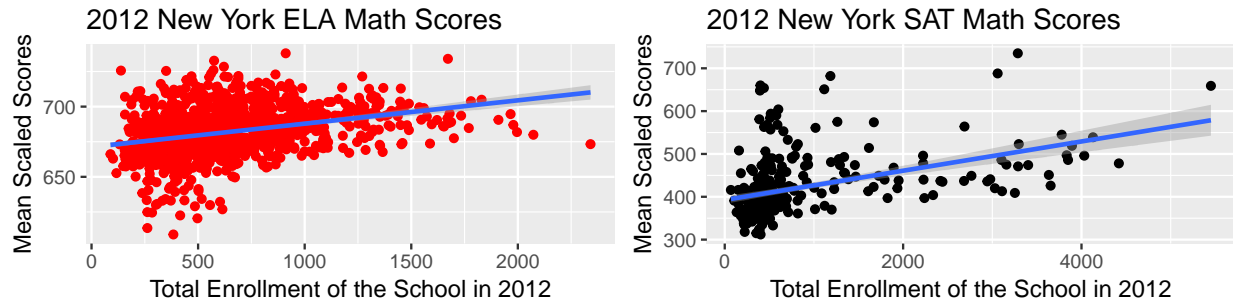# Analyzing Connection Between School Size and 2012 Math Proficiency Test Scores

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Objective

New York School Districts annually administer the New York State English Language Arts (ELA) & Mathematics proficiency test for students in grades 3-8. The SAT can also be a proficiency metric for students in grades 9-12. It is of interest if school sizes in New York influence the mean scaled scores of both tests at all; some may hypothesize that larger school sizes can make it more difficult to get all students to succeed, while some could hypothesize that large school sizes have more established foundations in academic excellence and administrative organization. We visualize the data to get a high-level overview, and can conduct a brief test on the strength of the linear relationship.

Methodology

The New York SAT 2010 and 2012 data first was downloaded as .csv files while the demographics and ELA scores were downloaded as excel files and all were imported from the data.gov website. A challenge was joining this data with another demographics file detailing attendance and enrollment at all New York Schools in 2012 at the correct grades between elementary and high schools. We proceeded to clean the data using R and dplyr, removing incomplete or incomparable data for data validation. Two plots were generated with visualization of their simple linear regression model, one displaying the data for the ELA test scores and one for the SAT test scores in 2012. The plots were conclusively drawn from a cleaned data table containing variables SchoolID, Number of Tested for SAT and ELA, SchoolName, TotalEnrollment, Mean Scaled Math Scores for ELA and SAT.

Conclusion

Based on the plots created, it seems in both cases of plots that there is a large range of possible mean scores when enrollment is very low, but converges to generally higher mean scores as enrollment rises. The slope of both regression lines supports this visible trend, with extremely significant p-values $<2.2*10^{-6}$ in the formal linear regression tests. Future analysis could be a better comparable scale of scores, or detailed distributions of scores by demographic cohorts.