Impact of Different Performance Assessment Cut Scores on Student Promotion

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Abstract

This cut score modeling study investigated whether changing the cut scores of language arts performance assessments (PAs) would differentially affect sub-groups of students. Based on a data set of 227,817 students, hierarchical logistic regression analysis revealed that no sub-groups of students were found to have a higher or lower possibility of passing the PAs based on their background variables when we switched between the two different cut scores, with one exception. Immigrant students were found to have a higher possibility of passing than the native students when the cut score was set at 3, and we found no differences between them with the cut score at 2. This result contributes to evidence on the relative fairness of the PAs.

According to the general opinion of measurement specialists, student achievement on a test is more meaningful when considered as a continuous score rather than a small number of categorical scores (Linn, 2003). Green (1981) concluded that we should avoid fixed cut scores whenever possible. However, categorical scores cannot be avoided due to the application of some test results, and under certain situations pass-fail dichotomy is necessary in making decisions (Linn, 2003). Since no absolute "true standard" or "best" method exists, it makes sense to inquire into the variability of the results according to different adopted methods (Linn, 2003). As Jaeger (1989) suggested, it is good practice to use several methods in one study and then compare the results with important factors before making decisions on a final cutoff score.

This paper highlights findings on the impact of different cut scores on the likelihood of students passing a district-wide performance assessment in the Los

Angeles Unified School District (LAUSD) in Spring 2002. Specifically, we investigated whether setting the passing score as either a 2 or a 3 would have a different affect on different groups of students. For example, would certain subgroups of students be advantaged or disadvantaged by having 2 or 3 as the passing score? The results of this investigation address the fairness of the assessment and contribute to evidence on fairness obtained in other studies.

Data

There are 227,817 students in the final data set used for this study; 49% are male students and 51% are female students. All students in the data set were enrolled in Grades 2 through 9 at LAUSD during the school year 2001-2002. These students took language arts performance assignments (PAs). Students were included in the final data set for analyses if they were enrolled in Grades 2-9 and there were no missing values on all variables. The variables included in this study are: (a) grade level, (b) gender, (c) ethnicity, (d) meal program, (e) language classification, (f) Title 1 status, (g) immigrant status, (h) gifted student status, (i) home language survey results, (j) 2001-2002 reading NCE score, (k) 2001-2002 math NCE score, (l) 2001-2002 language NCE score, and (m) 2001-2002 PA scores.

Although close to 50% of the students in LAUSD are English Language Learners (ELLs), the data set used for this study does not have the same percentage of ELLs due to the district's testing eligibility requirements. Only ELL students at an advanced level of English language development are included in the PA testing, per district requirement. Therefore, in this report, the ELL students we refer to were actually the ELL students in the last stage of language development, right before being classified as Re-designated English Language Learners (RELLs). This final data set consequently includes only 16% ELL students. There were 35% RELLs and 49% English proficient (EP) students (including those who were initially fluent in English and those who were English only students).

Home language survey results confirm the language proficiency diversity in LAUSD. Based on the home language survey, 55% of the students reported speaking Spanish at home, 37% of the students reported speaking English, and 8% reported speaking languages other than Spanish and English at home. In terms of student racial and ethnic makeup, Hispanic students made up the largest sub-group of students (67%), followed by Blacks (16%), Whites (10%), Asians (4%), and students in none of the above ethnic groups (4%).

For the student distribution in the PAS, the majority of the students are in the "partially proficient" category (44% or 99,796 students). The next largest group consists of the 31% of the students who scored "proficient." Nine percent of the students scored "advanced" and 17% of the students scored "not proficient."

For the student achievement scores in SAT-9 NCE, we found the mean reading, language, and math scores are 44, 49, and 49 points, respectively. The corresponding standard deviations for these three test scores are 18, 20, and 20 points, indicating a wide spread of student score distribution. Figure 1 shows students' mean SAT-9 NCE scores in reading, math, and language by their performance category on the PAs. As shown, students who scored "advanced" on the PAs had the highest mean SAT-9 scores across all three subjects, and students in the category of "not proficient" had the lowest SAT-9 scores in reading, math, and language. There tended to be a 10-point increase in students' mean SAT-9 scores corresponding to each one-point increase in PA scores. The higher students scored in PAs, the higher they scored in SAT. This was one piece of descriptive evidence supporting the criterion validity of the PAs.

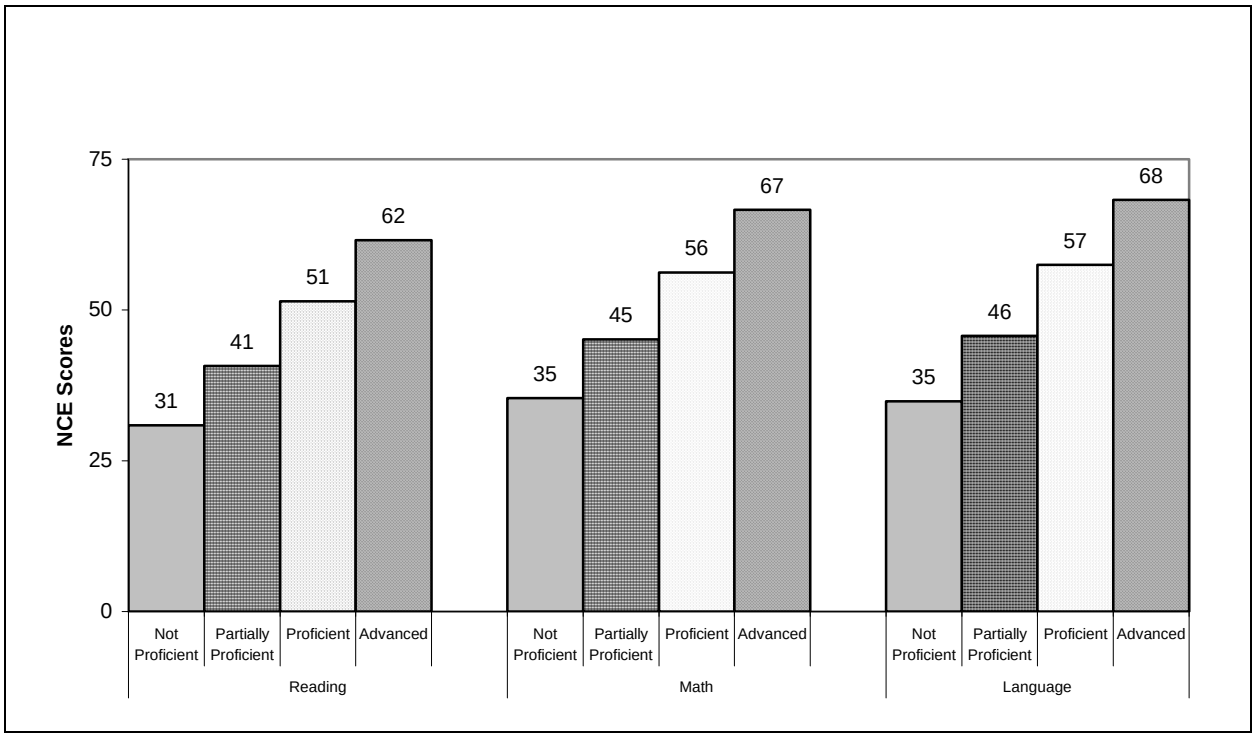

Figure 1. 2001-2002 students' mean scores by their PA categories.

Descriptive Results

Table 1 reported the percentages of students in the four categories of PA scores by their background variables. The percentages conveyed how students of a certain background group distributed across the four PA categories. These specific percentage numbers could be compared to the overall percentages on the top of the table to see how much deviation there was. Overall, 17% of the students were "not proficient," 44% were "partially proficient," 31% were "proficient," and 9% were "advanced." Results from Table 1 may be summarized as follows:

Gender. Female students performed better in the PAs than male students. Proportionally, more female students fell in the categories of "proficient" and "advanced," and more male students had scores of "not proficient" and "partially proficient."

Ethnicity. The majority of Asian, White, and Others students fell in the categories of "proficient" or "advanced," while the majority of Black and Hispanic students were in the categories of "partially proficient" and "proficient". This points

to the importance of examining where the cut score for proficiency should be since the decision seems to be ethnic-sensitive, at least descriptively.

Free Meal Status. The free meal status variable was used as an indicator of students' family socio-economic status. Students who received free or reduced-fee lunch at school were over-represented in the lower categories of the PAs, being either "not proficient" or "partially proficient." Sixty-three percent of the students receiving free or reduced-fee lunch scored "not proficient" (18%) and "partially proficient" (45%), while the corresponding percentage for the students who pay for lunch was 54%.

Title 1 Status. Title 1 status was another indicator of students' family socio-economic status. Students from disadvantaged families typically received Title 1 services at school. Title 1 results were similar to results from the variable "free meal status," where students receiving Title 1 service were over-represented in the lower categories and under-represented in the higher categories of PAs.

Language Proficiency. The distribution of ELL students across the four categories of PAs was very different from the distributions for RELL and EP students. Thirty-one percent of the ELL students, even though they were classified as at the "advanced" level of ELD, had a PA score of "not proficient"; 48% of ELL students are "partially proficient"; 18% are "proficient" and 3% are "advanced." For RELL students, the majority of students were "partially proficient" (44%) and "proficient" (34%). Only 13% of the students were in the "not proficient" category, and about 9% were "advanced" in the PAs.

Immigrant Status. Immigrant status did not differentiate students in their PA performance as the other background variables did. They had similar performances on the PAs.

Home Language Classification. Students whose home language was either English or Spanish had similar distribution patterns in their PA scores, with English-speaking students performing slightly better. English-speaking students had a higher proportion in the "proficient" and "advanced" categories, and lower proportion in "not proficient" and "partially proficient" categories. Students whose home languages were other than English and Spanish seemed to be in the higher achievers group. Among them, only 9% are "not proficient", 36% partially proficient, and 55% are either "proficient" or "advanced."

Grade Level. There was no uniform pattern in students' distribution across PA score categories for students of different grades. Students enrolled in Grades 2-5 and Grade 8 had more similar distributions than students in Grades 6, 7, and 9. Students in the first group had lower percentages in the categories of "not proficient" and higher percentages in "proficient" and "advanced," generally speaking. However, the reasons for this grade level effect were not clear.

Gifted Status. Gifted students clearly did better than non-gifted students in the PAs. Gifted students had lower proportions of being "not proficient" and "partially proficient" and higher proportions in the other two proficient categories than non-gifted students. Among gifted students, only 4% were not proficient and 27% were partially proficient. While among non-gifted students, 19% were not proficient and 46% were partially proficient.

Table 1

The Distribution of Students' PA scores by their Background Variables, 2001-2002 (N=227,817)

	Not Proficient	Partially Proficient	Proficient	Advanced	Total Number of Students	Percentage of Students
Overall %	17.0%	43.8%	30.6%	8.6%	227,817	
Gender						
Male	20.6%	45.7%	27.3%	6.4%	111,126	49%
Female	13.7%	42.0%	33.7%	10.7%	116,691	51%
Ethnicity						
All Other	9.8%	37.5%	37.6%	15.2%	7,986	4%
Asian	7.3%	33.3%	40.7%	18.7%	9,723	4%
Black, Not Hispanic	21.3%	44.7%	27.0%	7.0%	35,857	16%
Hispanic	18.1%	45.6%	29.4%	7.0%	152,078	67%
White, Not Hispanic	10.0%	37.0%	37.5%	15.5%	22,173	10%
Free Meal Status						
Full pay	14.1%	40.3%	33.5%	12.2%	58,903	26%
Free and Reduced	18.1%	45.0%	29.5%	7.3%	168,914	74%
Title 1 Status						
Non-title 1	13.2%	38.9%	34.5%	13.3%	59,076	26%
Title 1	18.4%	45.5%	29.2%	6.9%	168,741	74%
Language Proficiency						
EP	15.4%	42.1%	32.4%	10.1%	111,102	49%
RELL	12.7%	44.2%	33.9%	9.2%	79,491	35%
ELL	31.2%	48.1%	17.9%	2.7%	37,224	16%

Table 1 (continued)

	Not Proficient	Partially Proficient	Proficient	Advanced	Total number of students	Percentage of students
Immigrant or Native						
Non-immigrant	16.8%	43.8%	30.8%	8.6%	195,724	86%
Immigrant	18.7%	43.7%	29.1%	8.6%	32,093	14%
Home Language						
English	16.8%	42.8%	31.0%	9.5%	85,368	37%
Spanish	18.4%	45.6%	29.1%	6.9%	125,001	55%
Others	9.0%	36.2%	38.6%	16.2%	17,448	8%
Grade Level						
Grade 2	14.0%	40.1%	35.7%	10.2%	14,490	6%
Grade 3	12.2%	42.2%	36.4%	9.3%	17,296	8%
Grade 4	11.1%	44.6%	35.4%	8.9%	21,309	9%
Grade 5	10.6%	44.5%	36.4%	8.5%	25,542	11%
Grade 6	21.5%	42.0%	27.7%	8.8%	39,046	17%
Grade 7	25.2%	43.5%	24.4%	6.9%	38,315	17%
Grade 8	12.0%	44.2%	33.2%	10.6%	38,506	17%
Grade 9	20.9%	47.2%	25.0%	6.9%	33,313	15%
Gifted Students						
Non-gifted	18.6%	45.7%	29.0%	6.7%	204,865	90%
Gifted	3.5%	27.1%	44.3%	25.1%	22,952	10%

In summary, if the cut score for being proficient or not in the PAs is 3 (proficient) instead of 2 (partially proficient), students of the following subgroups

were at the disadvantage of not passing the PAs when 3 was the cut score: males, Hispanics, students receiving free or reduced-pay lunch, Title 1 students, ELL students, students whose home language is Spanish, and non-gifted students. To test whether these observations were statistically significant when the other background variables were controlled for, we ran logistic regression analyses.

Methods and Analysis

Since each passing score (2 or 3) was a dichotomous dependent variable, we conducted a logistic regression analysis to take into consideration the complex and intertwining nature of the factors that impact learning. We used logistic regression to see whether there were differences in the significance of regression coefficients, in the adjusted odds ratio values, and in the partial possibilities with these two dependent variables. Various dummy variables were created to represent categorical variables on ethnicity, language proficiency, and home language classification. The estimation model we used takes the following form

POSSIBILITY OF PASSING PERFORMANCE ASSIGNMENTS

$$= \alpha + \beta\,\text{FEMALE} + \beta\,\text{ASIAN} + \beta\,\text{BLACK} + \beta\,\text{HISPANIC} + \beta\,\text{OTHERS}$$
$$+ \beta\,\text{TITLE 1} + \beta\,\text{IMMIGRANT} + \beta\,\text{FREE-LUNCH}$$
$$+ \beta\,\text{SPANISH} + \beta\,\text{H\_OTHER} + \beta\,\text{ELL} + \beta\,\text{RELL}$$
$$+ \beta\,\text{GIFTED} + \beta\,\text{READING} + \beta\,\text{MATH} + \beta\,\text{LANGUAGE} + \varepsilon.$$

Please note that ε in the preceding model indicates the base coefficient for the comparison group. The comparison group consisted of non-immigrant white male students who were not in Title 1, who paid for lunch, who were proficient in English, who were not gifted, whose home language was English, and who scored at the mean in SAT-9 reading, math, and language tests (NCE scale). Also, instead of using individual students' raw achievement scores, we used their transformed scores by deducting the mean from individuals' raw scores for the purpose of easier interpretation.

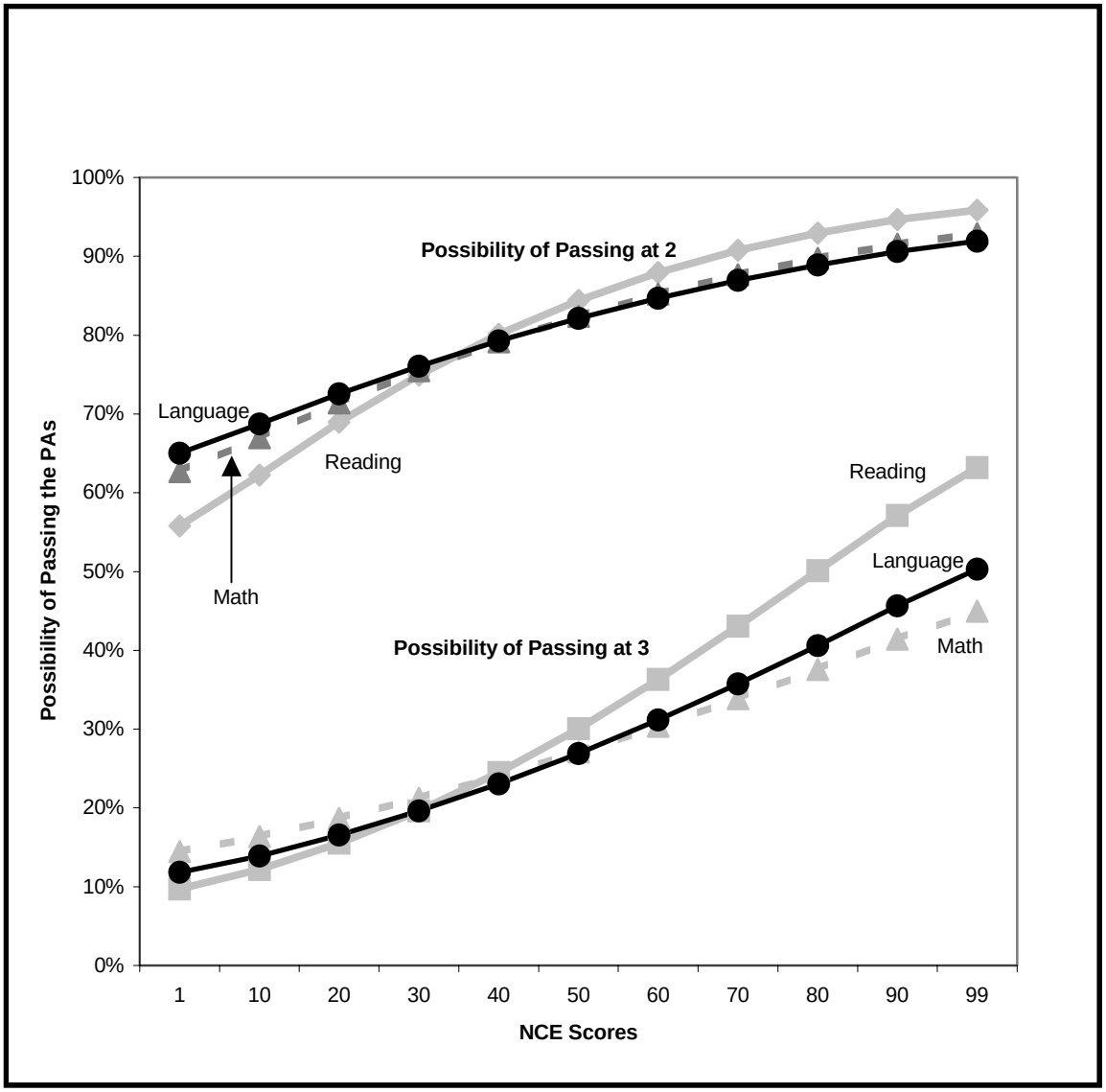

Figure 2. Comparison of partial possibility of passing the performance assignment assessment with cut scores at 2 and 3.

Logistic Regression Results

There were two dependent variables for the logistic regression analysis. One variable was determined by setting the passing score for the PAs at 2; the other by setting the passing score at 3. For both variables, students who passed are coded as 1 and students who failed are coded as 0.

Logistic Regression Results – Passing at 2

Except for the background variables on students' immigrant status and receiving free or reduced-fee lunch or not, all the other variables were significant predictors of whether a student had a passing PA score. As shown in Table 2, there was no statistical difference in students' likelihood of having a passing PA score between students who received a free or reduced-fee lunch and students who paid for lunch, and between immigrant students and native students.

Female students were more likely to pass than male students. Students classified as "Asian and other" had a higher likelihood of passing, and Black and Hispanic students were more likely not to pass, compared to White students. Compared to students whose home language was English, students whose home language was Spanish and other than English or Spanish were more likely to pass the PAs. Compared to English proficient students, ELL students in the advanced stage of language development and RELL students were less likely to pass.

Gifted students are more likely to pass than non-gifted students and Title 1 students are less likely to pass than non-Title 1 students. In terms of previous achievement scores, students with a higher SAT-9 NCE reading, math, and language scores are more likely to pass the PAS than the other students.

Table 2

Logistic Regression Results for Setting Performance Assignments Passing Score at 2 or 3

	Passing at 2 or above				Passing at 3 or above			
	Coefficient	Std. Error	Adjusted Odds Ratio	Partial Possibility Relative to the Base	Coefficient	Std. Error	Adjusted Odds Ratio	Partial Possibility Relative to the Base
Base Possibility				82.0%				26.7%
Constant	1.52*	0.038	4.6		-1.01*	0.030	0.0	
Female	0.41*	0.012	1.5	5.3%	0.43*	0.010	1.5	9.2%
Asian	0.10*	0.052	1.1	1.5%	0.08*	0.031	1.1	1.7%
Black	0.07*	0.032	1.1	1.0%	0.15*	0.022	1.2	3.1%
Hispanic	0.09*	0.033	1.1	1.3%	0.06*	0.023	1.1	1.2%
Others	0.21*	0.047	1.2	2.9%	0.23*	0.030	1.3	4.8%
Title1	0.18*	0.016	1.2	2.5%	0.09*	0.012	1.1	1.7%
Immigrant	0.03	0.018	1.0	0.4%	0.08*	0.015	1.1	1.6%
Lunch	-0.01	0.016	1.0	-0.2%	-0.02*	0.013	1.0	0.0%
Spanish	0.11*	0.027	1.1	1.6%	0.12*	0.020	1.1	2.4%
H_other	0.17*	0.044	1.2	2.4%	0.10*	0.027	1.1	1.9%
ELL	-0.16*	0.026	0.9	-2.5%	-0.10*	0.021	0.9	-1.9%
RELL	0.07*	0.024	1.1	1.0%	0.07*	0.016	1.1	1.4%
Gifted	0.19*	0.039	1.2	2.7%	0.07*	0.018	1.1	1.3%
Reading	0.03*	0.001	1.0		0.03*	0.001	1.0	

Table 2 (*continued*)

	Passing at 2 or above				Passing at 3 or above			
	Coefficient	Std. Error	Adjusted Odds Ratio	Partial Possibility Relative to the Base	Coefficient	Std. Error	Adjusted Odds Ratio	Partial Possibility Relative to the Base
Math	0.02*	0.001	1.0		0.02*	0.000	1.0	
Language	0.02*	0.001	1.0		0.02*	0.000	1.0	

Note 1. The base possibility is calculated for a non-immigrant male White student who is not in Title 1, who pays for lunch, who is proficient in English, who is not gifted, whose home language is English, and who scored the mean values in reading, math, and language. 2. Variable coefficients denoted with * indicate the variables are significant at 0.05 significance level.

Besides reporting regression coefficients, standard errors, and adjusted odds ratios, Table 3 also presented the partial possibilities associated with each of the variables and the base possibility for the comparison group. The base comparison group for this logistic regression analyses consisted of students who were (a) non-immigrant, (b) male, (c) white, (d) not enrolled in Title 1, (e) not receiving free or reduced-fee lunch, (f) English proficient, and (g) had mean NCE scores. As shown in Table 3, the possibility for students in the base comparison group to pass the PAs at score of 2 was 82%. This corresponds to the fact that in the actual data, 83% of the students score 2 or higher in the PAs.

The specific numbers under the Column "Partial Possibility Relative to the Base" (corresponding to all predictors except regression constant) indicated the incremental possibility associated with each predictor. For example, holding everything else constant and comparing to the base comparison group of students, female students had a 5.3% higher possibility of passing the PAs at Score 2 than male students; gifted students had a 2.7% higher possibility of passing at Score 2 than non-gifted students; and the ELL students in the advanced stage of English language development had a 2.5% lower possibility of passing at Score 2 than EP students.

Logistic Regression Results – Passing at 3

Similar results were found when the cut score is set at 3, as reported in the last four columns of Table 2, instead of 2 for passing the PAs with one exception. When the cut score is 3, immigrant students were statistically more likely to pass the PAs relative to native students. In other words, native students would be at a disadvantage if the cut score is 3. All the other predictors stayed statistically significant for both outcome variables. In turn, two additional observations are in order. One, the standard errors for all predictors went down when the cut score is 3. This indicated that the effects of students' background, family, and school variables on their possibility of passing the PAs became more reliable. The other possibility is that the regression coefficients change their sizes up and down without any uniform pattern. This implies that the subgroup differences in their chances of passing the PAs are similar across these two outcome variables overall.

When the cut score for passing the PAs is 3, the possibility for students in the base comparison group to pass is 26.7%. This is much lower than the base possibility of passing when the cut score is 2, as expected. Descriptively, only 39.2% of the students in this data set have PA scores of 3 and 4.

Relative to the partial possibility values when the outcome variable has a 2 as the passing score, the magnitude of the partial possibility values increased for seven variables and decreased for the remaining six variables, excluding the three NCE achievement variables. For example, holding everything else constant, female students have a 9.2% (compared to 5.3% with 2 as the passing score) higher possibility of passing the PAs than male students; and ELL students in the advanced stage of English language development have a 1.9% (2.5% with passing score at 2) lower possibility of passing than EP students.

To demonstrate how students' SAT-9 achievement scores affected students' possibilities of passing the PAs, Figure 1 graphs the possibilities of passing for the base comparison group of students. The three lines on the top of Figure 1 have the possibility lines when the passing score for the PAs is 2. When the passing score is 2 instead of the higher score of 3, more students pass. The three lines on the bottom show the possibilities of passing the PAs relative to students' SAT-9 scores when the cut score is 3. As shown in the figure, reading scores have the sharpest slopes, indicating that the possibility of passing PA scores is most responsive to students' reading scores, compared to language and math scores. For a comparison group

student, the chance of passing the PAs with the cut score of 3 is 10% with a SAT-9 reading score of 1, and the possibility increases to 63% when the student's SAT-9 reading score is 99. Similar results are found for both language and math scores, regardless of whether the cut score is 2 or 3.

Logistic Regression Results by Grade Level

Since there is no uniform distribution pattern for students in different grades, and considering that grade level usually makes a difference in students' achievement performance, we also ran the logistic regression by grade level. We found by-grade variation in regression coefficients for all variables in terms of either statistical significance and/or coefficient values for both dependent variables. For example when the dependent variable is passing at 2, we noticed that there are four variables (Female, Black, Title 1, and Spanish-as-home-language) that have significant coefficients across all grade levels, and the coefficient values vary across grades. The female coefficients range from 0.42 (Grade 3) to 0.62 (Grade 4); the coefficients for Black range from –0.88 (Grade 8) to –0.28 (Grade 5); the coefficients for Title 1 range from –1.68 (Grade 2) to –0.15 (Grade 9); and the Spanish coefficients range from 0.19 to 0.54. For all the other variables, their by-grade regression coefficients not only vary in statistical significance, but also in coefficient values. A similar pattern is found for the dependent variable with 3 as the passing score.

The following list provide **only** the grades that we found statistical significant for the sub-group of students in their possibility of passing the PAs or not:

1. *Asian students in Grades 2, 5 and 6***.** When the cut score is set at 3, Asian students in Grades 2, 5, and 6 are statistically more likely to pass the PAs than White students.

2. *Black students in Grades 3, 6 and 7.* When the cut score is set at 3, Black students in Grades 3 and 6 are statistically more likely to pass the PAs than White students. When the cut score is set at 2, Black students in Grade 7 are statistically less likely to pass the PAs than White students.

3. *Hispanic students in Grades 3, 4, 7 and 8.* When the cut score is set at 3, Hispanic students in Grade 3 are statistically more likely to pass the PAs. When the cut score is set at 2, Hispanic students in Grade 4 are statistically more likely to pass than White students and Hispanic

students in Grades 7 and 8 are statistically less likely to pass the PAs than White students.

4. *Students of other ethnic groups in Grades 2-3 and 6-9*. When the cut score is set at 3, students of other ethnicity in Grades 2, 3, 6, 7, and 8 are statistically more likely to pass the PAs than White students. When the cut score is set at 2, students of other ethnicity in Grade 9 are more likely to pass.
5. *Title 1 students in Grades 4 and 5*. When the cut score is 3, Title 1 students in Grades 4 and 5 are statistically more likely to pass.
6. *Immigrant students in Grades 6 and 8.* When the cut score is 3, immigrant students in Grade 6 are statistically more likely to pass the PAs.
7. *Students who speak Spanish at home in Grade 8.* When the cut score is 3, grade 8 students who speak Spanish at home are statistically more likely to pass the PAs than their peers.
8. *Students speaking languages other than English and Spanish at home in Grades 2, 3, 5 and 8.* When the cut score is set at 3, 2nd-, 3rd-, and 5th-grade students whose home language is other than English and Spanish are statistically more likely to pass the PAs than students whose home language is English. When the cut score is 2, English-speaking 8th-grade students are statistically more likely to pass when the cut score is 2.
9. *ELL students in Grades 5 and 8.* When the cut score is at 3, ELL students in Grade 5 are statistically more likely to pass the PAs than EP students while Grade 8 ELL students are statistically less likely to pass.
10. *RELL students in Grades 2, 8 and 9.* When the cut score is at 3, RELL students in Grade 2 have a statistically higher likelihood of passing than EP students. When the cut score is at 2, RELL have a statistically lower possibility of passing the PAs.
11. *Gifted students in Grades 2, 3, 5, 6, and 7*. When the cut score is at 3, Grade 3 gifted students, have a statistically higher possibility of passing the PAs than non-gifted students. When the cut score is at 3, Grades 6 and 7 gifted students have a statistically higher likelihood of passing, and gifted students in Grade 2 are statistically less likely to pass the PAs.

Summary and Conclusions

In summary, students in the following sub-groups have a higher possibility of passing the PAs: (a) female students are more likely to pass than male students; (b) White students have a lower possibility of passing than the other students; (c) Title 1 students are more likely to pass than non-Title 1 students; (d) students whose home language is English are less likely to pass the PAs when compared to students whose home language is not English; (e) students who are English proficient are more likely to pass than ELL students in the advanced stage of language development and are less likely to pass than RELL students; (f) gifted students are more likely to pass than non-gifted students; and (g) students with higher SAT-9 scores are more likely to pass than students with lower scores. All these interpretations are valid under the condition that all other variables in the model specification are held constant. Please also note that even though we found statistically significant differences in the above groups of students, a 1% or 2% difference in the possibility calculation is not large enough to be substantially important.

As mentioned above, these student background variables, family variables, and student characteristic variables all have statistically significant effects on the possibility of passing the PAs in 2002, regardless of whether the cut score is 2 or 3. There are, however, two exceptions. One is that students' immigrant status was found to be insignificant when the cut score is 2, and it was significant when the cut score is 3. The statistical significance changed with the change of the cut score. Immigrant students are more likely to pass the PAs when the cut score is 3 than students born in the United States.

The other exception is that participation in a school lunch program is the only variable that has no statistically significant effect on students' passing the PAs at either cut score. This is somewhat surprising since as a typical proxy for student socio-economic status (SES), school lunch program indicator is usually a significant predictor of students' school performance, despite the fact that it is not the best measure of SES. We explored the exclusion of students' Title 1 Status in the model, and found that the lunch program variable remained insignificant. One possible explanation for this finding could be that the PAs is not sensitive to students' family social-economic status, as represented by whether students received free or reduced-

fee lunch. These findings are based on the model without taking into consideration students' grade level.

The by-grade analysis is more detailed, but provided no clear and consistent pattern of how these independent variables affect students' possibility of passing the PA differently when the cut score is changed between Score 2 and Score 3. For example, we found that across different grades, the same variable would be statistically significance for some grades and not significant for others, and it could be positively related to the outcome variables for some grades and negatively related to the outcome variables for other grades, besides having different sizes of the coefficients. In other words, certain subgroups of students do become the disadvantaged or advantaged groups when we switched between the two cut scores.

The findings summarized above indicate that no matter where we set the cut score, most sub-groups of students would have the similar possibilities of passing the PAs statistically at either cut Score 2 or 3. Practically, however, caution should be exercised in making the decision considering that the decision will involve about 100,000 students who Scored 2 in 2002 in our sample and that the PAs would also contribute to students' chances of being retained or promoted to the next grade.

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