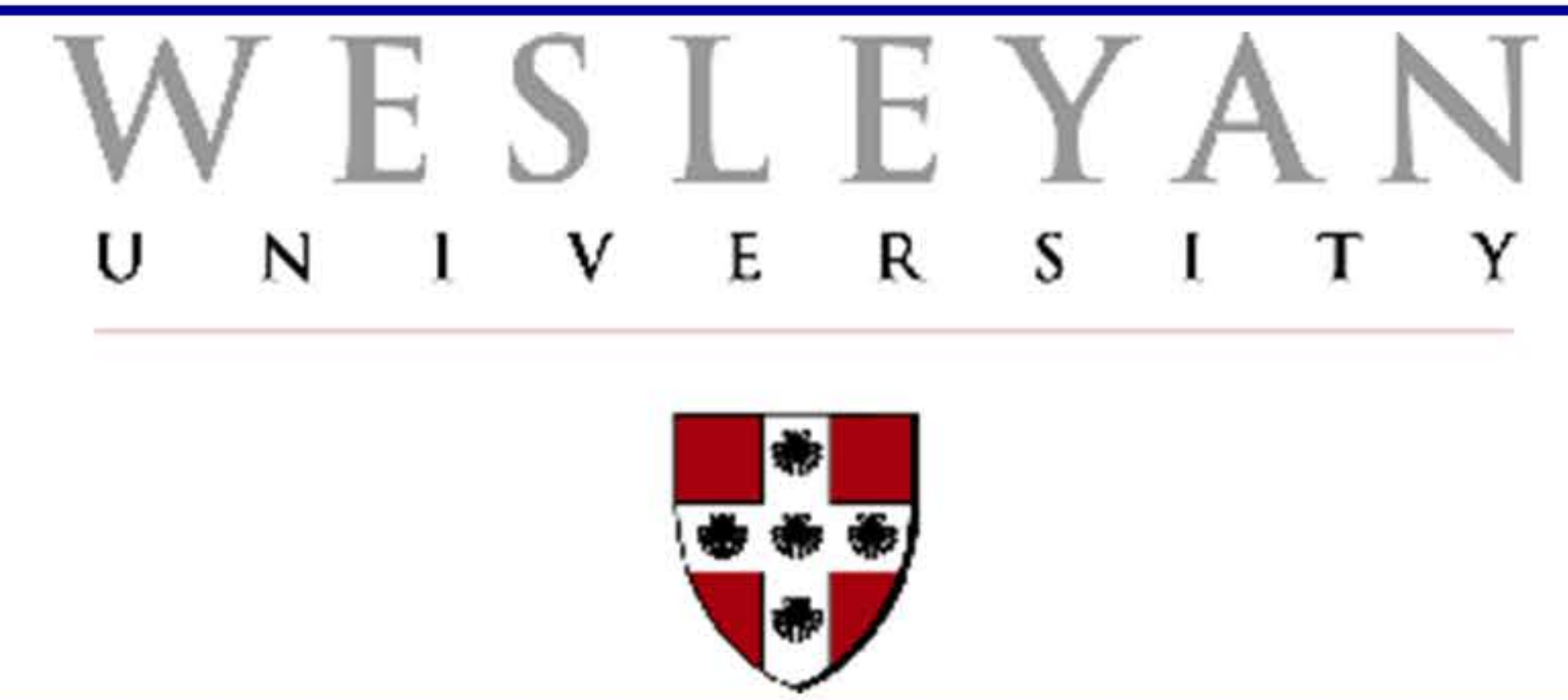


# Analyzing the Effect of School Choice on Achievement

**Shivani Kochhar**  
**Faculty Sponsor: Daniel Long**  
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## Introduction

The presence of charter schools continues to rise in school systems across the country, in some cases replacing traditional public schools. Advocates of charter schools claim that charter schools provide a way for the most disadvantaged students to receive a “better education,” which is usually measured by achievement scores. Furthermore, charter school advocates claim that despite lower achievement scores, charter schools are more effective than traditional public schools because the student body is more disadvantaged (Carnoy, Jacobsen, Mishel, Rothstein 2005).

Conversely, others argue that charter schools may in fact attract the most highly motivated, bright students from regular public schools, leaving the disadvantaged, struggling students without the benefit of peer interaction. Carnoy, Jacobsen, Mishel, and Rothstein (2005) find evidence that charter schools perform worse than regular public schools, even when controlling for the effects of different socioeconomic statuses and races/ethnicities, although this result is not statistically significant. Our research question seeks to address the debate between charter schools and traditional public schools and their effect on student achievement. Do students who attend schools of choice have higher achievement scores than those who attend traditional public schools?

## Data and Methods

The data used in this study are taken from the Early Childhood Longitudinal Study (ECLS) kindergarten class of 1998-99 cohort. This is a nationally representative sample of children that were studied from kindergarten through eighth grade.

The main independent variable in this study is whether or not a student attends a school of choice.

The key independent variables in our study are math IRT scores waves 2 (spring kindergarten), 4 (spring first grade), 5 (spring third grade), and 6 (spring fifth grade). We created IRT gain score variables from these scores in addition to the math IRT scores from wave 1 (fall kindergarten)

The covariates in our study are divided into four blocks: school and neighborhood characteristics, teacher characteristics, student and family characteristics, socioeconomic status of the family.

Initially we conducted a set of OLS regressions to look at the relationship between time and math and reading achievement. This was done using both spring IRT scores and the gain scores that we created. Because our dataset had many missing observations, we performed multiple imputation in order to increase the sample. Using this larger dataset, we created multi-level models, nesting students within classrooms within schools.

## Results

Kindergarten IRT Math Gain Scores					
	Choice with no covariates (2)	Choice with student-level SES (3)	Choice with school and student-level SES (4)	Choice with student-level SES and controls (5)	Choice with school and student-level SES and controls (6)
School of choice	-.3750513 [.3096551]	-.2605392 [.3056883]	-.21958062 [.3057874]	-.20420971 [.312313]	-.20314684 [0.3118932]
Student-level SES		.9219361*** [.0803076]	.83661194*** [.0885566]	.28981443* [.134783]	.28422914* [.1352473]
Mean school SES			.40427597* [.1728358]		.06541309 [.2335286]
Intercept	10.3326***	10.32022***	10.32079***	8.416161***	8.4350361***
BIC	113200.744	113033.808	113036.58	113265.532	113274.882
N	17295	17295	17295	17295	17295
* p<0.05; ** p<0.01; *** p<0.001					
1 <sup>st</sup> Grade IRT Math Gain Scores					
School of choice	-.39854006 [.5083088]	-.14104279 [.4815176]	-.03992393 [.4773387]	-.34281279 [.4511152]	-.33324407 [.4504083]
Student-level SES		2.1065007*** [.117029]	1.8196381*** [.1395764]	.98460412*** [.2397455]	.89949311*** [.2431052]
Mean school SES			1.0164082*** [.2502647]		.53276632 [.3238585]
Intercept	24.351578***	24.387813***	24.41611***	2.3052168***	2.3051455***
BIC	131318.704	130962.732	130957.444	131036.688	131044.344
N	17404	17404	17404	17404	17404
* p<0.05; ** p<0.01; *** p<0.001					
3 <sup>rd</sup> Grade IRT Math Gain Scores					
School of choice	.28193949 [.8749681]	.70776121 [.828887]	.85246097 [.8195454]	.46192705 [.836346]	.47926626 [.8341152]
Student-level SES		3.087137*** [.1441941]	2.4585996*** [.1773067]	1.8201989*** [.369876]	1.5210681*** [.3682914]
Mean school SES			1.8584246*** [.3142708]		1.5235805*** [.3679331]
Intercept	33.83231***	33.982528***	34.055483***	28.645633***	28.974251***
BIC	121029.428	120587.394	120556.746	120637.378	120627.79
N	15163	15163	15163	15163	15163
* p<0.05; ** p<0.01; *** p<0.001					
5 <sup>th</sup> Grade IRT Math Gain Scores					
School of choice	.51014685 [.5857093]	.52213146 [.5844884]	.49279795 [.5857134]	.4587432 [.5832842]	.47406673 [.58328]
Student-level SES		.13876082 [.1960345]	.37840043 [.2603302]	.09119539 [.4056483]	.14040361 [.4278524]
Mean school SES			-.55882889 [.3863881]		-.19868103 [.4707384]
Intercept	21.291754***	21.296405***	21.27719***	2.3020628***	2.3019831***
BIC	40676.1632	40684.171	40690.1828	40965.8544	40973.9656
N	5389	5389	5389	5389	5389
* p<0.05; ** p<0.01; *** p<0.001					

Notes:  
\*Models 5 & 6 control for school & neighborhood characteristics, teacher characteristics, and student & family characteristics.  
\*Standard error in brackets  
\*The boxed model represents the best fit model  
\*In wave 6, the data was subset to only include observations with a math teacher

## Conclusions

Initially we tested the relationship between choice and spring math achievement scores using OLS regression and found that in a bivariate analysis of all four waves, choice was significantly and negatively associated with spring math achievement scores. However, when controlling for factors such as socioeconomic status, choice was no longer significant.

In order to account for our nested data (students within classrooms within schools), we used multi-level models in our secondary analyses to test the relationship between choice and math gain scores. The use of gain scores accounts for both student learning during the school year and any gains or losses during the summer. The results of our study were very similar to the results found by Carnoy, Jacobsen, Mishel, and Rothstein.

In the multi-level models that simply tested the relationship between choice schools and math gain scores, the coefficient for choice was negative for kindergarten and first grade but not statistically significant. Interestingly, the coefficient for choice became positive, although not statistically significant, in third and fifth grade. Even when controlling for socioeconomic status of the individual students and at the school level and for the demographics of the school, choice produced lower achievement scores than regular public schools, although this difference was not statistically significant. This result may be due to the fact that charter schools range from corrupt and mismanaged to excellent and serve both disadvantaged and highly motivated students, so it may be difficult to determine a relationship across such a broad range of schools.

**References:**  
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