Research Article

The Influence of Length of School Day on Student Achievement in Grades 8 and Grade 11 in New Jersey

Phyllis deAngelis, EdD
Teacher
New Brunswick High School
New Brunswick, New Jersey

Danielle Sammarone, EdD
Teacher
Lyndhurst School District
Lyndhurst, New Jersey

Abstract

The purpose for this correlational, explanatory study was to explain the influence of the length of the school day on the mean Partnership for Assessment of Readiness for College and Careers (PARCC) scores on the 2016 Grade 8 Mathematics and 2016 Algebra II tests for students in various socio-economic strata. The Grade 8 Mathematics sample included 150 public schools and the Algebra II sample included 166 public comprehensive high schools. The analyses controlled for various student, staff, and school variables. The results suggest that longer school days benefit students from wealthier school districts more so than students living in poverty or middle class students.

Key Words

school reform, extended school day, standardized testing

The length of the school day is a limited resource. There are only so many hours in a day and most schools operate six to seven-hour school day schedules. Extending the length of the school day is a reform idea that some superintendents implement to address perceived problems associated with low levels of student achievement in some school districts.

New Jersey is a state in which superintendents in some of the state's school districts experimented with the length of the school day. Some superintendents took advantage of funds from the federal School Improvement Grant (SIG) program and other state funding mechanisms. New Jersey defines the length of the school day as the amount of time a school is in session for a typical student on a normal school day (NJDOE, 2011). Length of school day is different than instructional minutes, which is defined as the actual total minutes students spend in classroom instruction.

Despite mixed results from the early rounds of extending the school day, many of the schools that extended their school day as part of a SIG grant or state funded opportunity continued their extended days after funding ran out. Local taxpayers were required to pick up the tab and/or the districts moved funds from other programs such as athletics or enrichment programs to continue to pay for extended school days.

Literature Overview in Length of School Day in New Jersey

New Jersey presents an interesting lens from which to study the influence nationally of the length of school day on student achievement. By 2011, 99 High Schools and 178 schools that housed grade 8 in New Jersey had school days that were 30-60 minutes longer than the average school day of 341-355 minutes in the state. The SIG program directly funded 20 schools in New Jersey for at least three years. Other schools either had longer school days or extended their days as a result of the influence of SIG grants.

The empirical research on the relationship between the length of the school day and student academic achievement in New Jersey centers on a group of studies conducted mainly using data from the 2010-2011 school year. Sammarone (2014) conducted an initial study of the relationship between the length of the school day and student achievement in New Jersey middle school grades 6-8 for the 2011 administration of the state tests in English language arts and mathematics. The samples in the study ranged from 640 schools that served students in grade 8 to 746 schools that served students in grade 6.

The results from Sammarone's (2014) study suggested that students in schools that served the least poor students, 10% or less of the students eligible for free or reduced lunch, demonstrated the greatest gains by increasing their school day by 30-60 minutes. Students in schools in which 50% or more of the students were eligible for free or reduced lunch only demonstrated positive effects of the longer school day on the grade 8 test of English language arts and only when the school day was lengthened by 60 minutes.

The proficiency percentages for students eligible for free or reduced lunch on the grade 8 test increased only 9 percentage points, from 61% to 70%. The cost of extending the regular school day 60 minutes for an entire year, in a school of about 1,200 students, was approximately 1 million dollars in 2011, or about $110,000 per percentage point increase on the Grade 8 English language arts exam for student eligible for free or reduced lunch.

Similarly, deAngelis (2014) studied the relationship between an extended school day

and achievement on the 2011 New Jersey high school exit exam in math and language arts. Results indicated that school day length did not have a significant influence on high school LAL achievement overall, and it accounted for only 1.8% of the variance in high school Math achievement scores.

Yikon'a (2017) examined the relationship between length of school day and student achievement on the 2011 New Jersey grade 3 state tests in mathematics and English language arts. The results indicated that length of school day had no statistical significance as a predictor of student achievement. Socioeconomic status was the strongest predictor of student achievement, accounting for 28% of the explained variance in LAL and 9% of the explained variance in Mathematics.

One criticism of length of day studies is that schools can lengthen the school day, but the time might not translate into more time spent on academics. Tully (2017) conducted a study to examine the relationship between the actual number of instructional minutes in a school day and student achievement on the 2011 New Jersey mandated tests in mathematics and LAL in grades 6-8.

Tully's (2017) sample included approximately 200 schools that served students in grade 8. The percentage of students eligible for free and reduced lunch was found to be the strongest predictor of achievement in grades 6-8 LAL and Mathematics. Student attendance was also found to be a statistically significant predictor of the percentage of student scoring Proficient and Advanced Proficient on the LAL and Mathematics tests in grades 6-8. There was no statistically significant relationship between the instructional minutes and the percentage of students scoring Proficient or above on statewide tests of Language Arts and Mathematics scores for Grades 6, 7 and 8.

Pleiver (2016) found no statistically significant relationship existed between the length of school day and students' proficiency percentages on the 2011 grades 4 and 5 tests of LAL and math. The results suggested that the percentage of students eligible for free and reduced lunch (SES), student attendance, percentage of students with disabilities, and percentage of staff with master's degree or higher were found to be statistically significant predictors of student achievement. Additionally, school size and student mobility were found to be statistically significant predictors of student achievement when the dependent variables were the grade 4 and 5 Math tests.

Theoretical Framework to Support Time

The use of time as an input intervention is supported by production-function theory (Pigott, et al., 2012). Policy makers claim that more time in school should equate to more learning. It is a straightforward assumption similar to that of eating more food will lead to gaining more weight. (Pigott, 2012) explained, "Education production functions are commonly used to study the relationship between school inputs (predictors) such as per pupil expenditure (PPE) and student inputs (outcomes) such as academic achievement" (p.1).

Policymakers seem drawn to production function theory as a means to guide policies aimed to increase student achievement because the theory aligns well with a resource-based perspective of education reform (Hannushek & Rivkin, 2006; Resnick & Scherrer, 2012). The general idea behind the resource-based perspective of reform is that if you give a school and its students more resources, they will be able to achieve more. This perspective is rife throughout various reform programs like one-to-one technology initiatives, longer school days, and longer school years.

Some education reforms based on production/function and resource-based perspectives often fail to attain their stated objectives because students from poverty cannot make full use of the resources provided due to the debilitating effects of poverty. Scherrer (2014) put forth a competing theory to the resource-based perspective of reform: the capabilities perspective. The capabilities perspective is based on the student's ability to convert educational resources into the intended outcomes: higher levels of learning.

Poverty causes a negative drag on student achievement (Scherrer, 2014; Tienken, 2017). Factors related to poorer health, higher levels of student mobility, housing insecurity, mental and physical trauma, sleep deprivation, lack of effective childcare, and a host of other issues that impede reaching one's academic potential despite of having access to educational resources influence student achievement on standardized tests (Sirin, 2005; Tienken, 2016).

The capabilities perspective explains why, that as a group, students from poverty score lower on all state and national standardized tests and why standardized test results are highly predictable based on student and community demographic factors (Currie, 2009; Scherrer, 2014; Tienken 2020; Tienken, Colella, Angelillo, Fox, McCahill, and Wolfe, 2017).

Problem and Questions

There has been a dearth of research on the topic since New Jersey and most other states moved to assessments aligned to the Common Core, like the Partnership for Assessment of Readiness for College and Careers (PARCC) assessment platform.

The extant literature and theoretical construct led us to the following overarching research question and sub-questions:

What is the influence of the length of the school day on student achievement in Mathematics in grades 8 and 11 Algebra 2 on the 2016 PARCC when controlling for various staff, student and school-level variables?

Sub-question 1: What is the influence of the length of the school day on the percentage of Proficient and Advanced Proficient students in Grade 8 as measured by the 2016 PARCC test in Mathematics when controlling for staff, student, and school variables?

Sub-question 2: What is the influence of the length of the school day on the percentage of Proficient and Advanced Proficient students as measured by the 2016 PARCC test in Algebra 2 when controlling for staff, student, and school variables?

Methodology and Results

We used a correlational, explanatory, cross-sectional design (Johnson, 2001) with quantitative methods as the backbone for the study. We created hierarchical regression models to examine the influence of the independent variable on the dependent variables.

The following variables were included in the analyses of the results from grade 8 and grade 11 PARCC tests: School Day Length, SES (student economic status), Percentage Chronic Absenteeism, and Percentage of Students with Disabilities. The dependent variables studied were the influence of the length of the school day and student poverty on PARCC test results for Grade 8 Math and Language Arts and Grade 11 Algebra 2. We conducted stratified, proportional random sampling to ensure the sample of schools represented the various socio-economic strata that exist in New Jersey for grade levels of interest; 8 and 11. (See Table 1)

PARCC grade 8 SPSS data models

Table 1

Distribution of Schools in Stratified Sample by District Factor Group (DFG)

DFG Group	Number of Schools
A	22
B	19
CD	14
DE	21
FG	24
GH	19
I	27
J	4
Total	150

The New Jersey Department of Education categorizes districts from A-J according to their communities' ability to financially support public education. School located in "A" districts serve communities in the poorest towns in New Jersey, whereas "J" districts service communities in the wealthiest towns.

In the fourth model Hierarchical regression models were run and all models were statistically significant ($p \leq .05$). The fourth model accounted for the greatest amount of variance with an R square of .45. See Table 2.

PARCC 8th Grade Mathematics results analysis

Table 2

Model Summary[e]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					
					R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.21[a]	.04	.04	11.63	.04	6.66	1	147	.011	
2	.57[b]	.32	.31	9.84	.28	59.35	1	146	.000	
3	.64[c]	.41	.40	9.21	.09	21.62	1	145	.000	
4	.67[d]	.45	.43	8.93	.04	10.25	1	144	.002	1.84

a. Predictors: (Constant), SCHLDAYLENGTH

b. Predictors: (Constant), SCHLDAYLENGTH, Final_SES_Percentage

c. Predictors: (Constant), SCHLDAYLENGTH, Final_SES_Percentage, ChronicAbs

d. Predictors: (Constant), SCHLDAYLENGTH, Final_SES_Percentage, ChronicAbs, Disability_ Percentage

e. Dependent Variable: MEAN_SCORE

Only approximately 4 % of the variance of the 2016 Grade 8 Math PARCC scores was accounted for by the length of the school day whereas student eligibility for free or reduced lunch accounted for 27% of the variance. The negative standardized beta for school day length suggests that schools with longer days tend to have a lower average Grade 8 Math PARCC score (See Table 3).

Grade 8 Math PARCC score

Table 3

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	769.64	15.64		49.20	.000		
	SCHLDAYLENGTH	-.12	.05	-.21	-2.58	.011	1.00	1.00
2	(Constant)	765.43	13.25		57.78	.000		
	SCHLDAYLENGTH	-.08	.04	-.14	-2.09	.038	.99	1.02
	Final_SES_Percentage	-.22	.03	-.53	-7.70	.000	.99	1.02
3	(Constant)	749.82	12.85		58.37	.000		
	SCHLDAYLENGTH	-.03	.04	-.05	-.69	.494	.89	1.12
	Final_SES_Percentage	-.16	.03	-.40	-5.61	.000	.82	1.22
	ChronicAbs	-.68	.15	-.35	-4.65	.000	.74	1.35
4	(Constant)	751.24	12.46		60.28	.000		
	SCHLDAYLENGTH	-.01	.04	-.02	-.25	.805	.87	1.15
	Final_SES_Percentage	-.19	.03	-.47	-6.50	.000	.74	1.35
	ChronicAbs	-.60	.14	-.30	-4.15	.000	.72	1.39
	Disability_ Percentage	-.30	.09	-.21	-3.20	.002	.88	1.14

a. Dependent Variable: MEAN_SCORE

This is probably an artifact of more schools that serve students from lower socio-economic strata more frequently had longer school days. The results should not be interpreted to mean that long school days cause lower achievement.

We used a factorial ANOVA with visual binning to divide the SES of the school and length of the school day variables into three equal size groups to test the interaction of SES and length of day: wealthy, Middle, and Poor, and Long, Medium, and Short day. Wealthy income schools were defined by SPSS as schools that had between 0 and 18.67% of students eligible for reduced for free lunch. Medium income schools were identified as schools having 18.68-50% of students eligible for free/reduced lunch and poor schools had more than 50% of students eligible. Schools with 50% or more students eligible for free or reduced lunch receive additional funding from the state in New Jersey. Short-day schools were defined as those with a school day consisting of 340 minutes or less. Mean-day length schools were identified as a day that ranged from 341 to 355 minutes, and long-day schools were those with a school day of 356 or more minutes.

Results in Table 4 suggest that the socioeconomic status (SES) grouping variables were statistically significant (p = .000); however, the length of the school day variable was not (p = .246). Moreover, there was no significant interaction between SES and school day length grouping variable on the Grade 8 Math mean PARCC scores (p = .435).

Table 4

Tests of Between-Subjects Effects

Dependent Variable: MEAN_SCORE

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	6097.80[a]	8	762.23	7.27	.000
Intercept	71763566.52	1	71763566.52	684284.16	.000
SCHLDAYLENGTHBIN	296.88	2	148.44	1.42	.246
SES_BINN	5305.69	2	2652.85	25.30	.000
SCHLDAYLENGTHBIN * SES_BINN	400.52	4	100.13	.96	.435
Error	14682.35	140	104.87		
Total	79282782.00	149			
Corrected Total	20780.15	148			

a. R Squared = .29 (Adjusted R Squared = .25)

In order to determine the specific pairs of SES groups that had significant differences, a post-hoc analysis was run (see Table 5).

Table 5

Multiple Comparisons

Dependent Variable: MEAN_SCORE
Tukey HSD

(I) Final_SES_Percentage (Binned)	(J) Final_SES_Percentage (Binned)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Wealthy	Middle	7.64*	2.05	.001	2.79	12.49
	Poor	14.90*	2.06	.000	10.03	19.78
Middle	Wealthy	-7.64*	2.05	.001	-12.49	-2.79
	Poor	7.26*	2.06	.002	2.39	12.14
Poor	Wealthy	-14.90*	2.06	.000	-19.78	-10.03
	Middle	-7.26*	2.06	.002	-12.14	-2.39

Based on observed means.

The error term is Mean Square (Error) = 104.87.

* The mean square difference is significant at the .05 level.

The average mean score for middle-wealth schools was 7.64 scale score points higher than poor schools. Overall, wealthy schools' mean scores were 14.90 scale points higher than those for poor schools. All of these pairwise differences were statistically significant. We also ran a one-way ANOVA that used nine different groupings set to each possible combination of the three SES levels and the three levels of length of the school day. The purpose for this analysis was to determine whether there were any significant differences in the mean PARCC math scores between the three length of school day bins and SES stratum. No statistically significant relationships were detected (see Table 6).

Table 6

Multiple Comparisons

Dependent Variable: MEAN_SCORE

Games-Howell

(I) SDLSESBin	(J) SDLSESBin	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Short Day Wealthy	Medium Day Wealthy	1.30	3.89	1.000	-11.71	14.31
	Long Day Wealthy	1.57	3.79	1.000	-11.28	14.42
Short Day Middle	Medium Day Middle	-.51	3.02	1.000	-10.59	9.58
	Long Day Middle	3.84	2.35	.775	-4.51	12.19
Short Day Poor	Medium Day Poor	8.14	3.50	.364	-3.70	19.98
	Long Day Poor	4.10	3.59	.963	-7.82	16.01
Medium Day Wealthy	Short Day Wealthy	-1.30	3.89	1.000	-14.31	11.71
	Long Day Wealthy	.27	3.25	1.000	-10.55	11.09
Medium Day Middle	Short Day Middle	.51	3.02	1.000	-9.58	10.59
	Long Day Middle	4.35	3.23	.907	-6.56	15.26
Medium Day Poor	Short Day Poor	-8.14	3.50	.364	-19.98	3.70
	Long Day Poor	-4.05	3.85	.977	-16.84	8.75
Long Day Wealthy	Short Day Wealthy	-1.57	3.79	1.000	-14.42	11.28
	Medium Day Wealthy	-.27	3.25	1.000	-11.09	10.55
Long Day Middle	Short Day Middle	-3.84	2.35	.775	-12.19	4.51
	Medium Day Middle	-4.35	3.23	.907	-15.26	6.56
Long Day Poor	Short Day Poor	-4.10	3.59	.963	-16.01	7.82
	Medium Day Poor	4.05	3.85	.977	-8.75	16.84

* The mean difference is significant at the .05 level.

Grade 11 PARCC—Algebra 2 analysis

The grade 11 sample included 150 schools from the various socio-economic strata (see Table 7).

Table 7

Distribution of Schools in PARCC Algebra 2 Sample by District Factor Group (DFG)

DFG Group	Number of Schools
A	6
B	12
CD	19
DE	25
FG	28
GH	40
I	29
J	7
Total	166

A hierarchical regression was run with three variables. In model 1 the sole predictor variable was school day length. In the second model the low SES predictor was added to the model. The third model included the two predictors from the previous model as well as the percentage of students with disabilities variable. Finally, the fourth model included school day length, the low SES percentage, the percentage of students with disabilities, and chronic absenteeism as predictors (see Tables 8 and 9).

The third model had the largest adjusted R square of 35%. The model summary reveals that SES was statistically significant and explained 27% of the variance of the 2016 Algebra 2 PARCC Math scores. School day length had a positive relationship to the mean Algebra 2 PARCC score but only accounted for 2% of the variance.

A two-way factorial analysis of variance (ANOVA) along with a univariate ANOVA analysis was conducted to better understand the interaction of the various lengths of the school day and the various socio-economic strata on the mean PARCC score.

For the factorial ANOVA, the visual binning utility was used again to divide both the percentage of low SES and the length of the school day variables into three equal size groups.

Wealthy income schools were defined by SPSS as schools that had between 0% and 8.88% of students eligible for reduced or free lunch. Medium income schools were identified as schools having between 8.89% and 22.77% of students' eligible for free/reduced lunch, and poor schools had more than 22.77% of students eligible. Short-day schools were defined as those with a school day consisting of 400 minutes or less. Medium day schools were identified as a day that ranged from 401 to 415 minutes, and long day schools were those with a school day of 416 or more minutes.

Table 8

Model Summary[e]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.15[a]	.02	.02	14.44	.02	3.52	1	164	.062	
2	.55[b]	.30	.29	12.22	.28	65.84	1	163	.000	
3	.60[c]	.36	.35	11.71	.06	15.67	1	162	.000	
4	.61[d]	.37	.36	11.67	.01	2.05	1	161	.154	1.801

a. Predictors: (Constant), SCHLDAYLENGTH

b. Predictors: (Constant), SCHLDAYLENGTH, Final_SES_Percentage

c. Predictors: (Constant), SCHLDAYLENGTH, Final_SES_Percentage, Disability_ Percentage

d. Predictors: (Constant), SCHLDAYLENGTH, Final_SES_Percentage, Disability_ Percentage, ChronicAbs

e. Dependent Variable: MEAN_SCORE

Table 9

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	703.42	12.58		55.91	.000		
	SCHLDAYLENGTH	.06	.03	.15	1.88	.062	1.00	1.00
2	(Constant)	724.71	10.97		66.07	.000		
	SCHLDAYLENGTH	.03	.03	.07	1.05	.296	.98	1.02
	Final_SES_Percentage	-0.43	.05	-.54	-8.11	.000	.98	1.02
3	(Constant)	731.32	10.64		68.74	.000		
	SCHLDAYLENGTH	.03	.03	.09	1.34	.184	.98	1.02
	Final_SES_Percentage	-.40	.05	-.50	-7.82	.000	.96	1.04
	Disability_ Percentage	-.81	.21	-.25	-3.96	.000	.98	1.02
4	(Constant)	731.79	10.61		68.98	.000		
	SCHLDAYLENGTH	.04	.03	.09	1.44	.152	.97	1.03
	Final_SES_Percentage	-.35	.06	-.43	-5.53	.000	.63	1.58
	Disability_ Percentage	-.83	.21	-.25	-4.03	.000	.98	1.02
	ChronicAbs	-.23	.16	-.11	-1.43	.154	.66	1.52

a. Dependent Variable: MEAN_SCORE

Table 10 shows that the socioeconomic status (SES) grouping variable and the length of school day grouping variable were statistically significant with p-values of .000 and .020, respectively. Moreover, the SES and school day length grouping variables had a significant interaction on the Algebra 2 mean PARCC scores (p =.041).

Table 10

Tests of Between-Subjects Effects

Dependent Variable: MEAN_SCORE

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	12892.65[a]	8	1611.58	11.49	.000
Intercept	84726686.89	1	84726686.89	603890.13	.000
SES_BINN	10257.74	2	5128.87	36.56	.000
SCHLDAY_BIN	1130.52	2	565.26	4.03	.020
SES_BINN * SCHLDAY_BIN	1435.21	4	358.80	2.56	.041
Error	22027.34	157	140.30		
Total	87751833.00	166			
Corrected Total	34919.98	165			

a. R Squared = .37 (Adjusted R Squared = .34)

In order to determine the specific pairs of SES groups that had significant differences, a post-hoc analysis was run. The average mean score for wealthy schools was 5.22 scale score points higher than medium wealth SES schools (see Table 11).

Table 11

Multiple Comparisons
Dependent Variable: MEAN_SCORE
Tukey HSD

(I) Final_SES_Percentage (Binned)	(J) Final_SES_Percentage (Binned)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Wealthy	Middle	5.22	2.25	.056	-.10	10.54
	Poor	18.62*	2.25	.000	13.30	23.94
Middle	Wealthy	-5.22	2.25	.056	-10.54	0.10
	Poor	13.40*	2.26	.000	8.06	18.74
Poor	Wealthy	-18.62*	2.25	.000	-23.94	-13.30
	Middle	-13.40*	2.26	.000	-18.74	-8.06

Based on observed means.

The error term is Mean Square(Error) = 140.30.

*. The mean difference is significant at the .05 level.

Mean scores for schools in the middle were 13.40 points higher than poor schools. Overall, wealthy schools' mean scores were, on average, 18.62 scale score points higher than those for poor schools. The differences between the wealthy and poor schools, wealthy and middle SES schools and middle SES and poor schools were statistically significant.

A post-hoc analysis was run to determine the specific pairs of school day length groups that had significant differences. The average mean scale score increase for long day schools was 2.22 points higher than medium length day schools. Mean scores for medium length day schools averaged 4.78 points higher than those for short day schools (see Table 12). Overall, long day schools' mean scores were 7.00 points higher than that for short day schools. The difference between the long day and the short-day schools was statistically significant. On the other hand, long day schools and medium day schools did not have a statistically significant difference in the mean PARCC score.

Visualizing the Differences

Figure 1 depicts the differences in mean Algebra 2 PARCC scores for the three SES categories and the short, medium, and long day schools.

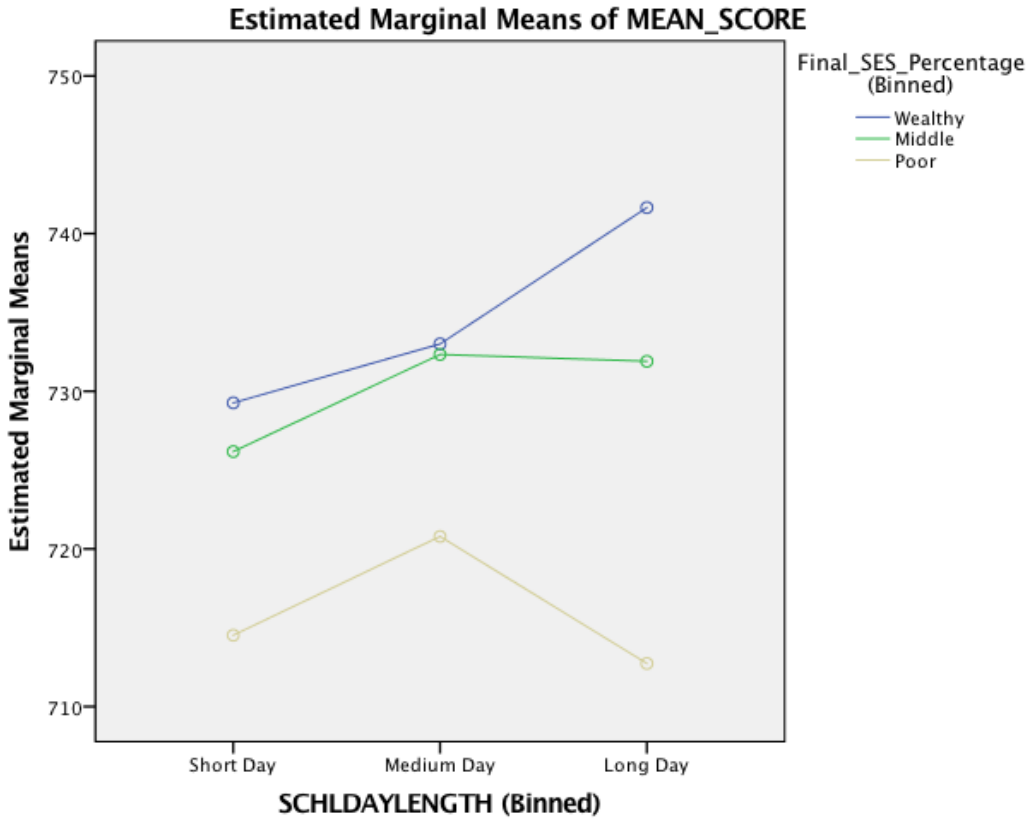

Figure 1. PARCC Algebra 2 estimated marginal means plot.

For wealthy schools, the mean PARCC score increased by four scale score points (from 729 to 733) as the school day length went from short to medium and then rose another nine scale score points (to 742) as the school day increased from medium to long. The average PARCC score for schools in the middle SES stratum rose by six scale points (from 726 to 732) as the school day length went from short to medium but then remained unchanged as the school day duration moved from medium to long.

In schools categorized as poor, the mean PARCC score rose by six scale score points (from 715 to 721) as the school day increased from short to medium but then dropped by eight scale score points (to 713) when the school day became long.

Although the interaction between the SES and school day length grouping variables was statistically significant the average mean PARCC scale score for wealthy schools was always higher than that for middle SES schools, and poor schools. Achievement on the PARCC settles along SES strata. Time did not level the academic playing field in terms of test scores.

A one-way ANOVA was run to examine the interaction between the SES and the length of school day. The post-hoc results in Table 12 show that for both the poor and medium SES school groups there were no significant differences in the mean PARCC scores between schools with short, medium, and long days.

Table 12

Multiple Comparisons
Dependent Variable: MEAN_SCORE
Tukey HSD

(I) COMBO	(J) COMBO	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Short Day Wealthy	Medium Day Wealthy	-3.74	3.95	.990	-16.18	8.70
	Long Day Wealthy	-12.39*	3.80	.035	-24.32	-.45
Short Day Middle	Medium Day Middle	-6.16	4.22	.872	-19.43	7.11
	Long Day Middle	-5.73	3.62	.814	-17.12	5.67
Short Day Poor	Medium Day Poor	-6.27	3.75	.763	-18.06	5.53
	Long Day Poor	1.79	4.00	1.000	-10.81	14.39
Medium Day Wealthy	Short Day Wealthy	3.74	3.95	.990	-8.70	16.18
	Long Day Wealthy	-8.65	3.91	.402	-20.94	3.64
Medium Day Middle	Short Day Middle	6.16	4.22	.872	-7.11	19.43
	Long Day Middle	.43	4.33	1.000	-13.17	14.04
Medium Day Poor	Short Day Poor	6.27	3.75	.763	-5.53	18.06
	Long Day Poor	8.06	4.09	.567	-4.81	20.93
Long Day Wealthy	Short Day Wealthy	12.39*	3.80	.035	.45	24.32
	Medium Day Wealthy	8.65	3.91	.402	-3.64	20.94
Long Day Middle	Short Day Middle	5.73	3.62	.814	-5.67	17.12
	Medium Day Middle	-.43	4.33	1.000	-14.04	13.17
Long Day Poor	Short Day Poor	-1.79	4.00	1.000	-14.39	10.81
	Medium Day Poor	-8.06	4.09	.567	-20.93	4.81

*. The mean difference is significant at the .05 level.

On the other hand, for the wealthy schools, there was a statistically significant difference of 12.39 points in the average mean Algebra 2 PARCC schools between the long day schools and the short day schools, respectively. Across the board, schools serving a wealthy student population benefited from longer school days compared to schools serving a majority of students eligible for free or reduced lunch.

Conclusion

The length of the school day did little to level the standardized test results playing field. These results are consistent with other results of education reform initiatives based on a resource allocation approach. Resources alone cannot overcome the drag that poverty has on the capability to use the resources to their fullest potential (Scherrer, 2014).

Superintendents should pursue a more coordinated approach that includes addressing some of the root causes of underachievement on standardized tests—poverty. For example, the 1.1 million dollars used to extend the school year 60 minutes in school with 1,200 students cited earlier might be better spent on providing and/or coordinating things like health, child care, food security, and housing security for the students. Superintendents should also continue to lobby policy makers to consider alternative ways to use funding to mediate some of the issues that cause resources to be underutilized before spending more time and money on those resources.

Author Biographies

For fifteen years, Phyllis deAngelis has taught business subjects at New Brunswick High School in New Jersey. She completed her EdD in K-12 leadership from Seton Hall University where she became a member of Kappa Delta Pi Epsilon, the International Honor Society in Education. Her practice and interests have always surrounded achievement and leadership. Formerly, deAngelis held several corporate training executive positions for fortune 500 financial companies. E-mail: pdeg@optonline.net

Danielle Sammarone is an aspiring school administrator who has been teaching in Lyndhurst, New Jersey since 2007. She completed her EdD in K-12 leadership from Seton Hall University. In 2015, the National Council for Professors of Educational Administration awarded her Dissertation of the Year. E-mail: sammarone.danielle@gmail.com

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