

Promoting Academic Success: Influence on WASL Retake Scores Through Summer 2007

The 2006 Washington State Legislature allocated funds for school districts to provide “Promoting Academic Success” (PAS) remediation for 10th-grade students who do not meet standard in one or more content areas of the Washington Assessment of Student Learning (WASL).¹

The 2006 Legislature also directed the Washington State Institute for Public Policy (Institute) to evaluate the effectiveness of PAS-funded remediation in helping students meet standard on the WASL.² The study goals are to determine the:

- overall effectiveness of PAS;
- relative effectiveness of different remedial strategies; and
- relative effectiveness disaggregated by student characteristics.

This report examines the effectiveness of PAS for students in the class of 2008. Effectiveness is defined as the difference in performance on WASL retakes for students who did and did not participate in PAS.

This report contains three sections:

1. Research Strategy
2. Descriptive Results
3. Statistical Analysis
 - ✓ Overall Effectiveness of PAS
 - ✓ Effectiveness by Subgroups
 - ✓ Effectiveness by Session of PAS

We were unable to analyze the effectiveness of different remedial strategies because students could not be linked to specific interventions or teachers. Therefore, we do not know which students took what type of intervention.

SUMMARY

This report examines the effectiveness of Promoting Academic Success (PAS) for students in the class of 2008, where effectiveness is defined as the difference in performance on WASL retakes for students who did and did not participate in PAS.

- Summer PAS increased met-standard rates in every subject, whereas PAS offered during the school year had no statistically significant impact on WASL performance.
- Overall, PAS had a modest effect on performance in writing and math but no statistically appreciable impact on reading performance.
 - ✓ The effect of summer PAS in **reading** is overshadowed statistically by the ineffectiveness of school-year PAS.
 - ✓ PAS had a statistically significant but small impact on **writing** performance. Compared with non-participants, students who took PAS had slightly higher met-standard rates and scale scores on their WASL retakes.
 - ✓ On average, scale scores in **math** were slightly higher among PAS participants relative to non-participants, but the increases were not large enough to impact met-standard rates.

A previous report by the Institute concluded that no particular remedial strategy substantially increased performance on the August 2006 WASL retake.³

Appendix A (at the end of this report) provides technical details regarding the main statistical analyses; Appendix B presents results from the evaluation of summer and school-year PAS programs.

¹ ESSB 6386 § 515 (1), Chapter 372, Laws of 2006, supplemental operating budget.

² Ibid, § 607 (11).

³ R. Barnoski. (2007). *Do summer 2006 Promoting Academic Success program characteristics influence WASL retake results?* Olympia: Washington State Institute for Public Policy, Document No. 07-08-2201.

RESEARCH STRATEGY

This analysis includes students who took but did not meet standard on one or more WASL assessments at least once as of spring 2007 and who subsequently retook the corresponding subject-area assessment(s). These students are divided into two groups: students who took PAS prior to retaking the WASL and those who did not.

Exhibit 1 presents a timeline of WASL administrations and PAS opportunities for students in the class of 2008. These students were first slated to take the 10th-grade WASL in spring 2006, although not everyone completed the WASL as scheduled at that time. Our analyses therefore include students who first took that WASL in spring 2006, summer 2006, or spring 2007. Students who did not meet standard in a subject-area WASL assessment have had four opportunities to take PAS:

- summer 2006;
- fall 2006 (first semester of the 2006–07 school year);
- spring 2007 (second semester of the 2006–07 school year); and
- summer 2007.

Exhibit 2 documents the process by which we selected the study groups for each subject-area WASL assessment. We began with students who completed the WASL as of spring 2007, did not meet standard, and subsequently retook the WASL. We then divided these students into those who participated in PAS before their WASL retake and those who did not participate in PAS prior to the retake.

Exhibit 2
Selection of the PAS Study Group and Comparison Group

Selection Process	Reading	Writing	Math
Completed the WASL as of spring 2007	75,798	75,403	74,815
Did not meet standard (% of WASL completers)	11,240 (14.8%)	12,284 (16.3%)	35,313 (47.2%)
Retook the WASL (% of not met standard)	6,310 (56.1%)	7,452 (60.7%)	24,003 (65.0%)
Participated in PAS* (% of retakes)	2,781 (44.1%)	2,763 (37.1%)	12,311 (51.3%)
Did not participate in PAS* (% of retakes)	3,529 (55.9%)	4,689 (62.9%)	11,692 (48.7%)

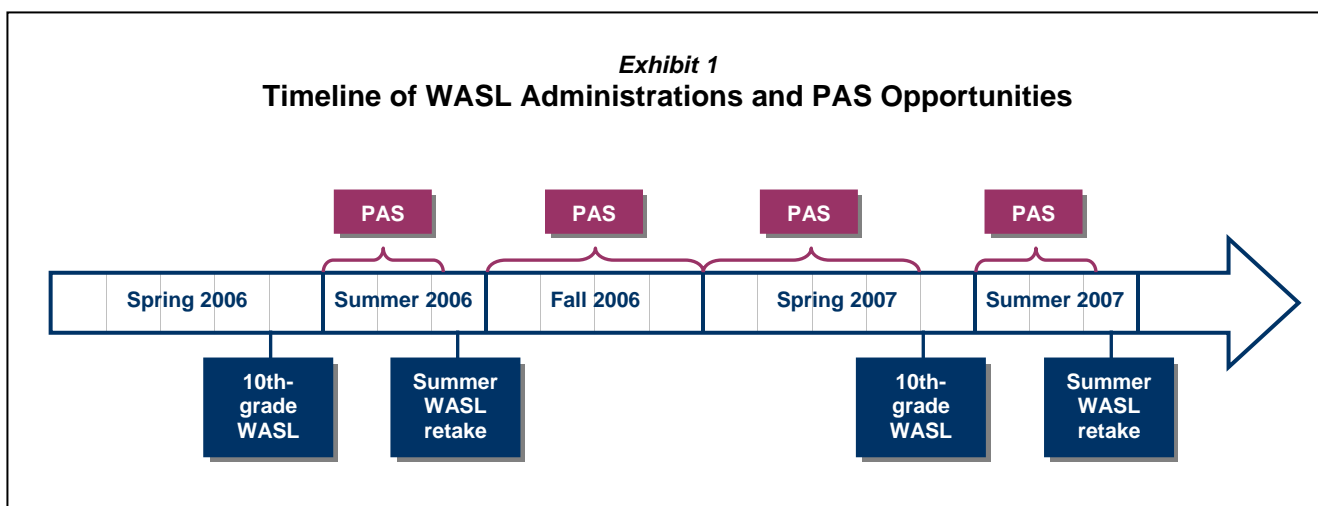
* Prior to the WASL retake.

For example, of the 75,798 students who completed the reading WASL as of spring 2007, 14.8 percent (n=11,240) did not meet standard on their first attempt. Of these students, more than half (n=6,310) retook the reading WASL. Approximately 44 percent of students who retook the reading WASL enrolled in PAS (n=2,781); the remaining 56 percent of students (n=3,529) did not enroll in PAS before their retake.

The ideal method for evaluating the effectiveness of PAS would be to assign some students randomly to a PAS program, to withhold PAS for another random sample of students, and then to retest both groups of students. Using this design, the only systematic difference between the two groups would be participation in PAS.

Since this design is not possible, the research task is to identify a comparison group with similar characteristics to the PAS group. This study's comparison group consists of students who retook the WASL but did not participate in PAS.

Exhibit 1
Timeline of WASL Administrations and PAS Opportunities



To compare PAS participants and non-participants, we examined student characteristics from Office of Superintendent of Public Instruction (OSPI) databases. These characteristics include gender, race/ethnicity, eligibility for free or reduced-price meal benefits, English language learner status, disability status, and initial WASL performance.

Multivariate logistic regression analyses were used to quantify the comparability of the two groups. Based on these statistical analyses, the characteristics of PAS and non-PAS students were found to be quite similar.⁴ That is, non-PAS students who retook the WASL are a valid comparison group for PAS students.

DESCRIPTIVE RESULTS

Math

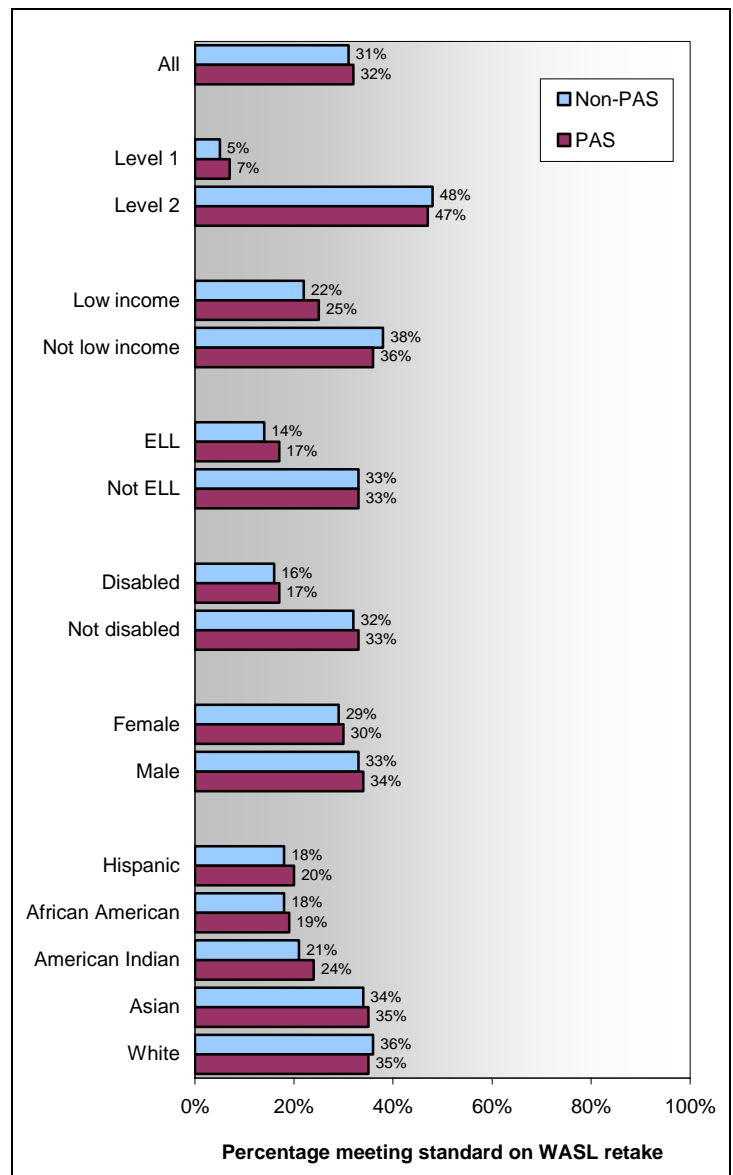
Sixty-five percent of the 35,313 students in the class of 2008 who did not meet standard on their first attempt at the 10th-grade math WASL subsequently retook the assessment (n=24,003), of whom slightly more than half (n=12,311) participated in PAS (see Exhibit 2).

Exhibit 3 compares PAS and non-PAS students with respect to the percentage who met standard on a math WASL retake. These met-standard rates are unadjusted; that is, they do not account or “control” for other characteristics. Overall, 32 percent of students who participated in PAS for math eventually met standard on a WASL retake in math, compared with 31 percent of students who did not participate in PAS.

Met-standard rates differ substantially based on students’ initial WASL performance. Of students who had level 1 scores on their first math WASL attempt, only 5 and 7 percent of non-PAS and PAS students, respectively, met standard on a retake; conversely, nearly half of students with level 2 scores met standard on a retake (48 percent of non-PAS and 47 percent of PAS students).

Exhibit 3 conveys two general trends. First, “disadvantaged” students—low-income students, English language learners, students with at least one documented disability, and non-Asian minorities—generally have lower met-standard rates on WASL retakes than their peers.⁵ Second, met-standard rates for students who did and did not participate in PAS are comparable, differing in most cases by only one or two percentage points.

Exhibit 3
What Percentage of Students Who Retook the Math WASL Met Standard?
Comparing PAS and Non-PAS Students



Note: These met-standard rates are unadjusted—that is, they do not control statistically for student characteristics or prior WASL performance.

⁴ One measure of the overall similarity between PAS and non-PAS students is a statistic from the logistic regression analysis called the Area Under the Receiver Operating Characteristic Curve (AUC). The AUC varies between .500 and 1.00. AUCs in the 0.500s indicate no difference between groups while AUCs in the 0.800s or above suggest strong differences. The AUCs for reading, writing, and math are 0.539, 0.550, and 0.533, respectively, indicating that PAS participants are nearly indistinguishable from non-participants in terms of their demographic characteristics and initial WASL performance.

⁵ This pattern is consistent with WASL performance more generally. See, for example, W. Cole & A. Pennucci. (2007). *Washington’s high school assessment system: A review of student performance on the WASL and alternative assessment options*. Olympia: Washington State Institute for Public Policy, Document No. 07-12-2202.

Exhibit 4

What Percentage of Students Who Retook the Reading WASL Met Standard?

Comparing PAS and Non-PAS Students

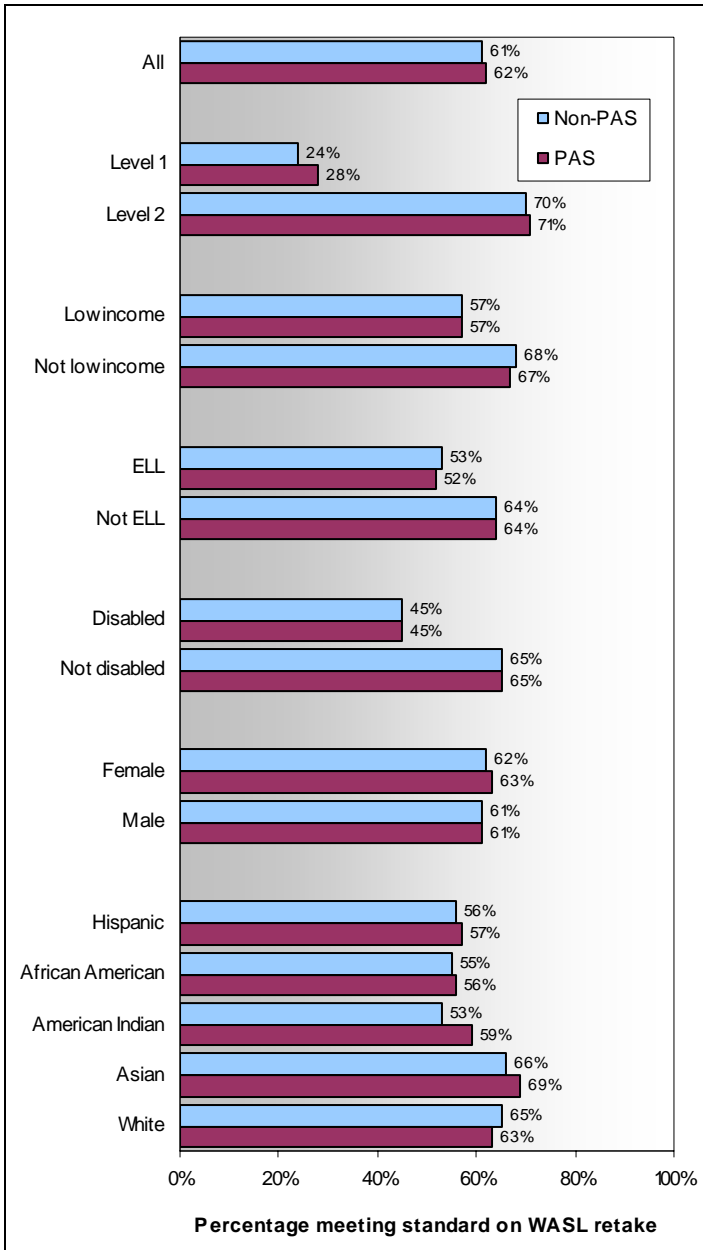
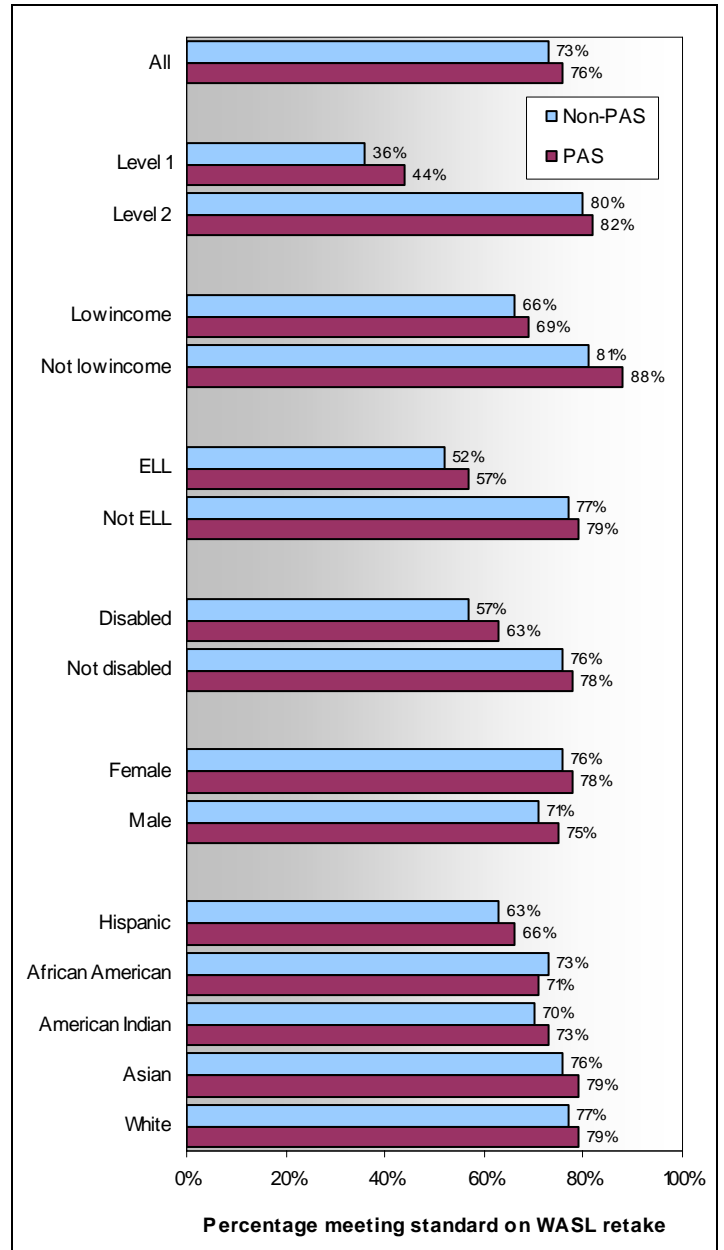


Exhibit 5

What Percentage of Students Who Retook the Writing WASL Met Standard?

Comparing PAS and Non-PAS Students



Note: These met-standard rates are unadjusted—that is, they do not control statistically for student characteristics or prior WASL performance.

Reading and Writing

Exhibits 4 and 5 chart the percentage of PAS and non-PAS students who met standard on a reading and writing retake, respectively. As with math, two trends are evident. First, performance on the reading and writing WASL varies by student characteristics. Approximately twice as many level 2 students met standard on a retake as level 1 students. Likewise, low-income students, English language learners, disabled students, and non-Asian minorities had lower met-standard rates than their higher-income, English speaking, non-disabled, and White or Asian peers.

Second, the differences in met-standard rates between PAS and non-PAS students are larger for writing than for reading. Overall, 62 percent of PAS students and 61 percent of non-PAS students met standard on a retake of the reading WASL; this compares with 76 percent of PAS students and 73 percent of non-PAS students who met standard on a writing retake. Based on raw met-standard rates alone, however, it is difficult to evaluate the effectiveness of PAS with any precision. Such an evaluation requires a more sophisticated analysis (as follows).

STATISTICAL ANALYSIS

Analytical Design

To examine more rigorously whether PAS had an effect on different aspects of WASL performance, we conducted two forms of statistical analysis: logistic regression and linear regression.

- Logistic regression analysis shows whether the likelihood of meeting standard on a WASL retake increased as a result of PAS.
- Linear regression analysis tells a somewhat different story: it shows whether scale scores increased as a result of PAS.

Logistic and linear regression analyses both examine the effectiveness of PAS while controlling for other characteristics. Our analyses controlled for the following student characteristics: initial WASL performance, eligibility for free/reduced-price meal benefits, English language learner status, disability status (student has at least one documented disability), gender, and race/ethnicity. The technical details and results of our regression analyses are reported in Appendices A and B.

We measure PAS in three ways.

- The first method counts the number of times a student took PAS in each subject area, ranging from 0 to 4. A score of 0 indicates that a student did not take PAS, while a score of 4 is assigned to students who took all available PAS opportunities (summer 2006, fall 2006, spring 2007, and summer 2007).
- The second way to assess the effectiveness of PAS is to examine WASL performance for students who took any PAS, comparing them with students who did not participate in PAS.
- Another way to evaluate PAS is to disaggregate “any” PAS into its component parts, conducting a separate analysis of PAS offered in summer 2006, fall 2006, spring 2007, and summer 2007.

Exhibit 6 documents the number of students who participated in PAS multiple times. The majority of students who took PAS did so only once prior to their retake. For example, of the 2,781 students who participated in PAS for reading, 1,894 enrolled in PAS once, 722 enrolled twice, 154 enrolled three times, and 11 enrolled in all four available PAS opportunities. Compared with reading and writing, a slightly higher percentage of students took multiple sessions of PAS in math.

Exhibit 6

PAS Participation Among Students Who Did Not Meet Standard on the WASL

Level of participation	Reading	Writing	Math
Did not participate in PAS	3,529 (55.9%)	4,689 (62.9%)	11,692 (48.7%)
Participated in PAS	2,781 (44.1%)	2,763 (37.1%)	12,311 (51.3%)
Number of times enrolled in PAS (Percentage of PAS participants)			
One	1,894 (68.1%)	2,071 (75.0%)	7,457 (60.6%)
Two	722 (26.0%)	553 (20.0%)	3,746 (30.4%)
Three	154 (5.5%)	132 (4.8%)	1,070 (8.7%)
Four	11 (0.4%)	7 (0.3%)	38 (0.3%)

Overall Conclusions

Conclusions regarding the effectiveness of PAS for students in the class of 2008 vary based on the way PAS is measured.

- Summer PAS increased met-standard rates in every subject, whereas PAS offered during the school year had no statistically significant impact on WASL performance.
- Overall, PAS had a modest effect on performance in writing and math but no statistically appreciable impact on reading performance.
 - ✓ The effect of summer PAS in **reading** is overshadowed statistically by the lack of an effect for school-year PAS.
 - ✓ PAS had a statistically significant but small impact on **writing** performance. Compared with non-participants, students who took PAS had slightly higher met-standard rates and scale scores on their WASL retakes.
 - ✓ On average, scale scores in **math** were slightly higher among PAS participants relative to non-participants, but the increases were not large enough to impact met-standard rates.

The exhibits that follow use results from the statistical analysis to illustrate the magnitude of the effect of PAS overall, by various subgroups, and with respect to summer and school-year PAS programs.

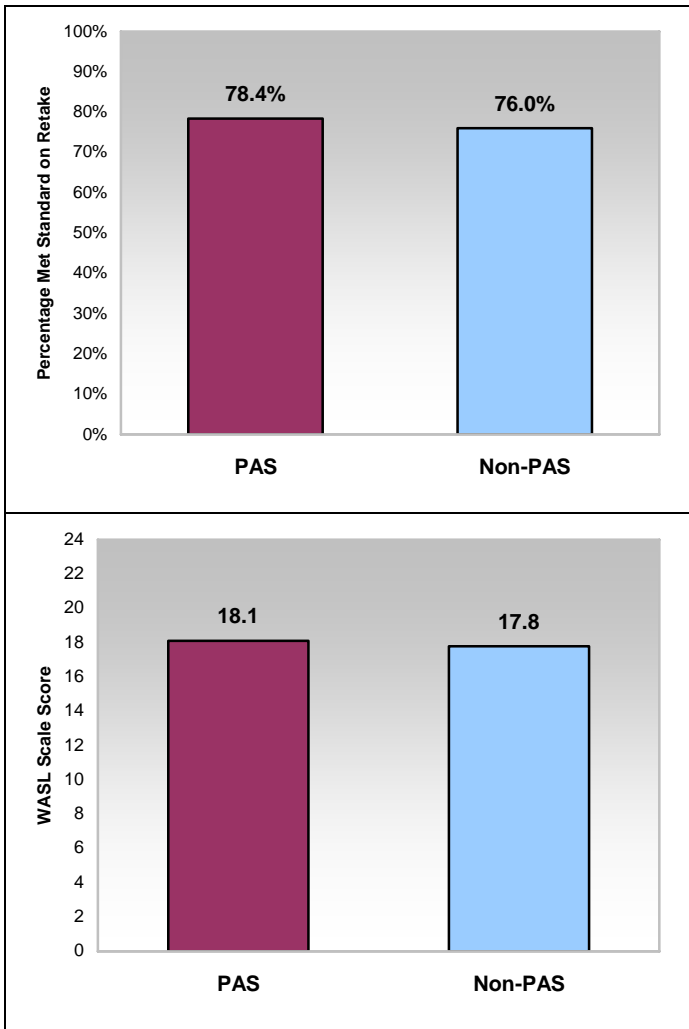
Overall Effectiveness of PAS

Exhibit 7 demonstrates that, controlling for available student characteristics and initial WASL performance, met-standard rates on the writing WASL increased by an estimated 2.4 percentage points as a result of PAS: 76 percent of students who did not participate in PAS met standard on a writing retake compared with 78.4 percent of PAS participants. Estimated average scale scores were also slightly higher for PAS participants (18.1 points) than for non-participants (17.8 points), although average scores on writing retakes for both PAS and non-PAS students were above the met-standard threshold of 17 points.

Exhibit 7

The Effect of PAS on Writing Performance is Statistically Significant But Small

Regression-Adjusted Met-Standard Rates and Scale Scores on WASL Retakes



Based on regression analyses that control for initial WASL performance, eligibility for free/reduced-price meal benefits, English language learner status, disability status, gender, and race/ethnicity.

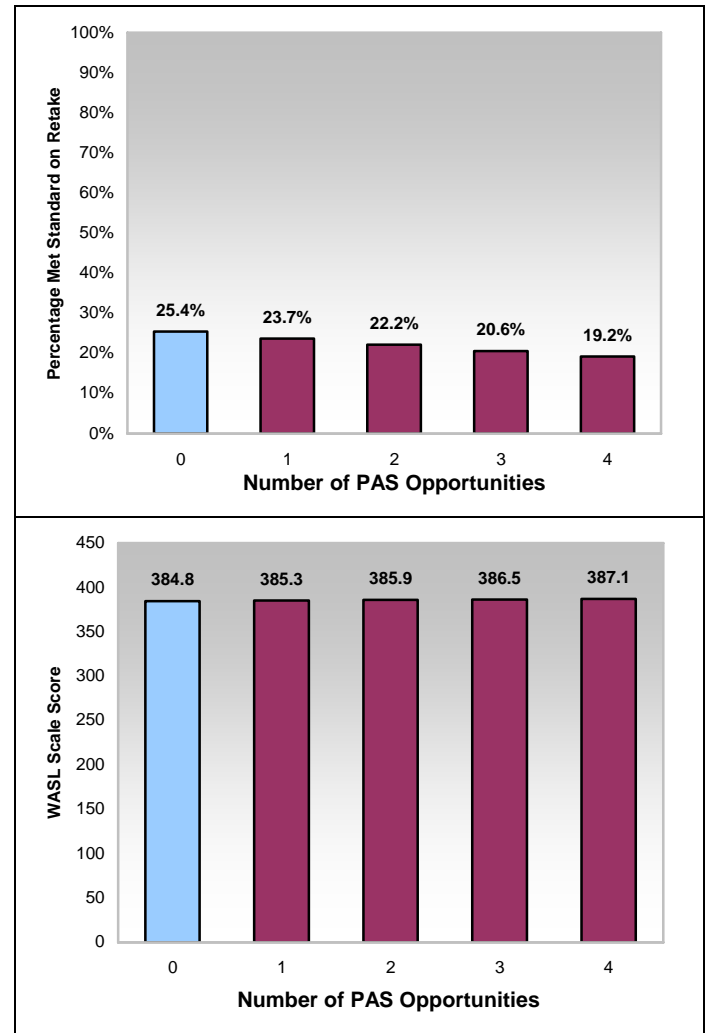
Exhibit 8 shows that the more times students take PAS, the less likely they are to meet standard on a math WASL retake. This counterintuitive finding makes sense if one considers that students who take PAS multiple times also tend to struggle the most on the WASL.

Unlike met-standard rates, scale scores in math increase slightly with each additional session of PAS, although not enough to impact met-standard rates. The average scale score for students who did not take any PAS was 384.8 compared with 387.1 for students who took PAS four times (the cut-off for meeting standard is 400).

Exhibit 8

The Effect of PAS on Math Performance is Statistically Significant But Small

Regression-Adjusted Met-Standard Rates and Scale Scores on WASL Retakes



Based on regression analyses that control for initial WASL performance, eligibility for free/reduced-price meal benefits, English language learner status, disability status, gender, and race/ethnicity.

Effectiveness by Subgroups

To determine whether PAS was more effective for some groups of students than for others, we conducted a series of regression analyses that examined possible interaction effects. Statistically significant interaction effects indicate that the effectiveness of PAS varies systematically with particular characteristics.

As shown in **Exhibit 9**, the effect of PAS varies with initial level of WASL performance and eligibility for free/reduced-price meal benefits.

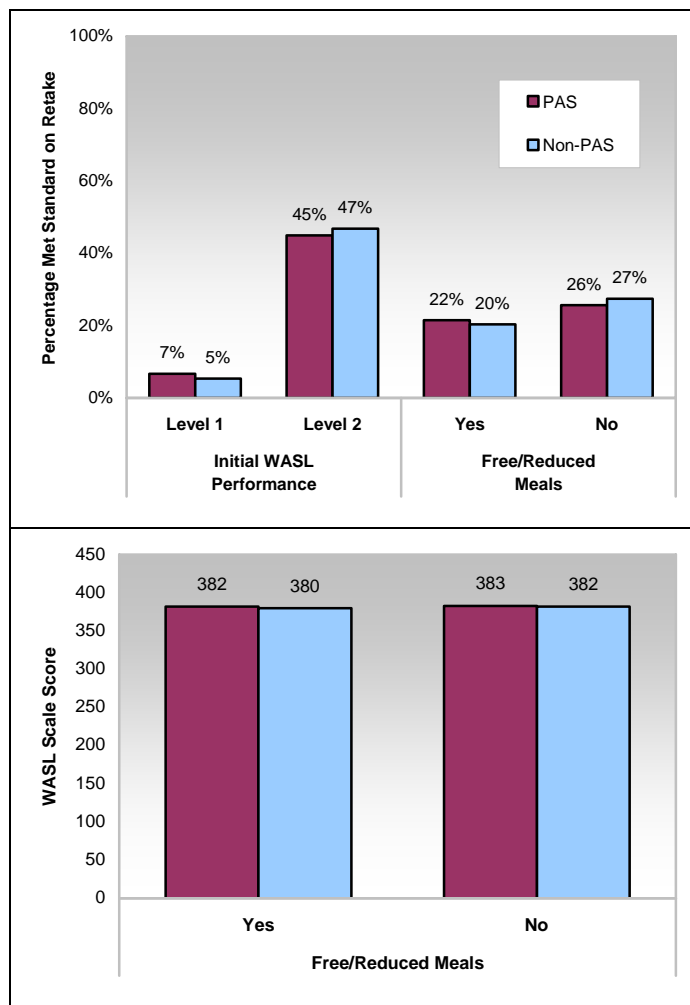
- Among students who received a level 2 score on their initial math WASL, PAS participants had a slightly lower estimated met-standard rate (45 percent) on a WASL retake than non-participants (47 percent).
- Students eligible for free/reduced-price meals who took PAS had a slightly higher met-standard rate (22 percent) than their counterparts who did not take PAS (20 percent).
- Average scale scores were also higher among students eligible for free/reduced-price meals who took PAS (382) than for similar students who did not take PAS (380).

Although these differences are statistically significant, they are substantively inconsequential.

Why were non-PAS students with level 2 scores on their initial math WASL more likely to meet standard on a retake than PAS students with similar scores? **Exhibit 10** shows why: more non-PAS students than PAS students were closer to meeting standard on their first attempt. Twenty-three percent of non-PAS students with level 2 “baseline” scores were within 5 points of meeting standard (395–399) compared with 18 percent of PAS students. Students with scores in this range are more likely than students with lower scores to meet standard on a retake even without remediation.

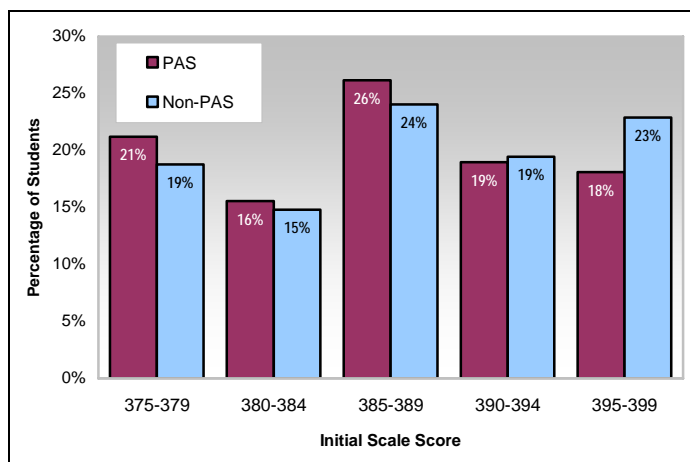
Exhibit 9 The Effect of PAS on Math Performance Varies Systematically by Initial WASL Performance and Poverty Status

Regression-Adjusted Met-Standard Rates and Scale Scores on WASL Retakes



Based on regression analyses that control for initial WASL performance, eligibility for free/reduced-price meal benefits, English language learner status, disability status, gender, and race/ethnicity.

Exhibit 10 Level 2 PAS Students Had Lower Scale Scores than Level 2 Non-PAS Students



Effectiveness by Session of PAS

In this final section, we evaluate the effectiveness of different sessions of PAS: summer 2006, fall 2006, spring 2007, and summer 2007.

Exhibit 11 demonstrates that for every subject, unadjusted met-standard rates were higher for students who participated in summer PAS than for students who did not. Conversely, PAS offered during the school year had little effect on met-standard rates. These results are confirmed by statistical analyses that control for student characteristics and level of initial WASL performance (see Appendix B). In only one case—fall 2006 writing PAS—did a school-year session of PAS have a statistically significant impact on met-standard rates.

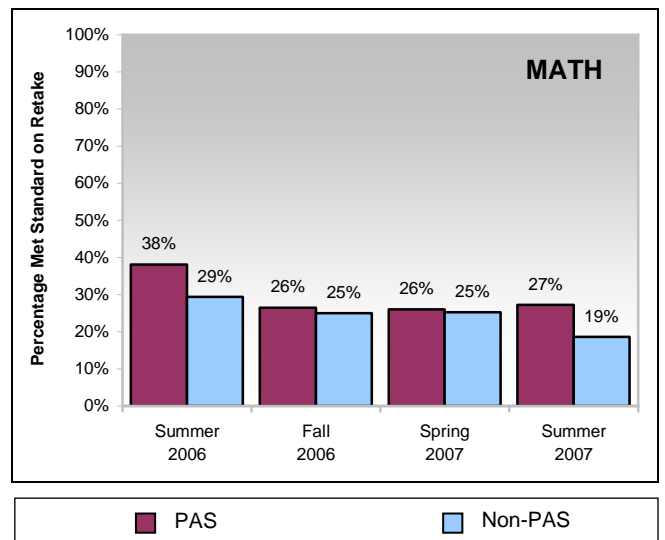
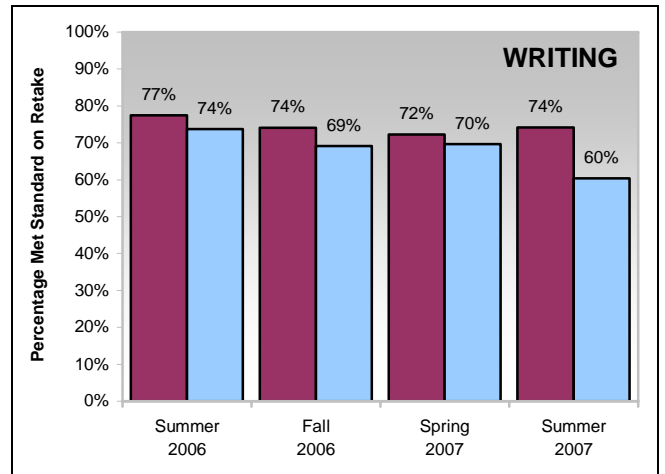
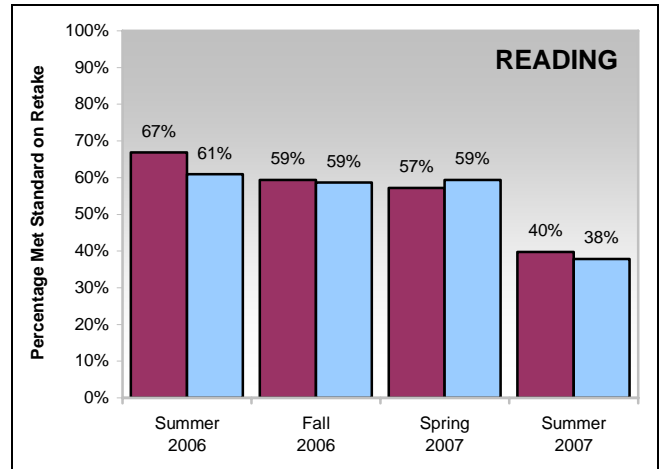
Why is summer PAS effective when school-year PAS is not? Although we cannot address this question directly with available data, at least two explanations are plausible. First, it could be that only highly motivated students opt to enroll in summer PAS. Alternatively, summer PAS may be more intensive than PAS offered during the school year.

Additionally, why is reading PAS *overall* shown to be ineffective even though *summer* PAS had a statistically significant impact on reading performance? This paradoxical finding reflects the way students are distributed across different sessions of PAS. As reported in **Exhibit 12**, the number of participants in school-year PAS for reading (n=2,566) is twice the number of summer PAS participants (n=1,278). For this reason, the positive effect of summer PAS is overshadowed by the lack of effect for school-year PAS.

Exhibit 12
Number of Participants in the Study Groups
by Session of PAS

Session of PAS	Reading		Writing		Math	
	PAS	No PAS	PAS	No PAS	PAS	No PAS
Summer 2006	1,200	4,855	1,362	5,866	5,703	17,738
Fall 2006	1,322	3,807	1,152	4,602	6,472	13,922
Spring 2007	1,244	3,885	1,025	4,729	5,828	14,566
Summer 2007	78	626	62	606	308	1,814

Exhibit 11
Only Summer PAS Had a Statistically Significant Effect on WASL Met-Standard Rates*



* Lone exception: Fall 2006 writing PAS had a marginally significant effect ($p=0.0503$).

Appendix A

Technical Appendix: Multivariate Analyses

This appendix discusses the technical details of our multivariate regression analyses evaluating the effectiveness of PAS.

We measured PAS two ways:

- a binary variable (“Any PAS”) set equal to 1 if a student had any PAS prior to his or her WASL retake and 0 otherwise, and
- a count variable (“PAS count”) ranging from 0 to 4 describing the number of PAS sessions a student took.

We measured WASL performance two ways:

- a binary variable set equal to 1 if a student met standard on a WASL retake and 0 if a student did not meet standard, and
- the scale score a student earned on his or her WASL retake.

We used logistic regression to analyze whether a student met standard on the WASL and linear regression to analyze WASL scale scores. All analyses controlled for the following variables: initial WASL performance, eligibility for free/reduced-price meal benefits, English language learner status, disability status, gender, and race/ethnicity. Initial WASL performance was operationalized in one of two ways: (1) as a binary variable indicating whether students had a level 2 score on their first attempt (for analyses of met-standard rates) or (2) as the scale score on a student's initial WASL (for analyses of scale scores).

Exhibit A.1 presents estimates for the effect of PAS on performance in math. Identical analyses were performed for reading and writing, the results of which appear in Exhibits A.2 and A.3. For each subject we conducted four regression analyses, two each for the logistic regression analysis of met-standard rates and linear regression analysis of scale scores. The first set of analyses examined the cumulative effectiveness of PAS—that is, whether students who took more sessions of PAS met standard at higher rates or had higher scale scores on subsequent WASL attempts. The second set of analyses determined whether taking any PAS had an effect on subsequent met-standard rates or scale scores.

Exhibits A.1, A.2, and A.3 present unstandardized and standardized coefficients from the regression analyses. Coefficient estimates in boldface type and with asterisks represent statistically significant effects ($p < .05$); the shaded regions demarcate the statistical effect of PAS net of other variables in the analysis.

Unstandardized logistic regression coefficients yield a variable's estimated net effect on the log-odds of meeting WASL standard. For example, the first column of results in Exhibit A.1 shows that each additional session of PAS reduces the log-odds of meeting standard on a math WASL retake by 0.09; put differently, the odds of meeting standard on a math retake decline by an estimated 8.6 percent ($100\%[1 - e^{-0.09}]$) for each additional session of PAS.

Unstandardized coefficients obtained from linear regression analyses are much easier to interpret: they represent the change in scale score associated with a one-unit increase in the corresponding variable. For example, each additional session of PAS is associated with an estimated 0.58-point increase in a student's scale score on a math retake, whereas taking any PAS is associated with an increase of 1.41 points in math.

In addition to unstandardized coefficients, we also report standardized coefficients. Standardized coefficients represent the change in an outcome, in standard deviation units, associated with a one-standard-deviation change in the corresponding variable. Because these estimates are standardized, they can be compared directly—the larger the absolute value, whether positive or negative, the stronger its association with WASL outcomes. Positive values indicate that the characteristic is associated with increased met-standard rates or scale scores, whereas negative values indicate lower rates or scores. As expected, the strongest predictor of a student's performance on a WASL retake is his or her performance on the initial WASL attempt.

To analyze the effectiveness of PAS for different subgroups of students, we iteratively re-estimated each regression model including statistical interactions between PAS and each student characteristic. For example, to evaluate whether the effect of PAS on math performance varied systematically by gender, we estimated a regression equation that included an interaction term for PAS*Female.

Exhibit A.1
Net Effect of PAS on Math Performance

Variable	Meeting Standard				Scale Score			
	PAS Count		Any PAS		PAS Count		Any PAS	
	Estimate	Std. Estimate	Estimate	Std. Estimate	Estimate	Std. Estimate	Estimate	Std. Estimate
PAS count	-0.09*	-0.04			0.58*	0.02		
Any PAS			-0.03	-0.01			1.41*	0.02
Performance on initial WASL[†]	2.57*	0.69	2.57*	0.69	0.87*	0.72	0.87*	0.72
Free/reduced meals	-0.31*	-0.08	-0.30*	-0.08	-1.47*	-0.03	-1.47*	-0.03
ELL	-0.04	-0.01	-0.04	-0.01	0.71	0.01	0.72	0.01
Disability	-0.37*	-0.05	-0.36*	-0.05	-2.88*	-0.03	-2.89*	-0.03
Female	-0.25*	-0.07	-0.25*	-0.07	-1.95*	-0.04	-1.96*	-0.04
African American	-0.44*	-0.06	-0.44*	-0.06	-2.30*	-0.02	-2.28*	-0.02
American Indian	-0.36*	-0.03	-0.35*	-0.03	-1.58*	-0.01	-1.54*	-0.01
Asian	0.13*	0.02	0.13*	0.02	1.06*	0.01	1.06*	0.01
Hispanic	-0.36*	-0.07	-0.36*	-0.07	-2.19*	-0.03	-2.15*	-0.03
Unknown race/ethnicity	0.41*	0.02	0.38	0.02	1.93	0.01	1.88	0.01
Intercept	-2.30	n/a	-2.35	n/a	61.37	n/a	61.24	n/a

Note: Estimates for meeting standard are unstandardized logistic regression coefficients; estimates for scale scores are unstandardized coefficients from OLS regression analyses. "Std. Estimate" refers to the corresponding standardized estimates.

* Statistically significant ($p < 0.05$).

[†] Refers to level 2 performance for the analysis of meeting standard and scale score for the scale score analysis.

Exhibit A.2
Net Effect of PAS on Reading Performance

Variable	Meeting Standard				Scale Score			
	PAS Count		Any PAS		PAS Count		Any PAS	
	Estimate	Std. Estimate	Estimate	Std. Estimate	Estimate	Std. Estimate	Estimate	Std. Estimate
PAS count	-0.01	0.00			0.32	0.01		
Any PAS			0.05	0.01			0.59	0.01
Performance on initial WASL[†]	1.79*	0.39	1.79*	0.39	0.68*	0.51	0.68*	0.51
Free/reduced meals	-0.27*	-0.07	-0.27*	-0.07	-1.96*	-0.05	-1.96*	-0.05
ELL	-0.09	-0.02	-0.09	-0.02	1.54*	0.03	1.54*	0.03
Disability	-0.72*	-0.15	-0.72*	-0.15	-5.13*	-0.10	-5.14*	-0.10
Female	0.01	0.00	0.01	0.00	0.49	0.01	0.48	0.01
African American	-0.24*	-0.04	-0.23*	-0.04	-2.12*	-0.03	-2.11*	-0.03
American Indian	-0.28	-0.03	-0.27	-0.03	-2.11	-0.02	-2.10	-0.02
Asian	0.18	0.03	0.19	0.03	0.53	0.01	0.54	0.01
Hispanic	-0.01	0.00	0.01	0.00	0.37	0.01	0.38	0.01
Unknown race/ethnicity	0.18	0.01	0.18	0.01	1.32	0.00	1.30	0.01
Intercept	-0.63	n/a	-0.66	n/a	143.41	n/a	143.41	n/a

Note: Estimates for meeting standard are unstandardized logistic regression coefficients; estimates for scale scores are unstandardized coefficients from OLS regression analyses. "Std. Estimate" refers to the corresponding standardized estimates.

* Statistically significant ($p < 0.05$).

[†] Refers to level 2 performance for the analysis of meeting standard and scale score for the scale score analysis.

Exhibit A.3
Net Effect of PAS on Writing Performance

Variable	Meeting Standard				Scale Score			
	PAS Count		Any PAS		PAS Count		Any PAS	
	Estimate	Std. Estimate	Estimate	Std. Estimate	Estimate	Std. Estimate	Estimate	Std. Estimate
PAS count	0.04	0.02			0.13*	0.03		
Any PAS			0.14*	0.04			0.24*	0.04
Performance on initial WASL [†]	1.56*	0.32	1.56*	0.32	0.55*	0.44	0.55*	0.44
Free/reduced meals	-0.48*	-0.13	-0.48*	-0.13	-0.47*	-0.08	-0.47*	-0.08
ELL	-0.91*	-0.19	-0.91*	-0.19	-0.91*	-0.12	-0.90*	-0.12
Disability	-0.85*	-0.17	-0.85*	-0.17	-0.98*	-0.12	-0.98*	-0.12
Female	0.39*	0.10	0.39*	0.10	0.38*	0.06	0.38*	0.06
African American	-0.01	0.00	-0.01	0.00	-0.14	-0.01	-0.14	-0.01
American Indian	-0.30	-0.03	-0.30	-0.03	-0.39	-0.02	-0.39	-0.02
Asian	0.24*	0.04	0.25*	0.04	0.04	0.00	0.04	0.00
Hispanic	-0.02	-0.01	-0.02	-0.01	0.06	0.01	0.06	0.01
Unknown race/ethnicity	-0.32	-0.01	-0.32	-0.01	-0.17	0.00	-0.17	0.00
Intercept	0.29	n/a	0.26	n/a	10.39	n/a	10.37	n/a

Note: Estimates for meeting standard are unstandardized logistic regression coefficients; estimates for scale scores are unstandardized coefficients from OLS regression analyses. "Std. Estimate" refers to the corresponding standardized estimates.

* Statistically significant ($p < 0.05$).

[†] Refers to level 2 performance for the analysis of meeting standard and scale score for the scale score analysis.

Appendix B

Effectiveness of Different Sessions of PAS: Logistic Regression Analyses

Exhibit B.1

Effect of Summer and School-Year PAS on Meeting Standard in Math

Variable	Summer 2006		School Year 2006–07		Summer 2007	
	Estimate	Std. Est.	Estimate	Std. Est.	Estimate	Std. Est.
Summer 2006 PAS	0.29*	0.07				
Autumn 2006 PAS			0.02	0.01		
Spring 2007 PAS			0.03	0.01		
Summer 2007 PAS					1.20*	0.17
Level 2 on initial WASL	2.56*	0.69	2.38*	0.65	1.73*	0.48
Free/reduced meals	-0.30*	-0.08	-0.17*	-0.05	-0.39*	-0.11
ELL	-0.02	0.00	0.09	0.01	-0.03	-0.01
Disability	-0.35*	-0.05	-0.28*	-0.04	0.61*	0.10
Female	-0.26*	-0.07	-0.27*	-0.07	-0.02	-0.01
African American	-0.43*	-0.06	-0.48*	-0.07	-0.32	-0.05
American Indian	-0.34*	-0.03	-0.36*	-0.03	-0.35	-0.03
Asian	0.11*	0.02	-0.04	-0.01	0.21	0.03
Hispanic	-0.35*	-0.07	-0.41*	-0.08	-0.08	-0.02
Unknown race/ethnicity	0.34	0.01	0.55*	0.02	-0.13	-0.01
Intercept	-2.44	n/a	-2.59	n/a	-4.79	n/a

Exhibit B.2

Effect of Summer and School-Year PAS on Meeting Standard in Reading

Variable	Summer 2006		School Year 2006–07		Summer 2007	
	Estimate	Std. Est.	Estimate	Std. Est.	Estimate	Std. Est.
Summer 2006 PAS	0.25*	0.05				
Autumn 2006 PAS			0.04	0.01		
Spring 2007 PAS			0.01	0.01		
Summer 2007 PAS					0.42*	0.17
Level 2 on initial WASL	1.79*	0.39	1.67*	0.65	1.46*	0.48
Free/reduced meals	-0.27*	-0.07	-0.20*	-0.05	-0.57*	-0.11
ELL	-0.08	-0.02	-0.02	0.01	0.01	-0.01
Disability	-0.72*	-0.15	-0.67*	-0.04	-0.05	0.10
Female	0.01	0.00	0.03	-0.07	-0.19	-0.01
African American	-0.22*	-0.04	-0.25*	-0.07	0.18	-0.05
American Indian	-0.27	-0.03	-0.29	-0.03	0.03	-0.03
Asian	0.18	0.03	0.11	-0.01	0.25	0.03
Hispanic	0.01	0.00	-0.02	-0.08	-0.21	-0.02
Unknown race/ethnicity	0.20	0.01	0.14	0.02	-0.10	-0.01
Intercept	-0.69	n/a	-0.82	n/a	-2.90	n/a

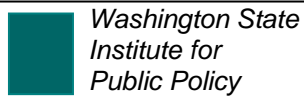
Exhibit B.3

Effect of Summer and School-Year PAS on Meeting Standard in Writing

Variable	Summer 2006		School Year 2006–07		Summer 2007	
	Estimate	Std. Est.	Estimate	Std. Est.	Estimate	Std. Est.
Summer 2006 PAS	0.15*	0.03				
Autumn 2006 PAS			0.16*	0.03		
Spring 2007 PAS			0.11	0.02		
Summer 2007 PAS					0.63*	0.09
Level 2 on initial WASL	1.56*	0.32	1.41*	0.31	1.16*	0.31
Free/reduced meals	-0.48*	-0.13	-0.39*	-0.11	-0.71*	-0.19
ELL	-0.91*	-0.19	-0.87*	-0.19	-0.08	-0.02
Disability	-0.85*	-0.17	-0.79*	-0.16	-0.29*	-0.07
Female	0.39*	0.10	0.35*	0.09	0.30*	0.08
African American	-0.01	0.00	-0.05	-0.01	0.35	0.05
American Indian	-0.30	-0.03	-0.23	-0.02	-0.74	-0.07
Asian	0.24*	0.03	0.16	0.02	0.21	0.03
Hispanic	-0.02	0.00	0.01	0.00	0.09	0.02
Unknown race/ethnicity	-0.31	-0.01	-0.34	-0.01	-0.41	-0.02
Intercept	0.28	n/a	0.06	n/a	-2.07	n/a

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