Before and After: Assessing NYC Community Schools Initiative, SAT Score Disparities, and Further Improvement.

Mariana Garcia Mejia

1. Introduction.

The SAT has long been regarded as a key indicator of success for college admissions in the United States. However, growing evidence suggests that SAT scores are influenced by a range of external factors beyond academic ability, including socioeconomic status and ethnicity. In an effort to address educational disparities, New York City launched the Community Schools Initiative in 2014, aiming to support underperforming schools through comprehensive services that extend beyond traditional classroom instruction. This study investigates the effect of NYC's Community Schools Initiative on SAT scores and suggests that although the initiative targets the schools with the greatest needs and has overall improved SAT Performance in underprivileged schools, structural socioeconomic inequalities continue to influence student performance, as students with higher Economic Need Index, mainly Hispanic and Black, keep having lower SAT Performance.

Research has repeatedly proven that a student's socioeconomic status and ethnicity is correlated with their SAT performance (Liu, Lu & Zhao, 2024; White, Stepney, Hatchimonji, Moceri, Linsky, Reyes-Portillo, Elias, 2016). It is important to note that high school scores tend to be more highly correlated with socioeconomic status than SAT Scores (Zwick & Greif, 2007), however SAT Scores tend to be a more crucial part of the college admission decision (Zwick, 2014).

In general, students with high income levels tend to perform better than those with low income levels (Hess, 2019). Although this gap has been known for years, studies have proven that the gap in scores is not only due to income difference, but also due to race (Geiser, 2015; Krueger, Rothstein & Turner, 2005; Hoover, 2007). A 2013 study at the University of Pennsylvania found that the difference in scores between low and high income is twice as large among black students compared to white students (Dixon-Roman, Everson, & Mcardle, 2013). Another study found that Hispanic and Black students tend to score lower on the SAT because they attend scores with fewer resources (Zwick & Himelfarb, 2011). Additionally, school characteristics and family background are

two other factors that affect performance on the SAT (Everson & Millsap, 2004), showing that standardized test scores are strongly influenced by factors beyond what the test aims to measure.

As a result, some researchers believe educational policy has been wrongly oriented in the past, as factors outside the academics keep shaping student outcomes greatly, despite policy changes in schools (Carr & Powell, 1985). More recently, a study assessed a College Board initiative that increased the number of free SAT score reports available to low-income students. It found that "the policy improved on-time college attendance and 6-year bachelor's completion by about 2 percentage points" (Hurwitz, Mbekeani, Nipson, & Page, 2017), suggesting that policy changes can actually improve student outcomes by providing easier access to resources to certain groups of students. Nevertheless, after receiving their SAT Scores many students apply to less competitive schools, simply because of their race. This was found by a study from Mississippi State University, which indicated that Black and Hispanic students perceive their opportunities at in-state public institutions to be different from Whites, and therefore apply to less selective in-state institutions (Thomas, 2004).

Considering the important role SAT scores play in students' future, as most colleges require them for admission (Sackett, Kuncel, Beatty, Rigdon, Shen & Kiger, 2012), the City of New York introduced Community Schools in 2014 aiming to achieve an equitable educational system. This initiative provides a wide range of services in specific schools including health care, mentoring and expanded learning programs. Inspired by this initiative, this study aims to explore which schools were given priority to become Community Schools, and what characteristics they share in terms of socioeconomic traits and student body composition. By identifying the role of specific demographic factors in shaping score differences across community and non-community schools, it will be possible to offer recommendations to improve this initiative and its impact on student outcomes.

2. Data

The study employed two data sets from NYC Public High Schools between the years, 2012 and 2016, to perform comparisons of school performance before and after the Community Schools initiative. The main data set contains average SAT Scores for 435 NYC accredited high schools, compiled by College Board. Note that all datasets were obtained from Kaggle.com.

This data set was merged with data provided by PASSNYC, which contains demographic information on 1273 high schools, including community school status (Yes/No), economic need index, school estimate, and student body composition by race. Note that the main data set contains information for the year 2014-2015, while the second data set is from 2016. Due to the unavailability of community schools for the year 2015, the study assumes that school performance didn't change too much from 2015 to 2016, and will use the datasets jointly when required.

3. Summary Statistics and Visualizations (863)

3.1. SAT Score Differences in 2012 and 2016.

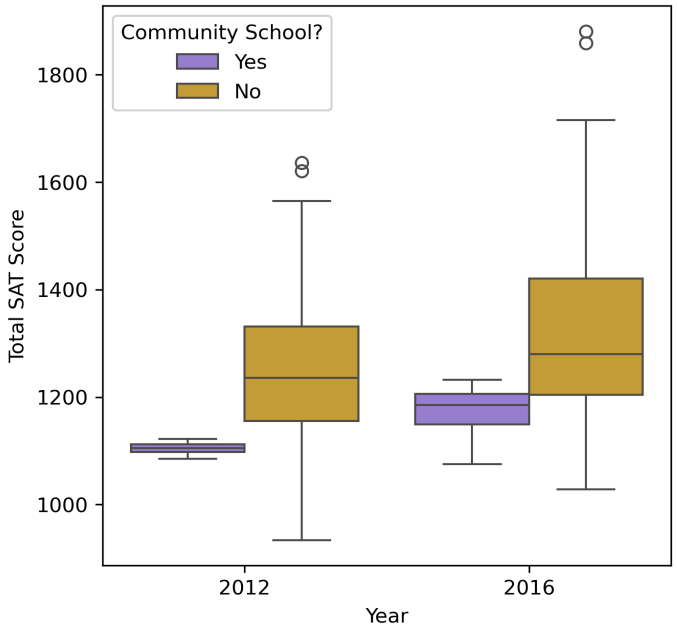


Figure 1: SAT Score Distribution in 2012 and 2016 for Community and Non-Community Schools.

We begin by comparing SAT scores from 2012 and 2016 to assess the impact of the Community Schools policy. As observed in Figure 1, SAT scores for Community Schools improved significantly after the initiative was implemented in 2014. Two years after the policy was introduced, in 2016, around 50% of the schools were scoring more than 1200, whereas in 2012, before the policy, none exceeded 1170. Despite this progress, score disparities based on economic need persist, as high-need schools keep having the lowest performance as shown in Figure 2. However, it is important

to note that there's no Low Economic Need Index schools that are Community Schools, showing that the policy was radical in considering only those schools with Medium/High Economic Need, yet there are still some High Economic Need schools that are not Community Schools as of 2016.

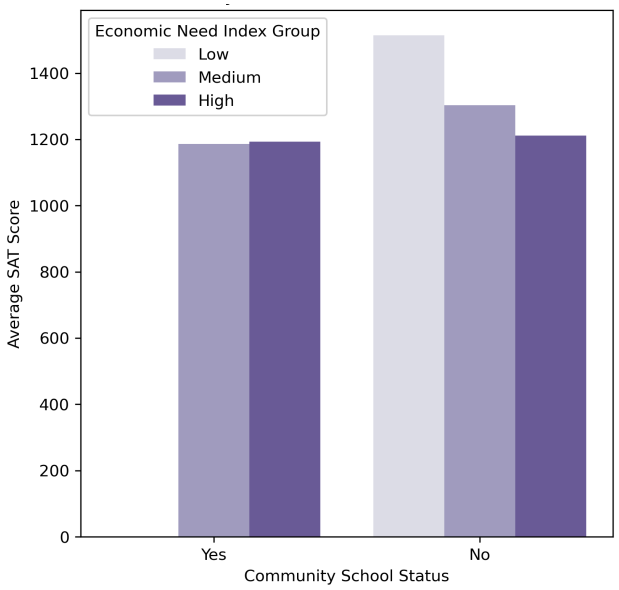


Figure 2: SAT Performance by Community School and Economic Need Index.

3.2. SAT Scores and Community Schools Across Boroughs.

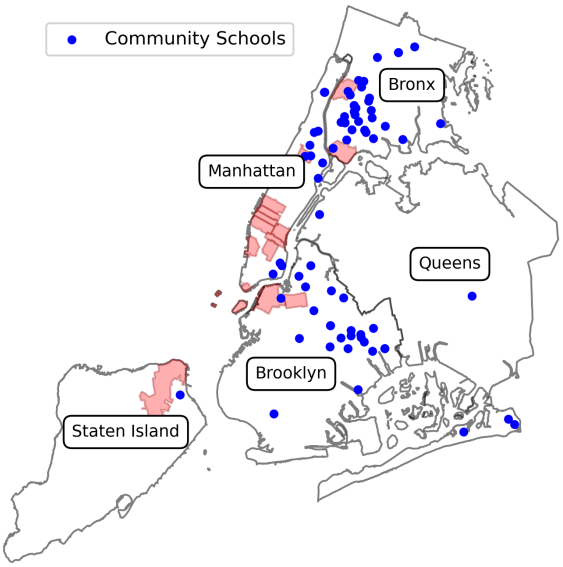


Figure 3: NYC Community Schools and Most Dangerous Neighborhoods (2016).

Figure 3 shows the locations of Community Schools in 2016. These schools tend to be found in the boroughs of Bronx, Brooklyn and Manhattan, which are the three boroughs with lowest average total SAT scores (1202, 1230, 1340) as observed in Table 1, and also the most dangerous neighborhoods (red). Note that the difference in average total SAT scores between Manhattan and Queens is only about 5 points, yet Manhattan has a lot more Community Schools than Queens. Table 1 also suggests that Manhattan is the second borough with the most Hispanic students with 51%, after Bronx (62%), while Queens has only 34%, which could possibly explain why there are more Community Schools there than in Queens. Another interesting finding is that Staten Island's high performance may be linked to its demographic composition, as schools here have a higher percentage of White students (46%), who statistically perform better on the SAT.

Borough	Average Total SAT Score	Percent White	Percent Asian	Percent Hispanic	Percent Black
Bronx	1202	3.12	3.91	62.71	3.12
Brooklyn	1230	7.18	7.45	28.79	7.18
Manhattan	1340	10.11	11.17	51.19	10.11
Queens	1345	11.20	23.52	34.37	11.20
Staten Island	1439	45.77	10.74	25.21	45.77

Table 1: Means for SAT Scores and Demographics per borough in NYC.

3.3. Economic Indicators and SAT Scores.

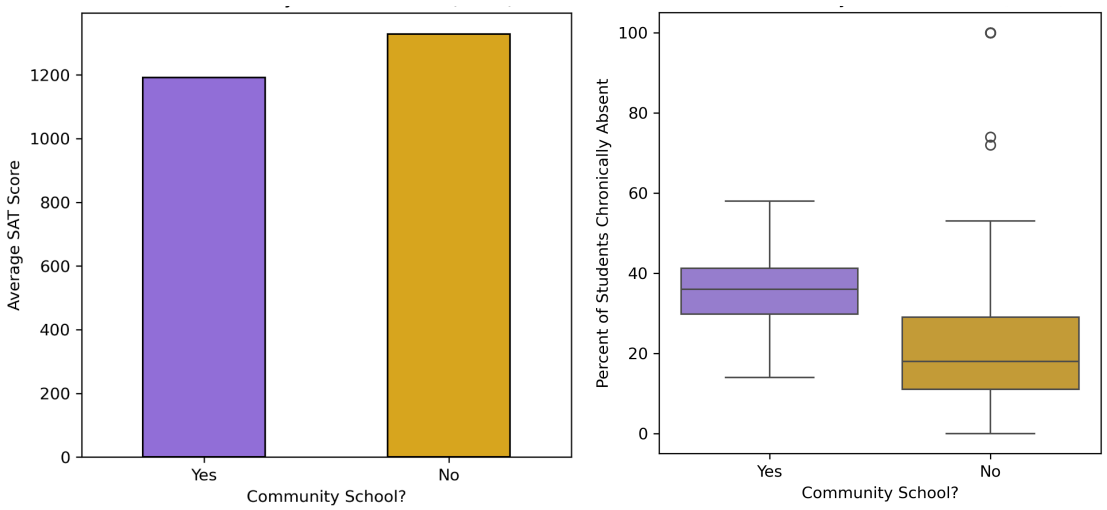


Figure 4: Average Total SAT Score and Percent of Students Chronically Absent for Community and Non-Community Schools (2016).

The NYC Community Schools Initiative aimed to improve student outcomes by targeting schools with high absence rates and low SAT scores, as shown in Figure 4. However, it is essential to consider broader socioeconomic factors, such as the Economic Need Index and School Income Estimate that may be influencing the academic indicators above; why Community Schools have higher absence rates and lower scores.

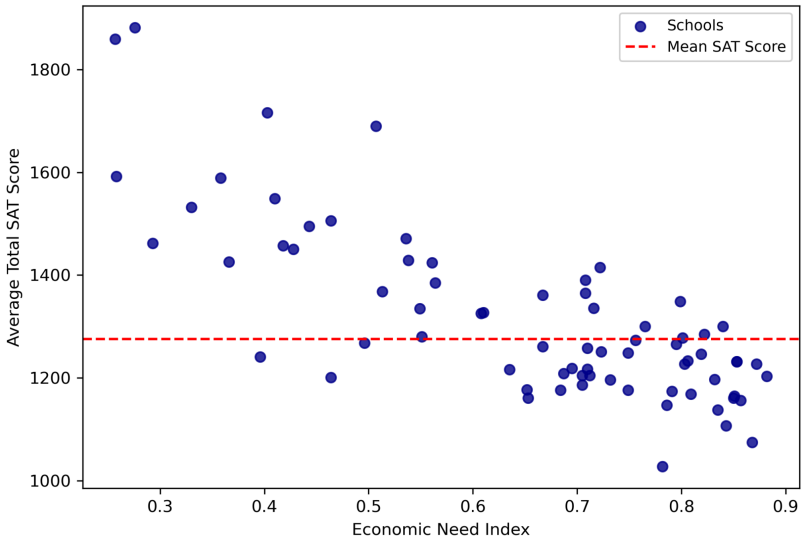


Figure 5: Economic Need Index and Average Total SAT Scores.

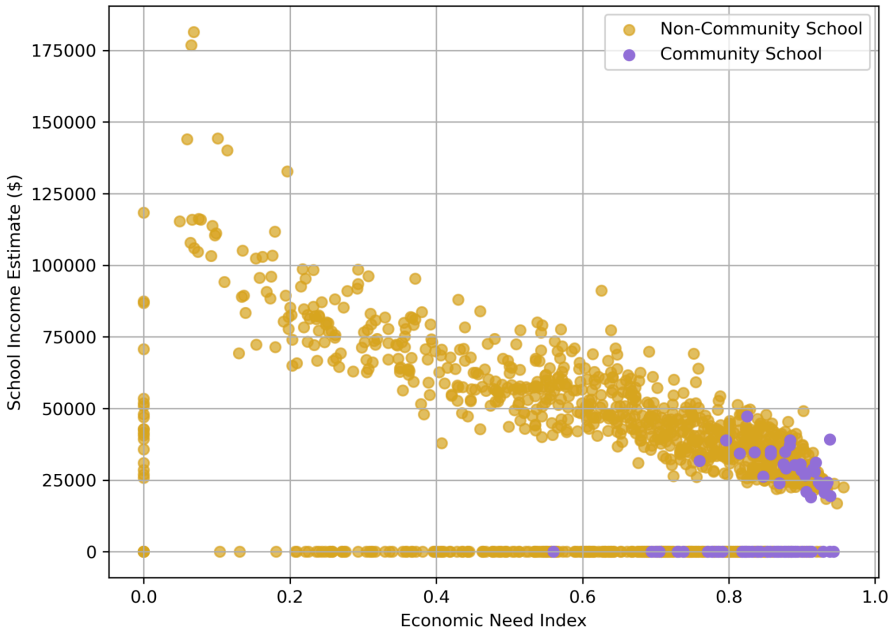


Figure 6: Relationship between School Income Estimate and Economic Need Index.

The data revealed a negative correlation between Economic Need Index and SAT scores, suggesting that students in economically disadvantaged schools tend to score lower on the SAT. While community schools were designed to address such disparities, the persistently low scores indicate that additional resources may be needed to close the gap. Additionally, Community schools (purple) tend to cluster at the highest levels of economic need while having the lowest school income (yellow). Together, these findings suggest that while the Community Schools Initiative may have targeted the right schools, socioeconomic inequalities continue to play a critical role in shaping SAT performance. Addressing these disparities requires not only academic interventions but also broader socio economic reforms, like for example, ensuring all schools receive similar resources.

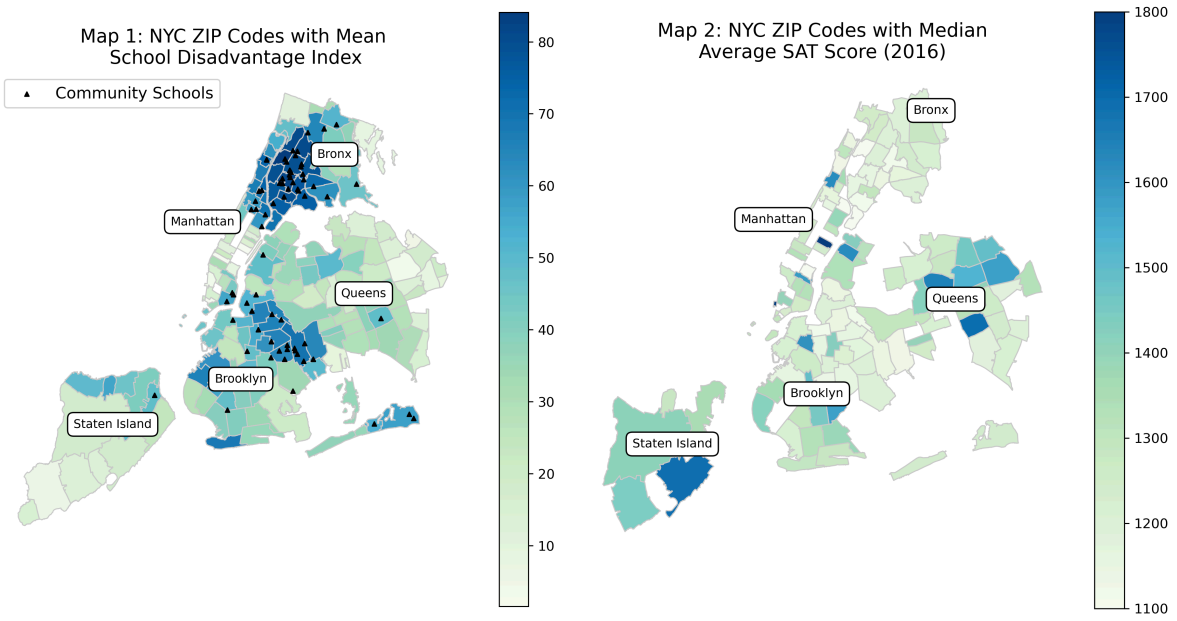


Figure 7: School Disadvantage Index and Median SAT Score in NYC Boroughs.

Geographically, these results make sense too. Map 1 reveals critical patterns in the Bronx and Brooklyn, highlighting areas where the School Disadvantage Index is particularly high. Interestingly, these high-need areas align with the locations where Community Schools were strategically implemented, marked with triangles. On the other hand, Map 2 reveals a concerning pattern: these same areas also have the lowest SAT scores, underscoring the persistent challenges faced by students in high-poverty schools. This reinforces the idea that areas facing the most educational challenges were prioritized for the introduction of community schools, and calls for citywide efforts—such as school-specific SAT prep programs and fostering a stronger college-going culture—to ensure that students in high-need areas receive the academic support necessary to improve outcomes.

3.4. Racial Disparities in SAT Scores.

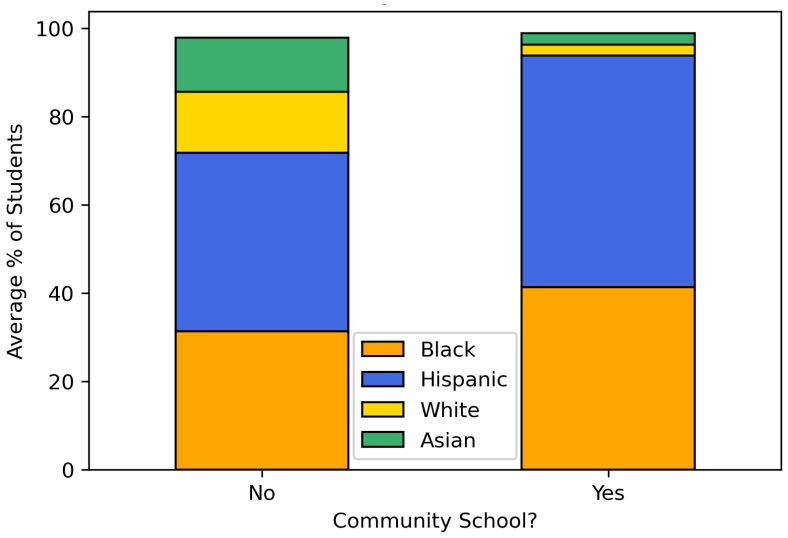


Figure 8: Ethnic Composition of Community vs. Non-Community Schools in NYC.

Figure 8 confirms that Community schools serve a significantly higher proportion of Black and Hispanic students, while non-community schools have a greater percentage of White and Asian students. Given the earlier findings on economic disadvantages among community schools, this graph suggests that Hispanic and Black students tend to have higher Economic Need Index, which might be the reason why they score lower in the SAT Scores, as they attend schools with lower School Income Estimate. However, it is important to note that in general, NYC schools have more Hispanics and Black students, which might be simply due to the demographics of New York overall.

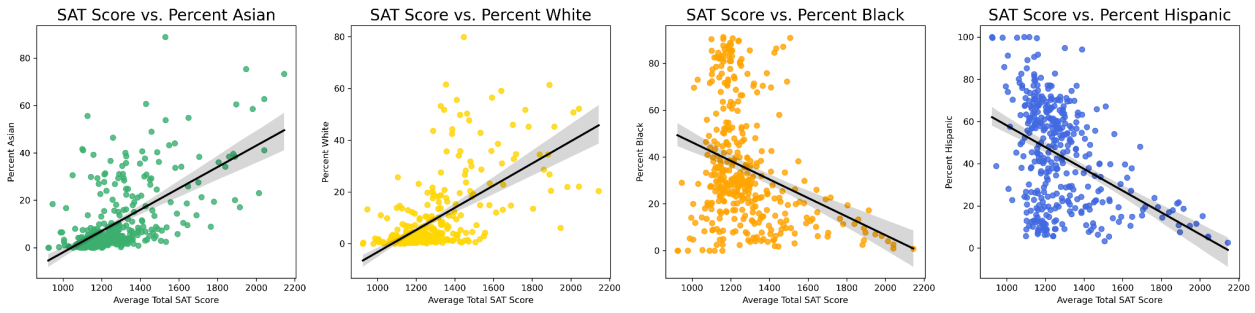


Figure 9: Relationship between Average SAT Score and Percent of Race for NYC Schools.

SAT performance tends to vary by racial demographics, as shown in Figure 9. The scatterplots display a negative correlation between SAT scores and the percentage of Black and Hispanic students,

meaning that the more Hispanic and Black students in a school, the lower the average SAT Score. On the other hand, schools with a higher percentage of Asian and White students tend to have higher SAT scores. Since community schools predominantly serve Black and Hispanic students and also students with higher Economic Need Index, we can conclude that these are the students that require the most assistance. Not only due to the high Economic Need Index but also because their lower SAT scores may affect their future opportunities and life quality. Additionally, in schools with majority Hispanic/Black students only 60% of the students take the SAT on average, whereas for schools with Majority White/Asian students this number is about 90% on average, as shown in Figure 10.

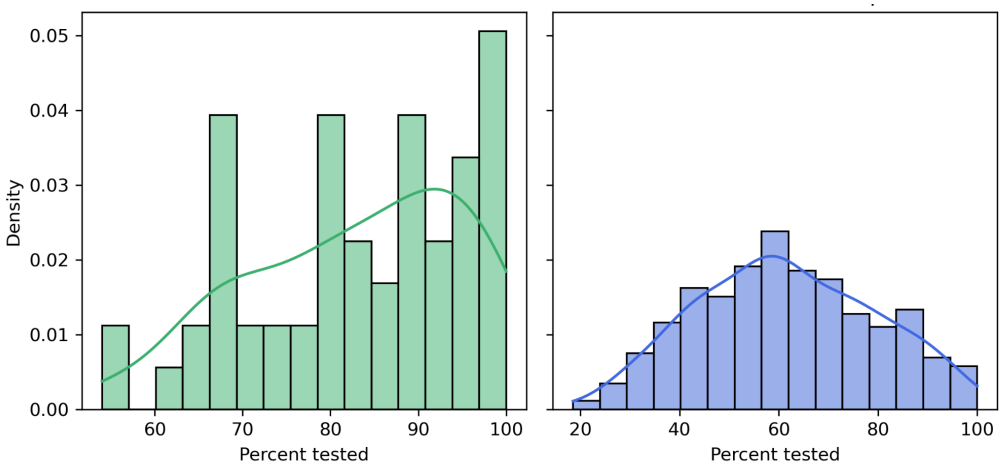


Figure 10: Percent Tested for Majority White/Asian Schools and Majority Black/Hispanic Schools.

4. Results

4.1. Linear Regressions.

Several linear regression models were run to examine the relationship between socioeconomic and racial factors, and SAT scores in NYC high schools. Each independent variable was chosen based on existing literature on educational inequality and the results obtained in previous sections.

For Regression 1, the predictor variables used to explain differences in a school's Average Total SAT Score included: Economic Need Index, School Income Estimate and Racial Composition. Previous research suggests that students from higher-income backgrounds tend to score higher on standardized tests (Hess, 2019) due to better access to educational resources, tutoring, and other

advantages. This will be captured by the Economic Need Index which captures the economic hardship of students at the school level. The School Income Estimate variable represents the estimated average income of the school, which correlates with better educational opportunities, leading to higher SAT scores as schools have more resources to offer their students. Moreover, studies show that the income gap is wider for Black students than for White students (Dixon-Roman, Everson, & Mcardle, 2013), making it important to explore whether racial disparities persist even when controlling for economic factors in New York City schools. We will use racial composition (Majority Black, Majority Hispanic, Majority White and control with Majority Asian), to measure racial disparities in SAT performance.

Regression 2, was inspired by results from previous sections to observe the effects of different variables on SAT Score. Figure 10 suggested that Percent Tested, which represents the proportion of students in a school taking the SAT, was very different for Majority White/Asian and Majority Black/Hispanic schools. We will use it in Regression 2 to observe whether this factor shapes SAT Score differences across schools. Additionally, we consider whether Absence Rates can impact performance; I currently believe higher absenteeism might suggest disengagement from school, which can negatively affect SAT scores, but we will test this using our regression.

Lastly, we include School Disadvantage Index, which combines School Income Estimate and Economic Need Index into a single percentile-based index (where schools with the highest economic need index and lowest school income estimate have higher percentile) to account for socioeconomic factors. Including these variables aims to isolate the effects of socioeconomic status and racial composition on SAT performance while controlling for Percent Tested and Chronically Absent.

	Dependent variable: Average Total SAT Score			
	Model 1:	Model 2:	Model 3	Model 4
Intercept	1803.091***	1780.899***	1837.394***	1865.773***
	(48.036)	(51.282)	(52.008)	(55.012)
Economic Need Index	-750.525***	-720.555***	-787.069***	-814.159***
	(71.272)	(75.245)	(96.093)	(97.001)
School Income Estimate		0.001	0.001	0.001
		(0.001)	(0.001)	(0.001)
Majority Black			-79.535**	-90.479**
			(34.233)	(34.732)
Majority Hispanic			29.014	21.693
			(40.147)	(40.103)
Majority White				-91.237
				(61.723)
Observations	72	72	72	72
R^2	0.613	0.621	0.692	0.702
Adjusted R^2	0.607	0.610	0.674	0.679
Residual Std. Error	106.049 (df=70)	105.702 (df=69)	96.683 (df=67)	95.839 (df=66)
F Statistic	110.891*** (df=1; 70)	56.539*** (df=2; 69)	37.659*** (df=4; 67)	31.097*** (df=5; 66)
Note:	*p<0.1; **p<0.05; ***p<0.01			

The results from Regression 1 confirm a strong link between economic disadvantage and lower SAT scores. Economic Need Index is consistently negative and statistically significant, reinforcing that schools with higher economic need tend to have lower SAT scores; if the Economic Need Index goes up by 1 point, SAT Score goes down by about -740 points. Moreover, even after

controlling for economic factors, majority Black schools score significantly lower, by approximately 79 to 90 points, suggesting that racial disparities in SAT performance extend beyond economic disadvantage. Surprisingly, majority Hispanic schools do not show a statistically significant difference in SAT scores, implying that the economic need variable captures most of the disadvantages faced by Hispanic students. Finally, School Income Estimate appears to be non-significant, meaning that a school's average income does not directly predict SAT scores once economic need is accounted for.

	Dependent variable: Average Total SAT Score			
	Model 1	Model 2	Model 3	Model 4
Intercept	1710.384***	1361.533***	1393.573***	1393.573***
	(46.352)	(97.975)	(99.762)	(99.762)
School Disadvantage Index	-7.045***	-5.494***	-4.817***	-4.817***
	(0.788)	(0.818)	(0.939)	(0.939)
Percent Tested		3.542***	3.073***	3.073***
		(0.898)	(0.949)	(0.949)
Chronically Absent (%)			-1.910	-1.910
			(1.331)	(1.331)
Observations	72	72	72	72
R^2	0.533	0.619	0.630	0.630
Adjusted R^2	0.526	0.608	0.614	0.614
Residual Std. Error	116.499 (df=70)	105.995 (df=69)	105.191 (df=68)	105.191 (df=68)
F Statistic	79.892*** (df=1; 70)	56.036*** (df=2; 69)	38.618*** (df=3; 68)	38.618*** (df=3; 68)
Note:	*p<0.1; **p<0.05; ***p<0.01			

In Regression 2, the School Disadvantage Index remains negative and significant, reinforcing the strong association between economic hardship and lower SAT performance. Notably, Percent

Tested is positive and significant, meaning that schools with a higher percentage of students taking the SAT tend to have higher average scores. This could indicate that schools actively encouraging broader participation may also provide better test preparation resources, leading to stronger performance. Surprisingly, Chronic Absenteeism is not significant, meaning that while attendance issues may impact individual student outcomes, they do not strongly predict overall school-wide SAT averages. This raises important questions about the mechanisms driving performance disparities—while economic hardship is clearly a major factor, improving test participation at the school level could be an effective way to boost SAT scores across disadvantaged schools.

4.1.1. Preferred Specification.

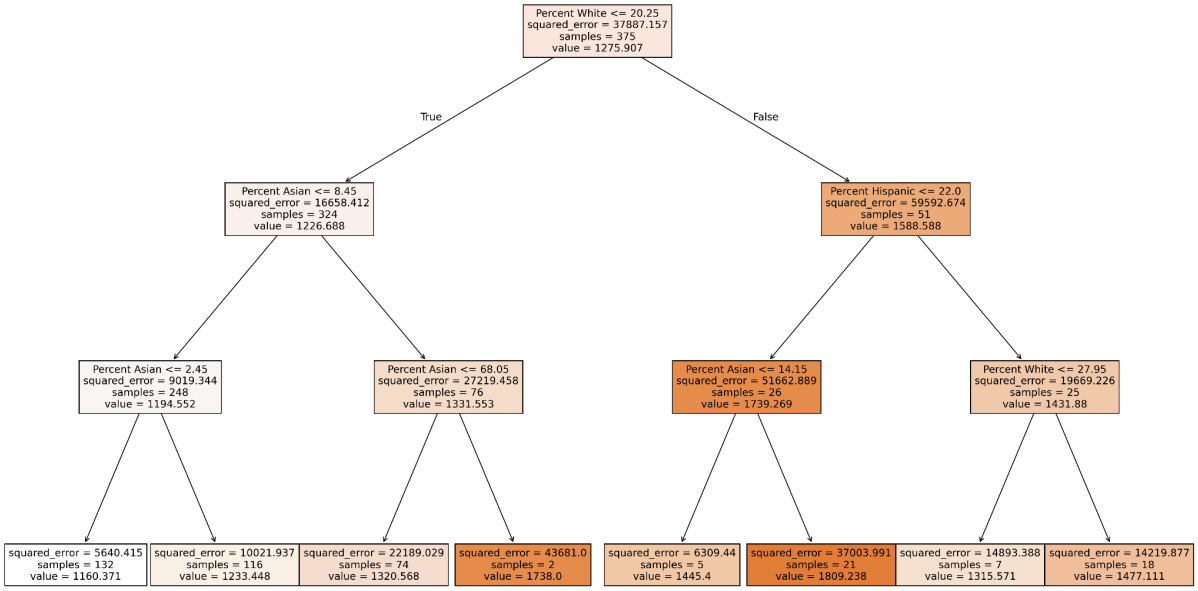
$$SAT\ SCORE = 1865.8 - 814.2\ (Economic\ Need\ Index) - 90.8\ (Majority\ Black)$$

Model 4 was selected as the preferred specification because it provides the most comprehensive explanation of SAT score disparities by incorporating both economic and racial factors. Both Economic Need Index and Majority Black remain strongly significant, confirming that racial disparities persist even after controlling for economic need. Additionally, this model has the highest adjusted R squared among all others, meaning it explains the most variance in SAT scores.

4.2. Machine Learning.

4.2.1. Regression Tree.

Before arriving at the final regression tree presented below, an initial model was run using our preferred specification, which included Economic Need Index and Majority Black variables. However, this model resulted in a high Mean Squared Error (MSE), suggesting poor predictive performance. To reduce error and get better insights, a revised model with a lower MSE was selected, which captures key racial patterns in SAT performance much better.



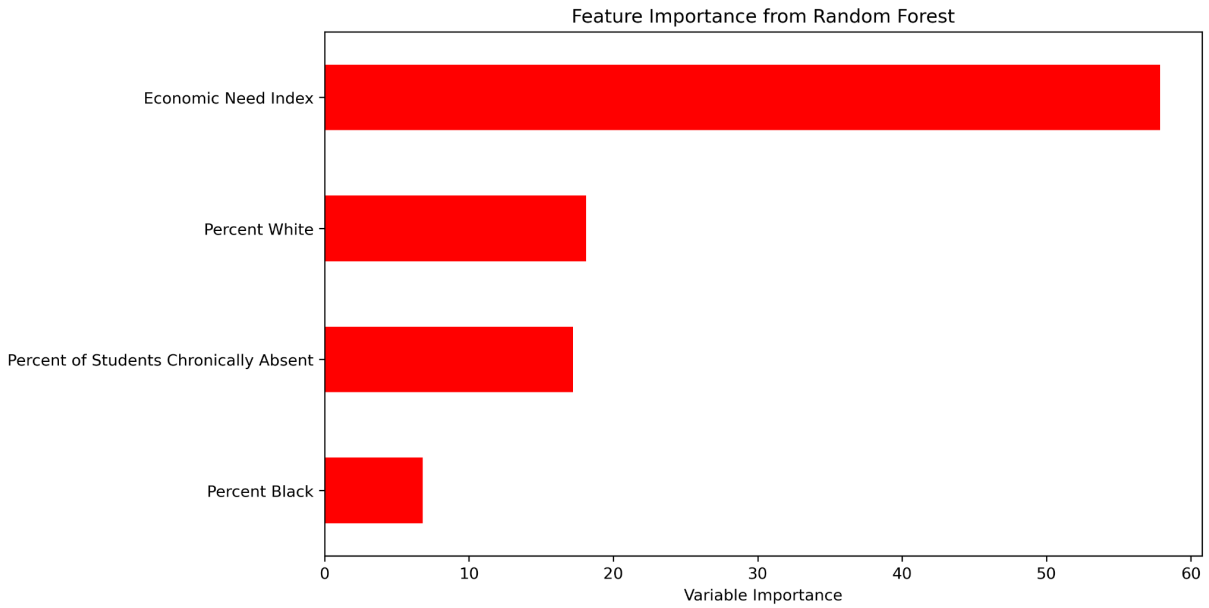
Regression Tree

The Regression Tree predicts SAT scores using the percentages of White, Asian, and Hispanic students. The root node splits on Percent White less than 20.25%, suggesting that schools with a lower percentage of White students generally have lower SAT scores (1275.9). For those schools, the next most influential factor is Percent Asian, with lower values associated with lower average SAT scores. In contrast, schools with more than 20.25% White students show a much higher predicted SAT score (1588.6), and their splits are driven primarily by Percent Hispanic and Percent Asian, both of which further differentiate performance. Notably, one of the highest predicted SAT scores in the tree (1809.2) appears in a group with high White and low Hispanic percentages, reinforcing patterns seen in educational outcome disparities. Overall, the tree reveals that schools with higher percentages of White and Asian students tend to have higher SAT scores, while those with lower percentages of these groups and higher Hispanic representation show lower predicted performance.

4.2.2. Random Forest.

To identify the most important predictors of SAT performance, we experimented with three random forest models using different sets of variables. The first model included a broad set of demographic and socioeconomic features, revealing race as the most important predictor—a surprising result, given initial expectations that economic need would dominate. To test this further,

we constructed a second model excluding all race variables, focusing instead on economic need and chronic absenteeism, which led to a modest improvement in predictive accuracy through lower MSE. Finally, our third and preferred model (presented below) includes only the percentage of Black and White students, Economic Need Index, and percentage of students chronically absent. This specification yielded the lowest Mean Squared Error, and showed that a focused set of features (especially race and economic need) could still capture much of the variation in SAT scores.



Random Forest

5. Conclusion

The results of this study reinforce the idea that socioeconomic status—captured by the School Disadvantage Index—plays a significant role in shaping academic performance. Since community schools predominantly serve Black and Hispanic students and also students with higher Economic Need Index, we can conclude that these are the students that require the most assistance, not only due to their high Economic Need Index but also because their lower SAT scores may affect their future opportunities and life quality. Considering that low SAT scores might be due to the lower School Income Estimate of the school they attend, it is important that policy makers revisit the benefits of Community Schools. Addressing these disparities requires not only academic interventions but also broader socio economic reforms to ensure equitable access to quality education, like for example,

ensuring all schools receive similar resources (to bridge the gap in School Income Estimate). High schools should also encourage students, mainly Black and Hispanic, to take the SAT, by offering support services to promote a college-going culture in all schools, and bridge the gap in percentage tested across mainly White/Asian schools and mainly Hispanic/Black schools.

The regression analysis further supports the presence of structural inequalities affecting SAT performance in NYC schools. The strong significance of the Economic Need Index confirms the impact of economic hardship on test scores, while the persistence of racial disparities, even after controlling for economic factors, suggests that broader systemic issues remain unresolved. The fact that Majority Black schools exhibit significantly lower SAT scores despite accounting for economic variables indicates that racial disparities in education go beyond income differences alone. Additionally, absenteeism and percent tested emerged as key factors influencing SAT scores, suggesting that school attendance plays a crucial role in academic success, as well as the number of students actually taking the test. These findings indicate that while economic support is essential, policies must also address racial inequities and student engagement through targeted interventions such as school attendance initiatives and a college-going culture. Expanding the scope of support beyond Community Schools to include all high-need schools will be necessary to create a more equitable educational landscape and reduce the overall disparity in SAT performance citywide.

6. Work Cited

Dixon-Roman, E. J., Everson, H. T., & Mcardle, J. J. (2013). Race, Poverty and SAT Scores: Modeling the Influences of Family Income on Black and White High School Students' SAT Performance. Teachers College Record: The Voice of Scholarship in Education, 115(4), 1–33. https://doi.org/10.1177/016146811311500406

Everson, H. T., & Millsap, R. E. (2004). Beyond Individual Differences: Exploring School Effects on SAT Scores. Educational Psychologist, 39(3), 157–172. https://doi.org/10.1207/s15326985ep3903_2

Geiser, S. (2015). THE GROWING CORRELATION BETWEEN RACE AND SAT SCORES: New Findings from California. UC Berkeley: Center for Studies in Higher Education. https://escholarship.org/uc/item/9gs5v3pv

Hess, A. J. (2019, October 3). Rich students get better SAT scores—here's why. CNBC. Retrieved from https://www.cnbc.com/2019/10/03/rich-students-get-better-sat-scores-heres-why.html

Hoover, N. (2007). Cultural Disparities of SAT Scores and the Influence on Higher Education Opportunities for African American and Latino Students. *Dominican University of California*. https://doi.org/10.33015/dominican.edu/2007.edu.03

Hurwitz, M., Mbekeani, P. P., Nipson, M. M., & Page, L. C. (2017). Surprising Ripple Effects: How Changing the SAT Score-Sending Policy for Low-Income Students Impacts College Access and Success. Educational Evaluation and Policy Analysis, 39(1), 77-103. https://doi.org/10.3102/0162373716665198

Krueger, Rothstein & Turner (2005). Race, Income and College in 25 Years: The Continuing Legacy of Segregation and Discrimination. NBER. Retrieved from https://www.nber.org/papers/w11445

M. Liu, W. Lu and L. Zhao. (2024). Decoding SAT Scores: A Multifaceted Analysis of Socioeconomic and Educational Influences Across Diverse Regions. (2024). 2024 IEEE Integrated STEM Education Conference (ISEC), 1-2. https://doi-org.myaccess.library.utoronto.ca/10.1109/ISEC61299.2024.10665306

Sackett, P. R., Kuncel, N. R., Beatty, A. S., Rigdon, J. L., Shen, W., & Kiger, T. B. (2012). The Role of Socioeconomic Status in SAT-Grade Relationships and in College Admissions Decisions. Psychological Science, 23(9), 1000-1007. https://doi.org/10.1177/0956797612438732 (Original work published 2012)

Steelman, L. C., & Powell, B. (1985). Appraising the Implications of the SAT for Educational Policy. *The Phi Delta Kappan*, *66*(9), 603–607. http://www.jstor.org/stable/20387452

Thomas, M.K. (2004). Where College-Bound Students Send Their SAT Scores: Does Race Matter? *Social Science Quarterly*, 85(5), 1374-1389. https://onlinelibrary.wiley.com/doi/10.1111/j.0038-4941.2004.00281.x

White G., Stepney C., Hatchimonji D., Moceri D., Linsky A., Reyes-Portillo J., Elias M. (2016). The increasing impact of socioeconomics and race on standardized academic test scores across elementary, middle, and high school. *Am J Orthopsychiatry*, 86(1), 10-23. doi: 10.1037/ort0000122

Zwick, R. (2014). DISENTANGLING THE ROLE OF HIGH SCHOOL GRADES, SAT® SCORES, AND SES IN PREDICTING COLLEGE ACHIEVEMENT. *ETS Research Report Series*, 2013(1), 1-20. https://doi.org/10.1002/j.2333-8504.2013.tb02316.x

Zwick, R. & Greif, J. (2007). New Perspectives on the Correlation of SAT Scores, High School Grades, and Socioeconomic Factors. *Journal of Educational Measurement*, 44(1), 23-45. https://onlinelibrary.wiley.com/doi/full/10.1111/j.1745-3984.2007.00025.x

Zwick, R. & Himelfarb, I. (2011). The Effect of High School Socioeconomic Status on the Predictive Validity of SAT Scores and High School Grade-Point Average. *Journal of Educational Measurement*, 48(2), 101-121. https://doi.org/10.1111/j.1745-3984.2011.00136.x