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State education spending for K-12 students is an essential component of the state and local government fiscal budget, and in the United States, education spending varies by state, with some states spending much more than others. The SAT and ACT standardized tests have been in use since the early to mid twentieth century and have long been the standard testing metric for college admissions. In the past twenty years, many states have begun requiring their students to take one of these tests as a graduation requirement. With half of states now requiring one of these standardized tests, it seems that these states would have some motive for requiring the test. This paper will explore the idea that states may be using the SAT and ACT test scores from their students to assess their state education spending effectiveness. While it is known that factors such as state partisanship or ideology, percent rural, and median state income have an effect on state education spending, this paper will test the idea that standardized test scores may also have an effect on education spending in each state.

Introduction

In the past two decades, some states have begun requiring their students to take one of two standardized tests, the ACT or SAT, that are used by colleges for admissions. This sudden requirement of testing among students seems to indicate that the states have a motive for maximizing student participation in standardized tests. SAT and ACT average scores have changed over time, as has state education spending, leading to the question of whether or not

state average test scores are used as a metric when evaluating state education budgeting decisions. It could be reasonably argued that states who require their students to take the ACT or SAT would use these scores as an indicator of student academic performance and adjust their education spending in order to improve student performance. This study is concerned with the correlations between standardized test scores and state education spending, and hopes to identify the drivers of state education spending and the reasoning behind state laws requiring these standardized tests to be taken by high school students.

Literature Review

In an effort to identify the drivers of state education spending trends and make inferences about future trends, researchers Sheila E. Murray, Kim Reuben, and Carol Rosenberg investigated education spending over time, looking all the way back to the 1970s. While their publication is slightly dated, it shows interesting trends that came due to demographic changes in the population, as well as pressure from the court system. Murray and her team identify the role that population shifts have played in state education spending, as shrinking numbers of children are often not met with lowered expenditures by states, creating inflated per-pupil spending.[59] Additionally, they showed that court decisions from many state level supreme courts have shifted the responsibility of education funding onto the state government over time. Local governments have continued to contribute the same amount or less of the funding for education while the state's obligations have only increased. Lastly, the research showed that teacher salaries have been a large factor in education spending increases. Murray and her team claim that from 1980-2000, a quarter of the increase in education spending was from teacher salary obligations.[60]

[59] Murray et al. 2007.
[60] Murray et al. 2007.

While this study provides some interesting insight into some driving factors of education spending increases, research performed by Andrew J. Hill and Daniel B. Jones provides evidence of more politically centered influences. Specifically, in their 2017 study *Does Partisan Affiliation Impact the Distribution of Spending? Evidence from State Governments' Expenditures on Education,* Hill and Jones investigate the relationship between the political ideology of a governor and changes in that states' education spending. While past research has shown conflicting narratives on the effect of partisanship on education spending, this study shows that Democratic governors and Republican governors do spend differently on education. Specifically, the study by Hill and Jones finds that states who recently elected a Democratic governor will spend more on K-12 education, as well as on schools with larger minority populations.[61] This study shows substantial evidence that ideology does have an effect on state education expenditures, something to keep in mind moving forward.

The research of Hill and Jones did address partisanship as a factor when looking at education spending, but they did not address state median income. C. Christopher Lee and Matthew McGrath provide insight into the effects of income on education spending through their study on the impact of minimum wage and education spending on the economy of different states. While the minimum wage discussion is not important for the topic of this paper, it is important to consider Lee and McGraths findings related to education spending. When addressing education spending in their study, they find that household earnings play a major role in education spending in a given state. They find that states that spent the most on education also had the highest household incomes. Most importantly, their research claims that median

[61] Hill and Jones. 2017.

household income in all 10 states that are leaders in education spending was higher than the national median.[62]

While determining the driving factors behind state education is important for this paper, it is also important to investigate the role of the SAT and ACT standardized tests in determining student achievement. Researcher Andrew J. Coulson studies the SAT as a metric for student achievement and its correlation with education spending in his publication. In this article Coulson says that the SAT effectively measures reading comprehension and mathematical skills that are useful as a metric for student achievement. However, Coulson also finds that the SAT loses some "predictive validity" when looking at different racial and ethnic minority groups. This has been increasingly supported by more recent research, which shows discrepancies in standardized test scores when comparing minority groups to the majority. Lastly and most importantly for his study, Coulson found that while education spending has increased over time, average SAT scores have not. In fact, there has been a slight decrease in average state scores of around 3%, even after adjusting for participation rates and demographics.[63] This research seems to question the idea that more spending on education equates to high student achievement, a trend that could be problematic for this paper's research.

While Coulson's research shows some issues with SAT trends over time and calls into question the effectiveness of heightened education spending, Joshua Hyman's article counters the work of Coulson by showing a correlation between state education spending and long term educational success. Hyman's work focuses on the effects of state education spending on long term success, specifically in college enrollment rates and degrees earned. In his paper Hyman states, "I find that additional spending led to increases in rates of college entry and completion,

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[62] Lee and McGrath. 2019.
[63] Coulson, Andrew J. *State Education Trends, Academic Performance and Spending over the Past 40 Years.* 2014.

by 3.0 and 2.3 percentage points (7 and 11 percent), respectively".[64] This positive view of education spending is also supported by the work of Clement Jackson, Rucker C. Johnson, and Claudia Perisco. In their work they find that education spending has a positive effect on educational attainment, as well as post-graduation wages.[65]

Perhaps the most important challenge to Coulson's argument about education spending effectiveness comes from Julien Lafortune, Jesse Rothstein, and Diane Whitmore Shanzenbach. These researchers investigated the impact of school finance reform on the distribution of student achievement. Through their research, they found that relative academic achievement of students was positively impacted by higher spending after a reform. Though they did not find that school finance reforms closed the achievement gap between low and high income, it did show that reforms did lead to increases in achievement among low-income districts.[66] This is important because it shows that there is some positive impact on student achievement and performance when education spending is increased, providing some challenge to Coulson's claims.

One of the more interesting factors when considering the SAT and ACT tests and their effects on state education spending is the recent laws by some states requiring high schoolers to take these tests. Researcher Daniel Klasik investigated the effects and potential reasons behind the implementation of these laws in his publication. Klasik performed a comparative study of three states who first implemented laws requiring these tests to be taken in the early 2000's, those states being Illinois, Colorado, and Maine. By comparing these states with a "synthetic" version of that state (a highly comparable state that does not require testing), Klasik was able to explore outcomes like college enrollment rates and what types of colleges were being enrolled in. The results of his experiment showed an overall increase in college enrollment and an

[64] Hyman, Joshua. 2017.
[65] Jackson, et al. 2016.
[66] LaFortune et al. 2018.

increase in enrollment in 4-year universities.[67] The results of this work by Klasic provide some insight into one driving force behind the push for higher test participation rates in some states; state governments hope to nudge their high schoolers towards college by providing them with access to one previous barrier to higher education, the standardized test for college admissions.

Hypothesis and Research Question

The central research question of this study asks: What kind of an effect do standardized test scores at the high school level, specifically ACT and SAT, have on state education spending? To answer this question it is necessary to understand how much difference there is between states when discussing education spending. Also, it is necessary to understand how states make decisions on education spending, something that was partially investigated in the literature review. Throughout the history of the U.S. states have had control over their own education expenditures and naturally, differences in state cultures have produced large differences in spending on education. States make their decisions on a variety of biases, including but not limited to the academic performance of students. Since the SAT and ACT tests are seen as a good measure of student aptitude, the hypothesis for this research will follow what would be a logical spending progression based on student achievement and performance.

The hypothesis for this research is: As states' average SAT or ACT scores decrease or fall below those of other states, they will spend more money on education. This hypothesis would be supported if the data shows that there is a strong correlation between state average test scores and an increase in state education spending.

Methods and Measures

Utilizing a quasi experimental design, this research will explore the relationship between ACT and SAT scores and education spending by state utilizing data from the years 2005, 2016,

[67] Klasik, Daniel. 2013

and 2020. By using data from years with larger periods of time between them, there will be a greater allowance for change in the data over time. Using years that are consecutive or have only two or three years between them could create issues within the data set. Preferably, the data set would include a more recent year than 2020 in order to create more time between 2016 and the last data set, but problems arose with the collection of data from any more recent years. Also, changes in the two tests must be noted when discussing the collection of data. Both the ACT and SAT have undergone changes over time, but the SAT has sustained the most major changes since 2005, with 3 different scoring systems used in the 2005, 2016, and 2020 data sets. During the 2005 test data, the scoring scale was 400-1600. For the 2016 test data, the scoring scale was 600-2400. Finally for the 2020 test data, the scoring scale was once again 400-1600. These differences in scoring were important to keep in mind while compiling data.

In order to test the hypothesis that lower SAT and ACT scores would lead to increased education spending, this research uses per pupil education spending as the dependent variable. Since the goal is to test what kind of an effect on spending the test scores have, it is important to have spending as the dependent variable. This research will utilize data from the *National Center for Education Statistics*[68] that shows per pupil spending in unadjusted dollars, by state. While dollars adjusted for inflation could produce more consistent or better results, there was no data available that used the same adjusted dollar value for every data set needed.

Variables

The main independent variable selected for this research is ACT or SAT average (mean) score for the year being tested. The test used for the experiment (either ACT or SAT) was determined by the participation rate for that year's tests. The test administered in that state in that year with the higher participation rate is used for the experiment. Both the test scores and

[68] All state spending data gathered from the *National Center for Education Statistics (NCES)*

participation rates were gathered from a variety of sources[69] and were successfully collected and organized for the years 2005, 2016, and 2020. In order to create a common, comparable metric for the test scores, raw scores were converted to percentiles using percentile charts for that year's test, provided by the test makers. This essential step allows for a common scoring scale for test scores due to the SAT's varying score scaling over the years and the ACT's completely different scoring scale of 1-36.

One control variable used for the standardized testing data is test participation percentage. The test participation percentage refers to the percentage of high school graduates who were tested for that year. Andrew J. Coulson mentions the impact of participation rates on average scores in his CATO Institute working paper *Drawing Meaningful Trends from the SAT*.[70] In this paper, Coulson identifies the interaction between SAT scores and participation rates as one that causes too much variation in the data. Therefore, this research uses participation rate as an independent variable, attempting to control for any effect it may have on the data.

The other independent variable relating to the test (SAT/ACT) data is the test required variable. This is a "dummy variable" that is either valued at 1 or 0, 1 for states that do require the SAT or ACT to be taken by high schoolers at present time, and 0 for states that do not. It is important to note that while some states offer these tests to their high school students, they may not require them as a graduation requirement. States who offer it but do not require that it be taken will be valued at 0 for the purposes of this study. The use of this variable is to investigate a potential relationship between education spending and the requirement of standardized testing.

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[69] All test score data for ACT and SAT was gathered from the *College Board, ACT.org,* the *National Center for Education Statistics (NCES),* and the *World Almanac and Book of Facts, 2006*

[70] Coulson, Andrew J. *Drawing Meaningful Trends from the SAT.* 2014

Control variables used in this experiment were determined while doing a review of the literature in the area. Median household income, as mentioned by Lee and McGrath[71], is an important variable to control for when the dependent variable in an experiment is state education spending. Higher income levels in a state provides a wealthier tax base, allowing for higher collection and spending of public dollars. For this experiment, data available for the year 2010 was used.[72] This data included that median income by state for the year 2010, allowing for the effects of income on education spending to be controlled for. It is important to use median income rather than mean income because mean income can be skewed due to the unequal spread of income within the population.

As mentioned in the study performed by Hill and Jones, partisanship does have an effect on state education spending, making it an important variable to control for.[73] For this experiment, the independent variable used to control for ideology or partisanship, was a measure of ideology by state. This measure was calculated by subtracting the percentage of conservatives from liberals[74] in each state for the year 2010, giving a number that effectively displays the ideology of that state.[75] Ideology calculated for this study showed a stronger effect on the dependent variable during initial testing than partisanship measures such as presidential vote.

Though it was not covered in the literature review for this paper, the percentage of a state that is rural was also used as an independent variable in order to control for any effect it may have on the dependent variable. When thinking about education spending, it is important to consider the costs undertaken by a school district such as transportation and building maintenance costs. In rural areas, children must be transported a further distance to access school

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[71] Lee and McGrath. 2019.
[72] Median Income Data gathered from the Illinois Wesleyan University Social Sciences Laboratory
[73] Hill and Jones. 2017.
[74] See appendix for liberal and conservative definitions
[75] Ideology data gathered from the Illinois Wesleyan University Social Sciences Laboratory

facilities. Additionally, small rural populations still require the same types of facilities as urban centers for schooling, carrying similar maintenance costs despite lower numbers of students and a smaller tax base. Using 2010 data, the percentage of each state that is rural was gathered and used as an independent variable in this study.[76] Lastly, the percentage of Evangelicals[77] by state, for the year 2010, was added as an independent control variable.[78] This variable was added because there was some variance in the data that was not being explained until the Evangelicals variable was added. This variable is significant because of the relationship between religion and politics in the U.S. Religion and politics in the U.S. have been found to be strongly related.[79]Due to this correlation, it was hypothesized that adding another form of an ideological variable may explain some of the variance, or "noise" in the data, which it did successfully.

Initial Observations

While compiling the data, initial observations uncovered some interesting trends in the data. As mentioned before, the participation rate has a major effect on the average scores of ACT and SAT tests. For example, in Delaware their 2005 average score put them at the 45th percentile, but had a participation rate of 73%. In 2016 their percent tested rose to 100% and their percentile fell to 34th. This drop in percentile of over 10 points shows the effects that higher participation rates have on average scores. The other commonly held idea is that states with lower participation rates have self-selected test takers, meaning that the students decided to take the test due to their academic prowess. Coulson mentions this in his working paper for CATO[80], explaining that students who make the choice to take the test are likely to be the better students academically.

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[76] % of states that are rural data gathered from the Illinois Wesleyan University Social Sciences Laboratory
[77] See appendix for definition of Evangelical
[78] Evangelical % data gathered from the Illinois Wesleyan University Social Sciences Laboratory
[79] Schnabel, Landon. 2021
[80] Coulson, Andrew J. *Drawing Meaningful Trends from the SAT.* 2014

Another initial observation made is that some states do spend as much as double the amount per pupil on education than other states. An example of this is in 2020 where Alabama spent $10,893 per pupil while Connecticut spent double that amount at $21,693 per pupil. Notably, Alabama did not even have the lowest per pupil spending of all states in 2020. In fact, the lowest per pupil spending in 2020 was Idaho, at $8,838 per pupil. This large variance in spending produces some confidence that some of the variation in spending levels will be correlated with standardized test scores.

Operationalization and Data Analysis

Using the variables outlined above, a multiple regression model was created in SPSS in order to operationalize the hypothesis. Using SPSS, the multiple regression analysis tool was run with state education spending per pupil as the dependent variable. The independent variables were test score percentile, percent tested, test required, ideology, income, % rural, and % Evangelicals. Multiple regression analyses were run for each of the years tested, 2005, 2016, and 2020. For each year, the per pupil spending was changed to match the year, along with the test score percentile and percent tested. All other variables remained constant across the three tests.

2005 Model

	Model Summary	
Model	R	R Square
1	.823^a	0.677

		Coefficients^a				
Model		Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2866.495	3102.659		0.924	0.361
	% Rural	42.65	15.998	0.3	2.666	0.011
	Income	0.291	0.098	0.47	2.971	0.005
	% Evangelical	-38.56	21.135	-0.21	-1.824	0.075
	Ideology	60.712	23.995	0.338	2.53	0.015
	% Tested 2005	19.414	14.272	0.132	1.36	0.181
	2005 Percentile	-17.622	26.607	-0.6	-0.662	0.511
	Test Required	-72.279	379.74	-0.018	-0.19	0.85
a. Dependent Variable: Per Pupil Spending 2005						

Figure 1.1 - This table shows the results of the multiple regression analysis for 2005. Notably, the table shows some important values when evaluating correlations, including the R^2 value, the t-scores, and the significance value.

The 2005 model produces some interesting results and is fairly robust given the fact that the R^2 value is 0.677, meaning that the model is explaining just shy of 70% of the variance, at 67.7%. This is important because it shows that the statistical model is fairly strong. When analyzing the t-scores of a multiple regression, it is important to define what kind of score is significant. For this research, the commonly accepted value of an absolute value of 2.0 or higher is utilized for determining significance of the t-score data. Additionally, for this research a few different significance levels will be taken into account when analyzing the significance of the values. A significance level of .001 is most desirable, as it presents a very strong correlation between the variables. However, given the rarity of those kinds of values, for this research a value at .01 or .05 levels will also be given considerable thought as a correlation that is significant. In the 2005 model, the % Evangelicals independent variable is significant at the .1 level, given its value of .075. This value, in conjunction with the t-score of -1.824 presents a correlation that lacks real strength to be considered for this research. However, the independent variable % rural with a t-score of 2.666 and being significant at the .05 level presents a correlation showing an increase in education spending with a larger % rural, which is worth examining further. Additionally, the income independent variable seems strongly correlated with a t-score of 2.971 that is significant at the .01 level, showing that as income increases, so does education spending. Lastly, the independent variable ideology also shows strongly in the 2005

model with a t-score of 2.53 that is significant at the .05 level. This data suggests that states with more liberals spend more on education.

Despite the strong correlation with some of the control variables, the model shows no correlations between the independent variable and the standardized test variables of percentile score, percent tested, and test required. The "strongest" of the three is percent tested with a t-score of 1.36, but it is nowhere close to being significant at any level of importance for this research. The values for the other two variables are even lower, but of some not both score percentile and test required both have a negative t-score in this model, indicating that while of no consequence, spending may be negatively correlated with test scores.

Given the results of the model, it is clear that in 2005 the null hypothesis (H_0) is supported and the research hypothesis (H_a) of this paper is not supported given the lack of significant correlation between standardized test scores and education spending. The control variables performed as expected based on the existing literature. The next model to be tested is the 2016 model, which was run in SPSS as a multiple regression analysis with the same conditions as the 2005 model, with the applicable variables being changed to match the year being tested.

2016 Model

Model Summary		
Model	R	R Square
1	.818^a	0.669

Coefficients^a						
Model		Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-1364.016	5562.615		-0.245	0.807
	% Rural	95.724	27.71	0.389	3.454	0.001
	Income	0.622	0.164	0.58	3.804	<0.001
	% Evangelical	-88.081	36.169	-0.276	-2.435	0.019
	Ideology	70.358	42.567	0.226	1.653	0.106
	% Tested 2016	-9.596	25.484	-0.044	-0.377	0.708
	2016 Percentile	7.628	48.094	0.015	0.159	0.875
	Test Required	150.208	799.977	0.022	0.188	0.852
a. Dependent Variable: Per Pupil Spending 2016						

Figure 1.2 - This table shows the results of the multiple regression analysis for 2016. Notably the table shows some important values when evaluating correlations, including the R^2 value, the t-score, and the significance value.

Once again the model presents well when considering model strength, given the R^2 value of 0.669, meaning that the model is explaining 66.9% of the variance. This value is considered to be strong for the purposes of this research and constitutes a strong model for the data. As mentioned before, the significance levels that indicate a correlation that is worth considering are the .001 level, the .01 level, and the .05 level. The 2016 model presents similar results to that of the 2005 model but some of the control variables appear even more strongly correlated than before. In this 2016 model, the % rural independent variable has a t-score of 3.454 and is significant at the .001 level which shows that as % rural increases, education spending rises. The income independent variable is also significant at the .001 level and has a t-score of 3.804, indicating that as income rises, education spending rises. An interesting change comes into play however, as the independent variable % Evangelicals becomes significant at the .05 level with a t-score of -2.435. This negative t-score indicates that as Evangelicals % rises, education spending per pupil falls, indicating a negative correlation. Meanwhile, the ideology independent variable loses its significance with a t-score of 1.653 and is not significant at any of the levels considered when evaluating correlations for this research.

When looking at the standardized test variables in the 2016 model, the t-scores and significance values are weaker than those of the 2005 model. While the 2005 model showed no significant correlations, it appears to have been slightly stronger (relative) than the 2016 model.

This slight difference in correlation could be from a number of things, but one interesting thought is that it may be related to an initial increase in attentiveness to test scores around 2005. This could be due to the first states, as mentioned by Klasik, beginning to require high schoolers to take the tests in the early 2000's. Once again the data shows that the null hypothesis (H_0) is supported and the research hypothesis (H_a) of this paper is not supported given the lack of significant correlation between standardized test scores and education spending. This result is consistent with what was found in the 2005 data and further bolsters the case for % rural and income being strong factors in state education spending. % Evangelicals arose as a newly significant variable and it will be interesting to see if it maintains significance in the 2020 model. The 2020 model was run in SPSS as a multiple regression analysis under the same conditions as the previous years, except for the variables that need to match the year being tested.

2020 Model

Model Summary		
Model	R	R Square
1	.832^a	0.692

Coefficients^a						
Model		Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2808.351	6426.629		0.437	0.664
	% Rural	92.895	31.76	0.321	2.925	0.006
	Income	0.557	0.188	0.442	2.963	0.005
	% Evangelical	-82.044	41.675	-0.218	-1.969	0.056
	Ideology	145.859	48.926	0.397	2.981	0.005
	% Tested 2020	-31.405	31.854	-0.127	-0.986	0.33
	2020 Percentile	48.721	59.216	0.09	0.823	0.415
	Test Required	848.224	1081.261	0.103	0.784	0.437
a. Dependent Variable: Per Pupil Spending 2020						

Figure 1.3 - This table shows the results of the multiple regression analysis for 2020. Notably the table shows some important values when evaluating correlations, including the R^2 value, the t-score, and the significance value.

The 2020 model holds the best result when looking at the percentage of the variance of the data explained, with 69.2%, as indicated by the R^2 value of 0.692. Once again, the significance values determined to be of importance for this research are ones that are at the significance levels of the .001 level, the .01 level, and the .05 level. As is consistent with the last two models, the independent variable % rural remains significant as it has a t-score of 2.925 and is significant at the .01 level, again showing a positive correlation. Additionally, the independent variable income also remains significant as it has a t-score of 2.963 and it is significant at the .01 level, showing the same positive correlation. Ideology, which was significant in the 2005 model but not the 2016 model, is once again significant in the 2020 model as it has a t-score of 2.981 and is significant at the .01 level, once again suggesting a positive correlation. The independent variable % Evangelicals, which was significant only in the 2016 model, is not statistically significant in the 2020 model. Given the t-score of -1.969 and it only being significant at the .1 level, it cannot be considered to have a correlation with education spending that is statistically significant in the 2020 model given the parameters discussed in the initial analysis of the 2005 model.

Despite the lack of statistical significance, the independent variable % Evangelicals did show an arguable correlation in the 2020 model. As discussed before, it is important to consider the connections between religious and political ideology. Religion has a large influence on political ideology[81], so this variable serves as an additional marker for political influence on education spending. It is also important to note that some researchers may place value on the significance value and t-score that it had in the 2020 model. Given the correlation shown in the 2016 model and the arguability of the values in the 2005 and 2020 models, some weight can be given to % Evangelicals when considering future research opportunities. Once again the data

[81] Schnabel, Landon. 2021

shows that the null hypothesis (H_0) is supported and the research hypothesis (H_a) of this paper is not supported given the lack of significant correlation between standardized test scores and education spending.

Key Implications

As the existing literature showed, there are many factors that influence a state's education spending for K-12 students. While states are responsible for both K-12 funding and contributions to higher education, this research focused specifically on K-12 spending. As argued by Coulson in his research, there is some value in evaluating student achievement through SAT scores.[82] However, the data uncovered in this research shows that states do not seem to take advantage of their ability to utilize standardized test scores as a metric for student achievement, or at least they do not use it to adjust their spending. Coulson would agree with this stance by states, as his research also shows that higher spending on education has not produced higher test scores. Despite literature that counters Coulson's point and supports the idea that higher and more equitable spending does produce better student outcomes in many areas from the researchers like Hyman[83], LaFortune et al.[84], and Jackson et al.[85], states seem to continue to resist spending more on education to produce higher student achievement.

The independent variables that were shown to be highly correlated with state education spending were not surprising, given the existing knowledge. As mentioned by the researchers Lee and McGrath in their publication, median household income has consistently affected education spending.[86] Many have argued that it is simply a wealthier tax base that provides more available resources for spending on education that drives per pupil spending. The data analyzed

[82] Coulson, Andrew J. *State Education Trends, Academic Performance and Spending over the Past 40 Years.* 2014.
[83] Hyman, Joshua. 2017
[84] LaFortune et al. 2018
[85] Jackson et al. 2016.
[86] Lee and McGrath. 2019.

in this paper also supports this idea, as income as an independent variable is highly correlated with per pupil education spending across all three years selected. In fact, given the results of the data in this research, one could argue that income is even more important than ideology or partisanship when looking at state education spending. While it was not mentioned in any literature analyzed for this paper, percentage rural as an independent variable became the only other variable consistently highly correlated with education spending, other than income. Though it is an inference, one could argue that states with more rural areas likely spend more on transportation and maintenance costs. Transportation is often an overlooked component of the education budget but is one that comprises a large portion of spending.

One of the more contested factors in education spending, partisanship or ideology, showed strongly in two of the three years selected for this research. Researchers Hill and Jones showed that gubernatorial partisanship did have an effect on education spending, with Democratic governors spending more. However, Hill and Jones also do mention that the differences can be small and that existing literature has long conflicted over the significance of partisanship and ideology in education spending.[87] From the results of this study, conflicting takeaways could be drawn, given the lack of consistency of the correlation between ideology and per pupil spending. However, two out of three times having a strong correlation, as well as support from past literature seems to indicate that ideology has at least some part in the budgetary calculations of state K-12 spending.

Perhaps the most surprising result of this research came from the independent variable % Evangelicals. This independent variable was added to the model upon discovering during early testing that it may have some correlation with education spending. Though it was only significantly correlated with per pupil spending in 2016 for the parameters of this research, the

[87] Hill and Jones. 2017.

other two years showed arguable correlations that can be taken into account when addressing the potential influence of Evangelicals. Based on the one case of strong correlation, there is a need for a potential explanation of why Evangelicals had a negative correlation with education spending. When considering this relationship, it is important to understand that the lack of existing literature provides room for speculation only. Factors such as homeschooling and a higher proportion of private schools in a state can be mentioned but are only speculatory inferences. A higher number of homeschooled students, or a higher number of private schools in a state would provide the state with the opportunity to lower its education expenditures, but this is not known to be certain. Future research focusing on this relationship could produce interesting results.

As addressed by Daniel Klasik in his publication, the recent trend of states passing laws requiring high schoolers to take either the SAT or ACT have caused some questions over states' motives. In his paper, he demonstrates that states want to nudge students towards college by giving them the opportunity to take the tests required for admissions.[88] The data for this research clearly shows that there is no correlation between states requiring the SAT or ACT and state education spending. Therefore, it can be concluded that states are not motivated by the need for another measure of student achievement to adjust education spending when implementing laws requiring these tests. Klasik's results seem to be the only real explanation for these laws. States want higher college attendance rates.

Interestingly, recent trends have seen more and more colleges and universities go test optional in their admissions processes. A recent publication by a team of researchers led by Michael N. Bastedo has provided some interesting insight into these recent admissions trends. According to Bastedo's publication, "More than 1,800 of the 2,330 accredited 4-year colleges

[88] Klasik, Daniel. 2013

and universities in the United States do not require ACT/SAT scores from all or some of their fall 2023 applicants".[89] As more colleges and universities move to test optional admissions practices, the future of the SAT and ACT tests seems to be bleak. Moreover, due to these test-optional policies, it could be reasonably inferred that states will have to begin suspending or abolishing their laws requiring the SAT or ACT as a graduation requirement. However, students may still opt in to these tests in order to set themselves apart from other college applicants.

Limitations and Potential Error

While the results of the experiment in this paper are consistent with the existing literature, it is important to note where improvements could be made to the design of the research or where there are potentially sources of error. First off, test participation rates varied heavily across states and almost certainly caused noise in the data. Given more time, there is an opportunity to control for the participation rate, as explained by Coulson in one of his publications.[90]

Additionally, questions can reasonably arise given the values of per pupil education spending being presented in unadjusted dollars. Inflation has certainly been a factor when comparing raw increases in spending. As mentioned previously, the *National Center for Education Statistics (NCES)* did not provide all the data sets needed in the same adjusted dollar value (ex. 2007-08 dollar value). Converting all of the data to a constant dollar amount could be done given the time and may contribute more interesting results.

Regarding the tests themselves, the SAT and the ACT are two different tests. While they serve the same purpose for college admissions purposes, there are differences in what they test and how they test it. Some students likely are more successful at one test than the other.

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[89] Bastedo et al. 2023
[90]Coulson, Andrew J. *Drawing Meaningful Trends from the SAT.* 2014

Nevertheless, the participation rate issue required the use of both tests in this research due to the fact that a lot of states heavily favor one test over another. Also, when addressing the tests it is important to note the changes in the tests over time that could affect the consistency of the data.

Perhaps most importantly for this research, the year 1996 was not able to be used in the data sets due to issues with data collection. Issues arose with both the scores gathered from the year 1996, as the source only listed ACT scores to the nearest whole number, rather than a decimal like the data showed for the other years. Additionally, the participation rates on both tests in 1996 were often around 50% or even less. This caused me to fear the extreme effect that participation percentage would have on the 1996 scores. Perhaps the largest issue when collecting the 1996 data was the lack of a percentile chart for either test. Without a percentile chart it was impossible to create a data set comparable between tests. If I had more time, I would request the 1996 scores and percentile charts straight from both *ACT.org* and the *College Board,* who administer the ACT and SAT, respectively.

Conclusion

Though the hypothesis presented for this research was not supported by the data, the takeaways from the data still provide insight into what drives state education spending and how spending may change in the future. Additionally, some interesting results with Evangelicals were found that could inspire future research. Pertinent questions for the future were generated from the results of this research. Will states continue to require SAT/ACT tests for high schoolers despite the number of colleges dropping their test requirements for admission? Since state's don't seem to utilize standardized test scores for education spending budgeting, will the tests totally lose their significance? Overall, the data shows that there is no statistically significant correlation between ACT/SAT scores and state education spending.

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Appendix

This appendix contains some definitions of terms used throughout the paper, as well as charts and tables utilized throughout the research. Additionally, this appendix contains multiple regression analysis tables from a secondary experiment that I performed in an attempt to further control for ACT/SAT participation rates. The test included 19 states who had 90% or more participation rates. Due to the small sample size providing a small N, the data was insignificant and provided no real contributions to my research.

Dictionary
(definitions from Oxford)

Liberal: having or relating to political and social beliefs that support individual freedom and rights, democracy and free enterprise (= businesses competing against each other with little government control)
Conservative: favoring free enterprise, private ownership, and socially traditional ideas. Often contrasted with liberal
Evangelical: a member of the evangelical tradition in the Christian Church.

2005 Model (N=50)

Model Summary		
Model	R	R Square
1	.823^a	0.677

Coefficients^a						
Model		Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2866.495	3102.659		0.924	0.361
	% Rural	42.65	15.998	0.3	2.666	0.011
	Income	0.291	0.098	0.47	2.971	0.005
	% Evangelical	-38.56	21.135	-0.21	-1.824	0.075
	Ideology	60.712	23.995	0.338	2.53	0.015
	% Tested 2005	19.414	14.272	0.132	1.36	0.181
	2005 Percentile	-17.622	26.607	-0.6	-0.662	0.511
	Test Required	-72.279	379.74	-0.018	-0.19	0.85
a. Dependent Variable: Per Pupil Spending 2005						

2016 Model (N=50)

Model Summary		
Model	R	R Square
1	.818^a	0.669

Coefficients^a						
Model		Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-1364.016	5562.615		-0.245	0.807
	% Rural	95.724	27.71	0.389	3.454	0.001
	Income	0.622	0.164	0.58	3.804	<0.001
	% Evangelical	-88.081	36.169	-0.276	-2.435	0.019
	Ideology	70.358	42.567	0.226	1.653	0.106
	% Tested 2016	-9.596	25.484	-0.044	-0.377	0.708
	2016 Percentile	7.628	48.094	0.015	0.159	0.875
	Test Required	150.208	799.977	0.022	0.188	0.852
a. Dependent Variable: Per Pupil Spending 2016						

Figure 1.2

2020 Model (N=50)

Model Summary		
Model	R	R Square
1	.832^a	0.692

Coefficients^a						
Model		Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2808.351	6426.629		0.437	0.664
	% Rural	92.895	31.76	0.321	2.925	0.006
	Income	0.557	0.188	0.442	2.963	0.005
	% Evangelical	-82.044	41.675	-0.218	-1.969	0.056
	Ideology	145.859	48.926	0.397	2.981	0.005
	% Tested 2020	-31.405	31.854	-0.127	-0.986	0.33
	2020 Percentile	48.721	59.216	0.09	0.823	0.415
	Test Required	848.224	1081.261	0.103	0.784	0.437
a. Dependent Variable: Per Pupil Spending 2020						

Figure 1.3

2016 Model (N=19, Additional Experiment)

Model Summary		
Model	R	R Square
1	.709^a	0.503

Coefficients^a						
Model		Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	32639.172	58621.689		0.557	0.589
	% Rural	139.354	68.132	0.723	2.045	0.065
	Income	0.941	0.549	1	1.713	0.115
	% Evangelical	-71.558	51.409	-0.355	-1.392	0.191
	Ideology	-69.539	118.227	-0.284	-0.588	0.568
	% Tested 2016	-550.709	657.344	-0.26	-0.838	0.42
	2016 Percentile	160.46	95.996	0.43	1.672	0.123
	Test Required	1633.678	2263.361	0.193	0.722	0.485
a. Dependent Variable: Per Pupil Spending 2016						

Figure 2.1 - This table shows the results of a multiple regression analysis performed on SPSS for the 2016 data set containing a sample group of 19 states with 90%+ test participation rates

2020 Model (N=19, Additional Experiment)

Model Summary		
Model	R	R Square
1	.679^a	0.462

Coefficients^a						
Model		Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	37832.36	49774.031		0.76	0.463
	% Rural	65.899	82.354	0.304	0.8	0.441
	Income	0.158	0.565	0.149	0.279	0.785
	% Evangelical	-35.073	66.107	-0.155	-0.531	0.606
	Ideology	132.979	111.961	0.484	1.188	0.26
	% Tested 2020	-328.989	424.1	-0.246	-0.776	0.454
	2020 Percentile	62.943	127.908	0.14	0.492	0.632
	Test Required	2380.364	2616.873	0.25	0.91	
a. Dependent Variable: Per Pupil Spending 2020						

Figure 2.2 - This table shows the results of a multiple regression analysis performed on SPSS for the 2020 data set containing a sample group of 19 states with 90%+ test participation rates