

The Influence of the Length of the School Day on the Percentage of Proficient and Advanced Proficient Scores on the New Jersey Assessment of Skills and Knowledge for Grades 6, 7, and 8

Danielle Sammarone, EdD
Grade 5 Teacher
Mathematics and Science
Lyndhurst School District
Lyndhurst, NJ

Abstract

The purpose for this correlational, cross-sectional, explanatory was to explain the influence of the length of the school day on the total percentage of students who scored Proficient or Advanced Proficient (TPAP) on the New Jersey Ask (NJ ASK) in Language Arts and Mathematics in Grades 6-8 in for student populations with low, median, and high socio-economic status who attended schools with below average, average, and above average school day lengths. The data analyzed included the length of the school day with controlled student, staff, and school variables. The results from the study serve to distinguish how this intervention influences TPAP based upon socioeconomic status (SES). The study used over 600 public schools for each grade level/subject combination. For all grade level/subject combinations, socioeconomic status (SES) by far had the largest predictive contribution to the dependent variable compared to the other predictor variables.

Key Words

school reform, extended school day, standardized testing

Problem and Purpose

Time is a finite education resource because there are only so many hours in a school day. Since the fledgling years of the United States public school system, structural reforms and interventions aimed at adding time or using time in different ways to influence student learning have been put into place (Tienken & Orlich, 2013).

Extending the school day is a reform that some education bureaucrats and policy makers propose to address perceived problems associated with student achievement. The conclusions from the extant literature about the influence of length of school day on standardized tests scores lack consistency.

The results from this statewide study provide New Jersey policy makers and school administrators with information and data that can be utilized to develop better policy recommendations regarding the length of the school day as an intervention to raise student achievement on statewide standardized tests.

Literature in a Snapshot

Length of school day

The existing empirical research regarding the length of the school day provided mixed results. The major meta-analysis written by Patall, Cooper, & Batts-Allen (2010) examined the relationship between time and academic success. Patall et al. (2010) investigated the research from 1985-2009 and concentrated on 15 empirical works of various designs, most consisted of small sample sizes and were based on flawed methodologies.

According to Patall et al. (2010), the results from the PISA and TIMS tests are impacting how the United States education system is viewed nationally and internationally. Ever since *A Nation at Risk*, the American

school year consisting of 180 days has been compared to the school calendars in Europe and in Japan, whose school days vary from 190 to 240.

Patall et al. (2010) explicated that *Prisoners of Time*, a Report completed in 1994 by the National Education Commission on Time and Learning aimed to reestablish the need for an extended school day and longer school year in hopes to increase achievement.

This paved the way and between the years 2000 and 2008, multiple reforms aiming to increase time were put into action. There is inconclusive data and a lack of evidence to confirm if the intervention of lengthening the school day positively affects student achievement.

Socioeconomic status

The existing empirical research regarding socioeconomic status and student achievement has been consistent and conclusive.

The major landmark study by Coleman (1966) explored education gaps between advantaged and disadvantaged students and stipulated that African American students had less of an opportunity to achieve academically due to the concentration of poor minorities within their schools.

The research of Coleman (1966) determined that disadvantaged students would have a better chance of achieving if they attended a desegregated school that contained an increased percentage of students with a higher socioeconomic background.

The study further explained that students from schools with high concentrations of low socioeconomic statuses would benefit greatly from being integrated into schools with a smaller population of those in poverty. A

number of studies have similar conclusions attesting that student achievement is highly correlated with a family's socioeconomic status.

Sirin (2005) examined existing literature from 1990-2000 regarding socioeconomic status (SES) and academic achievement in his meta-Analysis. Sirin (2005) established that family SES at the student level proved to be one of the strongest correlations and also determined the correlations at the school level were even stronger (p. 438).

The results determine it is irrefutable that "... school success is greatly influenced by students' family SES. This finding indicated that our society may be failing in one of the greatest commitments of every modern society; that is, the responsibility to provide educational opportunities for each student regardless of social and economic background" (Sirin, 2005, p.445).

Similarly, Stull (2013) focused in on the relationship between a family's socioeconomic status (SES) and their educational expectations for their children. Stull (2013) also identified the difference between the direct and indirect effects of SES on the achievement of students.

It was concluded that the direct effects outweighed the indirect ones and that the choice of early education plays a significant role in achievement.

Likewise, Caldas and Bankston (2001) found there is a strong tendency for poor students to attend schools with peers who are disproportionately poor" (p. 272). Regressions were run to illustrate the effect of family poverty status and family social status on student achievement.

The results concluded the highest correlation ($r = .606$) was between race and percentage of minority students (Caldas &

Bankston, 2001, p.272). Nevertheless, small negative effect on academic achievement for individuals who receive free or reduced lunch was found. There was a larger positive effect on academic achievement and a family's higher social status.

Furthermore, Caldas and Bankston (2001) conclude integrating students based on socioeconomic status can result in an increase of achievement overall.

Theoretical construct/research questions

In order to determine the influence of length of school day on student achievement for grades 6-8, a diverse set of variables found in the literature to influence middle school student achievement on standardized tests were also investigated, including a theoretical construct for why the length of the school day would matter as a variable to raise test scores.

The use of time as an input intervention is supported by production-function theory (Pigott, et al., 2012). The education production-function theoretical construct guided the investigation to explain the relationship between variables listed on the New Jersey Report Card and student achievement on the New Jersey Assessment of Skills and Knowledge (NJ ASK) for Grades 6, 7, & 8 (Greenwald, Hedges, & Laine, 1996). Pigott et al., (2012) explained, "Education production functions are commonly used to study the relationship between school inputs (predictors) such as per-pupil expenditure (PPE) and student outputs (outcomes) such as academic achievement" (p. 1).

In this study, the output variable of student achievement on the mathematics and language arts sections of the NJ ASK tests in grades 6-8 should theoretically be influenced by the input of length of school day along with other student, staff, and school inputs.

I guided the study with the following overarching research question and sub-questions: What is the influence of the length of the school day on student achievement in Mathematics and Language Arts in grades 6 through 8 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 6 as measured by the New Jersey Assessment of Skills and Knowledge for Mathematics and Language Arts for the 2010-2011 school year 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 in Grade 7 as measured by the New Jersey Assessment of Skills and Knowledge for Mathematics and Language Arts for the 2010-2011 school year when controlling for staff, student, and school variables?

Sub-question 3:

What is the influence of the length of the school day on the percentage of Proficient and Advanced Proficient students in Grade 8 on the standardized assessment in Mathematics and Language Arts measured by New Jersey Assessment of Skills and Knowledge 8 for the 2010-2011 school year when controlling for staff, student, and school variables?

Sub-question 4:

What is the influence of the length of the school day on students in schools that serve students in the lowest third of the socioeconomic strata compared to the influence on students in schools that serve students in the middle and top third of the socio-economic strata?

Methodology

Sample

The sample for this study consisted of public middle schools within the 21 counties of New Jersey.

The study excluded schools with specialized populations such as magnet schools, vocational schools, charter schools, and alternative schools for students with special needs.

All other public schools were included. The number of schools that had complete data for each subject for Grades 6, 7, and 8 included the following:

- Grade 6 Language Arts ($n=786$) and Grade 6 Mathematics ($n=786$).
- Grade 7 Language Arts ($n=644$) and Grade 7 Mathematics ($n=653$).
- Grade 8 Language Arts ($n=645$) and Grade 8 Mathematics ($n=640$).

The sample sizes necessary to achieve appropriate power of the regression models were calculated based on being able to identify a p value of at least .05 and an effect size of at least 0.50.

For the simultaneous multiple regression models, I used a formula advocated by Field (2009) to determine if the samples were large enough to find the desired level of statistical significance. Field (2009) suggested $50+8(k)$, with k representing the number of predictor variables, as an appropriate method to calculate sample size. There were ten predictor variables used in the various models for this study, therefore a minimum of 130 cases were needed ($50 + 8(10) = 130$) to obtain predictive power.

Analysis

I began the analysis phase for each grade level and subject area by exploring the data to

determine whether the dependent variables met the assumption of normality. I measured skewness for the dependent variables, constructed histograms, and applied two tests of normality.

A slight negative skew, greater than 1.000 was found in several dependent variables. To determine whether the large sample sizes were producing the statistically significant results on the tests of normality, I conducted descriptive tests on a smaller random sample for each grade level subject combination.

I used a sample size equivalent to that necessary to conduct a hierarchical regression. The results of the descriptive statistics for the smaller sample suggested that the skewness were most likely an artifact of the large sample sizes (Field, 2009).

For each subject and grade, the following three-step procedure was used to determine the significant independent variables and their relative predictive strengths.

The first step was to run an “enter method” simultaneous multiple regression that included all ten independent variables. My purpose for this procedure was to determine which of the variables were statistically significant predictors.

The second step was to run a multiple regression using the backward method to confirm or disconfirm the findings from the initial regression. The backwards method began with running a regression that used all ten independent variables and then excluded them sequentially starting with the variable that was least significant (i.e., highest p value).

The next part of this second step consisted of excluding that variable and rerunning the regression using the remaining nine variables. The variables that were not

statistically significant were automatically excluded from future models. The process was repeated until the model included all significant independent variables. If the p value was greater than .10, then it was removed from the model. I allowed variables with p values of .10 or less to be included to guard against excluding a potentially statistically significant variable due to model error.

The third step was to run a series of hierarchical regressions by using the strongest statistically significant independent variables obtained from the backwards analysis. Each regression was performed by adding an additional independent variable to each new model. I reviewed the model summaries and ANOVA tables to determine the statistically significant model of best fit.

In addition I also conducted factorial analyses of variance (ANOVAs) and univariate analyses for each subject and grade level to explain the interaction between various lengths of school day and various socio-economic strata.

I used visual binning to divide the SES and length of the school day variables into three equal size groups based on high, median, and low categories.

The codes for the SES binning groups were labeled as follows: 1 = wealthy incomes, 2 = median incomes, and 3 = high concentration of low socioeconomic status.

Wealthy income schools were defined by SPSS as schools that had between 0 and 10% of students eligible for free lunch. Median income schools were identified as schools having 11-49% of students eligible for free lunch and high concentration schools exceeded 50% of students eligible.

Similarly, the codes for length of the school day groups were labeled as follows: 1 =

short school day, 2 = mean school day, and 3 = long school day.

Short-day schools were defined as those with a school day consisting of 390 minutes or less. Mean-day schools were identified as a day that ranged from 391 to 400 minutes, and long-day schools were those with a school day of 400 or more minutes.

Once the codes were determined for SES and length of the school day, a separate factorial (i.e., two-way) analysis of variance (ANOVA) was run on each grade and subject, using the two sets of visual binning groups as grouping variables.

The purpose of the factorial analyses of variance (ANOVA) was to determine if there were statistically significant differences ($p < .05$) in the New Jersey Assessment of Skills and Knowledge (NJ ASK) proficiency percentages for three levels of socioeconomic status (SES) and three levels of length of school day, as well as whether there was an interaction between the SES and length of school day on the NJ ASK proficiency rates.

In addition to running the two-way factorial ANOVA, a one-way ANOVA was run. The one-way ANOVA used nine different groupings. The nine groupings were set to each possible combination of the SES levels and the levels of length of the school day bin.

The one-way ANOVA served as a post hoc confirmation for the exact pairs of SES and the length of school day bin combinations

where there were significant differences in the NJ ASK passing rate.

Findings and interpretations

The results from this study provide evidence that no matter how much funding is put into

lengthening the school day, this reform has minimal influence on improving the proficiency percentages of the New Jersey Assessment of Skills and Knowledge (NJ ASK) for Grades 6, 7, and 8, especially in schools serving the state's poorest middle school students.

The results from the statistically significant ($p \leq .05$) hierarchical regression models of best fit suggest lengthening the school day might not provide much return on academic gains as measured by the New Jersey state tests. Results from the Mathematics and Language Arts models for all grade levels and subject combinations suggest that length of the school day was a statistically significant variable although it portrayed a weak relationship (See Table 1).

It was evident through the *R* squared values and standardized betas that socioeconomic status (SES) was the strongest predictor variable for every grade level and subject regardless of length of school day or other school factors.

Existing research claims that achievement of students of low socioeconomic strata or those students who are eligible for free or reduced lunch is much lower than students of median and wealthy incomes.

Unfortunately, only minimal gains were made by lengthening the school day, including gains for students within low socioeconomic strata (See Table 1).

Using one-way ANOVA tests, I was able to pinpoint specific gains between the various categories of school day length within particular socioeconomic strata.

Extending the school day benefited students in wealthy schools three-times as much as it benefited students in the poorest schools.

Table 1

Summary of Statistically Significant Hierarchical Regression Standardized Beta Values by Predictor Variables

	Grade 6 MA β	Grade 6 LA β	Grade 7 MA β	Grade 7 LA β	Grade 8 MA β	Grade 8 LA β
SES	-.497	-.600	-.506	-.617	-.466	-.474
Attendance	.284	.227	.198	.146	.234	.208
Student Mobility	-.134	-.142	-.179	-.180	-.242	-.322
School Day Length	.054	.039	.109	.100	.054	.055
MA+		.054	.069	.073		
Faculty Mobility					-.048	
ELL					.065	

Table 2 shows the achievement in wealthy schools increased the Grade 7 Language Arts passing percentage by eight points (74.7%-82.6%) when the day was extended 13 minutes from a short day to a mean day (i.e., 6 hours 24 minutes to 6 hours 37 minutes on average).

Similarly, extending the school day from short to long (i.e., extending the day 28 minutes from 6 hours 24 minutes to 6 hours 52 minutes) in wealthy districts produced a seven-point increase in the percentage of students who scored proficient or above (74.7%-81.9%).

Table 2

Grade 7 Language Arts Post-Hoc Test Results for One-Way Combination ANOVA Multiple Comparisons

(I) Combo	(J) Combo	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Wealthy SES and Short School Day	Wealthy SES and Mean School Day	-7.8780*	1.7815	.001	-13.504	-2.252
	Wealthy SES and Long School Day	-7.2059*	1.8783	.006	-13.124	-1.288
	Median SES and Mean School Day	9.9393*	1.9270	.000	3.876	16.002
	Median SES and Mean School Day	10.6615*	2.0485	.000	4.204	17.119
	Median SES and Long School Day	9.1663*	2.1450	.001	2.411	15.922
	Low SES and Short School Day	36.6538*	2.0444	.000	30.235	43.072
	Low SES and Mean School Day	33.1122*	2.9508	.000	23.717	42.508
	Low SES and Long School Day	27.1279*	3.7683	.000	14.902	39.354
Wealthy SES and Mean School Day	Wealthy SES and Short School Day	7.8780*	1.7815	.001	2.252	13.504
	Wealthy SES and Long School Day	.6720	1.3323	1.000	-3.532	4.876
	Median SES and Mean School Day	17.8172*	1.4001	.000	13.412	22.223
	Median SES and Mean School Day	18.5395*	1.5631	.000	13.573	23.506
	Median SES and Long School Day	17.0442*	1.6876	.000	11.691	22.397
	Low SES and Short School Day	44.5317*	1.5578	.000	39.643	49.421
	Low SES and Mean School Day	40.9902*	2.6370	.000	32.493	49.488

	Low SES and Long School Day	35.0058*	3.5280	.000	23.414	46.598
Wealthy SES and Long School Day	Wealthy SES and Short School Day	7.2059*	1.8783	.006	1.288	13.124
	Wealthy SES and Mean School Day	-.6720	1.3323	1.000	-4.876	3.532
	Median SES and Mean School Day	17.1452*	1.5213	.000	12.364	21.926
	Median SES and Mean School Day	17.8674*	1.6726	.000	12.573	23.162
	Median SES and Long School Day	16.3722*	1.7895	.000	10.714	22.030
	Low SES and Short School Day	43.8597*	1.6676	.000	38.630	49.089
	Low SES and Mean School Day	40.3181*	2.7033	.000	31.636	49.000
	Low SES and Long School Day	34.3338*	3.5779	.000	22.614	46.054
Median SES and Mean School Day	Wealthy SES and Short School Day	-9.9393*	1.9270	.000	-16.002	-3.876
	Wealthy SES and Mean School Day	-17.8172*	1.4001	.000	-22.223	-13.412
	Wealthy SES and Long School Day	-17.1452*	1.5213	.000	-21.926	-12.364
	Median SES and Mean School Day	.7222	1.7271	1.000	-4.732	6.177
	Median SES and Long School Day	-.7730	1.8406	1.000	-6.581	5.035
	Low SES and Short School Day	26.7145*	1.7223	.000	21.320	32.109
	Low SES and Mean School Day	23.1729*	2.7374	.000	14.396	31.950
	Low SES and Long School Day	17.1886*	3.6037	.001	5.402	28.975
Median SES and Mean School Day	Wealthy SES and Short School Day	-10.6615*	2.0485	.000	-17.119	-4.204
	Wealthy SES and Mean School Day	-18.5395*	1.5631	.000	-23.506	-13.573

	Wealthy SES and Long School Day	-17.8674*	1.6726	.000	-23.162	-12.573
	Median SES and Mean School Day	-.7222	1.7271	1.000	-6.177	4.732
	Median SES and Long School Day	-1.4952	1.9674	.998	-7.716	4.725
	Low SES and Short School Day	25.9923*	1.8572	.000	20.147	31.838
	Low SES and Mean School Day	22.4507*	2.8243	.000	13.418	31.484
	Low SES and Long School Day	16.4663*	3.6701	.002	4.501	28.431
Median SES and Long School Day	Wealthy SES and Short School Day	-9.1663*	2.1450	.001	-15.922	-2.411
	Wealthy SES and Mean School Day	-17.0442*	1.6876	.000	-22.397	-11.691
	Wealthy SES and Long School Day	-16.3722*	1.7895	.000	-22.030	-10.714
	Median SES and Mean School Day	.7730	1.8406	1.000	-5.035	6.581
	Median SES and Mean School Day	1.4952	1.9674	.998	-4.725	7.716
	Low SES and Short School Day	27.4875*	1.9632	.000	21.311	33.664
	Low SES and Mean School Day	23.9459*	2.8950	.000	14.708	33.183
	Low SES and Long School Day	17.9616*	3.7248	.000	5.850	30.073
Low SES and Short School Day	Wealthy SES and Short School Day	-36.6538*	2.0444	.000	-43.072	-30.235
	Wealthy SES and Mean School Day	-44.5317*	1.5578	.000	-49.421	-39.643
	Wealthy SES and Long School Day	-43.8597*	1.6676	.000	-49.089	-38.630
	Median SES and Mean School Day	-26.7145*	1.7223	.000	-32.109	-21.320
	Median SES and Mean School Day	-25.9923*	1.8572	.000	-31.838	-20.147

	Median SES and Long School Day	-27.4875*	1.9632	.000	-33.664	-21.311
	Low SES and Mean School Day	-3.5416	2.8213	.941	-12.556	5.472
	Low SES and Long School Day	-9.5259	3.6678	.217	-21.480	2.428
Low SES and Mean School Day	Wealthy SES and Short School Day	-33.1122*	2.9508	.000	-42.508	-23.717
	Wealthy SES and Mean School Day	-40.9902*	2.6370	.000	-49.488	-32.493
	Wealthy SES and Long School Day	-40.3181*	2.7033	.000	-49.000	-31.636
	Median SES and Mean School Day	-23.1729*	2.7374	.000	-31.950	-14.396
	Median SES and Mean School Day	-22.4507*	2.8243	.000	-31.484	-13.418
	Median SES and Long School Day	-23.9459*	2.8950	.000	-33.183	-14.708
	Low SES and Short School Day	3.5416	2.8213	.941	-5.472	12.556
	Low SES and Long School Day	-5.9843	4.2403	.890	-19.581	7.612
Low SES and Long School Day	Wealthy SES and Short School Day	-27.1279*	3.7683	.000	-39.354	-14.902
	Wealthy SES and Mean School Day	-35.0058*	3.5280	.000	-46.598	-23.414
	Wealthy SES and Long School Day	-34.3338*	3.5779	.000	-46.054	-22.614
	Median SES and Mean School Day	-17.1886*	3.6037	.001	-28.975	-5.402
	Median SES and Mean School Day	-16.4663*	3.6701	.002	-28.431	-4.501
	Median SES and Long School Day	-17.9616*	3.7248	.000	-30.073	-5.850
	Low SES and Short School Day	9.5259	3.6678	.217	-2.428	21.480
	Low SES and Mean School Day	5.9843	4.2403	.890	-7.612	19.581

* The mean difference is significant at the 0.05 level.

For grade 7 Mathematics (See Table 3), an eight percentage-point gain was observed in wealthy school districts by changing a short day to a mean day (i.e., extending the day 13 minutes from 6 hours 24 minutes to 6 hours 37 minutes on average).

Table 3

Grade 7 Mathematics One-Way ANOVA Combination Table Multiple Comparisons

(I) combo	(J) combo	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Wealthy SES and Short School Day	Wealthy SES and Mean School Day	-7.8314*	1.7715	.001	-13.416	-2.247
	Wealthy SES and Long School Day	-5.6266	1.8176	.058	-11.348	.095
	Median SES and Short School Day	8.8522*	1.8870	.000	2.922	14.782
	Median SES and Mean School Day	8.0514*	1.9888	.003	1.780	14.323
	Median SES and Long School Day	6.9215*	2.0254	.023	.543	13.300
	Low SES and Short School Day	29.9797*	2.1426	.000	23.263	36.696
	Low SES and Mean School Day	30.4516*	2.8439	.000	21.389	39.514
	Low SES and Long School Day	20.1113*	3.8926	.000	7.453	32.769
	Wealthy SES and Mean School Day	Wealthy SES and Short School Day	7.8314*	1.7715	.001	2.247
Wealthy SES and Long School Day		2.2049	1.5056	.870	-2.544	6.954
Median SES and Short School Day		16.6836*	1.5887	.000	11.685	21.683
Median SES and Mean School Day		15.8828*	1.7084	.000	10.468	21.298
Median SES and Long School Day		14.7529*	1.7509	.000	9.216	20.290

	Low SES and Short School Day	37.8112*	1.8852	.000	31.895	43.727
	Low SES and Mean School Day	38.2830*	2.6554	.000	29.761	46.805
	Low SES and Long School Day	27.9427*	3.7571	.000	15.642	40.243
Wealthy SES and Long School Day	Wealthy SES and Short School Day	5.6266	1.8176	.058	-.095	11.348
	Wealthy SES and Mean School Day	-2.2049	1.5056	.870	-6.954	2.544
	Median SES and Short School Day	14.4788*	1.6399	.000	9.327	19.631
	Median SES and Mean School Day	13.6780*	1.7561	.000	8.124	19.232
	Median SES and Long School Day	12.5480*	1.7975	.000	6.874	18.222
	Low SES and Short School Day	35.6063*	1.9286	.000	29.560	41.653
	Low SES and Mean School Day	36.0781*	2.6864	.000	27.470	44.686
	Low SES and Long School Day	25.7379*	3.7791	.000	13.381	38.095
Median SES and Short School Day	Wealthy SES and Short School Day	-8.8522*	1.8870	.000	-14.782	-2.922
	Wealthy SES and Mean School Day	-16.6836*	1.5887	.000	-21.683	-11.685
	Wealthy SES and Long School Day	-14.4788*	1.6399	.000	-19.631	-9.327
	Median SES and Mean School Day	-.8008	1.8278	1.000	-6.568	4.967
	Median SES and Long School Day	-1.9307	1.8676	.982	-7.814	3.953
	Low SES and Short School Day	21.1275*	1.9941	.000	14.882	27.373
	Low SES and Mean School Day	21.5993*	2.7338	.000	12.858	30.341
	Low SES and Long School Day	11.2591	3.8129	.104	-1.186	23.704

Median SES and Mean School Day	Wealthy SES and Short School Day	-8.0514 [*]	1.9888	.003	-14.323	-1.780
	Wealthy SES and Mean School Day	-15.8828 [*]	1.7084	.000	-21.298	-10.468
	Wealthy SES and Long School Day	-13.6780 [*]	1.7561	.000	-19.232	-8.124
	Median SES and Short School Day	.8008	1.8278	1.000	-4.967	6.568
	Median SES and Long School Day	-1.1299	1.9705	1.000	-7.357	5.097
	Low SES and Short School Day	21.9283 [*]	2.0907	.000	15.359	28.498
	Low SES and Mean School Day	22.4001 [*]	2.8050	.000	13.444	31.356
	Low SES and Long School Day	12.0599	3.8643	.070	-.525	24.645
Median SES and Long School Day	Wealthy SES and Short School Day	-6.9215 [*]	2.0254	.023	-13.300	-.543
	Wealthy SES and Mean School Day	-14.7529 [*]	1.7509	.000	-20.290	-9.216
	Wealthy SES and Long School Day	-12.5480 [*]	1.7975	.000	-18.222	-6.874
	Median SES and Short School Day	1.9307	1.8676	.982	-3.953	7.814
	Median SES and Mean School Day	1.1299	1.9705	1.000	-5.097	7.357
	Low SES and Short School Day	23.0583 [*]	2.1256	.000	16.386	29.731
	Low SES and Mean School Day	23.5301 [*]	2.8311	.000	14.500	32.560
	Low SES and Long School Day	13.1898 [*]	3.8833	.035	.555	25.824
Low SES and Short School Day	Wealthy SES and Short School Day	-29.9797 [*]	2.1426	.000	-36.696	-23.263
	Wealthy SES and Mean School Day	-37.8112 [*]	1.8852	.000	-43.727	-31.895
	Wealthy SES and Long School Day	-35.6063 [*]	1.9286	.000	-41.653	-29.560

	Median SES and Short School Day	-21.1275*	1.9941	.000	-27.373	-14.882
	Median SES and Mean School Day	-21.9283*	2.0907	.000	-28.498	-15.359
	Median SES and Long School Day	-23.0583*	2.1256	.000	-29.731	-16.386
	Low SES and Mean School Day	.4718	2.9161	1.000	-8.796	9.739
	Low SES and Long School Day	-9.8684	3.9457	.257	-22.666	2.930
Low SES and Mean School Day	Wealthy SES and Short School Day	-30.4516*	2.8439	.000	-39.514	-21.389
	Wealthy SES and Mean School Day	-38.2830*	2.6554	.000	-46.805	-29.761
	Wealthy SES and Long School Day	-36.0781*	2.6864	.000	-44.686	-27.470
	Median SES and Short School Day	-21.5993*	2.7338	.000	-30.341	-12.858
	Median SES and Mean School Day	-22.4001*	2.8050	.000	-31.356	-13.444
	Median SES and Long School Day	-23.5301*	2.8311	.000	-32.560	-14.500
	Low SES and Short School Day	-.4718	2.9161	1.000	-9.739	8.796
	Low SES and Long School Day	-10.3402	4.3664	.319	-24.353	3.673
Low SES and Long School Day	Wealthy SES and Short School Day	-20.1113*	3.8926	.000	-32.769	-7.453
	Wealthy SES and Mean School Day	-27.9427*	3.7571	.000	-40.243	-15.642
	Wealthy SES and Long School Day	-25.7379*	3.7791	.000	-38.095	-13.381
	Median SES and Short School Day	-11.2591	3.8129	.104	-23.704	1.186
	Median SES and Mean School Day	-12.0599	3.8643	.070	-24.645	.525
	Median SES and Long School Day	-13.1898*	3.8833	.035	-25.824	-.555

Low SES and Short School Day	9.8684	3.9457	.257	-2.930	22.666
Low SES and Mean School Day	10.3402	4.3664	.319	-3.673	24.353

* The mean difference is significant at the 0.05 level. Dependent Variable: TPAPmath7

There was also an improvement on the percentage of proficiency for Grade 8 Language Arts in low SES schools (See Table 4). Hardly closing the achievement gap, scores were increased by 9.3 percentage points which raised the proficient percentage from 61.5% to 70.8% when the length of the school day was increased from short to long (i.e., extending the day 60 minutes from 6 hours 22 minutes to 7 hours 22 minutes on average).

Although some might see these gains as meaningful improvements, some of them may not be possible to implement due to the immense cost or might not be the best intervention in terms of effectiveness. In particular, increasing the school day by an hour for students in the lowest socioeconomic schools may not be possible due to fiscal constraints and the gains received from doing so might not be worth the hundreds of thousands or even millions of dollars that would need to be spent on each school.

Table 4

Grade 8 Language Arts Post-Hoc Test Results for One-Way Combination ANOVA

(I) COMBO	(J) COMBO	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Wealthy SES and Short School Day	Wealthy SES and Mean School Day	-2.3320	1.0998	.465	-5.810	1.146
	Wealthy SES and Long School Day	-2.2425	1.0949	.514	-5.705	1.220
	Median SES and Short School Day	5.2228*	1.1289	.000	1.660	8.786
	Median SES and Mean School Day	6.4440*	1.2755	.000	2.416	10.472
	Median SES and Long School Day	5.4582*	1.1501	.000	1.826	9.090
	Low SES and Short School Day	29.8509*	1.7842	.000	24.255	35.447
	Low SES and Mean School Day	27.2236*	2.5717	.000	18.941	35.506

	Low SES and Long School Day	20.5900*	2.6571	.000	11.994	29.185
Wealthy SES and Mean School Day	Wealthy SES and Short School Day	2.3320	1.0998	.465	-1.146	5.810
	Wealthy SES and Long School Day	.0895	.7457	1.000	-2.261	2.440
	Median SES and Short School Day	7.5548*	.7949	.000	5.056	10.054
	Median SES and Mean School Day	8.7760*	.9921	.000	5.619	11.933
	Median SES and Long School Day	7.7902*	.8247	.000	5.184	10.396
	Low SES and Short School Day	32.1829*	1.5940	.000	27.169	37.197
	Low SES and Mean School Day	29.5556*	2.4436	.000	21.624	37.487
	Low SES and Long School Day	22.9220*	2.5333	.000	14.659	31.185
Wealthy SES and Long School Day	Wealthy SES and Short School Day	2.2425	1.0949	.514	-1.220	5.705
	Wealthy SES and Mean School Day	-.0895	.7457	1.000	-2.440	2.261
	Median SES and Short School Day	7.4653*	.7881	.000	4.990	9.940
	Median SES and Mean School Day	8.6865*	.9866	.000	5.547	11.826
	Median SES and Long School Day	7.7007*	.8181	.000	5.118	10.284
	Low SES and Short School Day	32.0935*	1.5906	.000	27.090	37.097
	Low SES and Mean School Day	29.4661*	2.4414	.000	21.540	37.392
	Low SES and Long School Day	22.8325*	2.5312	.000	14.575	31.090
Median SES and Short School Day	Wealthy SES and Short School Day	-5.2228*	1.1289	.000	-8.786	-1.660
	Wealthy SES and Mean School Day	-7.5548*	.7949	.000	-10.054	-5.056

	Wealthy SES and Long School Day	-7.4653*	.7881	.000	-9.940	-4.990
	Median SES and Mean School Day	1.2212	1.0243	.956	-2.028	4.470
	Median SES and Long School Day	.2354	.8632	1.000	-2.483	2.953
	Low SES and Short School Day	24.6281*	1.6142	.000	19.554	29.702
	Low SES and Mean School Day	22.0007*	2.4568	.000	14.034	29.968
	Low SES and Long School Day	15.3671*	2.5461	.000	7.071	23.664
Median SES and Mean School Day	Wealthy SES and Short School Day	-6.4440*	1.2755	.000	-10.472	-2.416
	Wealthy SES and Mean School Day	-8.7760*	.9921	.000	-11.933	-5.619
	Wealthy SES and Long School Day	-8.6865*	.9866	.000	-11.826	-5.547
	Median SES and Short School Day	-1.2212	1.0243	.956	-4.470	2.028
	Median SES and Long School Day	-.9858	1.0476	.990	-4.311	2.339
	Low SES and Short School Day	23.4069*	1.7199	.000	18.005	28.809
	Low SES and Mean School Day	20.7796*	2.5275	.000	12.618	28.941
	Low SES and Long School Day	14.1460*	2.6144	.000	5.666	22.626
Median SES and Long School Day	Wealthy SES and Short School Day	-5.4582*	1.1501	.000	-9.090	-1.826
	Wealthy SES and Mean School Day	-7.7902*	.8247	.000	-10.396	-5.184
	Wealthy SES and Long School Day	-7.7007*	.8181	.000	-10.284	-5.118
	Median SES and Short School Day	-.2354	.8632	1.000	-2.953	2.483
	Median SES and Mean School Day	.9858	1.0476	.990	-2.339	4.311

	Low SES and Short School Day	24.3928*	1.6291	.000	19.272	29.513
	Low SES and Mean School Day	21.7654*	2.4666	.000	13.772	29.759
	Low SES and Long School Day	15.1318*	2.5555	.000	6.810	23.454
Low SES and Short School Day	Wealthy SES and Short School Day	-29.8509*	1.7842	.000	-35.447	-24.255
	Wealthy SES and Mean School Day	-32.1829*	1.5940	.000	-37.197	-27.169
	Wealthy SES and Long School Day	-32.0935*	1.5906	.000	-37.097	-27.090
	Median SES and Short School Day	-24.6281*	1.6142	.000	-29.702	-19.554
	Median SES and Mean School Day	-23.4069*	1.7199	.000	-28.809	-18.005
	Median SES and Long School Day	-24.3928*	1.6291	.000	-29.513	-19.272
	Low SES and Mean School Day	-2.6274	2.8187	.990	-11.610	6.355
	Low SES and Long School Day	-9.2610	2.8968	.050	-18.526	.004
Low SES and Mean School Day	Wealthy SES and Short School Day	-27.2236*	2.5717	.000	-35.506	-18.941
	Wealthy SES and Mean School Day	-29.5556*	2.4436	.000	-37.487	-21.624
	Wealthy SES and Long School Day	-29.4661*	2.4414	.000	-37.392	-21.540
	Median SES and Short School Day	-22.0007*	2.4568	.000	-29.968	-14.034
	Median SES and Mean School Day	-20.7796*	2.5275	.000	-28.941	-12.618
	Median SES and Long School Day	-21.7654*	2.4666	.000	-29.759	-13.772
	Low SES and Short School Day	2.6274	2.8187	.990	-6.355	11.610
	Low SES and Long School Day	-6.6336	3.4383	.596	-17.584	4.316

Low SES and Long School Day	Wealthy SES and Short School Day	-20.5900*	2.6571	.000	-29.185	-11.994
	Wealthy SES and Mean School Day	-22.9220*	2.5333	.000	-31.185	-14.659
	Wealthy SES and Long School Day	-22.8325*	2.5312	.000	-31.090	-14.575
	Median SES and Short School Day	-15.3671*	2.5461	.000	-23.664	-7.071
	Median SES and Mean School Day	-14.1460*	2.6144	.000	-22.626	-5.666
	Median SES and Long School Day	-15.1318*	2.5555	.000	-23.454	-6.810
	Low SES and Short School Day	9.2610	2.8968	.050	-.004	18.526
	Low SES and Mean School Day	6.6336	3.4383	.596	-4.316	17.584

* The mean difference is significant at the 0.05 level. Dependent Variable: TPAPLAS

Conclusion

Limited resources are a driver of educational output and the length of the school day is one of those limited resources. My study found that the required investment of time, more specifically lengthening the school day, to achieve greater results in student achievement in Grades 6, 7, and 8 do not justify the expenditure.

The study presented the opportunity for differences in improvements on the NJ ASK passing percentages to be exposed. There were eighteen possible combinations where the length of the school day could increase achievement; only four were found to be statistically significant (See Table 5), yet small. Three out of the four identified as statistically significant were found to benefit students of the wealthiest socioeconomic strata, and only one was found to benefit the students in the lowest third socioeconomic strata. The students who need the most receive the least by lengthening the school day.

Table 5

Summary of Statistically Significant Findings for One-Way Analysis of Variance

Grade/ Subject	School Day Length	Low SES	Median SES	Wealthy SES
6 th Grade Mathematics	Short to mean			
	Mean to long			
	Short to long			
6 th Grade	Short to mean			

Language Arts	Mean to long			
	Short to long			
7 th Grade Mathematics	Short to mean			<u>X</u>
	Mean to long			
	Short to long			
7 th Grade Language Arts	Short to mean			<u>X</u>
	Mean to long			
	Short to long			<u>X</u>
8 th Grade Mathematics	Short to mean			
	Mean to long			
	Short to long			
8 th Grade Language Arts	Short to mean			
	Mean to long			
	Short to long	<u>X</u>		

*X statistically significant ($p < .05$)

Implications for Policy and Practice

In order for lawmakers to ameliorate this societal problem, lawmakers must focus on what matters: a family's socioeconomic status (SES). "Students who are living at or below the poverty level usually reside in large urban areas.

It is within these areas that a great deal of conversation takes place regarding these schools being held accountable for academic achievement, dropout rates, and graduation rates" (Ross, 2013, p. 104). Providing assistance for everyday living costs such as housing and quality child care would enable these families to provide a better, more stable home life and in return, students may be able to focus on learning, thereby increasing achievement and narrowing the education gap.

Law makers can break up the poverty in urban communities by promoting inclusionary zoning programs (Schwartz, 2011). Since the greater part of achievement is established by

experience, promoting the opportunity for these students of low socioeconomic status to integrate with students of median and wealthy SES from an early age would eliminate barriers and support social, emotional, and intellectual growth for all students (Jackson and Davis, 2000; Coleman, 1966; Borman & Dowling, 2006).

In addition to making changes at the policy level, it is imperative for school leaders in all districts to meet the hierarchy of needs of their community. Routinely surveying students, teachers, and parents and utilizing the results to drive outcomes will enable the administrator to address and tackle problems as well as continue with certain policies and programs that are deemed beneficial.

Since decades of research have confirmed that socioeconomic status is the strongest predictor of achievement, a school leader of a low socioeconomic status (SES) school should keep in mind the constructs

necessary that will reach the students and community as well as keeping the staff motivated.

Since increased attendance is a direct indicator of school success, leaders may implement structural changes such as creating smaller class sizes, in order to positively reorganize the school (Gottfried, 2010; Parke & Kanyongo, 2012).

Smaller learning environments coupled with “team” teaching will produce supportive relationships between students and teachers (Jackson and Davidson, 2000). These relationships will foster intrinsic motivation and therefore result in greater performance and higher attendance rates (Jackson and Davis, 2000).

Besides increasing student attendance, administrators can equalize the playing field by working with parents to improve their participation. Although parents may be hesitant, the school should extend the invitation for them to attend parent nights or workshops where they can find support (i.e., clarify curriculum, explain policies, and provide resources).

Other initiatives include offering free Wi-Fi or setting up community locations where these parents can have computer access in order to check their child’s academic and behavior progress. Coupling with offering in-school support, leaders should also develop a rapid-response team of community-based support agencies/people who can provide immediate assistance to families in crisis.

These rapid-response programs and initiatives can be funded by donations from

vendors and third parties that do business with the school.

Recommendations for Future Research

Although this research served to look at the influence of the length of the school day within each of the three socioeconomic strata for Grades 6, 7, and 8, this study cannot provide all the answers related to the length of the school day and achievement.

For example, this study treated all schools within each category of school-day length the same. There was no differentiation from schools that had a longer school day before the 2010-2011 school year from those that adopted the longer school day as an intervention.

There was also no distinction between schools that added minutes to instructional time from those who had an elongated day due to extra minutes being added to passing time or for an extra period set for extracurricular activities or meetings. The data used in this study was found on the New Jersey Department of Education’s database.

Unfortunately, the NJDOE did not report the data as a disaggregate data point and therefore there was no way to distinguish between schools who added minutes as an intervention to those that did not. The 2010-2011 data was the last year that the NJDOE reported all statistics on the variables used in this study. In order to enhance the literature, it is imperative that future studies expand on such as those listed below.

1. Since 2010-2011, New Jersey has replaced the NJ ASK with the PARCC assessment, therefore a study should be conducted to explore whether there is a change in the relationship between time and achievement in the context of the new tests.
2. Conduct a study that investigates the influence of the length of the school day on other NJ grade levels and compare findings using the PARCC results.

3. Conduct a study that examines the influence of instructional minutes and Middle School test scores as measured by the PARCC.
4. Conduct a study concentrating on schools with the highest and lowest poverty rates and compare the curriculum and academic interventions for students who scored low on standardized tests in New Jersey.
5. Design a study that examines the achievement of students of low socioeconomic status that have been integrated to those students who have not.
6. Conduct a study that examines the influence of the length of the school day on Middle School test scores in other states. Compare test scores before and after the intervention of a longer school day.

Author Biography

Danielle Sammarone is an aspiring school administrator who has been teaching 5th grade math and science in Lyndhurst, New Jersey since 2007. She completed her EdD in K-12 Leadership from Seton Hall University. Danielle's research interests include examining the influence of structural and curricular interventions on student achievement. The National Council for Professors of Educational Administration awarded her Dissertation of the Year in 2015. E-mail: sammarone.danielle@gmail.com

References

- Caldas, S. J., & Bankston III, C. (1997). Effect of school population socioeconomic status on individual academic achievement. *Journal of Educational Research*, 90(5), 269.
- Coleman, J. S., Campbell, E. Q., Hobson, C. I., McPartland, J., Mood, A. M., Weinfeld, F. D., & York, R. L. (1966). *Equality of educational opportunity*. Washington, DC: U.S. Government Printing Office.
- Borland, M. V., Howsen, R. M., & Trawick, M. W. (2005). An investigation of the effect of class size on student academic achievement. *Education Economics*, 13(1), 73-83. doi:10.1080/0964529042000325216
- Field, A. P. (2009). *Discovering statistics using SPSS* (3rd ed.). Thousand Oaks, CA: Sage.
- Greenwald, R., Hedges, L., & Laine, R. (1996). The effect of school resources on student achievement. *Review of Educational Research*, 66(3), 361-396.
- Jackson, A., & Davis, G. (2000). *Turning points 2000: Educating adolescents in the 21st century*. New York, NY: Teachers College Press.
- Parke, C. S., & Kanyongo, G. Y. (2012). Student attendance, mobility, and mathematics achievement in an urban school district. *Journal of Educational Research*, 105(3), 161-175. doi:10.1080/00220671.2010.547231
- Patall, E. A., Cooper, H., & Allen, A. (2010). Extending the school day or school year: A systematic review of research (1985-2009). *Review Of Educational Research*, 80(3), 401-436.
- Pigott, T. D., Williams, R. T., Polanin, J. R., & Wu-Bohanon, M. (2012). Predicting student achievement with the education production-function and per-pupil expenditure: Synthesizing regression models from 1968-1994. Retrieved from ERIC database (ED530363).
- Ross, L. (2014). *The influence of the student mobility rate on the graduation rate in the state of New Jersey* (Doctoral dissertation). Retrieved from <http://scholarship.shu.edu/dissertations/1974>.
- Schwartz, H. (2011). Housing policy is school policy: Economically integrative housing promotes academic success in Montgomery County, MD. *Education Digest: Essential Readings Condensed for Quick Review*, 76(6), 42-48.
- Sirin, S. R. (2005, Fall). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research*, 75(3), 417-453.
- Stull, J. C. (2013). Family socioeconomic status, parent expectations, and a child's achievement. *Research in Education*, (90), 53-67. doi:10.7227/RIE.90.1.4

Tienken, C. H., & Orlich D. C. (2013). *The school reform landscape fraud, myth, and lies*. Lanham, MD: Rowman & Littlefield Publishers.