43	11.03	10.95	10.28	9.45	9.08	11.03	(10%)
8th/[333,342)	9.71	11.74	9.10	10.46	9.78	8.88	10.31	10.84	10.46	8.73	(9.9%)
9th/[342,355)	10.15	8.98	9.42	10.00	10.29	10.95	9.27	9.56	11.17	10.22	(10.3%)
10th/[355,450]	8.89	10.43	10.80	9.85	9.77	9.55	10.14	9.63	9.11	11.83	(10.2%)

*Prior score deciles can be uneven depending upon the prior score distribution
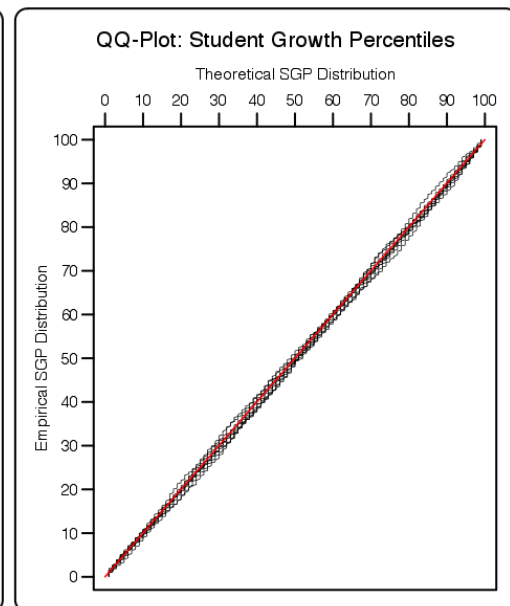
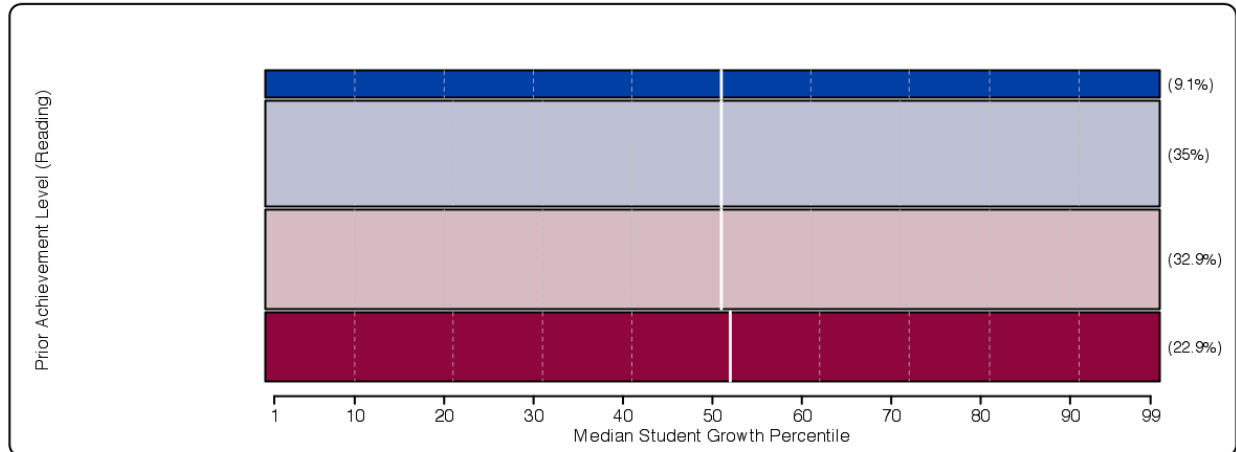### QQ-Plot: Student Growth Percentiles

Figure 2: Goodness of Fit Plot for Grade 5 Reading, 2015.

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Reading SGP, Grade 6 (N = 12,702)

Prior Achievement Level (Reading)

(9.1%)

(35%)

(32.9%)

(22.9%)

Median Student Growth Percentile

Ceiling / Floor Effects Test

Current Observed Score Extremes (Range)

Student Growth Percentile Range

		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2210,2269)	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 25
	[2269,2285]	96.2	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 26
Highest OSS:	[2724]	0.0	0.0	0.0	0.0	0.0	1.8	0.9	2.7	8.8	16.8	18.6	50.4	N = 113

Student Growth Percentile Range

Prior Scale Score Decile/Range

	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[215,270)	9.40	10.05	9.97	10.05	9.56	9.72	9.31	10.29	10.46	11.19	(9.6%)
2nd/[270,287)	9.98	8.90	9.37	9.75	10.29	9.75	10.45	10.68	9.60	11.22	(10.2%)
3rd/[287,298)	8.67	10.16	9.61	9.92	8.98	9.84	10.62	9.45	11.17	11.56	(10.1%)
4th/[298,306)	10.29	10.47	9.50	8.88	9.94	10.47	9.41	10.29	9.67	11.08	(9%)
5th/[306,314)	8.28	9.56	10.54	11.14	10.24	10.24	9.19	9.86	10.02	10.92	(10.5%)
6th/[314,321)	8.83	8.74	10.32	9.91	9.24	9.99	10.32	10.66	10.74	11.24	(9.5%)
7th/[321,330)	9.56	9.33	8.59	9.78	9.56	10.07	10.30	10.67	10.22	11.93	(10.6%)
8th/[330,340)	9.64	10.40	9.49	9.57	10.48	9.42	10.71	9.49	10.33	10.48	(10.4%)
9th/[340,354)	9.56	10.41	9.95	9.01	10.26	10.64	9.56	10.18	9.56	10.88	(10.1%)
10th/[354,455]	8.55	9.64	9.64	9.88	9.33	9.72	10.58	10.26	11.04	11.35	(10.1%)

*Prior score deciles can be uneven depending upon the prior score distribution

QQ-Plot: Student Growth Percentiles

Theoretical SGP Distribution
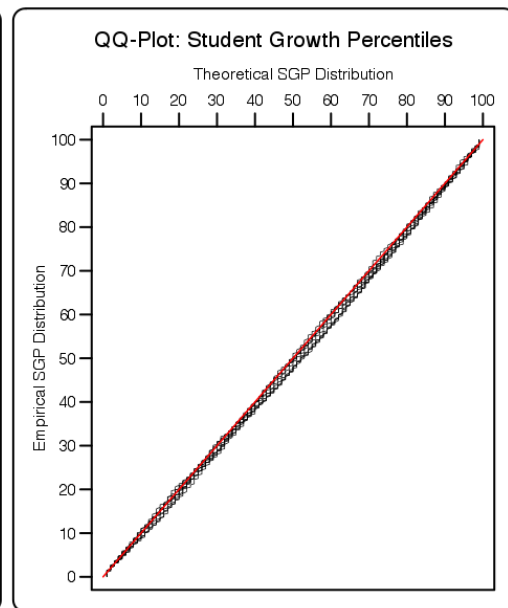
Empirical SGP Distribution

Figure 3: Goodness of Fit Plot for Grade 6 Reading, 2015.

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Reading SGP, Grade 7 (N = 11,985)
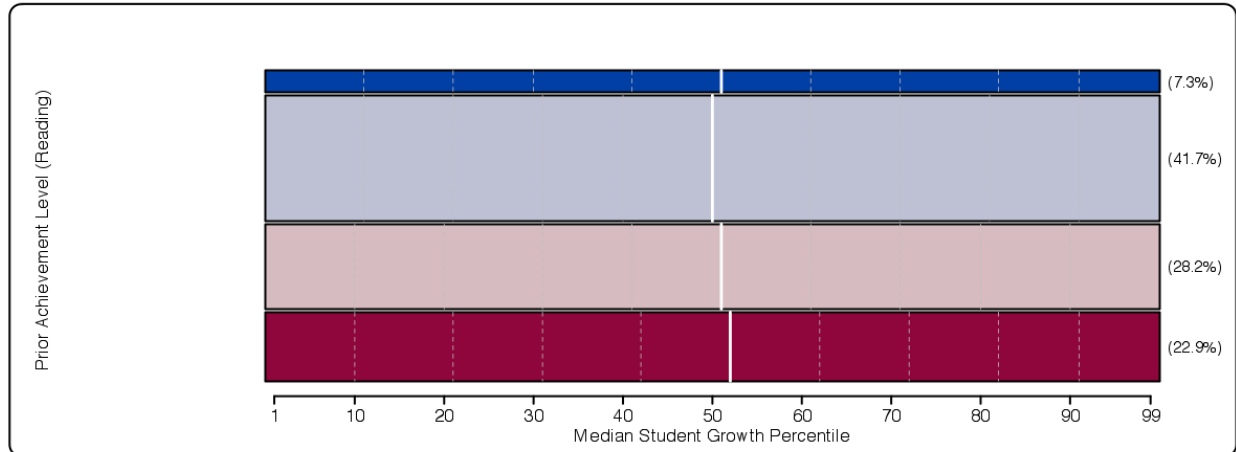

Figure 4: Goodness of Fit Plot for Grade 7 Reading, 2015.

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Reading SGP, Grade 8 (N = 11,212)

Prior Achievement Level (Reading)

(7%)
(45.9%)
(26%)
(21.2%)

Median Student Growth Percentile

Ceiling / Floor Effects Test

Student Growth Percentile Range

Current Observed Score Extremes (Range)

		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2288,2294)	96.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 25
	[2294,2316]	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 25
Highest OSS:	[2769]	0.0	0.0	0.0	0.0	0.0	1.3	1.3	3.9	13.2	14.5	21.1	44.7	N = 76

Student Growth Percentile Range

Prior Scale Score Decile/Range

	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[173,276)	10.02	10.55	9.21	8.32	9.75	10.20	9.75	9.30	10.47	12.43	(10%)
2nd/[276,291)	9.35	9.07	10.16	10.34	9.62	9.62	9.53	10.53	10.07	11.71	(9.8%)
3rd/[291,301)	9.23	9.23	8.66	10.73	9.13	9.79	9.98	10.83	10.36	12.05	(9.5%)
4th/[301,309)	9.79	10.26	9.89	9.14	10.73	9.24	10.73	9.70	9.79	10.73	(9.6%)
5th/[309,317)	10.02	8.78	10.34	9.69	9.28	9.77	9.85	9.28	11.00	11.99	(10.9%)
6th/[317,324)	8.47	9.26	9.56	9.76	10.76	10.56	10.26	10.06	10.36	10.96	(9%)
7th/[324,332)	9.31	11.24	9.40	10.40	9.48	10.32	9.06	10.65	9.56	10.57	(10.6%)
8th/[332,341)	8.39	9.01	9.89	10.42	8.92	10.25	10.87	10.16	11.75	10.34	(10.1%)
9th/[341,355)	11.60	9.41	10.00	9.58	9.66	8.24	10.00	9.75	9.50	12.27	(10.6%)
10th/[355,461]	9.80	10.07	9.36	9.89	10.52	10.78	9.89	9.71	9.80	10.16	(10%)

*Prior score deciles can be uneven depending upon the prior score distribution

QQ-Plot: Student Growth Percentiles

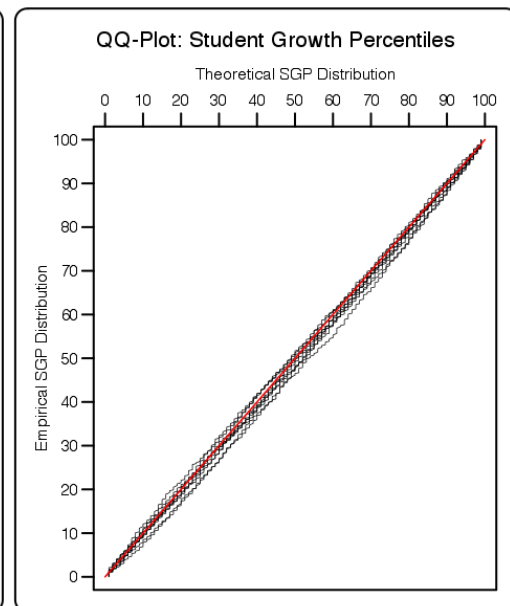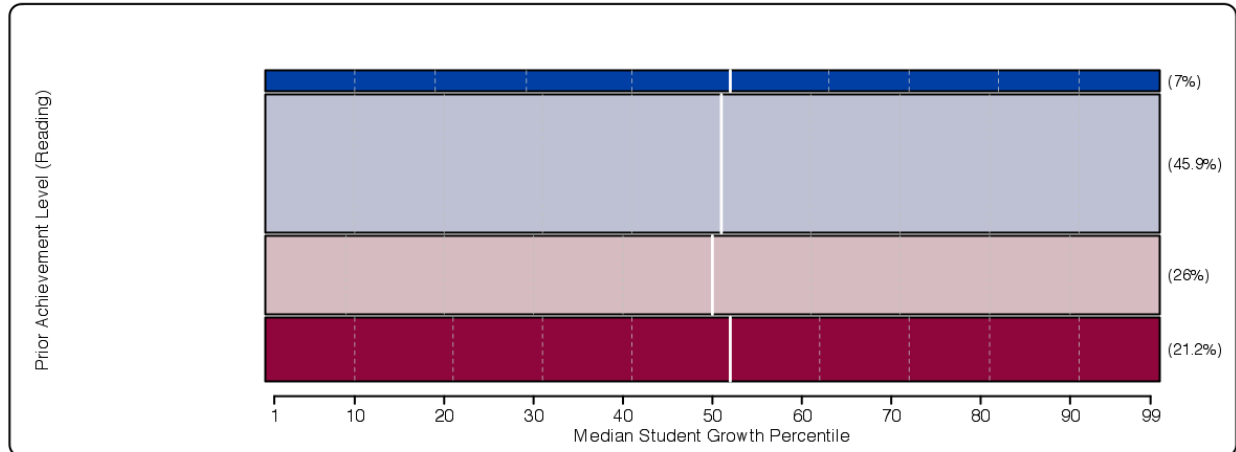Theoretical SGP Distribution
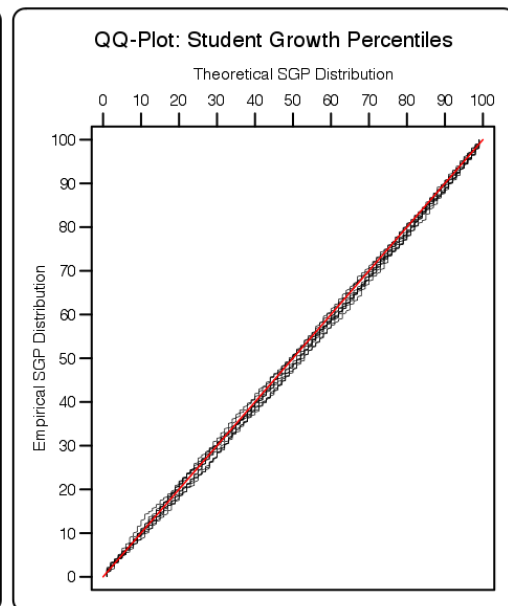
Empirical SGP Distribution

Figure 5: Goodness of Fit Plot for Grade 8 Reading, 2015.

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Reading SGP, Grade 11 (N = 9,460)

Ceiling / Floor Effects Test

Student Growth Percentile Range

Current Observed Score Extremes (Range)		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2299,2305)	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 24
	[2305,2318]	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 26
Highest OSS:	[2795]	0.0	0.0	0.8	0.8	0.0	1.6	4.8	8.1	10.5	20.2	13.7	39.5	N = 124

Student Growth Percentile Range

Prior Scale Score Decile/Range	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[179,278)	10.54	9.37	8.41	10.44	9.27	10.12	10.86	9.69	9.90	11.40	(9.9%)
2nd/[278,292)	9.05	9.49	9.38	9.38	11.37	8.50	10.04	10.60	11.37	10.82	(9.6%)
3rd/[292,301)	10.50	9.83	9.61	11.16	10.72	9.06	9.50	9.61	11.27	8.73	(9.6%)
4th/[301,308)	9.77	8.06	10.96	9.77	9.77	9.77	9.88	9.56	10.10	12.35	(9.8%)
5th/[308,315)	8.90	10.83	9.43	9.75	8.25	11.47	9.97	10.50	10.61	10.29	(9.9%)
6th/[315,322)	9.25	8.92	9.25	10.65	10.32	9.25	10.32	9.25	10.65	12.15	(9.8%)
7th/[322,330)	10.43	10.53	10.23	9.63	10.03	10.23	8.93	10.13	9.63	10.23	(10.5%)
8th/[330,340)	10.94	9.56	10.64	10.34	9.85	10.05	8.87	10.64	10.34	8.77	(10.7%)
9th/[340,353)	9.44	9.44	8.80	9.12	9.76	9.86	11.45	10.50	10.82	10.82	(10%)
10th/[353,451]	10.72	10.51	9.99	10.09	9.57	9.99	10.41	9.57	9.99	9.16	(10.2%)

*Prior score deciles can be uneven depending upon the prior score distribution

QQ-Plot: Student Growth Percentiles

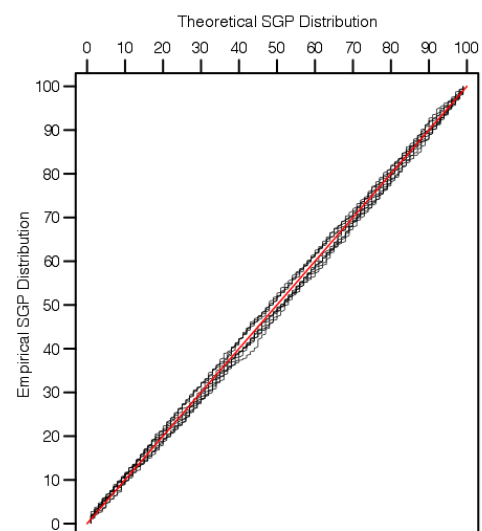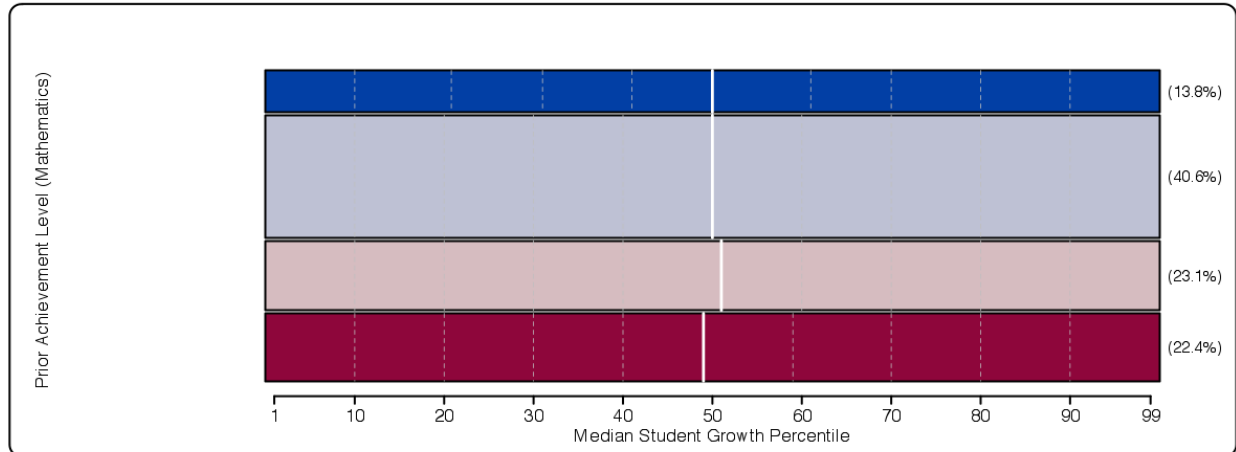Theoretical SGP Distribution

Figure 6: Goodness of Fit Plot for Grade 11 Reading, 2015.

2.2   Mathematics

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Mathematics SGP, Grade 4 (N = 13,538)

Figure 7: Goodness of Fit Plot for Grade 4 Mathematics, 2015.

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Mathematics SGP, Grade 5 (N = 13,329)

Prior Achievement Level (Mathematics) — Median Student Growth Percentile

- (12%)
- (41.6%)
- (21.5%)
- (24.9%)

Ceiling / Floor Effects Test

Student Growth Percentile Range

Current Observed Score Extremes (Range)

		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2219,2248)	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 24
	[2248,2270]	63.0	29.6	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 27
Highest OSS:	[2700]	0.0	0.0	0.0	0.0	0.0	0.0	5.0	5.9	12.6	21.0	11.8	43.7	N = 119

Student Growth Percentile Range

Prior Scale Score Decile/Range

	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[165,263)	9.08	9.70	9.70	9.78	9.55	9.94	10.02	10.40	10.64	11.18	(9.7%)
2nd/[263,280)	9.42	9.87	10.40	9.80	10.10	10.32	9.65	9.72	9.50	11.22	(10%)
3rd/[280,292)	8.84	10.21	9.22	9.60	10.44	9.22	10.44	9.60	11.59	10.82	(9.8%)
4th/[292,302)	9.70	9.93	10.40	10.32	8.99	10.79	9.46	10.24	9.62	10.56	(9.6%)
5th/[302,311)	8.66	10.75	9.93	9.19	10.38	9.71	10.68	9.11	9.71	11.87	(10%)
6th/[311,320)	9.27	8.74	8.66	11.09	10.26	9.80	10.03	10.26	11.32	10.56	(9.9%)
7th/[320,330)	9.80	10.83	10.90	8.78	10.10	9.44	10.39	10.39	9.36	10.02	(10.3%)
8th/[330,344)	8.83	9.19	9.90	11.04	9.69	10.40	10.19	10.83	9.97	9.97	(10.5%)
9th/[344,362)	9.86	9.56	8.64	9.63	10.32	10.47	9.71	9.86	10.40	11.54	(9.8%)
10th/[362,482]	9.43	10.44	10.73	10.01	9.43	9.86	9.79	9.64	9.86	10.80	(10.3%)

*Prior score deciles can be uneven depending upon the prior score distribution

QQ-Plot: Student Growth Percentiles

Theoretical SGP Distribution — Empirical SGP Distribution

Figure 8: Goodness of Fit Plot for Grade 5 Mathematics, 2015.

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Mathematics SGP, Grade 6 (N = 12,697)

Prior Achievement Level (Mathematics) (vertical axis)

- (12.7%)
- (40.9%)
- (23.5%)
- (23%)

Median Student Growth Percentile (1, 10, 20, 30, 40, 50, 60, 70, 80, 90, 99)

Ceiling / Floor Effects Test

Student Growth Percentile Range

Current Observed Score Extremes (Range)

		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2235]	68.4	17.7	12.7	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 79
Highest OSS:	[2748]	0.0	0.0	0.0	0.0	0.0	0.0	2.0	6.1	5.1	23.5	18.4	44.9	N = 98

Student Growth Percentile Range

Prior Scale Score Decile/Range	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[183,263)	8.98	9.06	9.69	10.01	9.77	9.38	10.95	9.77	10.01	12.37	(10%)
2nd/[263,281)	9.66	10.77	8.14	8.78	10.45	10.14	8.86	10.30	11.09	11.81	(9.9%)
3rd/[281,293)	8.57	8.16	10.14	9.73	9.40	9.81	11.05	10.39	10.63	12.12	(9.6%)
4th/[293,303)	8.47	10.03	10.28	9.87	9.70	9.70	10.53	10.12	10.86	10.44	(9.6%)
5th/[303,312)	8.34	9.66	9.90	9.59	9.20	10.60	10.91	9.74	11.07	10.99	(10.1%)
6th/[312,321)	9.83	9.21	8.34	10.07	10.31	9.13	10.46	10.78	10.31	11.57	(10%)
7th/[321,331)	8.75	10.05	10.05	9.59	10.88	9.44	9.21	9.67	10.96	11.42	(10.3%)
8th/[331,343)	8.94	9.63	9.09	9.55	10.08	10.39	9.78	10.24	10.62	11.69	(10.3%)
9th/[343,360)	9.55	8.52	10.51	9.47	9.24	10.83	9.79	9.95	10.43	11.70	(9.9%)
10th/[360,449]	8.45	9.98	9.29	10.43	9.67	9.29	10.81	10.97	10.36	10.74	(10.3%)

*Prior score deciles can be uneven depending upon the prior score distribution

QQ-Plot: Student Growth Percentiles

Theoretical SGP Distribution (0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100)

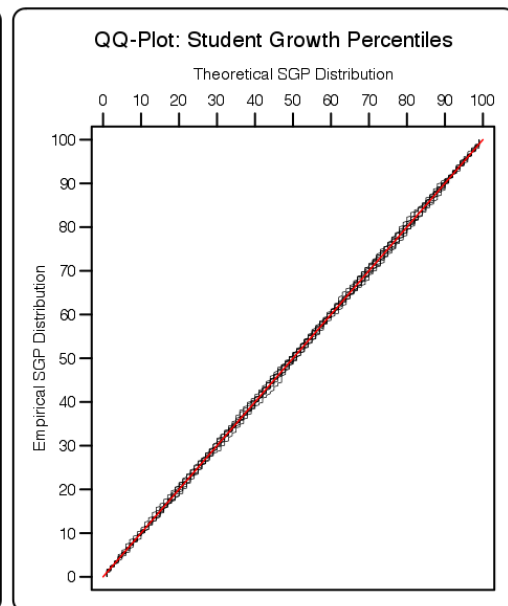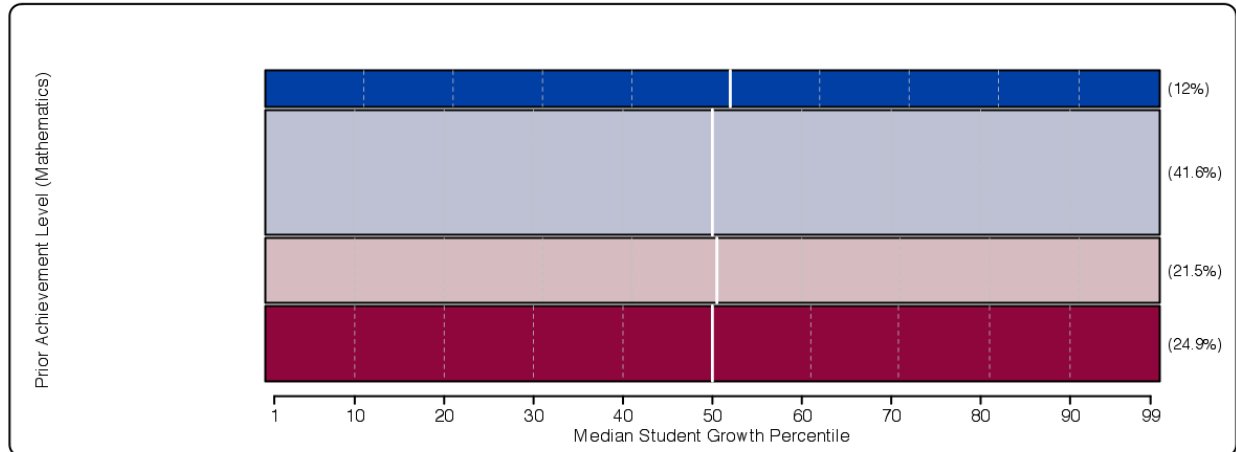Empirical SGP Distribution (0–100)

Figure 9: Goodness of Fit Plot for Grade 6 Mathematics, 2015.

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Mathematics SGP, Grade 7 (N = 11,928)

Prior Achievement Level (Mathematics)

(18.9%)

(33.4%)

(21.8%)

(25.8%)

Median Student Growth Percentile

Ceiling / Floor Effects Test

Student Growth Percentile Range

Current Observed Score Extremes (Range)

		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2250]	75.0	9.4	10.4	2.1	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	N = 96
Highest OSS:	[2778]	0.0	0.0	0.0	0.0	0.0	0.0	3.2	6.5	9.7	24.2	21.0	35.5	N = 62

Student Growth Percentile Range

Prior Scale Score Decile/Range

	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[137,256)	10.35	10.00	9.56	8.32	10.27	9.65	10.44	8.76	10.44	12.21	(9.5%)
2nd/[256,272)	8.52	9.25	10.48	10.57	10.32	10.24	10.16	9.01	10.32	11.14	(10.2%)
3rd/[272,284)	7.77	8.02	9.17	8.93	9.59	9.42	10.17	12.15	10.99	13.80	(10.1%)
4th/[284,294)	9.88	9.35	9.71	10.15	9.53	9.44	9.88	9.17	11.58	11.31	(9.4%)
5th/[294,305)	8.24	11.06	10.57	9.32	10.07	10.73	9.82	8.74	9.98	11.48	(10.1%)
6th/[305,316)	9.95	8.54	9.37	9.62	10.28	9.45	10.70	11.19	9.95	10.95	(10.1%)
7th/[316,328)	9.71	9.79	10.04	9.71	10.12	9.47	9.30	9.88	10.29	11.69	(10.2%)
8th/[328,343)	9.11	9.94	9.86	10.69	8.78	10.11	10.02	9.61	9.53	12.34	(10.1%)
9th/[343,365)	9.34	9.83	9.17	9.17	10.97	9.58	10.32	10.40	10.57	10.65	(10.2%)
10th/[365,480]	8.97	10.65	9.30	10.56	9.56	10.39	9.39	9.97	10.90	10.31	(10%)

*Prior score deciles can be uneven depending upon the prior score distribution

QQ-Plot: Student Growth Percentiles

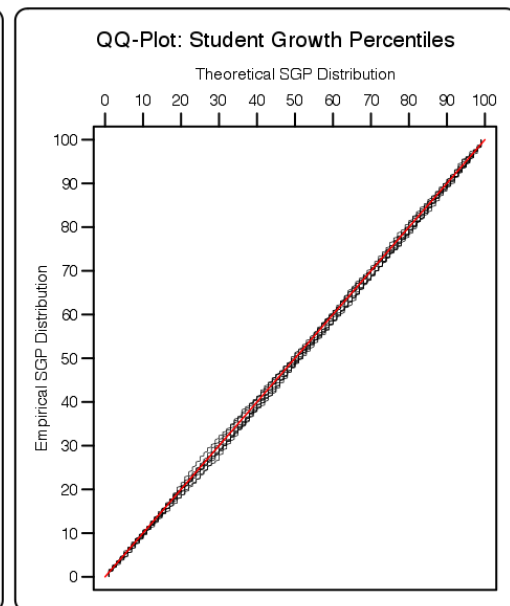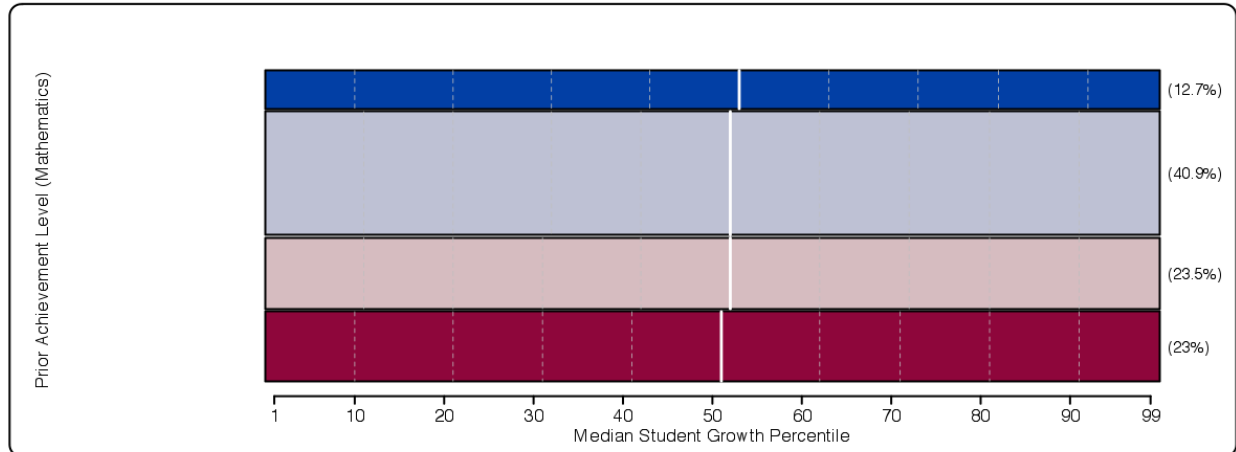Theoretical SGP Distribution

Empirical SGP Distribution

Figure 10: Goodness of Fit Plot for Grade 7 Mathematics, 2015.

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Mathematics SGP, Grade 8 (N = 11,154)

Prior Achievement Level (Mathematics)

(16.1%)
(35.4%)
(22.1%)
(26.4%)

Median Student Growth Percentile

1 10 20 30 40 50 60 70 80 90 99

Ceiling / Floor Effects Test

Current Observed Score Extremes (Range)

Student Growth Percentile Range

		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2265]	84.5	8.3	6.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 84
Highest OSS:	[2802]	0.0	0.0	0.0	2.0	1.0	5.9	3.0	8.9	11.9	24.8	8.9	33.7	N = 101

Student Growth Percentile Range

Prior Scale Score Decile/Range

	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[189,259)	10.10	9.55	9.55	8.80	10.57	9.73	10.66	10.10	9.73	11.21	(9.7%)
2nd/[259,276)	8.36	9.41	9.67	10.11	8.27	10.73	12.05	9.85	9.76	11.79	(10.2%)
3rd/[276,287)	9.33	9.42	9.61	10.70	9.24	9.06	9.70	10.34	10.70	11.89	(9.8%)
4th/[287,297)	8.25	9.82	9.18	8.80	10.29	11.31	9.08	10.38	10.75	12.14	(9.7%)
5th/[297,307)	9.69	9.01	11.04	9.35	9.69	9.44	10.53	9.44	10.36	11.46	(10.6%)
6th/[307,316)	9.43	9.52	8.77	11.50	9.33	9.90	11.12	10.65	9.24	10.56	(9.5%)
7th/[316,327)	10.47	10.82	10.11	8.97	10.38	9.59	8.62	10.55	10.11	10.38	(10.2%)
8th/[327,342)	8.18	9.43	11.05	8.98	9.52	8.89	9.52	11.59	11.59	11.23	(10%)
9th/[342,365)	8.36	10.98	8.62	10.98	9.84	10.80	9.76	10.19	10.80	9.67	(10.3%)
10th/[365,500]	10.27	9.55	10.18	10.00	10.00	9.46	10.62	9.02	9.55	11.34	(10%)

*Prior score deciles can be uneven depending upon the prior score distribution

QQ-Plot: Student Growth Percentiles

Theoretical SGP Distribution

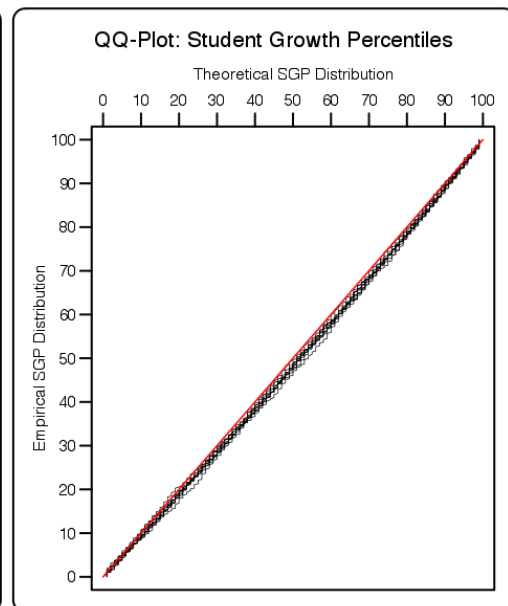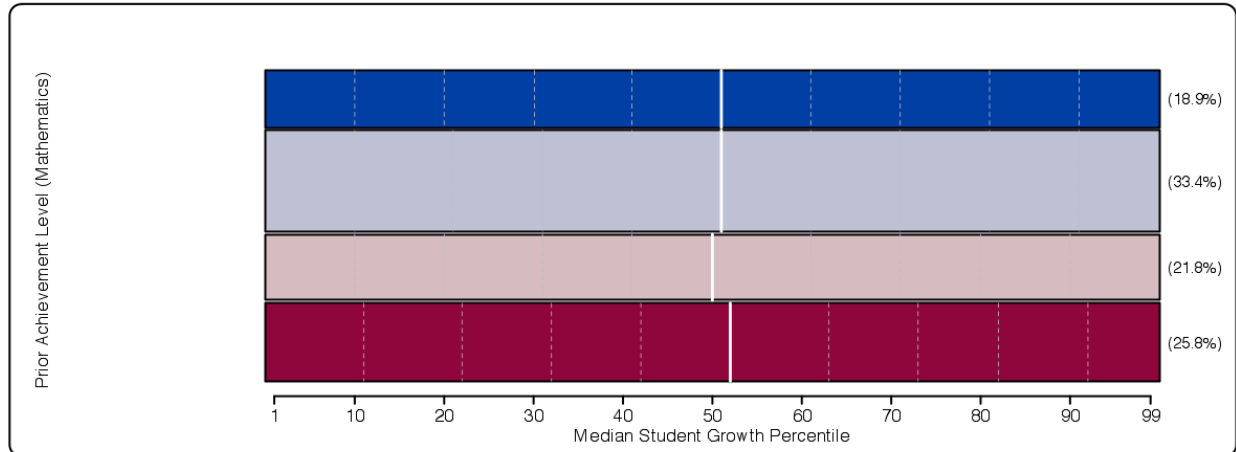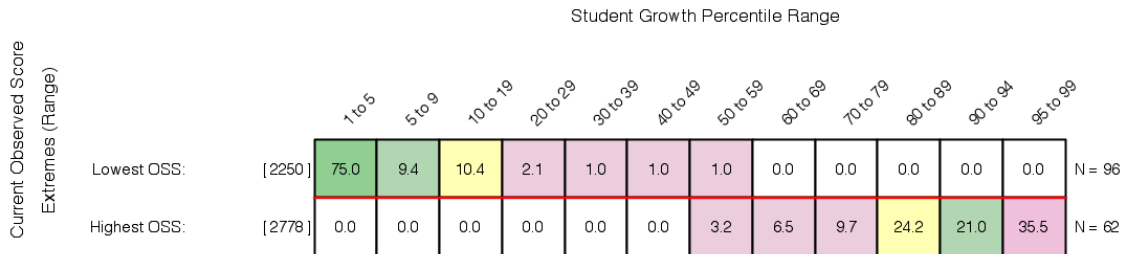0 10 20 30 40 50 60 70 80 90 100
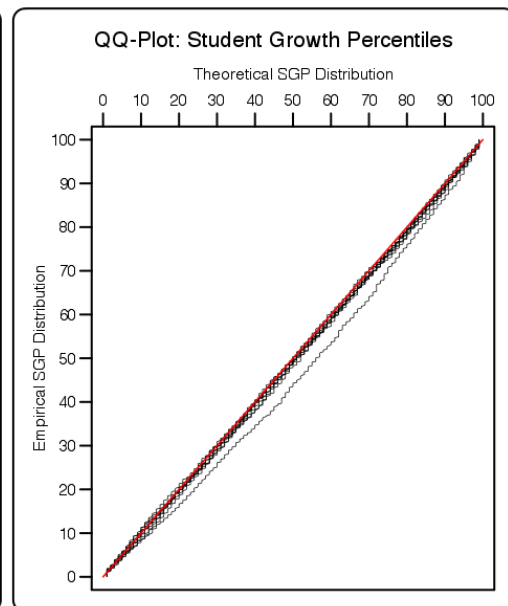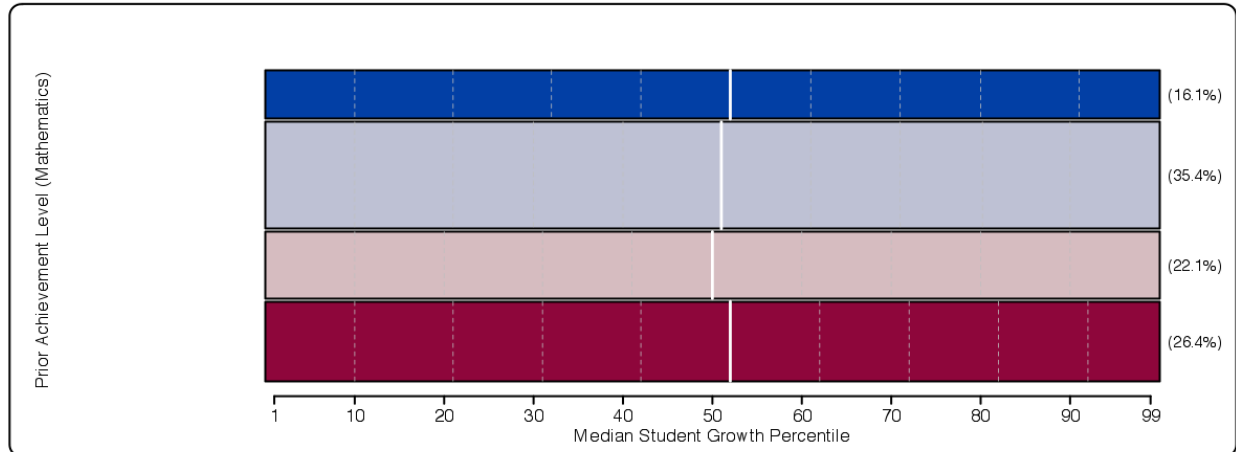
Empirical SGP Distribution
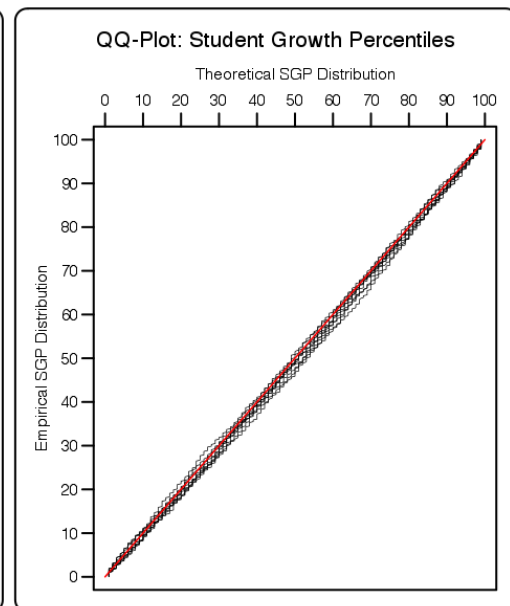
Figure 11: Goodness of Fit Plot for Grade 8 Mathematics, 2015.

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Mathematics SGP, Grade 11 (N = 9,434)

Ceiling / Floor Effects Test

Student Growth Percentile Range

Current Observed Score Extremes (Range)

		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2280]	75.7	9.7	10.7	2.9	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 103
Highest OSS:	[2855,2862)	0.0	0.0	0.0	0.0	8.3	0.0	0.0	8.3	8.3	25.0	16.7	33.3	N = 12
	[2862]	0.0	0.0	2.6	2.6	0.0	5.1	5.1	12.8	17.9	12.8	17.9	23.1	N = 39

Student Growth Percentile Range

Prior Scale Score Decile/Range

	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[177,262)	11.02	9.53	8.37	9.85	9.53	9.53	10.28	10.70	10.70	10.49	(10%)
2nd/[262,274)	8.18	9.70	9.46	10.16	10.63	10.75	8.41	10.51	9.58	12.62	(9.1%)
3rd/[274,283)	9.00	9.51	10.12	8.18	9.10	8.90	11.04	9.20	10.74	14.21	(10.4%)
4th/[283,291)	10.52	10.93	8.04	10.72	10.52	9.79	8.25	10.82	8.87	11.55	(10.3%)
5th/[291,298)	10.99	9.42	10.65	9.75	9.87	12.00	9.19	9.19	9.19	9.75	(9.5%)
6th/[298,305)	8.20	8.31	9.76	8.93	9.87	10.18	9.97	10.90	11.42	12.46	(10.2%)
7th/[305,313)	9.01	9.53	9.42	9.74	9.01	9.95	10.99	10.47	9.95	11.94	(10.1%)
8th/[313,325)	9.82	11.07	10.55	9.00	9.31	7.96	10.24	10.55	9.93	11.58	(10.3%)
9th/[325,345)	8.38	10.18	9.76	10.82	8.06	11.13	10.39	10.18	11.45	9.65	(10%)
10th/[345,483]	10.25	9.42	9.73	9.73	10.77	9.94	9.21	10.25	10.25	10.46	(10.2%)

*Prior score deciles can be uneven depending upon the prior score distribution

QQ-Plot: Student Growth Percentiles
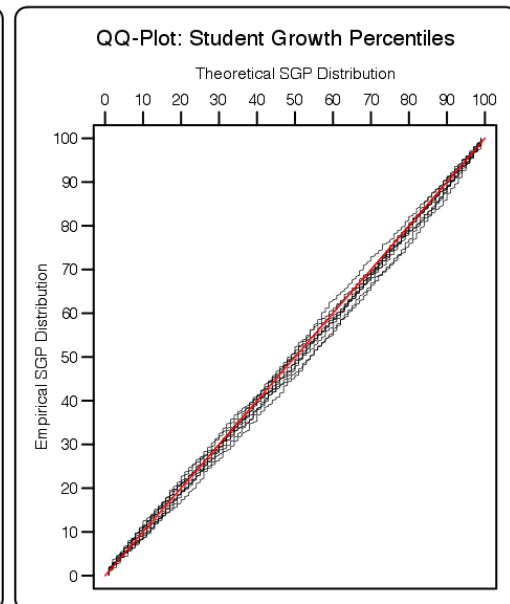
Figure 12: Goodness of Fit Plot for Grade 11 Mathematics, 2015.

3   Hawaii Equated Grade-Level Plots

In order to create student growth projections in the transition year(s) between the Hawaii State Assessment and the Smarter Balanced Assessment (SBA), the two tests must be equated to each other and SGP analyses conducted using the equated test scores[2]. The following goodness of fit plots were produced for those analyses.

3.1   Reading
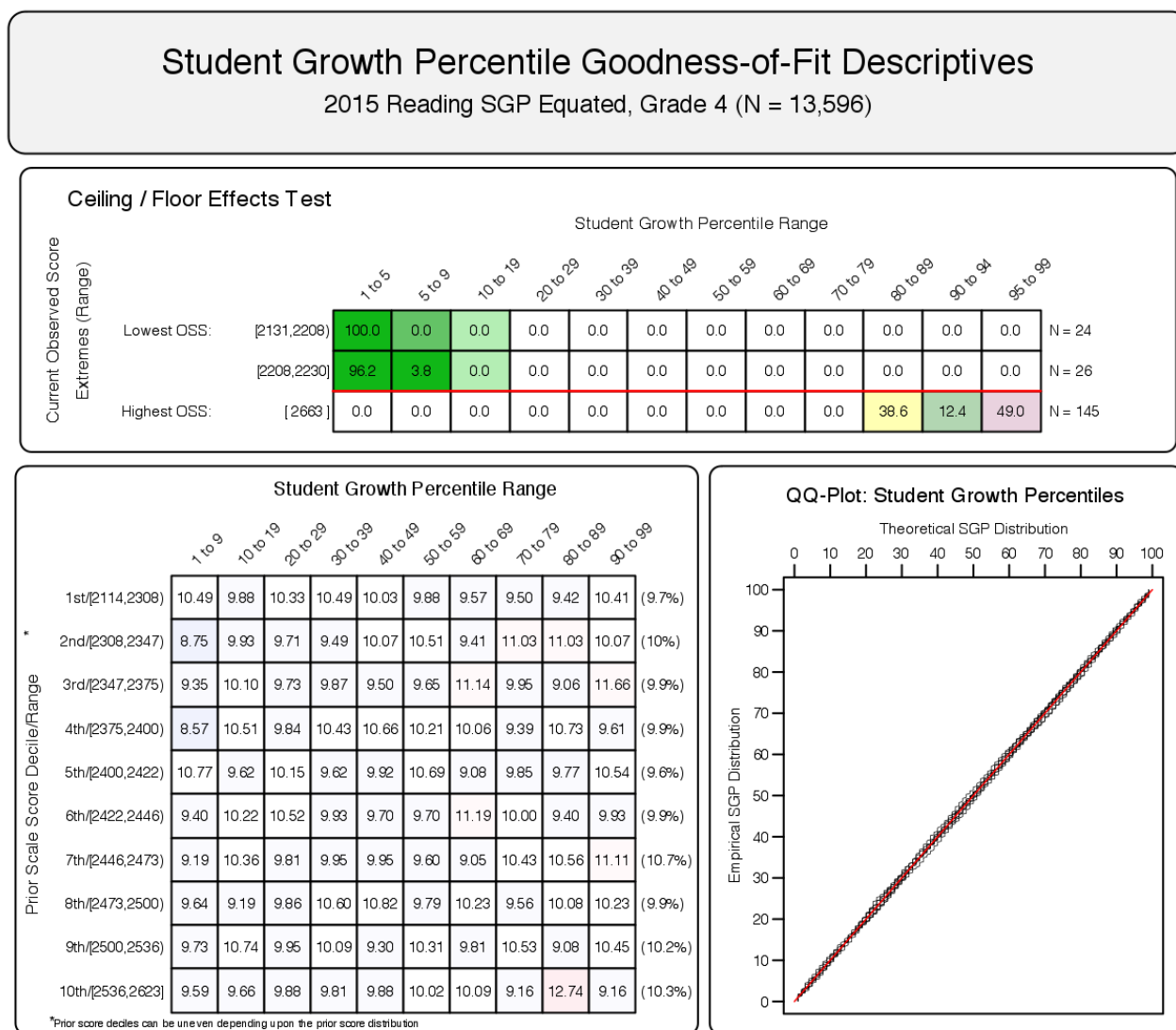
Figure 13: Goodness of Fit Plot for Grade 4 Reading, 2015.

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[2]The "equipercentile" equating method was used for this process.

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Reading SGP Equated, Grade 5 (N = 13,357)

Ceiling / Floor Effects Test

Student Growth Percentile Range

Current Observed Score Extremes (Range)		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2201,2258)	96.2	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 26
	[2258,2270]	80.8	11.5	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 26
Highest OSS:	[2701]	0.0	0.0	0.0	0.0	0.0	0.0	2.8	4.8	8.3	17.2	18.6	48.3	N = 145

Student Growth Percentile Range

Prior Scale Score Decile/Range	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[2131,2339)	9.25	9.80	9.88	9.41	10.34	9.88	10.11	10.03	10.50	10.81	(9.6%)
2nd/[2339,2378)	9.34	10.09	9.79	9.56	9.64	8.73	9.64	10.69	11.07	11.45	(9.9%)
3rd/[2378,2412)	8.38	9.23	9.92	10.69	10.69	10.85	10.46	9.69	9.31	10.77	(9.7%)
4th/[2412,2440)	9.92	9.77	11.37	10.23	8.70	9.47	9.77	10.69	9.01	11.07	(9.8%)
5th/[2440,2468)	9.06	10.00	8.91	9.49	10.43	10.51	9.57	9.64	12.10	10.29	(10.3%)
6th/[2468,2494)	9.49	10.37	9.78	9.93	9.34	9.93	10.00	10.22	9.19	11.76	(10.2%)
7th/[2494,2518)	9.68	8.48	9.83	10.05	10.80	10.73	10.13	9.53	9.38	11.40	(10%)
8th/[2518,2545)	9.63	11.14	9.86	10.38	9.78	8.65	10.16	10.16	10.46	9.78	(9.9%)
9th/[2545,2582)	9.85	8.69	10.36	9.85	10.15	11.24	9.34	9.64	10.44	10.44	(10.3%)
10th/[2582,2663]	8.96	11.02	9.70	9.99	9.99	9.77	10.14	9.85	9.63	10.95	(10.2%)

*Prior score deciles can be uneven depending upon the prior score distribution

QQ-Plot: Student Growth Percentiles

Figure 14: Goodness of Fit Plot for Grade 5 Reading, 2015.

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Reading SGP Equated, Grade 6 (N = 12,702)

Ceiling / Floor Effects Test

Student Growth Percentile Range

Current Observed Score Extremes (Range)		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2210,2269)	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 25
	[2269,2285]	92.3	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 26
Highest OSS:	[2724]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.4	18.6	22.1	46.9	N = 113

Student Growth Percentile Range

Prior Scale Score Decile/Range	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[2201,2378)	9.40	10.13	10.05	9.97	10.29	9.31	9.48	10.05	10.29	11.03	(9.6%)
2nd/[2378,2420)	9.67	8.98	9.52	9.60	10.29	9.91	10.06	10.91	10.22	10.84	(10.2%)
3rd/[2420,2453)	8.52	10.08	9.77	9.69	9.06	10.23	10.39	9.38	10.94	11.95	(10.1%)
4th/[2453,2479)	10.38	10.29	9.23	8.80	9.59	10.11	10.20	10.20	9.67	11.52	(9%)
5th/[2479,2507)	8.28	9.86	10.47	10.92	10.47	9.71	9.41	10.09	10.02	10.77	(10.5%)
6th/[2507,2529)	9.16	8.99	10.57	9.83	9.41	10.49	9.41	10.49	10.99	10.66	(9.5%)
7th/[2529,2554)	9.48	9.41	8.81	9.85	9.63	10.30	10.37	10.52	9.93	11.70	(10.6%)
8th/[2554,2583)	9.26	10.02	9.42	10.17	9.95	8.96	11.47	9.34	10.40	11.01	(10.4%)
9th/[2583,2619)	9.48	10.02	9.95	8.86	10.26	10.02	9.56	10.26	10.10	11.50	(10.1%)
10th/[2619,2701]	9.02	9.72	9.95	9.64	9.95	9.33	10.65	10.42	10.65	10.65	(10.1%)

*Prior score deciles can be uneven depending upon the prior score distribution

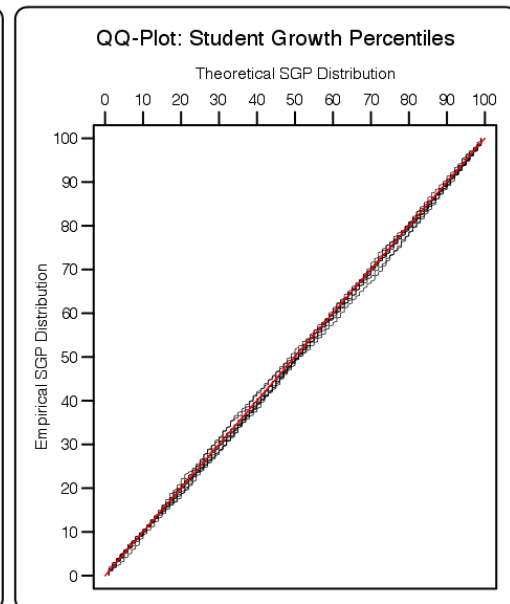**QQ-Plot: Student Growth Percentiles**

Figure 15: Goodness of Fit Plot for Grade 6 Reading, 2015.

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Reading SGP Equated, Grade 7 (N = 11,985)

Ceiling / Floor Effects Test

Student Growth Percentile Range

Current Observed Score Extremes (Range)		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2258,2266)	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 25
	[2266,2289)	92.3	3.8	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 26
Highest OSS:	[2745]	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.7	11.0	19.5	17.8	49.2	N = 118

Student Growth Percentile Range

Prior Scale Score Decile/Range	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[2210,2394)	8.88	9.64	10.48	9.30	10.48	8.79	9.72	10.06	11.16	11.50	(9.9%)
2nd/[2394,2435)	9.27	10.06	9.53	9.09	9.44	10.24	9.44	9.44	10.77	12.71	(9.5%)
3rd/[2435,2468)	8.20	9.58	9.92	9.49	9.92	10.01	11.39	10.01	10.53	10.96	(9.7%)
4th/[2468,2494)	9.47	10.08	10.42	10.68	10.08	7.58	9.91	9.56	11.80	10.42	(9.7%)
5th/[2494,2521)	7.43	9.53	9.68	10.14	9.98	11.86	9.76	10.59	9.38	11.64	(11.1%)
6th/[2521,2546)	11.76	9.73	10.15	9.73	9.64	9.64	9.14	9.64	10.32	10.24	(9.9%)
7th/[2546,2569)	7.39	9.06	9.59	9.85	10.47	9.15	10.47	10.55	11.08	12.40	(9.5%)
8th/[2569,2597)	9.52	10.01	11.06	10.01	9.28	10.25	8.96	10.73	10.17	10.01	(10.3%)
9th/[2597,2634)	10.12	9.96	9.05	9.71	10.12	9.79	10.53	9.47	10.70	10.53	(10.1%)
10th/[2634,2724]	9.16	9.89	9.16	10.61	10.29	9.81	9.97	10.85	10.21	10.05	(10.4%)

*Prior score deciles can be uneven depending upon the prior score distribution

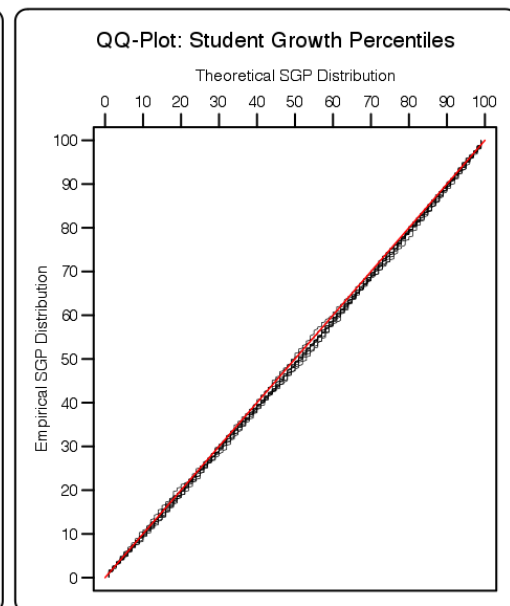**QQ-Plot: Student Growth Percentiles**
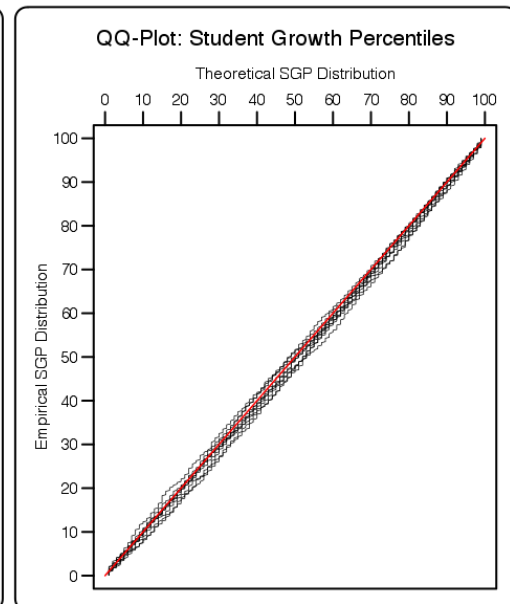
Figure 16: Goodness of Fit Plot for Grade 7 Reading, 2015.

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Reading SGP Equated, Grade 8 (N = 11,212)

Ceiling / Floor Effects Test

Student Growth Percentile Range

Current Observed Score Extremes (Range)		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2288,2294)	96.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 25
	[2294,2316)	92.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 25
Highest OSS:	[2769]	0.0	0.0	0.0	0.0	0.0	0.0	3.9	3.9	6.6	17.1	18.4	50.0	N = 76

Student Growth Percentile Range

Prior Scale Score Decile/Range	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[2258,2406)	10.02	9.93	8.86	9.30	9.48	9.93	10.11	9.48	10.64	12.25	(10%)
2nd/[2406,2447)	9.35	9.26	10.34	10.07	9.98	9.53	9.35	10.71	10.16	11.25	(9.8%)
3rd/[2447,2480)	9.13	9.70	8.57	10.36	8.85	10.08	9.79	10.73	10.45	12.34	(9.5%)
4th/[2480,2510)	9.79	10.17	10.17	8.96	10.45	10.17	10.63	9.33	9.79	10.54	(9.6%)
5th/[2510,2539)	10.02	8.62	10.43	10.02	9.03	9.85	9.69	9.77	10.76	11.82	(10.9%)
6th/[2539,2563)	8.96	8.47	9.56	9.66	10.46	10.46	10.06	11.25	10.06	11.06	(9%)
7th/[2563,2591)	9.40	10.74	9.73	10.57	9.31	10.15	9.14	10.91	9.31	10.74	(10.6%)
8th/[2591,2620)	8.22	10.07	9.45	10.16	9.54	10.34	10.78	9.19	11.93	10.34	(10.1%)
9th/[2620,2660)	11.34	10.08	10.42	9.41	9.50	8.49	9.92	9.58	9.33	11.93	(10.6%)
10th/[2660,2745]	9.71	9.63	8.91	10.34	10.34	10.61	9.89	9.89	10.16	10.52	(10%)

*Prior score deciles can be uneven depending upon the prior score distribution

QQ-Plot: Student Growth Percentiles
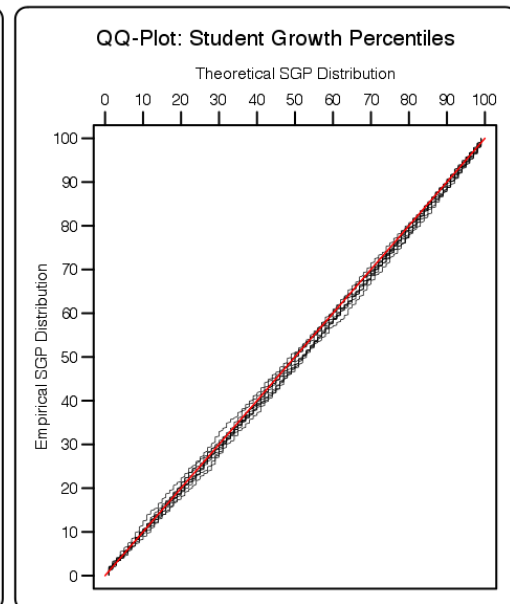
Figure 17: Goodness of Fit Plot for Grade 8 Reading, 2015.

3.2   Mathematics

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Mathematics SGP Equated, Grade 4 (N = 13,538)

Ceiling / Floor Effects Test

Student Growth Percentile Range

Current Observed Score Extremes (Range)		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2204,2237)	96.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 25
	[2237,2254]	77.8	22.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 27
Highest OSS:	[2659]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5	15.4	15.4	56.7	N = 104

Student Growth Percentile Range

Prior Scale Score Decile/Range	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[2189,2335)	9.35	10.20	10.12	10.74	10.20	9.81	8.96	9.81	10.28	10.51	(9.6%)
2nd/[2335,2371)	9.72	9.43	10.09	9.50	9.50	10.60	11.48	9.80	9.72	10.16	(10.1%)
3rd/[2371,2396)	9.57	11.52	8.68	9.87	10.62	9.72	9.05	10.55	9.95	10.47	(9.9%)
4th/[2396,2417)	9.63	8.69	10.92	9.70	10.13	9.70	10.34	9.77	10.34	10.78	(10.3%)
5th/[2417,2436)	9.60	10.18	10.55	10.26	9.38	10.04	10.92	10.18	8.86	10.04	(10.1%)
6th/[2436,2455)	9.13	9.53	9.77	9.69	10.33	10.81	8.97	9.69	10.89	11.21	(9.2%)
7th/[2455,2476)	10.20	10.92	9.34	9.77	9.99	9.41	9.77	10.42	10.34	9.84	(10.3%)
8th/[2476,2500)	9.69	9.69	10.33	10.33	10.05	9.69	10.83	9.05	9.69	10.62	(10.4%)
9th/[2500,2530)	8.75	9.89	9.74	10.43	10.05	10.20	9.36	10.50	9.82	11.26	(9.7%)
10th/[2530,2621]	9.69	10.04	10.32	9.69	9.97	9.97	10.11	10.53	10.32	9.34	(10.5%)

*Prior score deciles can be uneven depending upon the prior score distribution

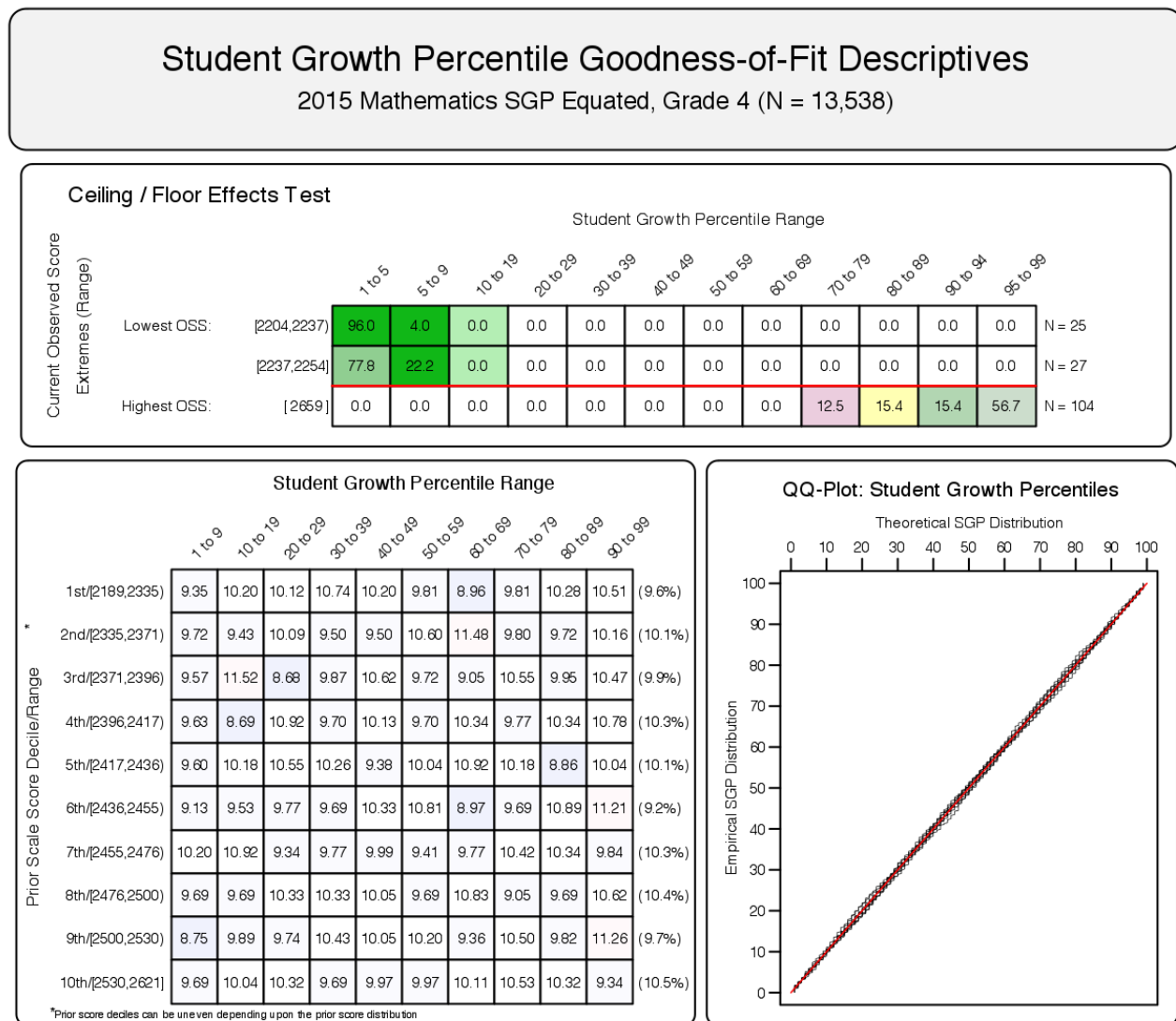**QQ-Plot: Student Growth Percentiles**

Figure 18: Goodness of Fit Plot for Grade 4 Mathematics, 2015.

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Mathematics SGP Equated, Grade 5 (N = 13,329)

Ceiling / Floor Effects Test

Student Growth Percentile Range

Current Observed Score Extremes (Range)

		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2219,2248)	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 24
	[2248,2270]	63.0	33.3	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 27
Highest OSS:	[2700]	0.0	0.0	0.0	0.0	0.0	0.0	5.0	6.7	10.9	16.0	19.3	42.0	N = 119

Student Growth Percentile Range

Prior Scale Score Decile/Range

	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[2204,2372)	8.93	9.70	9.94	9.94	9.24	9.63	10.64	10.40	10.71	10.87	(9.7%)
2nd/[2372,2409)	9.35	9.87	9.87	9.50	10.55	10.40	9.50	9.95	9.35	11.67	(10%)
3rd/[2409,2434)	9.30	10.14	9.45	9.68	10.90	9.15	9.91	9.15	11.36	10.98	(9.8%)
4th/[2434,2457)	9.54	9.93	10.48	10.40	8.84	10.32	9.85	10.56	9.70	10.40	(9.6%)
5th/[2457,2477)	8.36	10.75	10.01	8.96	10.16	10.16	10.83	9.78	9.78	11.20	(10%)
6th/[2477,2496)	9.57	8.43	8.51	11.25	9.88	10.03	10.11	10.49	11.25	10.49	(9.9%)
7th/[2496,2517)	10.10	11.05	10.90	8.49	10.24	9.44	9.95	10.17	9.14	10.53	(10.3%)
8th/[2517,2542)	8.55	9.19	10.19	11.25	9.76	10.40	10.04	9.97	9.90	10.75	(10.5%)
9th/[2542,2576)	9.63	9.71	8.72	9.63	9.86	10.63	10.09	10.32	9.86	11.54	(9.8%)
10th/[2576,2659]	9.57	10.37	10.51	9.93	9.79	9.93	9.43	10.01	10.51	9.93	(10.3%)

*Prior score deciles can be uneven depending upon the prior score distribution

QQ-Plot: Student Growth Percentiles

Theoretical SGP Distribution
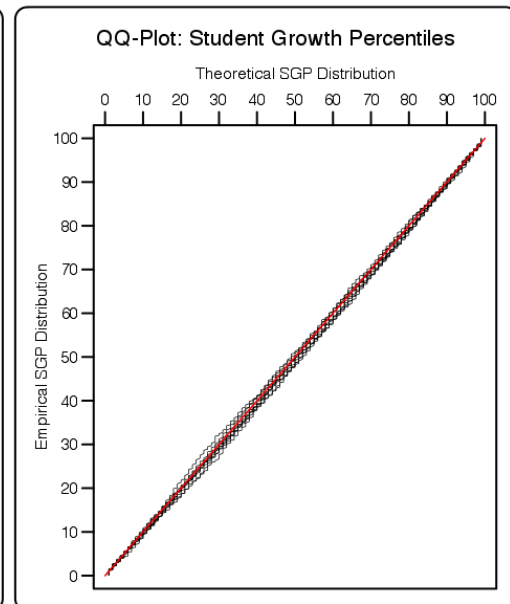
Empirical SGP Distribution

Figure 19: Goodness of Fit Plot for Grade 5 Mathematics, 2015.

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Mathematics SGP Equated, Grade 6 (N = 12,697)

Ceiling / Floor Effects Test

Current Observed Score Extremes (Range)

Student Growth Percentile Range

		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2235]	68.4	15.2	13.9	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 79
Highest OSS:	[2748]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	8.2	20.4	20.4	45.9	N = 98

Student Growth Percentile Range

Prior Scale Score Decile/Range

	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[2219,2394)	8.98	9.06	10.17	10.24	9.54	9.54	10.48	9.77	10.01	12.21	(10%)
2nd/[2394,2430)	9.42	10.53	8.78	8.30	10.45	10.14	9.02	10.30	10.85	12.21	(9.9%)
3rd/[2430,2457)	8.33	7.91	9.48	10.14	9.23	9.48	11.46	10.96	11.05	11.95	(9.6%)
4th/[2457,2482)	8.63	10.28	9.79	9.87	10.44	9.46	10.28	9.95	10.86	10.44	(9.6%)
5th/[2482,2506)	8.89	10.21	9.51	9.98	9.28	10.83	9.98	9.43	10.76	11.15	(10.1%)
6th/[2506,2530)	9.91	8.97	8.65	10.07	9.99	8.89	10.94	10.86	10.15	11.57	(10%)
7th/[2530,2553)	8.14	9.51	10.58	9.74	9.74	9.89	10.12	9.74	11.26	11.26	(10.3%)
8th/[2553,2579)	8.63	9.70	8.94	9.40	10.31	10.39	9.55	10.39	10.85	11.84	(10.3%)
9th/[2579,2610)	10.19	8.36	10.67	9.47	9.79	10.19	9.63	9.95	10.03	11.70	(9.9%)
10th/[2610,2700]	8.53	10.05	9.29	10.13	9.82	9.44	10.89	10.74	10.43	10.66	(10.3%)

*Prior score deciles can be uneven depending upon the prior score distribution

QQ-Plot: Student Growth Percentiles

Theoretical SGP Distribution
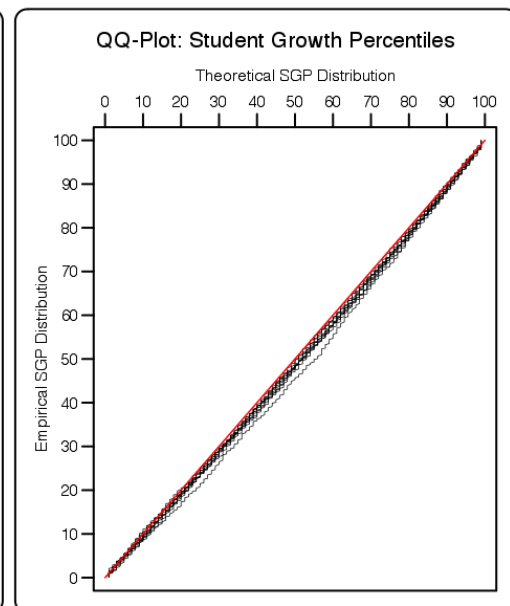
Empirical SGP Distribution

Figure 20: Goodness of Fit Plot for Grade 6 Mathematics, 2015.

Student Growth Percentile Goodness-of-Fit Descriptives
2015 Mathematics SGP Equated, Grade 7 (N = 11,928)

Ceiling / Floor Effects Test

Current Observed Score Extremes (Range)

Student Growth Percentile Range

		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2250]	75.0	9.4	13.5	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 96
Highest OSS:	[2778]	0.0	0.0	0.0	0.0	0.0	0.0	4.8	1.6	11.3	22.6	17.7	41.9	N = 62

Student Growth Percentile Range

Prior Scale Score Decile/Range

	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[2235,2383)	9.91	10.00	9.20	8.41	9.65	9.82	10.88	9.73	10.27	12.12	(9.5%)
2nd/[2383,2438)	8.85	9.50	10.40	10.81	10.65	9.83	9.58	9.09	10.07	11.22	(10.2%)
3rd/[2438,2474)	8.18	8.51	9.75	8.51	9.42	9.26	10.08	11.57	10.83	13.88	(10.1%)
4th/[2474,2499)	10.33	8.99	9.71	10.33	9.26	9.44	9.97	9.17	11.31	11.49	(9.4%)
5th/[2499,2524)	7.65	10.15	10.40	9.82	9.98	10.23	10.73	9.23	10.15	11.65	(10.1%)
6th/[2524,2546)	9.95	8.21	9.29	9.54	10.20	10.03	10.36	11.28	10.45	10.70	(10.1%)
7th/[2546,2573)	9.71	10.29	9.96	9.63	10.04	9.71	9.30	9.96	9.88	11.52	(10.2%)
8th/[2573,2602)	9.03	10.44	10.44	10.02	9.86	9.61	9.86	9.03	9.69	12.01	(10.1%)
9th/[2602,2641)	9.58	9.58	8.68	10.16	9.91	10.32	10.07	10.16	10.81	10.73	(10.2%)
10th/[2641,2748]	8.63	10.56	9.56	9.89	9.89	10.23	9.47	10.14	10.73	10.90	(10%)

*Prior score deciles can be uneven depending upon the prior score distribution

QQ-Plot: Student Growth Percentiles

Theoretical SGP Distribution
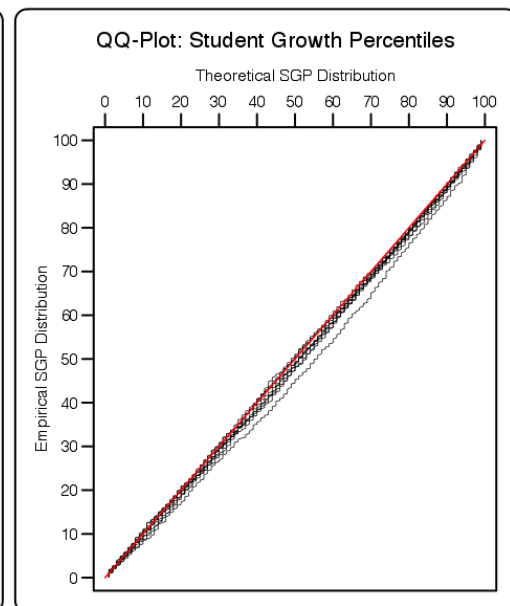
Empirical SGP Distribution

Figure 21: Goodness of Fit Plot for Grade 7 Mathematics, 2015.

Student Growth Percentile Goodness-of-Fit Descriptives

2015 Mathematics SGP Equated, Grade 8 (N = 11,154)

Ceiling / Floor Effects Test

Current Observed Score Extremes (Range)

Student Growth Percentile Range

		1 to 5	5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 94	95 to 99	
Lowest OSS:	[2265]	85.7	9.5	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N = 84
Highest OSS:	[2802]	0.0	0.0	0.0	0.0	2.0	5.0	7.9	4.0	13.9	21.8	10.9	34.7	N = 101

Student Growth Percentile Range

Prior Scale Score Decile/Range

	1 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
1st/[2250,2394)	9.73	10.29	9.08	9.08	10.57	9.73	10.19	10.29	9.55	11.49	(9.7%)
2nd/[2394,2446)	8.36	9.32	9.59	9.76	8.88	10.38	12.49	9.85	9.67	11.70	(10.2%)
3rd/[2446,2481)	9.33	9.42	9.88	10.61	9.24	9.79	9.24	10.70	10.34	11.44	(9.8%)
4th/[2481,2510)	8.53	9.45	9.73	9.18	10.38	10.38	9.45	10.10	10.47	12.33	(9.7%)
5th/[2510,2540)	9.27	9.69	10.19	9.18	9.52	9.35	10.36	9.44	10.95	12.05	(10.6%)
6th/[2540,2565)	9.33	9.33	9.14	11.22	9.14	9.99	11.40	10.46	9.90	10.08	(9.5%)
7th/[2565,2592)	10.64	10.64	10.20	9.15	10.29	10.38	8.71	10.29	9.67	10.03	(10.2%)
8th/[2592,2621)	8.63	9.25	11.23	9.16	9.70	9.16	9.16	11.32	10.87	11.50	(10%)
9th/[2621,2662)	8.10	10.80	8.45	10.89	10.10	11.06	9.84	9.58	11.15	10.02	(10.3%)
10th/[2662,2778]	10.62	9.46	10.18	9.91	9.38	10.09	9.91	9.73	9.82	10.89	(10%)

*Prior score deciles can be uneven depending upon the prior score distribution
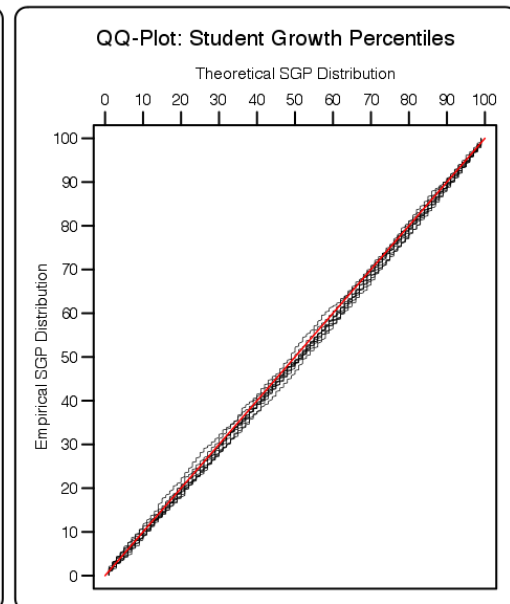
QQ-Plot: Student Growth Percentiles

Figure 22: Goodness of Fit Plot for Grade 8 Mathematics, 2015.