

**TECHNICAL DOCUMENTATION FOR PROJECTION OF PROFICIENT
PERFORMANCE LEVEL OF ACTAAP 2014 TESTS ON PARCC 2015
ASSESSMENTS**

By

**Office of Innovation for Education
University of Arkansas at Fayetteville**

**Guidance for Methodology Provided by the
Arkansas Technical Advisory Committee for Public School Accountability**

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Section 1: Introduction

Across the years public school students in Arkansas were administered state-mandated assessments designed within the Arkansas Comprehensive Testing, Assessment and Accountability Program (ACTAAP). These tests are those in Literacy and Math in Grades 3-8, End-of-Course (EOC) tests in Algebra and Geometry, and the Literacy test at Grade 11. The Arkansas State Board of Education has promulgated rules regarding use of ACTAAP data for various functions as determined by the Arkansas Legislature (Arkansas Department of Education [ADE], 2014).

ACTAAP test scores are reported using a 4-level performance scale: Below Basic, Basic, Proficient, and Advanced. The Proficient level has an important role in various accountability functions as determined by Arkansas legislators, Arkansas State Board of Education (SBE), and the ADE.

Students were administered the ACTAAP tests in Literacy and Math in Grades 3-8, End-of-Course tests in Algebra and Geometry, and the Literacy test in Grade 11 from 2005 through 2014. These tests were discontinued and replaced by the Partnership for Assessment of Readiness for College and Careers (PARCC) assessments in 2015: ELA/Literacy (hereafter referred to as ELA) Grades 3–10 and Math for Grades 3-8, Algebra I, Geometry. Table 1 provides a summary on the administration of these tests to Arkansas students.

TABLE 1: 2014 ACTAAP Tests and 2015 PARCC Tests

2014 ACTAAP Tests	2015 PARCC Tests
Literacy in Grades 3-8	ELA/Literacy in Grades 3-8
-	ELA/Literacy in Grade 9
-	ELA/Literacy in Grade 10
Literacy in Grade 11	-
Math in Grades 3-8	Math in Grades 3-8
Algebra*	Algebra I
Geometry	Geometry

*Algebra EOC tested Algebra I.

The purpose of this technical documentation is to record the steps taken to project the Proficient cut score on the ACTAAP tests onto the PARCC scale. The projected cut scores will also be called the concordant scores in the remaining part of this document. The Arkansas Technical Advisory Committee (TAC) on Accountability provided general guidance on methodology. Under contract with ADE, the Office of Innovation for Education at the University of Arkansas, Fayetteville conducted all data analyses.

It may be noted that ACTAAP and PARCC have similar tests in math and Literacy/ELA in Grades 3-8 and also similar tests of Algebra I and Geometry at the high school level. For these assessment situations, it would be feasible to determine ACTAAP/PARCC concordant cut scores via a *horizontal moderation* (linking) process. On the other hand, ACTAAP and PARCC do not test Literacy/ELA at the same grades in high school. Thus, a *vertical moderation* process was used to set the cut scores on the PARCC tests of English Grade 9 and English Grade 10. The vertical moderation process anchors these PARCC cut scores on ACTAAP student achievement on Grade 8 and Grade 11 Literacy tests.

Horizontal Moderation (Linking)

There are many ways to establish concordance between two tests in a horizontal moderation (linking) situation. Given that students in Arkansas took only the ACTAAP tests in 2014 and only the PARCC tests in 2015, a feasible procedure could be built upon the “equivalent group” design. Essentially, two student groups, one for 2014 ACTAAP and the other for 2015 PARCC, need to be assembled to be equivalent on relevant academic and demographic variables. Their score distributions will then be aligned to project, via equal percentile, the ACTAAP Proficient cut score onto the PARCC scale.

Again, for horizontal moderation (linking), a number of processes can be used to create equivalent groups of students. This project uses a dual approach that starts with selection of a 2014 ACTAPP student group and a 2015 PARCC student group from a set of schools (hereafter referred to as “*stable schools*”) with consistent student performance during the three-year period 2012-14. Including only stable schools in this project would give assurance that the 2014 ACTAPP and 2015 PARCC student groups are reasonably stable (equivalent) in their academic ability to respond to the ACTAPP and PARCC tests. This was followed by a propensity score weighting (PSW) procedure which would make these two student groups statistically equivalent (i.e. similar) in terms of previous academic and demographic characteristics. The PSW procedure used here is similar to the one employed by Braun and Qian (2007) in mapping state standards onto the NAEP scale. Propensity score weighting is also used in a number of quasi-experimental designs in which the control and experimental groups need to be weighted so that they can be as statistically equivalent as feasible on the basis of relevant background variables. Examples of

PSW include publications by (Guo & Fraser, 2010; Harder, Stuart, & Anthony, 2010; Robins, Rotnitzky, & Zhao, 1994).

Major Steps for Concordance

The major steps in establishing the concordant scores are listed below:

1. Select stable schools for each grade/test based on 2012 to 2014 student achievement on ACTAAP tests.
2. For Grades 3 through 8, Algebra I EOC, and Geometry EOC, calculate propensity score weights using a vector of student level covariates, based on the characteristics of students in 2014, to condition the student distribution in the 2015 stable school sample.
3. For Grades 3 through 8, Algebra I EOC, and Geometry EOC, use propensity score weights to calculate 2015 PARCC cut scores with propensity score weights.
4. For grade 9 and grade 10 ELA, calculate 2015 PARCC cut scores based on vertical moderation.

Data Source

To be consistent with major previous technical work for Arkansas accountability, the data used for this process came from the Arkansas student population that completed the regular assessments. This population does not include students who tested on alternate portfolio assessments. Additionally, this population does not include students indicated as highly mobile (not enrolled in the same school for a full academic year). All other regularly assessed, full academic year students—including disabled students and English Language Learners (ELLs) with accommodations—are included in the study. Consistent with accountability determinations in previous years, ELLs with less than one year in the USA were excluded from ELA/Literacy calculations.

Section 2: Major Steps in Selecting Stable Schools

Preliminary Steps

The first major steps in identifying the stable schools are listed below.

1. Calculate percent of students at the combined Proficient and Advanced levels for each school on each grade/EOC in each year during 2012 to 2014 school years.
2. Remove schools with $N < 25$ (on each grade/test in each year) from further steps of calculation.
3. Calculate the standard deviation of percent as defined for each school on each grade/test across three years.
4. Rank the standard deviation of percent as defined in all the schools on each grade/test.
5. Schools with percentile rank less than 90 are defined as “*stable schools*” on each grade/test.

The above preliminary steps were used to define stable schools based on 2012 to 2014 school year student achievement on each grade/test. It was then assumed that these schools would continue to remain stable in the 2015 school year on each grade/test. However, the grade 9 and grade 10 ELA tests in 2015 do not exist in prior years. To accommodate these two discrepant situations, a decision was made to select the grade 8 Literacy stable schools having a 9th grade as grade 9 ELA stable schools for 2015, and the grade 11 Literacy stable schools having a 10th grade as grade 10 ELA stable schools for 2015.

Table 2 reports the 2012 to 2014 achievement data for all students included in the stable schools. The percentages reported are for the students at the Proficient and Advanced levels on the ACTAAP assessments. In most cases, the stable schools cover roughly two thirds of the tested population.

TABLE 2: *Achievement Data of All Students at Stable Schools*

Grade / Test	Number of Students and Percent at Proficient and Advanced					
	2012		2013		2014	
	N	%	N	%	N	%
Grade 3 LIT	28344	83.4%	28622	81.6%	28291	79.0%
Grade 4 LIT	28706	87.0%	28693	86.2%	28460	84.7%
Grade 5 LIT	28282	86.9%	27685	85.2%	27265	84.2%
Grade 6 LIT	28614	77.0%	28264	74.6%	27765	71.3%
Grade 7 LIT	29802	82.1%	29539	78.7%	29385	78.5%
Grade 8 LIT	28401	81.9%	29066	79.2%	28273	78.6%
Grade 8 LIT VM	12743	82.1%	12929	79.3%	12697	79.6%
EOC LIT	25531	70.4%	26006	72.0%	27269	73.7%
Grade 11 LIT VM	25210	70.8%	25713	72.2%	26967	73.8%
Grade 3 Math	28170	89.1%	28565	88.1%	28179	86.1%
Grade 4 Math	28375	83.7%	28431	83.6%	28130	78.2%
Grade 5 Math	28118	78.1%	27458	71.9%	27116	70.3%
Grade 6 Math	28571	77.6%	28272	77.2%	27740	74.4%
Grade 7 Math	29024	78.7%	29044	71.8%	29020	71.3%
Grade 8 Math	18933	61.1%	21435	60.0%	21368	58.4%
Algebra	21682	80.8%	22142	78.8%	22778	77.4%
Geometry	21327	77.3%	20620	75.3%	21947	76.3%

Note: VM = Vertical Moderation

Final Steps with Random Sampling

Schools with very large student tested populations may have substantial bearing on the concordant results. To reduce this affect, a random sample of students was taken from each of the very large schools and used in place of the tested populations for these schools.

Very large schools were defined as those schools whose tested population exceeded the 90th percentile rank of the distribution of the N-size of the tested population in all schools included in the stable school sample. Schools were ranked by grade/test based on the number of students tested in the schools in 2014 and 2015 respectively. Random sampling was conducted using simple random sampling without replacement with the SAS function RANUNI (SAS, 2013). The number of students drawn in the random sample for each very large school was equal to the number of students in the median school size as determined for each grade/test. The median school sizes by grade/test for schools in the state that were used to determine the size of the random sample from very large schools is provided in Table 3.

TABLE 3: *School Sizes by Grade / Test*

Grade / Test	2014			2015		
	Min	Median	Max	Min	Median	Max
Grade 3 LIT	25	68	312	25	69	293
Grade 4 LIT	27	69	310	25	69	315
Grade 5 LIT	26	69	386	25	69	411
Grade 6 LIT	25	78	426	25	77	483
Grade 7 LIT	25	96	427	28	96	442
Grade 8 LIT	25	92	441	25	95	431
Grade 8 LIT VM	25	60	441	.	.	.
Grade 9 LIT	.	.	.	26	63	410
Grade 10 LIT	.	.	.	26	89	1019
EOC LIT	25	84	896	.	.	.
Grade 11 LIT VM	25	84	896	.	.	.
Grade 3 Math	25	68	312	25	68	293
Grade 4 Math	27	69	310	25	69	315
Grade 5 Math	26	69	386	25	70	411
Grade 6 Math	25	78	426	25	75	486
Grade 7 Math	25	92	427	25	93	445
Grade 8 Math	27	98	391	25	100	366
Algebra	25	75	915	25	78	865
Geometry	26	80	932	26	80	1048

Note: VM = Vertical Moderation

By taking a sample from large schools the impact of cluster correlation (that is inherent in any school-nested data set) is reduced. This would give more credence to the assumption of statistical independence used in calculating the propensity score for each student. Table 4 indicates the sample size and achievement (percent of students at Proficient and Advanced) before and after the random sampling from very large schools.

TABLE 4: *Achievement Data of 2014 Students at Stable Schools before and after Random Sampling Large Schools*

Grade / Test	Number of Students and Percent at Proficient and Advanced			
	Before Sampling		After Sampling	
	N	%	N	%
Grade 3 LIT	28291	79.0%	24593	79.4%
Grade 4 LIT	28460	84.7%	24740	85.0%
Grade 5 LIT	27265	84.2%	22350	84.1%
Grade 6 LIT	27765	71.3%	22645	70.2%
Grade 7 LIT	29385	78.5%	24511	77.5%
Grade 8 LIT	28273	78.6%	23361	77.7%
Grade 8 LIT VM	12697	79.6%	9669	78.8%
EOC LIT	27269	73.7%	19659	71.2%
Grade 11 LIT VM	26967	73.8%	19376	71.3%
Grade 3 Math	28179	86.1%	24518	86.4%
Grade 4 Math	28130	78.2%	24561	78.5%
Grade 5 Math	27116	70.3%	22197	70.1%
Grade 6 Math	27740	74.4%	22615	73.3%
Grade 7 Math	29020	71.3%	24078	70.2%
Grade 8 Math	21368	58.4%	18440	57.1%
Algebra	22778	77.4%	17720	75.5%
Geometry	21947	76.3%	16008	75.2%

Note: VM = Vertical Moderation

Concordant Samples for Horizontal Moderation

Two sets of concordant samples, one for ACTAAP 2014 and the other for PARCC 2015, were assembled for the horizontal moderation (linking) as defined in the introductory section of this document. Students included in these concordant samples are those from the stable schools (after random sampling) who have *complete data* on ACTAPP 2014 and PARCC 2015, and on academic and demographic covariates used in propensity score weighting (PSW). The N counts of the concordant samples are slightly smaller than the N counts of students included in the stable schools, after random sampling in large schools. The changes in the number of students in the sample before and after random sampling from very large schools are provided in Table 5.

TABLE 5: *Change of Student Numbers after Select in Stable Schools and Sample from Large Schools*

Grade / Test	2014			2015		
	Tested Population	Stable Schools	Random Sample	Tested Population	Stable Schools	Random Sample
Grade 3 LIT	33149	28291	24593	32697	27660	23939
Grade 4 LIT	33343	28460	24740	32906	27699	24114
Grade 5 LIT	33258	27265	22350	33159	26936	21845
Grade 6 LIT	33622	27765	22645	33053	26486	21537
Grade 7 LIT	33912	29385	24511	33648	28651	23959
Grade 8 LIT	33595	28273	23361	33579	27691	23073
Grade 8 LIT VM	15768	12697	9669			
Grade 9 LIT				33527	12341	9524
Grade 10 LIT				32035	27866	19800
EOC LIT	30808	27269	19659			
Grade 11 LIT VM	30383	26967	19376			
Grade 3 Math	33172	28179	24518	32738	27443	23757
Grade 4 Math	33378	28130	24561	32935	27330	23747
Grade 5 Math	33293	27116	22197	33197	26674	21917
Grade 6 Math	33650	27740	22615	33063	26389	21384
Grade 7 Math	33669	29020	24078	33445	28279	23515
Grade 8 Math	27094	21368	18440	27311	21031	18104
Algebra	30444	22778	17720	32548	23301	18247
Geometry	32559	21947	16008	30730	21033	14869

Note: VM = Vertical Moderation

Section 3: Major Steps in Propensity Score Weighting

General Descriptions of Propensity Score Weighting

PSW was implemented to establish statistical equivalence on important background characteristics between 2014 ACTAAP and 2015 PARCC concordant student samples. The purpose of using PSW was to correct for differences, if any, between these two groups on the observable covariates. PSW is often used where randomization cannot be used to select various groups for a study (See, for example, Guo & Fraser, 2010). It may be noted that, once computed, propensity scores can be used in further analysis by conditioning methods such as matching and weighting. The propensity score weighting (PSW) method was selected for this study so that all students comprising the concordant samples would be included in the determination of the final concordant cut scores. Technical details about PSW may be found in the paper by Harder et al. (2010).

Because grade 9 and grade 10 ELA tests in 2015 PARCC have no equivalent tests in 2014, propensity score weighting was not used for these two tests.

Demographic Covariates Used in Propensity Score Calculation

Both academic and demographic variables were used as covariates in propensity score calculation. The academic covariates were students' prior year achievement on the same test or a standardized test of the similar construct. The demographic covariates included race/ethnicity, free and reduced lunch price (FRLP), inclusion in limited English programs (LEP), and special education (SPED).

Academic Covariates Used in Propensity Score Calculation

For grade 3 math and literacy, academic covariates were scale scores on grade 2 Iowa Test of Basic Skills for math and language. For other grades/tests, there were two options for academic covariates. Option A utilizes students' ACTAAP assessment scores from the previous year and Option B uses students' Iowa Tests of Basic Skills (ITBS) scores in the same way. It may be noted that the ITBS and ACTAAP tests for grades 3-8 share a number of common items at each grade/test; so the current year ITBS score cannot be used as covariate. Details for these options follow.

Option A: For grade 4 through 8 math and literacy, academic covariates were scale scores on the ACTAAP assessment from the previous year (2013 ACTAAP for 2014 ACTAAP and 2014 ACTAAP for 2015 PARCC). For algebra, the academic covariate was the previous year ACTAAP math. For geometry, the academic covariate was the previous year ACTAAP algebra. For grade 3, the only covariate available was the prior year ITBS. Therefore, Option B is used for grade 3 in all cases.

Option B: For grade 3 through 8 math and literacy, academic covariates were scale scores on the ITBS math and language from the previous year (2013 ITBS for 2014 ACTAAP and 2014 ITBS for 2015 PARCC). For algebra and geometry, the academic covariate was the previous year ITBS math.

With two options for academic covariate, there are two options for concordant samples. These will be referred to as "Type A Concordant Sample" and "Type B Concordant Sample" in the remaining part of this documentation. The sample sizes after matching on prior year academic covariates are provided in Table 6.

TABLE 6: *Students Counts in Samples after Matching on Prior Year Achievement*

Grade / Test	2014			2015		
	Random Sample	Type A	Type B	Random Sample	Type A	Type B
Grade 3 LIT	24593	NA	23183	23939	NA	22632
Grade 4 LIT	24740	22788	23719	24114	21987	23129
Grade 5 LIT	22350	20682	21528	21845	20070	21054
Grade 6 LIT	22645	20893	21719	21537	19849	20707
Grade 7 LIT	24511	22544	23393	23959	21950	22852
Grade 8 LIT	23361	21566	22330	23073	21227	22024
Grade 3 Math	24518	NA	23110	23757	NA	22445
Grade 4 Math	24561	22610	23479	23747	21630	22664
Grade 5 Math	22197	20556	21363	21917	20135	21100
Grade 6 Math	22615	20855	21656	21384	19699	20552
Grade 7 Math	24078	22125	22920	23515	21468	22376
Grade 8 Math	18440	16950	17617	18104	16537	17213
Algebra	17720	15886	16544	18247	16108	16819
Geometry	16008	12776	13769	14869	12706	13140

Software for PSW

SAS procedure LOGISTIC (GLOGIT as the linking function) was used to calculate propensity scores (SAS, 2013). Inverse probability of treatment weights (Robins et al., 1994) was calculated to incorporate propensity scores into further analysis. To control for bias from extreme weights, we first stabilized the weights with normalization and then trimmed the stabilized weights to range between 0.1 and 10 as suggested in Harder, Stuart, & Anthony (2010).

Characteristics of PSW Weighted Concordant Samples

For illustration purposes, the major characteristics of the two PSW concordant samples are listed in Tables 7A and 7B for grade 4 LIT/ELA. Similar tables for each grade/test are provided in the Appendix.

TABLE 7A: Characteristics of Type A Concordant Sample for Grade 4 LIT/ELA Test

Covariate		Without PSW			With PSW		
		A 2014	P 2015	<i>p</i> -value	A 2014	P 2015	<i>p</i> -value
	N	22788	21987		22788	21987	
Academic (PARCC)	Mean	656.90	644.05	<0.05	650.68	650.72	0.98
	SD	186.34	193.84		188.29	192.91	
FRLP	%	61.50	62.07	0.21	61.79	61.78	0.99
LEP	%	10.04	10.15	0.70	10.10	10.10	1.00
SPED	%	11.12	11.16	0.88	11.13	11.12	0.97
Hispanic	%	12.88	13.45	0.07	13.17	13.17	1.00
African-American	%	18.10	17.72	0.30	17.90	17.90	1.00
Asian	%	1.61	1.58	0.79	1.59	1.60	1.00
Native-American	%	0.69	0.55	0.05	0.62	0.62	1.00
Pacific Islander	%	0.61	0.66	0.51	0.64	0.64	1.00
More than two races	%	1.12	2.07	<0.05	1.59	1.59	1.00
White	%	64.99	63.97	<0.05	64.49	64.49	1.00

Note: A = ACTAAP; P = PARCC

TABLE 7B: Characteristics of Type B Concordant Sample for Grade 4 LIT/ELA Test

Covariate		Without PSW			With PSW		
		A 2014	P 2015	<i>p</i> -value	A 2014	P 2015	<i>p</i> -value
	N	23719	23129		23719	23129	
Academic (ITBS)	Mean	184.43	183.28	<0.05	183.87	183.87	1.00
	SD	18.80	18.66		18.73	18.82	
FRLP	%	62.26	63.09	0.06	62.69	62.68	0.99
LEP	%	9.87	10.12	0.37	9.99	9.99	1.00
SPED	%	11.14	11.44	0.32	11.29	11.28	0.98
Hispanic	%	12.81	13.40	0.06	13.10	13.10	1.00
African-American	%	18.20	18.02	0.63	18.11	18.11	1.00
Asian	%	1.61	1.59	0.87	1.60	1.60	1.00
Native-American	%	0.71	0.55	<0.05	0.63	0.63	0.99
Pacific Islander	%	0.59	0.74	0.06	0.67	0.66	1.00
More than two races	%	1.13	2.11	<0.05	1.61	1.62	0.99
White	%	64.94	63.58	<0.05	64.28	64.28	1.00

Note: A = ACTAAP; P = PARCC

Tables 7A and 7B illustrate how PSW resulted in two statistically equivalent concordant student samples between 2014 ACTAAP and 2015 PARCC on the Grade 4 LIT/ELA tests. Without PSW, the two groups have significant differences on several of the covariates as evidenced by the *p*-values less than 0.05 for these covariates. However, after weighting on PSW, all the group differences were reduced to close to zero as evidenced by all *p*-values close to 1.00 for all covariates. The lack of significant difference on some covariates before PSW reflects the fact that the student composition of schools in terms of academic and demographic variables

(such as FRLP, LEP, SPED, and race/ethnicity) does not change much from one year to the next. It may also be noted from the cited tables that, in the context of statistical modeling, the PSW process creates “synthetic” 2014 ACTAPP and 2015 PARCC concordant (weighted) student samples for which the common background characteristics stand somewhere between the background characteristics of the two unweighted samples.

Section 4: Determination of 2015 PARCC Concordant Scores

General Procedures

Once the two PSW concordant student samples were identified, the 2014 ACTAAP and 2015 PARCC PSW test score distributions were compiled. The proportion of students in the combined levels of Proficient and Advanced on each 2014 ACTAAP test was computed and used to project a cut score on the corresponding 2015 PARCC test. All in all, the cut score calculations were based on the propensity score weights applied to the students in the two PSW concordant student groups.

Rounding

The following rounding rule, adopted by ADE under advisement from the Arkansas Technical Advisory Committee on Assessment for use with ACTAAP assessments, was used in locating the PARCC 2015 cut score. “If the scale score immediately below the performance standard is closer to the standard than is the first scale score above the standard, then the lower scale score is set to the standard, regardless of rounding.” (TAC/Assessment Minutes, March 2006 Meeting).

Results of 2015 PARCC Cut Scores

Table 8A records the 2015 PARCC Type A concordant cut scores for all tests/grades except the Grade 9 and 10 English tests (where a vertical moderation process was used). These scores are based on Option A which used the prior year ACTAAP scores as covariates.

TABLE 8A: Type A PARCC 2015 Cut Scores

Grade/Test	2014 ACTAAP % at Prof. and Above With PSW*	2015 PARCC % at Cut Score and Above With PSW*	2015 PARCC Type A Cut Score
Grade 4 LIT	84.82	84.57	707
Grade 5 LIT	84.21	83.88	706
Grade 6 LIT	70.31	69.94	724
Grade 7 LIT	76.97	77.21	713
Grade 8 LIT	78.86	78.95	707
Grade 4 Math	78.03	78.25	710
Grade 5 Math	68.28	67.68	719
Grade 6 Math	72.61	72.42	716
Grade 7 Math	69.86	70.68	719
Grade 8 Math	57.54	57.57	716
Algebra	76.43	76.03	715
Geometry	74.37	74.29	717

*Based on preliminary data and subject to some variation after appeals and corrections

Table 8B records the 2015 PARCC Type B concordant cut scores for all tests/grades except the Grade 9 and 10 English tests (where a vertical moderation process was used). These scores are based on Option B which used the prior year ITBS scores as covariates.

TABLE 8B: Type B PARCC 2015 Cut Scores

Grade/Test	2014 ACTAAP % at Prof. and Above With PSW*	2015 PARCC % at Cut Score and Above With PSW*	2015 PARCC Type B Cut Score
Grade 3 LIT	80.04	80.34	699
Grade 4 LIT	84.84	84.71	706
Grade 5 LIT	84.14	84.44	705
Grade 6 LIT	70.56	70.93	722
Grade 7 LIT	77.80	78.16	710
Grade 8 LIT	77.95	78.22	708
Grade 3 Math	87.12	87.09	702
Grade 4 Math	78.29	78.24	709
Grade 5 Math	70.26	70.40	715
Grade 6 Math	73.28	73.81	714
Grade 7 Math	70.79	71.07	717
Grade 8 Math	56.75	57.56	716
Algebra	76.14	75.62	715
Geometry	76.59	76.23	716

*Based on preliminary data and subject to some variation after appeals and corrections

Table 9 records the lower of the 2015 PARCC Type A and Type B concordant cut scores for all tests/grades except the Grade 9 and 10 English tests (where a vertical moderation process was used.)

TABLE 9: The Lower PARCC 2015 Cut Scores Based on Type A and Type B

Grade/Test	2015 PARCC Type A Cut Score	2015 PARCC Type B Cut Score	2015 PARCC Smaller Cut Score
Grade 3 LIT	NA	699	699
Grade 4 LIT	707	706	706
Grade 5 LIT	706	705	705
Grade 6 LIT	724	722	722
Grade 7 LIT	713	710	710
Grade 8 LIT	707	708	707
Grade 3 Math	NA	702	702
Grade 4 Math	710	709	709
Grade 5 Math	719	715	715
Grade 6 Math	716	714	714
Grade 7 Math	719	717	717
Grade 8 Math	716	716	716
Algebra	715	715	715
Geometry	717	716	716

Section 5: Vertical Moderation for English Grades 9 and 10

Issues

Arkansas administered the PARCC tests of Grade 9 ELA and Grade 10 ELA in 2015. There were no 2014 ACTAAP LIT tests for these grades. The two Arkansas tests adjacent to Grades 9 and 10 are the ACTAAP LIT tests at Grade 8 and Grade 11. Since the “equivalent groups” design cannot be used here, a “vertical moderation” process based on stable schools was called upon to calculate the concordant scores on Grade 9 ELA and Grade 10 ELA. The process of vertical moderation (articulation) has been used in a number of cross-grade standard settings to smooth out cut scores across a range of grades to assure some level of consistency in the trend line of student performance. (Lissitz & Huynh, 2003; Huynh & Schneider, 2005; Buckendahl, Huynh, Siskind, & Sanders, 2005). *Applied Measurement in Education* (2005) has an entire issue devoted to this topic.

Vertical Moderation Process

The vertical moderation process used in this study does not involve any propensity score weighting and is comprised of the following major steps. All students comprising the “stable schools” (after random sampling) were fully included in the moderation process.

Step 1: The lower-grade and higher-grade anchor points were determined. The lower-grade anchor point for vertical moderation is the proportion of grade 8 students in the combined Proficient and Advanced levels on the 2014 Grade 8 LIT test from the stable schools having both grade 8 and grade 9. The higher-grade anchor point for vertical moderation is the proportion of grade 11 students in the combined Proficient and Advanced levels on the 2014 EOC LIT test from the stable schools having both grade 10 and grade 11. It was found that the lower-grade anchor is 78.83% and the upper-grade anchor is 71.27%.

Step 2: Next, by using the two anchor points previously found and a linear interpolation, the proportion of students “At Cut Score and Above” for the 2015 PARCC was projected to be 76.31% for Grade 9 ELA and 73.79% for Grade 10 ELA.

Step 3: The PARCC 2015 Grade 9 ELA score distribution was compiled for all Grade 9 students in stable schools having both grade 8 and grade 9. The PARCC 2015 Grade 10 ELA score distribution was also compiled for all Grade 10 students in stable schools having both grade 10 and grade 11.

Step 4: The proportions of students at “At Cut Score and Above” found in Step 2 were projected onto the PARCC 2015 test score distributions in order to determine the PARCC 2015 cut scores. The ADE rounding rule previously cited was also applied.

Results

The resulting 2015 PARCC cut scores are 713 for Grade 9 ELA and 708 for Grade 10 ELA.

Section 6: Conclusion

Combining results from section 4 and section 5, cut scores for all 2015 PARCC grade/tests are listed in Table 10.

TABLE 10: 2015 PARCC Cut Scores

Grade/Test	ELA / LIT	Math
Grade 3	699	702
Grade 4	706	709
Grade 5	705	715
Grade 6	722	714
Grade 7	710	717
Grade 8	707	716
Grade 9	713	
Grade 10	708	
Algebra I		715
Geometry		716

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Appendix One

Characteristics of Type A Concordant Samples

EOC ALG

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	15886	16108		15886	16108	
Academic	Mean	745.46	741.60	<0.05	743.37	743.43	0.95
	SD	86.58	84.29		86.66	84.46	
FRLP	%	57.38	58.49	<0.05	57.98	57.96	0.97
LEP	%	5.11	4.94	0.47	5.03	5.04	0.99
SPED	%	4.64	5.19	<0.05	4.91	4.91	1.00
Hispanic	%	8.74	9.01	0.39	8.89	8.89	1.00
African-American	%	21.01	20.44	0.21	20.72	20.72	1.00
Asian	%	1.33	1.24	0.49	1.29	1.29	1.00
Native-American	%	0.72	0.56	0.08	0.64	0.64	1.00
Pacific Islander	%	0.17	0.17	0.93	0.17	0.17	1.00
More than two races	%	0.59	1.76	<0.05	1.19	1.18	0.94
White	%	67.44	66.80	0.22	67.10	67.11	0.99

EOC GEO

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	12776	12706		12776	12706	
Academic	Mean	234.47	230.53	<0.05	232.59	232.59	0.99
	SD	38.63	40.14		38.95	40.09	
FRLP	%	54.25	54.26	0.99	54.28	54.28	0.99
LEP	%	3.58	4.12	<0.05	3.85	3.84	0.99
SPED	%	3.95	3.82	0.58	3.87	3.86	0.99
Hispanic	%	7.04	8.30	<0.05	7.69	7.68	0.98
African-American	%	20.15	19.63	0.29	19.92	19.92	1.00
Asian	%	1.34	1.03	<0.05	1.19	1.19	0.98
Native-American	%	0.82	0.72	0.33	0.77	0.77	1.00
Pacific Islander	%	0.21	0.15	0.25	0.18	0.18	0.97
More than two races	%	0.79	1.53	<0.05	1.15	1.16	0.97
White	%	69.64	68.65	0.09	69.10	69.10	0.99

GRADE 4 LIT

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	22788	21987		22788	21987	
Academic	Mean	656.90	644.05	<0.05	650.68	650.72	0.98
	SD	186.34	193.84		188.29	192.91	
FRLP	%	61.50	62.07	0.21	61.79	61.78	0.99
LEP	%	10.04	10.15	0.70	10.10	10.10	1.00
SPED	%	11.12	11.16	0.88	11.13	11.12	0.97
Hispanic	%	12.88	13.45	0.07	13.17	13.17	1.00
African-American	%	18.10	17.72	0.30	17.90	17.90	1.00
Asian	%	1.61	1.58	0.79	1.59	1.60	1.00
Native-American	%	0.69	0.55	0.05	0.62	0.62	1.00
Pacific Islander	%	0.61	0.66	0.51	0.64	0.64	1.00
More than two races	%	1.12	2.07	<0.05	1.59	1.59	1.00
White	%	64.99	63.97	<0.05	64.49	64.49	1.00

GRADE 4 MATH

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	22610	21630		22610	21630	
Academic	Mean	609.61	601.35	<0.05	605.57	605.60	0.97
	SD	93.74	93.96		93.82	94.78	
FRLP	%	61.71	62.65	<0.05	62.18	62.17	0.98
LEP	%	10.31	10.39	0.77	10.37	10.37	1.00
SPED	%	11.13	11.41	0.34	11.29	11.28	0.99
Hispanic	%	13.06	13.53	0.14	13.29	13.29	1.00
African-American	%	18.01	17.64	0.30	17.81	17.80	0.98
Asian	%	1.75	1.63	0.33	1.69	1.69	0.99
Native-American	%	0.71	0.59	0.10	0.65	0.65	0.99
Pacific Islander	%	0.63	0.69	0.43	0.66	0.66	1.00
More than two races	%	1.12	2.08	<0.05	1.59	1.59	0.99
White	%	64.72	63.85	0.06	64.31	64.32	0.98

GRADE 5 LIT

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	20682	20070		20682	20070	
Academic	Mean	737.08	730.16	<0.05	733.57	733.58	1.00
	SD	165.25	165.33		166.54	164.79	
FRLP	%	62.22	62.75	0.27	62.45	62.46	0.98
LEP	%	10.49	10.19	0.33	10.32	10.32	1.00
SPED	%	10.71	10.95	0.45	10.84	10.84	0.99
Hispanic	%	13.15	13.52	0.28	13.32	13.32	1.00
African-American	%	18.77	18.31	0.22	18.53	18.53	1.00
Asian	%	1.55	1.49	0.61	1.52	1.52	1.00
Native-American	%	0.60	0.54	0.41	0.57	0.57	1.00
Pacific Islander	%	0.72	0.69	0.73	0.70	0.70	1.00
More than two races	%	0.94	1.95	<0.05	1.44	1.44	1.00
White	%	64.26	63.51	0.11	63.92	63.92	1.00

GRADE 5 MATH

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	20556	20135		20556	20135	
Academic	Mean	642.85	624.15	<0.05	633.88	634.06	0.85
	SD	91.07	93.88		92.31	95.76	
FRLP	%	62.00	62.73	0.13	62.26	62.24	0.97
LEP	%	10.68	10.64	0.88	10.62	10.62	0.99
SPED	%	10.46	10.86	0.19	10.70	10.67	0.94
Hispanic	%	13.31	13.83	0.12	13.55	13.54	1.00
African-American	%	18.79	18.19	0.12	18.47	18.45	0.95
Asian	%	1.60	1.52	0.54	1.57	1.57	1.00
Native-American	%	0.61	0.55	0.41	0.58	0.57	0.97
Pacific Islander	%	0.75	0.72	0.73	0.74	0.74	0.97
More than two races	%	0.93	1.90	<0.05	1.41	1.41	1.00
White	%	64.01	63.28	0.12	63.68	63.71	0.95

GRADE 6 LIT

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	20893	19849		20893	19849	
Academic	Mean	769.92	763.03	<0.05	766.60	766.59	0.99
	SD	166.02	166.88		167.44	166.14	
FRLP	%	63.21	63.42	0.66	63.32	63.33	0.99
LEP	%	6.72	7.13	0.10	6.92	6.91	1.00
SPED	%	10.38	10.18	0.52	10.29	10.29	1.00
Hispanic	%	9.92	10.66	<0.05	10.27	10.27	1.00
African-American	%	21.27	20.49	0.06	20.90	20.90	1.00
Asian	%	1.23	1.21	0.85	1.22	1.22	1.00
Native-American	%	0.61	0.56	0.48	0.59	0.59	1.00
Pacific Islander	%	0.23	0.23	0.97	0.23	0.23	1.00
More than two races	%	0.90	1.84	<0.05	1.36	1.36	0.98
White	%	65.84	65.00	0.08	65.43	65.42	1.00

GRADE 6 MATH

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	20855	19699		20855	19699	
Academic	Mean	650.32	640.09	<0.05	644.91	644.94	0.98
	SD	95.93	87.15		96.15	88.62	
FRLP	%	63.53	63.65	0.80	63.64	63.65	0.99
LEP	%	7.07	7.39	0.22	7.22	7.22	0.98
SPED	%	10.41	10.29	0.69	10.41	10.41	0.99
Hispanic	%	10.29	10.85	0.06	10.55	10.55	0.98
African-American	%	21.07	20.38	0.08	20.83	20.84	0.99
Asian	%	1.25	1.27	0.87	1.26	1.26	0.99
Native-American	%	0.67	0.55	0.13	0.61	0.61	0.98
Pacific Islander	%	0.19	0.25	0.18	0.22	0.22	0.99
More than two races	%	0.94	1.88	<0.05	1.39	1.39	0.97
White	%	65.60	64.83	0.10	65.14	65.13	0.99

GRADE 7 LIT

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	22544	21950		22544	21950	
Academic	Mean	738.98	719.69	<0.05	728.70	728.77	0.97
	SD	172.56	166.90		176.24	165.68	
FRLP	%	61.82	62.20	0.41	62.03	62.02	0.98
LEP	%	6.47	6.83	0.13	6.66	6.66	0.99
SPED	%	9.49	9.56	0.80	9.57	9.57	1.00
Hispanic	%	9.51	10.71	<0.05	10.11	10.11	1.00
African-American	%	21.03	20.37	0.09	20.75	20.76	0.98
Asian	%	1.46	1.20	<0.05	1.34	1.33	0.99
Native-American	%	0.71	0.57	0.06	0.64	0.64	1.00
Pacific Islander	%	0.31	0.19	<0.05	0.25	0.25	0.99
More than two races	%	0.84	1.58	<0.05	1.21	1.21	0.98
White	%	66.14	65.37	0.09	65.69	65.69	1.00

GRADE 7 MATH

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	22125	21468		22125	21468	
Academic	Mean	712.50	700.00	<0.05	706.67	706.70	0.98
	SD	98.49	102.14		98.44	103.35	
FRLP	%	62.38	62.46	0.87	62.39	62.37	0.98
LEP	%	6.58	7.06	<0.05	6.79	6.79	1.00
SPED	%	9.57	9.60	0.92	9.53	9.53	1.00
Hispanic	%	9.65	10.80	<0.05	10.19	10.19	0.98
African-American	%	21.56	21.02	0.16	21.28	21.28	1.00
Asian	%	1.33	1.09	<0.05	1.22	1.22	1.00
Native-American	%	0.72	0.60	0.11	0.66	0.65	0.97
Pacific Islander	%	0.29	0.20	0.08	0.25	0.25	1.00
More than two races	%	0.80	1.56	<0.05	1.17	1.17	0.99
White	%	65.65	64.72	<0.05	65.23	65.23	1.00

GRADE 8 LIT

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	21566	21227		21566	21227	
Academic	Mean	783.64	786.69	0.05	785.19	785.22	0.98
	SD	162.83	159.75		162.33	160.55	
FRLP	%	61.41	61.34	0.88	61.39	61.37	0.97
LEP	%	6.22	6.44	0.34	6.34	6.34	0.99
SPED	%	9.00	9.05	0.87	9.03	9.02	0.99
Hispanic	%	10.03	10.17	0.64	10.10	10.10	1.00
African-American	%	20.47	20.62	0.70	20.55	20.55	1.00
Asian	%	1.34	1.22	0.27	1.28	1.28	1.00
Native-American	%	0.72	0.53	<0.05	0.62	0.62	0.99
Pacific Islander	%	0.27	0.29	0.79	0.28	0.28	1.00
More than two races	%	0.65	1.66	<0.05	1.15	1.15	0.99
White	%	66.52	65.52	<0.05	66.01	66.01	1.00

GRADE 8 MATH

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	16950	16537		16950	16537	
Academic	Mean	703.19	700.15	<0.05	701.66	701.66	1.00
	SD	81.80	80.25		81.75	80.39	
FRLP	%	66.05	66.32	0.60	66.18	66.17	0.99
LEP	%	7.35	7.84	0.09	7.60	7.60	1.00
SPED	%	11.22	11.12	0.77	11.18	11.18	0.99
Hispanic	%	11.14	11.37	0.49	11.26	11.26	1.00
African-American	%	22.52	22.66	0.75	22.57	22.57	1.00
Asian	%	1.00	0.91	0.43	0.96	0.96	1.00
Native-American	%	0.73	0.59	0.13	0.66	0.66	0.99
Pacific Islander	%	0.23	0.32	0.11	0.27	0.27	0.99
More than two races	%	0.80	1.57	<0.05	1.18	1.18	1.00
White	%	63.59	62.56	0.05	63.10	63.09	1.00

Appendix Two

Characteristics of Type B Concordant Samples

EOC ALG

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	16544	16819		16544	16819	
Academic	Mean	254.02	253.12	<0.05	253.57	253.58	0.96
	SD	27.29	28.34		27.39	28.35	
FRLP	%	58.07	59.29	<0.05	58.71	58.69	0.97
LEP	%	5.16	4.90	0.28	5.03	5.03	0.99
SPED	%	4.65	5.31	<0.05	4.98	4.98	1.00
Hispanic	%	8.78	9.00	0.48	8.89	8.89	1.00
African-American	%	20.97	20.49	0.28	20.73	20.73	1.00
Asian	%	1.31	1.25	0.64	1.28	1.28	1.00
Native-American	%	0.73	0.58	0.09	0.65	0.65	0.99
Pacific Islander	%	0.21	0.18	0.57	0.19	0.19	1.00
More than two races	%	0.57	1.77	<0.05	1.19	1.18	0.95
White	%	67.43	66.73	0.17	67.08	67.08	0.99

EOC GEO

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	13769	13140		13769	13140	
Academic	Mean	262.63	259.83	<0.05	261.26	261.26	1.00
	SD	29.27	29.14		29.38	29.22	
FRLP	%	52.99	54.21	<0.05	53.59	53.58	1.00
LEP	%	3.29	3.95	<0.05	3.61	3.61	1.00
SPED	%	3.54	4.00	<0.05	3.76	3.76	0.99
Hispanic	%	6.84	8.07	<0.05	7.44	7.44	1.00
African-American	%	19.49	19.67	0.72	19.59	19.59	1.00
Asian	%	1.39	1.10	<0.05	1.25	1.25	1.00
Native-American	%	0.78	0.68	0.38	0.73	0.74	0.99
Pacific Islander	%	0.20	0.15	0.39	0.17	0.17	0.99
More than two races	%	0.76	1.49	<0.05	1.11	1.11	0.99
White	%	70.55	68.83	<0.05	69.70	69.70	1.00

GRADE 3 LIT

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	23183	22632		23183	22632	
Academic	Mean	171.06	170.44	<0.05	170.75	170.75	0.99
	SD	19.11	18.87		19.03	19.00	
FRLP	%	62.74	63.80	<0.05	63.26	63.26	1.00
LEP	%	8.49	9.05	<0.05	8.76	8.76	1.00
SPED	%	11.08	11.54	0.12	11.27	11.29	0.97
Hispanic	%	11.59	13.09	<0.05	12.34	12.33	1.00
African-American	%	18.38	17.67	<0.05	18.02	18.02	1.00
Asian	%	1.69	1.27	<0.05	1.48	1.48	1.00
Native-American	%	0.70	0.56	<0.05	0.63	0.63	1.00
Pacific Islander	%	0.50	0.58	0.20	0.54	0.54	1.00
More than two races	%	1.19	2.23	<0.05	1.70	1.70	0.99
White	%	65.95	64.61	<0.05	65.29	65.29	1.00

GRADE 3 MATH

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	23110	22445		23110	22445	
Academic	Mean	172.13	172.40	0.12	172.27	172.27	0.99
	SD	17.86	18.06		17.89	18.08	
FRLP	%	62.57	63.44	0.05	62.99	62.98	1.00
LEP	%	8.37	8.96	<0.05	8.65	8.65	1.00
SPED	%	11.22	11.52	0.31	11.34	11.35	0.97
Hispanic	%	11.55	13.06	<0.05	12.30	12.30	1.00
African-American	%	17.61	16.57	<0.05	17.10	17.10	1.00
Asian	%	1.65	1.37	<0.05	1.51	1.51	1.00
Native-American	%	0.71	0.55	<0.05	0.63	0.63	1.00
Pacific Islander	%	0.47	0.47	0.99	0.47	0.47	1.00
More than two races	%	1.22	2.23	<0.05	1.72	1.72	1.00
White	%	66.79	65.75	<0.05	66.28	66.28	1.00

GRADE 4 LIT

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	23719	23129		23719	23129	
Academic	Mean	184.43	183.28	<0.05	183.87	183.87	1.00
	SD	18.80	18.66		18.73	18.82	
FRLP	%	62.26	63.09	0.06	62.69	62.68	0.99
LEP	%	9.87	10.12	0.37	9.99	9.99	1.00
SPED	%	11.14	11.44	0.32	11.29	11.28	0.98
Hispanic	%	12.81	13.40	0.06	13.10	13.10	1.00
African-American	%	18.20	18.02	0.63	18.11	18.11	1.00
Asian	%	1.61	1.59	0.87	1.60	1.60	1.00
Native-American	%	0.71	0.55	<0.05	0.63	0.63	0.99
Pacific Islander	%	0.59	0.74	0.06	0.67	0.66	1.00
More than two races	%	1.13	2.11	<0.05	1.61	1.62	0.99
White	%	64.94	63.58	<0.05	64.28	64.28	1.00

GRADE 4 MATH

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	23479	22664		23479	22664	
Academic	Mean	188.29	187.61	<0.05	187.96	187.96	0.99
	SD	19.50	19.97		19.47	20.06	
FRLP	%	62.49	63.61	<0.05	63.05	63.04	0.99
LEP	%	10.17	10.45	0.31	10.30	10.30	1.00
SPED	%	11.16	11.65	0.10	11.41	11.40	0.98
Hispanic	%	12.99	13.53	0.08	13.25	13.25	1.00
African-American	%	18.11	17.89	0.53	17.99	17.99	1.00
Asian	%	1.74	1.67	0.56	1.70	1.70	1.00
Native-American	%	0.72	0.59	0.08	0.66	0.66	1.00
Pacific Islander	%	0.62	0.76	0.08	0.69	0.69	1.00
More than two races	%	1.15	2.11	<0.05	1.62	1.62	0.99
White	%	64.67	63.45	<0.05	64.08	64.08	0.99

GRADE 5 LIT

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	21528	21054		21528	21054	
Academic	Mean	205.24	204.28	<0.05	204.76	204.76	0.99
	SD	25.73	25.81		25.66	25.95	
FRLP	%	63.06	63.73	0.15	63.36	63.37	0.98
LEP	%	10.33	10.22	0.71	10.27	10.27	1.00
SPED	%	10.80	11.09	0.34	10.95	10.94	0.98
Hispanic	%	12.99	13.47	0.14	13.22	13.22	1.00
African-American	%	18.95	18.45	0.19	18.69	18.69	1.00
Asian	%	1.50	1.49	0.94	1.50	1.50	1.00
Native-American	%	0.61	0.56	0.44	0.58	0.58	0.99
Pacific Islander	%	0.72	0.77	0.59	0.75	0.75	1.00
More than two races	%	0.95	2.01	<0.05	1.48	1.48	0.99
White	%	64.27	63.25	<0.05	63.78	63.78	0.99

GRADE 5 MATH

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	21363	21100		21363	21100	
Academic	Mean	207.00	206.72	0.18	206.87	206.87	0.99
	SD	21.13	21.70		21.14	21.74	
FRLP	%	62.83	63.73	0.06	63.24	63.26	0.97
LEP	%	10.49	10.73	0.43	10.60	10.60	1.00
SPED	%	10.53	10.98	0.14	10.77	10.76	0.98
Hispanic	%	13.11	13.85	<0.05	13.48	13.48	1.00
African-American	%	19.00	18.32	0.07	18.66	18.66	1.00
Asian	%	1.56	1.52	0.72	1.54	1.54	1.00
Native-American	%	0.62	0.56	0.43	0.59	0.59	1.00
Pacific Islander	%	0.77	0.82	0.54	0.79	0.79	1.00
More than two races	%	0.94	1.96	<0.05	1.45	1.45	0.99
White	%	64.00	62.97	<0.05	63.50	63.50	1.00

GRADE 6 LIT

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	21719	20707		21719	20707	
Academic	Mean	214.73	214.57	0.57	214.64	214.64	1.00
	SD	29.00	29.18		29.00	29.25	
FRLP	%	63.97	64.28	0.51	64.12	64.12	0.99
LEP	%	6.64	7.10	0.06	6.87	6.87	1.00
SPED	%	10.41	10.36	0.86	10.39	10.39	1.00
Hispanic	%	9.87	10.59	<0.05	10.22	10.22	1.00
African-American	%	21.30	20.75	0.16	21.03	21.03	1.00
Asian	%	1.23	1.23	0.98	1.23	1.23	1.00
Native-American	%	0.62	0.56	0.41	0.59	0.59	1.00
Pacific Islander	%	0.24	0.25	0.81	0.25	0.25	1.00
More than two races	%	0.91	1.88	<0.05	1.38	1.38	1.00
White	%	65.83	64.75	<0.05	65.30	65.30	1.00

GRADE 6 MATH

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	21656	20552		21656	20552	
Academic	Mean	217.69	216.46	<0.05	217.11	217.10	0.99
	SD	28.77	28.51		28.69	28.70	
FRLP	%	64.32	64.53	0.65	64.41	64.42	0.98
LEP	%	6.99	7.37	0.13	7.18	7.17	1.00
SPED	%	10.42	10.47	0.87	10.45	10.45	1.00
Hispanic	%	10.24	10.80	0.06	10.51	10.51	1.00
African-American	%	21.14	20.66	0.23	20.91	20.91	1.00
Asian	%	1.25	1.28	0.76	1.26	1.26	1.00
Native-American	%	0.66	0.55	0.13	0.61	0.61	1.00
Pacific Islander	%	0.20	0.27	0.14	0.23	0.23	1.00
More than two races	%	0.95	1.92	<0.05	1.41	1.42	0.98
White	%	65.57	64.52	<0.05	65.06	65.06	1.00

GRADE 7 LIT

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	23393	22852		23393	22852	
Academic	Mean	227.89	226.93	<0.05	227.40	227.40	1.00
	SD	33.01	32.61		32.90	32.78	
FRLP	%	62.53	62.98	0.32	62.76	62.75	0.99
LEP	%	6.39	6.76	0.10	6.58	6.57	1.00
SPED	%	9.59	9.73	0.62	9.65	9.65	0.98
Hispanic	%	9.44	10.59	<0.05	10.01	10.01	1.00
African-American	%	21.10	20.43	0.07	20.76	20.76	1.00
Asian	%	1.43	1.20	<0.05	1.32	1.32	1.00
Native-American	%	0.73	0.60	0.09	0.66	0.66	1.00
Pacific Islander	%	0.30	0.21	0.06	0.26	0.26	1.00
More than two races	%	0.84	1.61	<0.05	1.22	1.22	1.00
White	%	66.15	65.36	0.07	65.76	65.76	1.00

GRADE 7 MATH

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	22920	22376		22920	22376	
Academic	Mean	231.51	231.25	0.34	231.38	231.38	1.00
	SD	28.76	29.44		28.76	29.49	
FRLP	%	63.11	63.28	0.71	63.21	63.20	0.99
LEP	%	6.52	7.00	<0.05	6.76	6.76	1.00
SPED	%	9.70	9.79	0.75	9.73	9.73	0.98
Hispanic	%	9.60	10.73	<0.05	10.16	10.16	1.00
African-American	%	21.70	21.09	0.11	21.40	21.40	1.00
Asian	%	1.31	1.10	<0.05	1.21	1.21	1.00
Native-American	%	0.72	0.62	0.18	0.67	0.67	1.00
Pacific Islander	%	0.29	0.22	0.14	0.25	0.25	1.00
More than two races	%	0.79	1.60	<0.05	1.19	1.19	1.00
White	%	65.59	64.64	<0.05	65.12	65.12	1.00

GRADE 8 LIT

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	22330	22024		22330	22024	
Academic	Mean	236.49	235.23	<0.05	235.85	235.87	0.96
	SD	35.07	35.03		34.98	35.22	
FRLP	%	62.06	62.01	0.93	62.07	62.05	0.97
LEP	%	6.19	6.45	0.26	6.33	6.33	0.99
SPED	%	9.20	9.23	0.92	9.22	9.22	0.98
Hispanic	%	10.00	10.21	0.46	10.11	10.11	1.00
African-American	%	20.58	20.62	0.92	20.60	20.60	1.00
Asian	%	1.32	1.26	0.58	1.29	1.29	1.00
Native-American	%	0.74	0.54	<0.05	0.64	0.64	0.99
Pacific Islander	%	0.27	0.32	0.34	0.30	0.30	1.00
More than two races	%	0.65	1.65	<0.05	1.15	1.15	0.99
White	%	66.44	65.40	<0.05	65.92	65.92	1.00

GRADE 8 MATH

		Without PSW			With PSW		
Covariate		A 2014	P 2015	p-value	A 2014	P 2015	p-value
	N	17617	17213		17617	17213	
Academic	Mean	237.13	235.18	<0.05	236.17	236.17	0.99
	SD	27.81	27.90		27.81	28.06	
FRLP	%	66.56	66.96	0.43	66.76	66.76	0.99
LEP	%	7.28	7.88	<0.05	7.58	7.58	1.00
SPED	%	11.42	11.28	0.68	11.36	11.35	0.99
Hispanic	%	11.07	11.44	0.27	11.26	11.26	1.00
African-American	%	22.50	22.62	0.79	22.55	22.55	1.00
Asian	%	0.99	0.96	0.74	0.98	0.98	0.99
Native-American	%	0.73	0.60	0.12	0.67	0.67	0.99
Pacific Islander	%	0.24	0.36	<0.05	0.30	0.30	1.00
More than two races	%	0.79	1.55	<0.05	1.16	1.16	0.99
White	%	63.67	62.47	<0.05	63.08	63.07	1.00