The Impact of Teacher Graduate Education on Kindergarteners' SAT Scores

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1 Introduction

Do kindergarten students whose teachers have received their master's degrees score higher on the SAT? Some may assume that teachers who are more educated are better equipped with the training and knowledge to effectively teach their students, resulting in higher test scores, as seen by data showing that teachers with master's degrees generally earn annual salaries that are $12,000 greater than teachers with bachelor's degrees (Saenz-Armstrong, 2021). However, past research that has been conducted to determine whether or not teachers' education levels are indicative of their ability to teach has led to mixed results. In one study, researchers found that the achievement level of elementary students was no different between students whose teachers did and did not have graduate-level degrees (Clotfelter et al., 2013). In another study, researchers found that elementary students' reading and math scores were positively impacted by higher levels of teacher education, with the difference in math scores being more significant (Croninger et al., 2007). Thus, this paper aims to further study the effects of kindergarten teacher education levels on their students' academic success. Gaining a better understanding of this issue can allow school districts to make better decisions on which teachers to hire, as well as their appropriate level of pay.

2 Methodology

The star.dta dataset contains 5,710 observations and 12 variables, including whether or not a student's teacher has a master's degree. To determine the relationship between the education level of kindergarteners' teachers and the kindergarteners' SAT reading, writing, and listening scores, a linear regression is performed with the teacher's education level as the independent variable and the students' test scores as three separate dependent variables. We will thus be regressing the scores variables on the master's degree variable. Teachers who don't have a master's degree are given a value of 0 under the master's degree variable and teachers who do have their master's degrees are given a value of

1. Therefore, the constant term indicates the score of the average student of a teacher who does not have their master's degree, while the coefficient term indicates the difference in scores between students whose teachers do and don't have master's degrees. A high coefficient would lead to a strong indication that students whose teachers have their master's degrees score higher on SAT tests.

3 Results

First, we will look at the regression of students' reading scores on teachers' education levels.

Source	SS	df	MS	Number of obs	=	5,710
				F(1, 5708)	=	1.31
Model	1319.1884	1	1319.1884	Prob > F	=	0.2528
Residual	5757303.72	5,708	1008.63765	R-squared	=	0.0002
				Adj R-squared	=	0.0001
Total	5758622.9	5,709	1008.69205	Root MSE	=	31.759

read	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
teacher_masters	1.005045	.8788193	1.14	0.253	-.7177748	2.727864
_cons	436.5157	.5229644	834.69	0.000	435.4905	437.5409

The coefficient of 1.01 is not statistically significant (p is greater than 0.05). This suggests that there is no correlation between a kindergarten teacher's education level and their students' SAT reading test scores. Next, we will look at the regression of students' listening scores on teachers' education levels.

Source	SS	df	MS	Number of obs	=	5,710
				F(1, 5708)	=	0.20
Model	460.716933	1	460.716933	Prob > F	=	0.6531
Residual	13014062.6	5,708	2279.96891	R-squared	=	0.0000
				Adj R-squared	=	-0.0001
Total	13014523.3	5,709	2279.65025	Root MSE	=	47.749

math	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
teacher_masters	.5939489	1.321285	0.45	0.653	-1.996271	3.184169
_cons	485.5648	.7862651	617.56	0.000	484.0234	487.1062

As before, the coefficient of 0.6 is not statistically significant (p is greater than 0.05), indicating that there is no correlation between a kindergarten teacher's education level and their students' SAT math test scores. Finally, we will look at the regression of students' listening scores on teachers' education levels.

Source	SS	df	MS	Number of obs	=	5,710
				F(1, 5708)	=	9.59
Model	10511.2654	1	10511.2654	Prob > F	=	0.0020
Residual	6258528.49	5,708	1096.44858	R-squared	=	0.0017
				Adj R-squared	=	0.0015
Total	6269039.76	5,709	1098.0977	Root MSE	=	33.113

listen	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
teacher_masters	2.837001	.9162757	3.10	0.002	1.040753	4.633249
_cons	536.5651	.5452538	984.06	0.000	535.4962	537.634

Here, the p-value is less than 0.01, but the R-squared value is 0, indicating that there is no evidence that students' SAT listening scores can be explained by whether or not their teachers have their master's degree. Thus, in all three instances, we fail to reject the null hypothesis.

4 Conclusion

The results of this study show that students whose teachers have a master's degree do not score higher on the reading, math, or listening sections of the SAT than students whose teachers do not have a master's degree. However, this issue deserves to be further researched. In this study, the subjects that teachers obtained their master's degrees in were not specified. It is worth evaluating student success in teachers' specialized area of study. For instance, do students whose teachers have a master's degree in math score higher on the math SAT? Additionally, there are other ways to assess teacher effectiveness apart from students' test scores, such as student engagement in the classroom and students' grades. These are potential areas of research for future studies to determine how teachers' education levels impact student learning. Gaining a better understanding of this issue can help school districts determine whether or not they should hire teachers that have received master's degrees and if teachers with higher qualifications deserve increased pay.
From this project, I gained a better understanding of how to use Stata to explore and analyze data, as well as how to present and communicate my findings in an academic paper.