

Are Charter Schools Better than Public Schools?

DATA 606 - Kory Martin





Agenda

1. Abstract
2. Overview
3. Summary Statistics
4. Analysis
5. Conclusion
6. Appendix

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Abstract



Abstract

This research attempts to answer the question of whether California Charter Schools are better than California Public schools, by evaluating the relative performance of charter schools and public schools in the areas of chronic absenteeism rate, college going rate, dropout rate, suspension rate and graduation rate.

For this research, the primary methodology for answering this question is by calculating the means for charter schools and public schools across each of the independent variables, and then using a t-test to determine if there is statistical evidence to support the hypothesis that the difference between charter schools and public schools is statistically significant at a 95% level of significance. Next, for those in which there is a statistical difference between the two groups, we will give a point to the school type with the better performance for each measure. Finally, we will determine which school type is better, based on the school type with the most points out of 5 possible points.

As a result of this analysis, we found that Charter Schools performed better than Public Schools in the areas of suspension rate and chronic absenteeism rate, while public schools out-performed charter schools in the areas of graduation rate and dropout rate, and there was no statistically significant difference between the two groups in the area of college going rate. This resulted in charter schools receiving 2 points out of 5 and public schools receiving 2 of 5 points. Leading us to conclude that - based on this methodology - that charter schools are not better than public schools.



Overview





Research Question

“Are California Charter Schools better than California Public Schools?”



Why is this analysis important?

- Educational attainment continues to be a significant predictor of individual income and household wealth over time
- Private school education continues to be a cost-prohibitive option for many families
- The quest for quality affordable K-12 education is an important decision in most American households - especially for individuals in underserved communities



Data

- Collected from California Department of Education website
- Data included:
 - Public schools directory
 - Student discipline data
 - Graduation and Dropout data
 - Chronic Absenteeism data
 - College Going Rate (16-months)
- The **independent variables** in this analysis is the mean rate for all schools across the respective school types for Suspension Rates, Graduation Rates, Dropout Rates, Chronic Absenteeism Rates, and College Going Rates
- The **dependent variable** in this analysis is a synthetic measure based on the count of the number of categories that each school type outperformed the other



Methodology

1. Collect data from California Department of Education website
2. Organize data based on each area of measurement
3. Calculate relevant statistics for each measurement area, which include average rate, N, and standard deviation for average rate for each school type
4. Used a t-test to evaluate if the difference in the means between the two groups is statistically significant at a 95% level of significance
5. For each measurement area, the school type that had the better average receives a point towards their “Best School Type” score
6. Compare the total number of points received by each school type
7. School type with the most points is considered the best school type

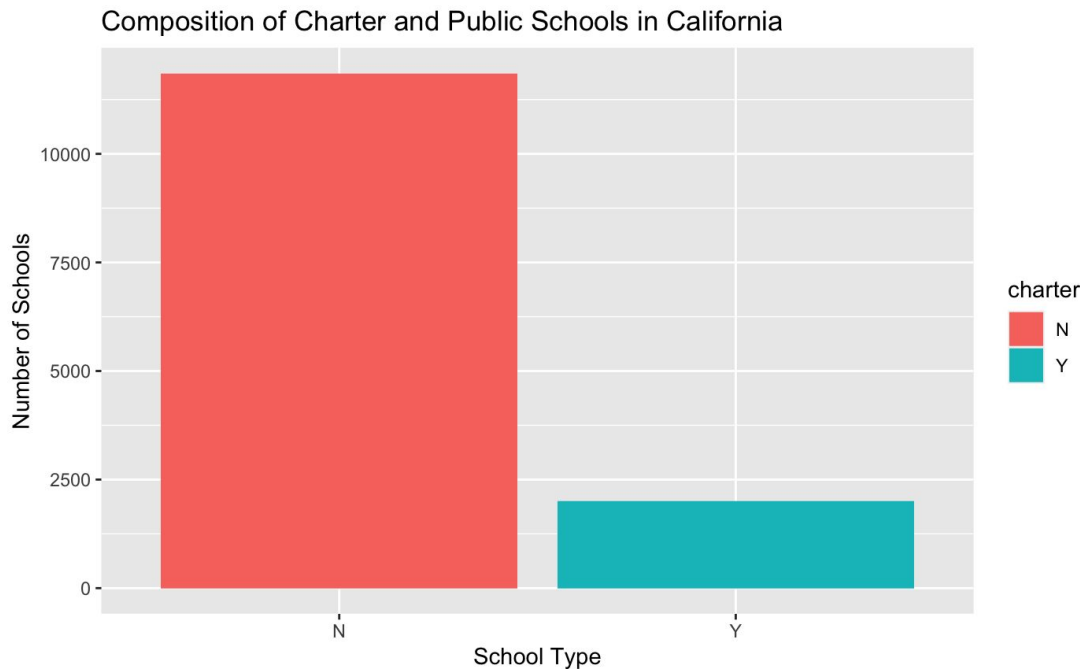


Summary Statistics



Composition of California Public Schools

- 13,860 schools included in data set
- 2,003 schools (15%) were Charter
- Los Angeles county has the largest number of schools, with 2,785 schools, 19% of which are charter schools





Elementary Schools represent 39% of all Charter Schools

Number of Schools by School Level (Charter)

School Level	N	Pct of Total
elementary	787	0.39
elementary-high combo	468	0.23
high school	541	0.27
intermediate/middle/junior high	207	0.10



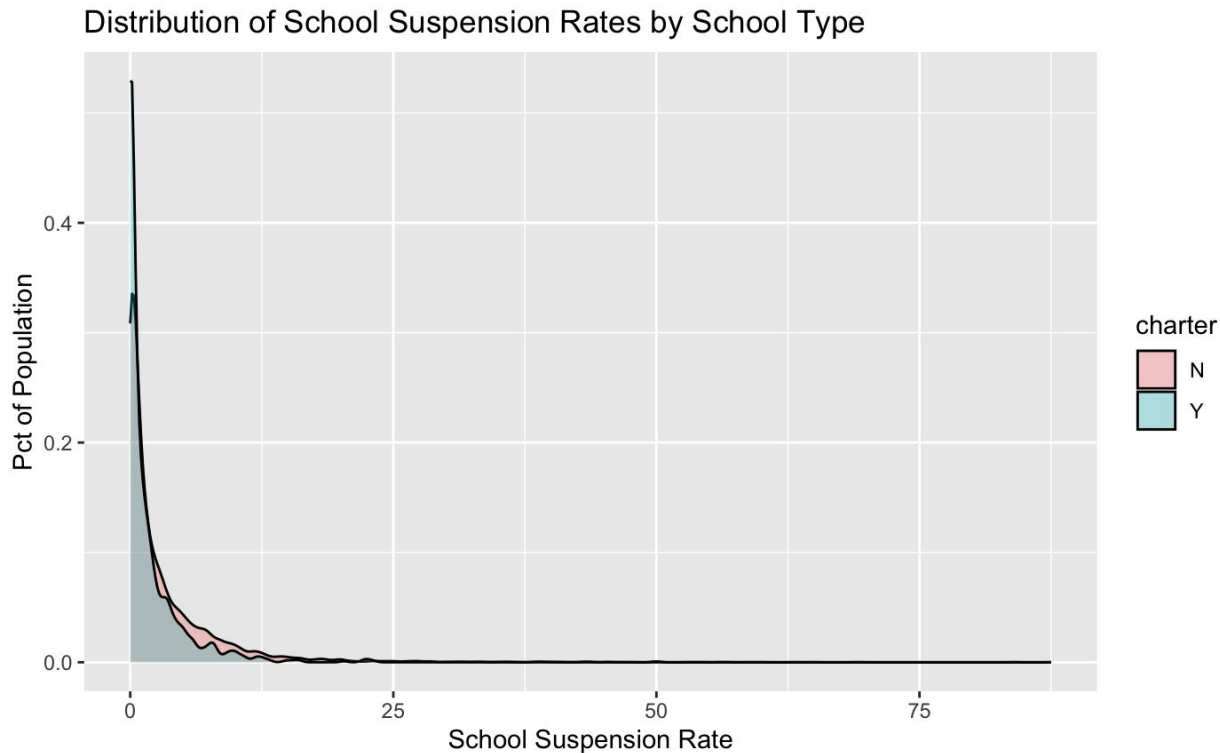
Elementary Schools represent 57% of all Public Schools

Number of Schools by School Level (Public)

School Level	N	Pct of Total
elementary	6743	0.57
elementary-high combo	504	0.04
high school	2931	0.25
intermediate/middle/junior high	1679	0.14

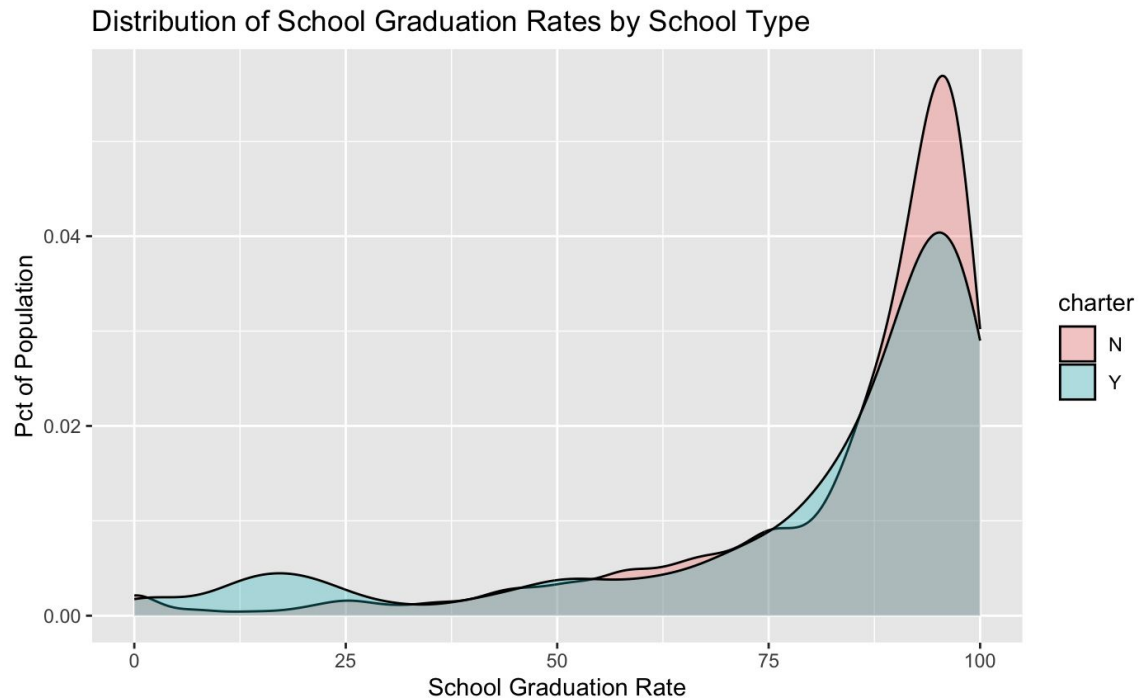


Mean suspension rate is 1.7% for Charter Schools vs. 3.3% for Public Schools



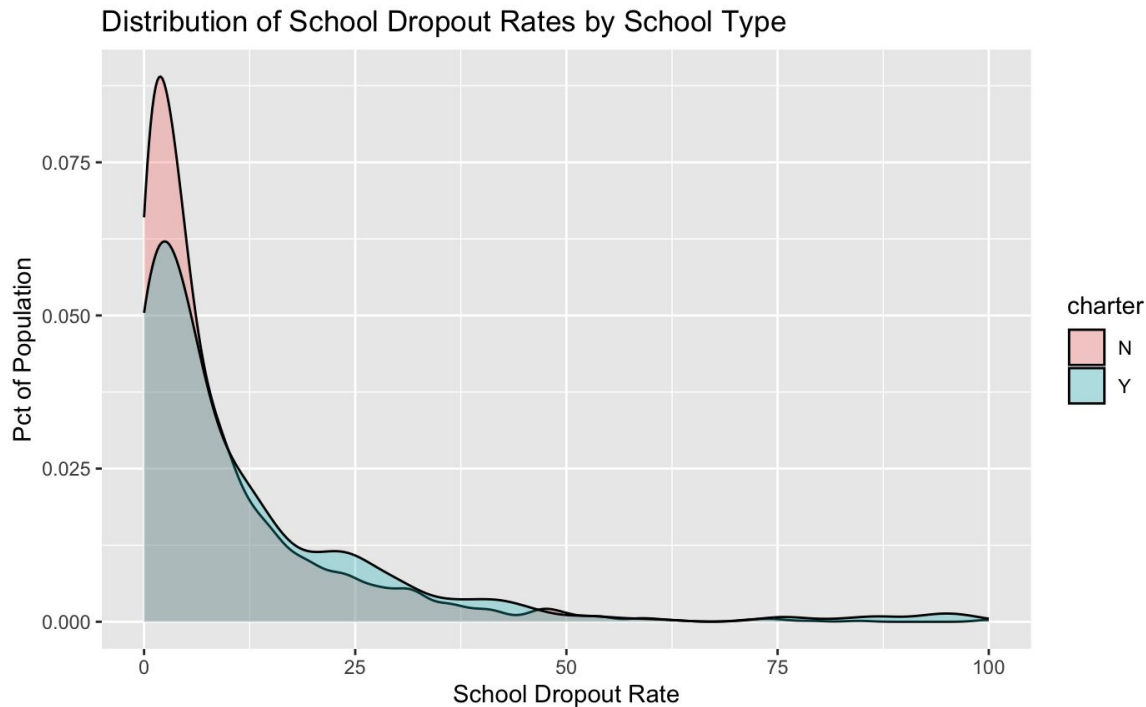


Mean graduation rate is **79%** for Charter Schools vs. **83%** for Public Schools



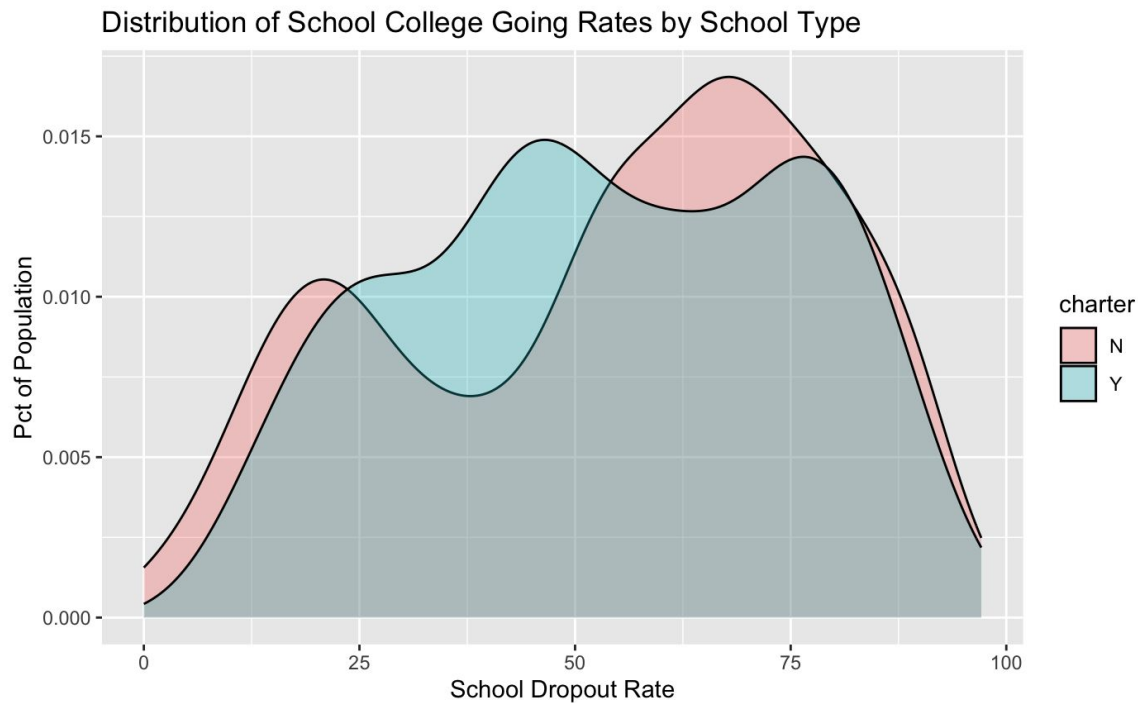


Mean dropout rate is 12% for Charter Schools vs. 9% for Public Schools



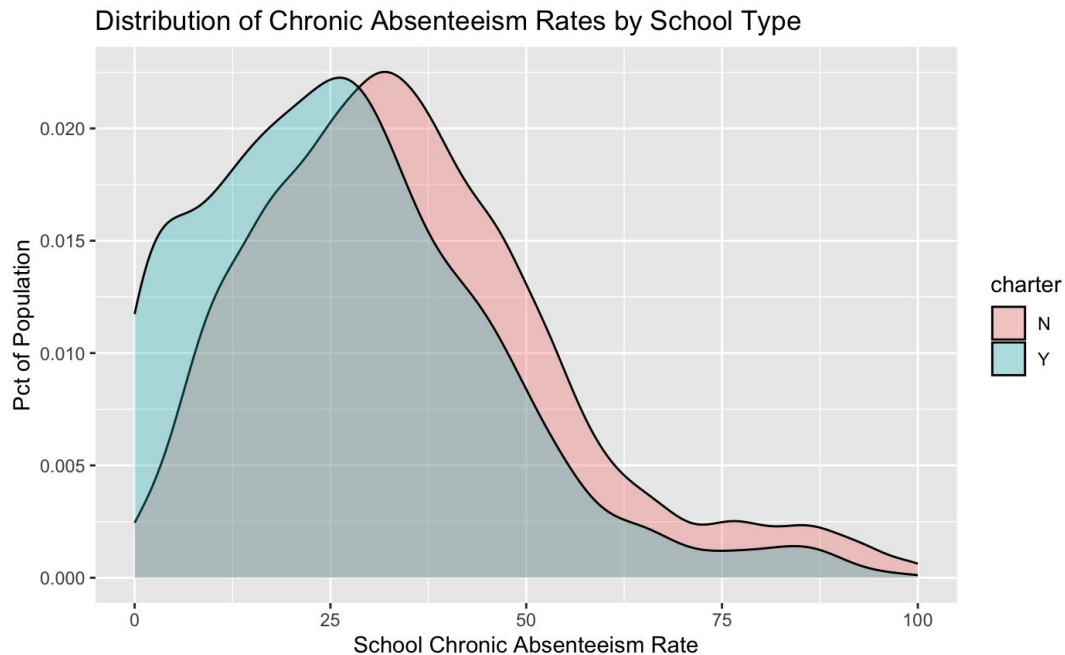


Mean college going rate is 53% for Charter Schools vs. 54% for Public Schools





Mean chronic absenteeism rate rate is 27% for Charter Schools vs. 35% for Public Schools

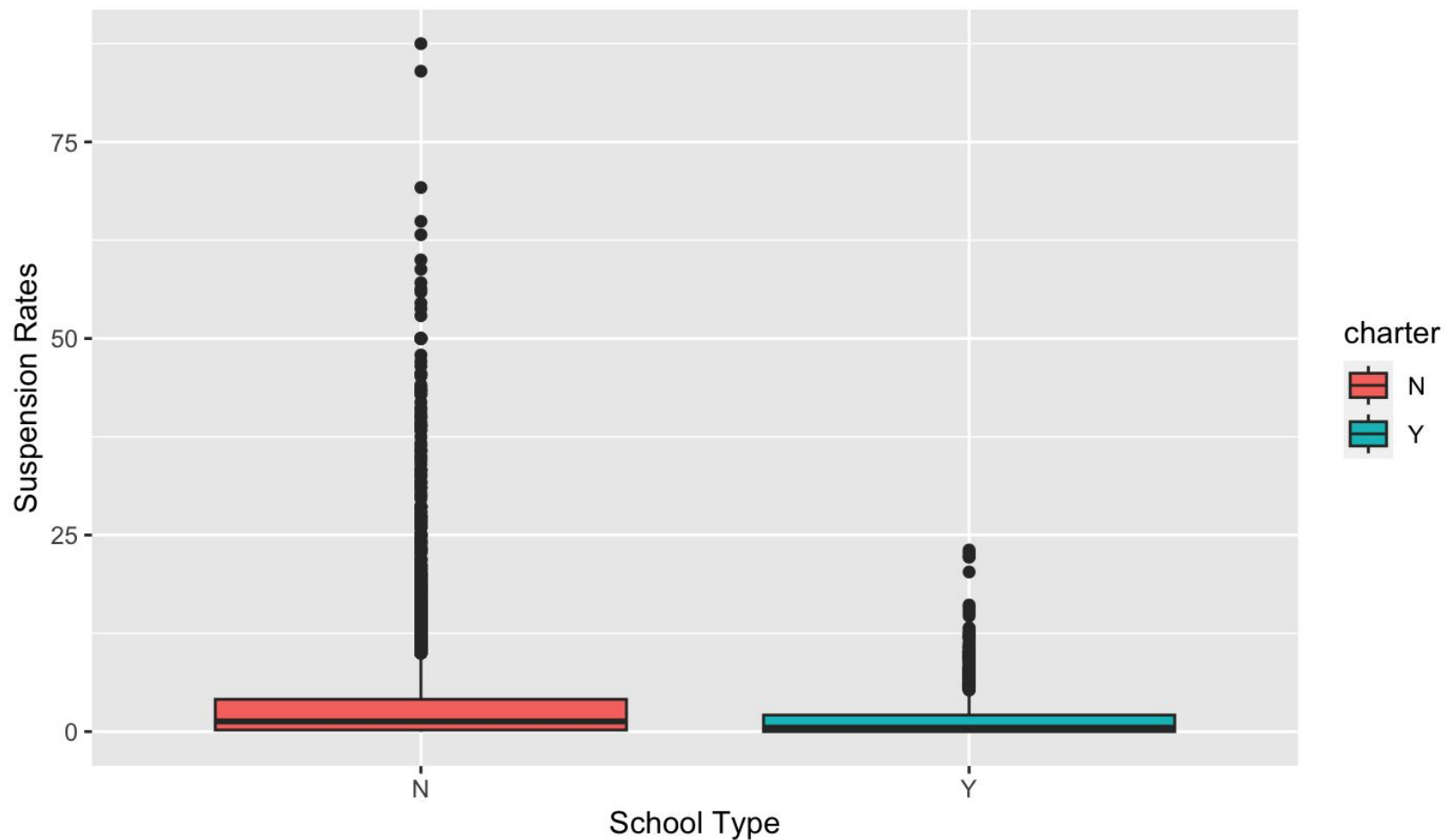




Analysis



Distribution of School Suspension Rates by School Type



Suspension Rates by School Type

Charter School	N	Sample Mean	Sample Std. Dev
N	8720	3.26	5.61
Y	1285	1.73	2.93



Difference in suspension rate is significant at 95% Level of Significance in favor of Charter Schools

Welch Two Sample t-test

data: sr_charter and sr_public

t = -15.016, df = 2922.7, p-value < 2.2e-16

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval:

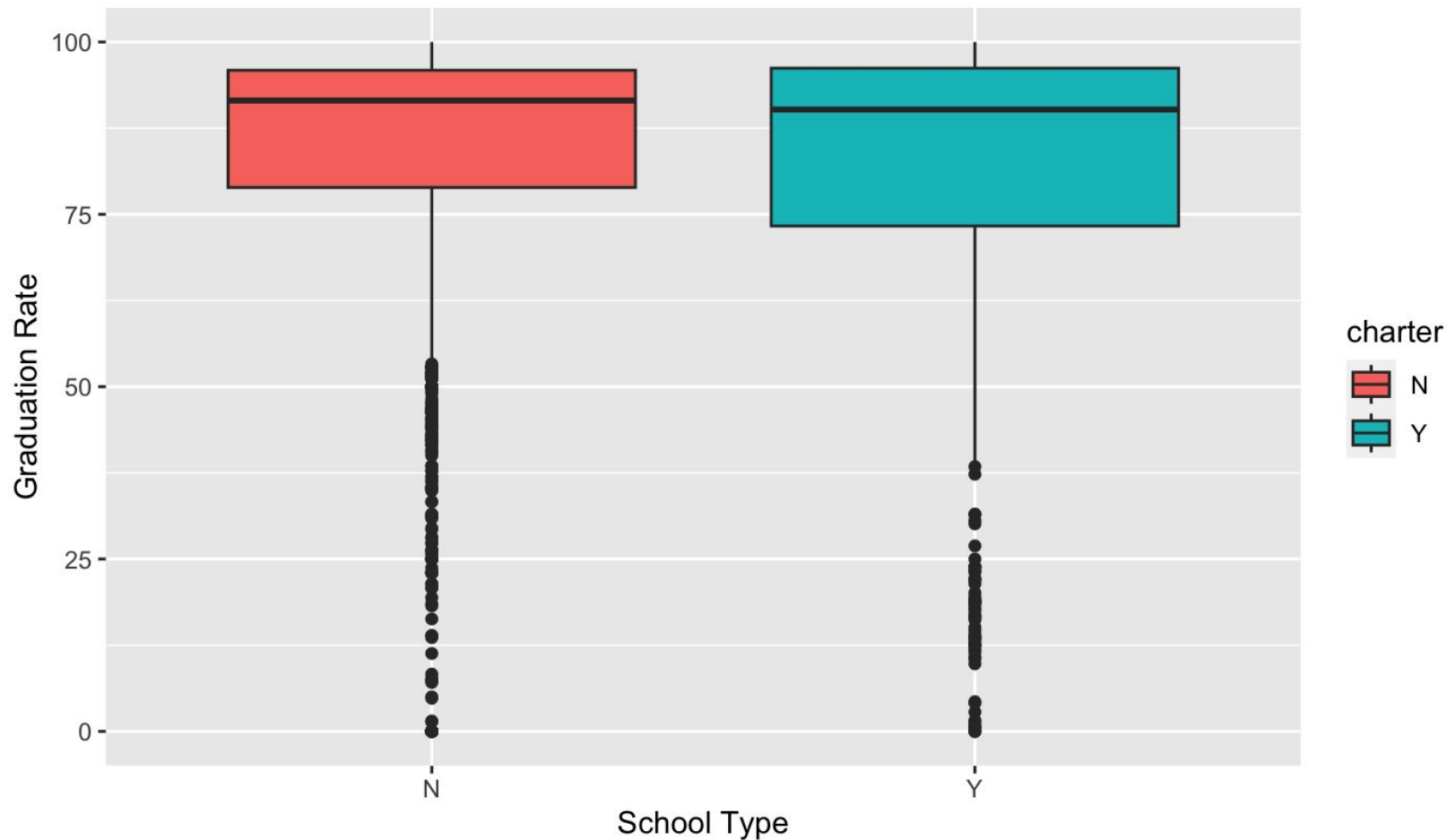
-1.722124 -1.324312

sample estimates:

mean of x mean of y

1.734397 3.257615

Distribution of School Graduation Rates by School Type



Graduation Rates by School Type

Charter School	N	Sample Mean	Sample Std. Dev
N	1759	83.43	20.07
Y	537	79.18	25.65



Difference in graduation rate is significant at 95% Level of Significance in favor of Public Schools

Welch Two Sample t-test

data: gr_charter and gr_public

t = -3.5241, df = 747.07, p-value = 0.0004507

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval:

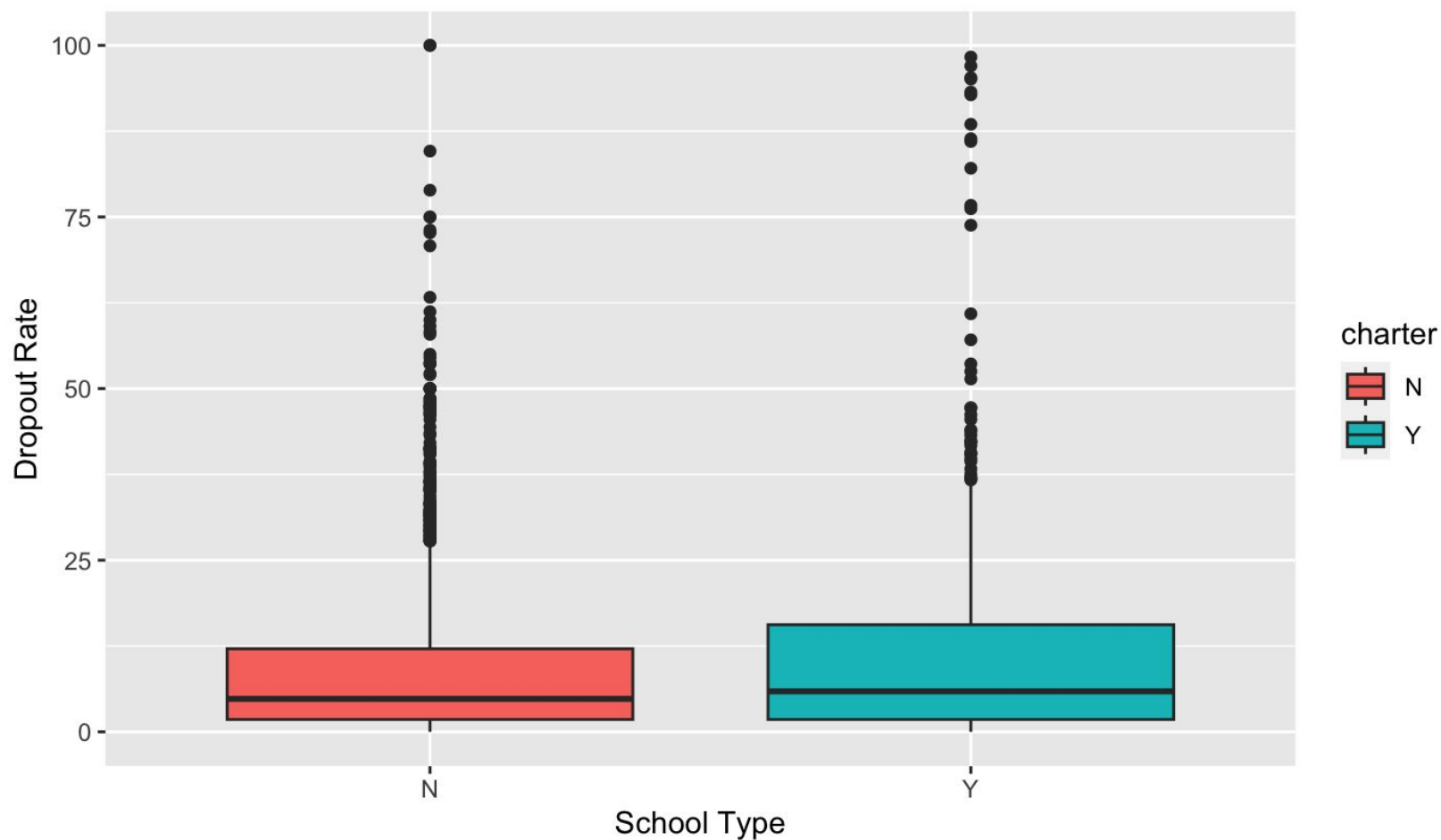
-6.616605 -1.882264

sample estimates:

mean of x mean of y

79.17598 83.42541

Distribution of School Dropout Rates by School Type



Dropout Rates by School Type

Charter School	N	Sample Mean	Sample Std. Dev
N	1759	9.27	11.90
Y	537	12.22	16.64



Difference in dropout rate is significant at 95% Level of Significance in favor of Public Schools

Welch Two Sample t-test

data: dr_charter and dr_public

t = 3.8232, df = 711.11, p-value = 0.0001433

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval:

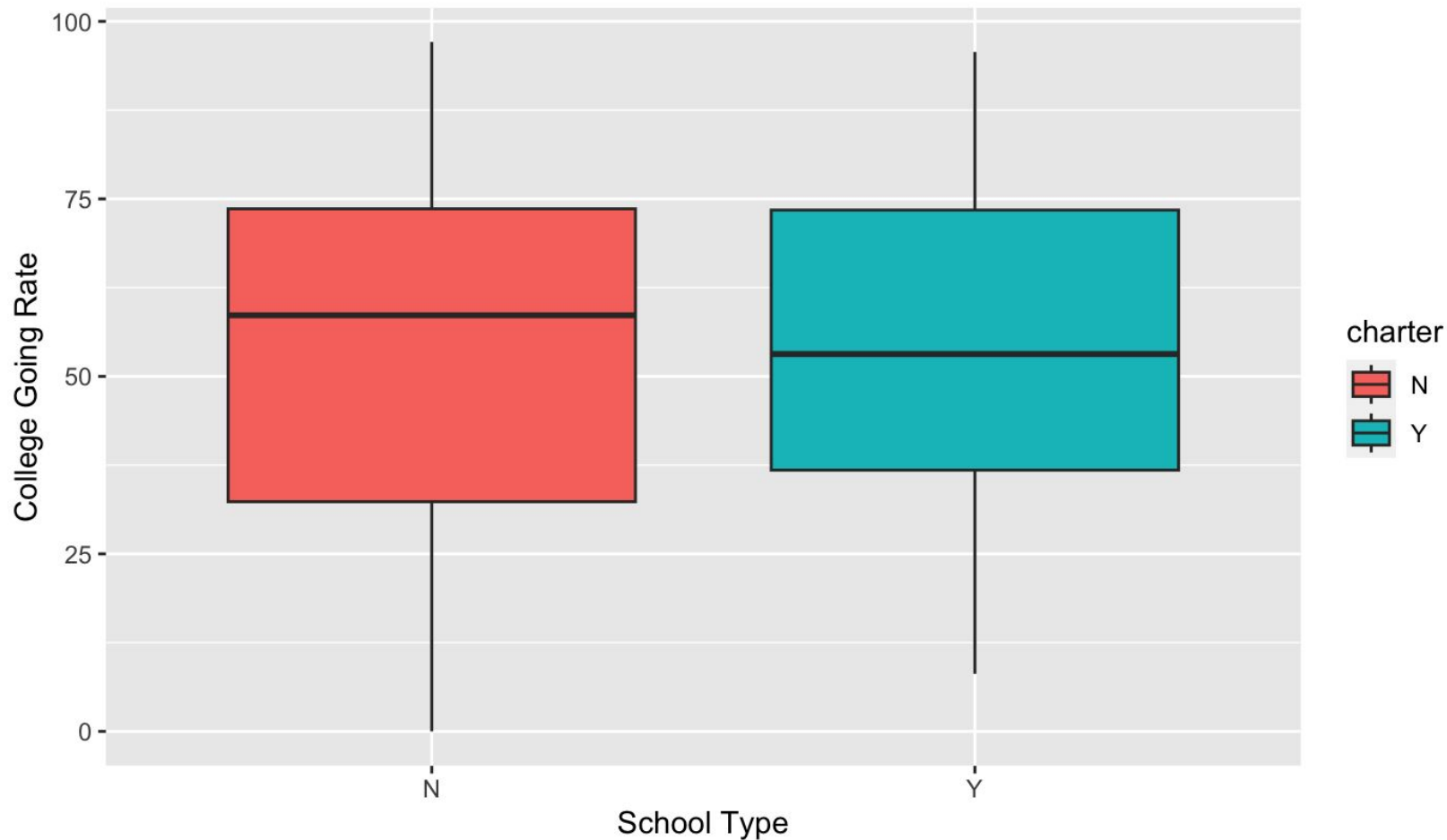
1.435686 4.466676

sample estimates:

mean of x mean of y

12.223836 9.272655

Distribution of School College Going Rates by School Type



College Going Rates by School Type

Charter School	N	Sample Mean	Sample Std. Dev
N	1535	54.02	24.48
Y	480	53.47	22.28



Difference in college going rate is not significant at 95% Level of Significance

Welch Two Sample t-test

data: cgr_charter and cgr_public

$t = 0.39652$, $df = 357.3$, $p\text{-value} = 0.692$

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval:

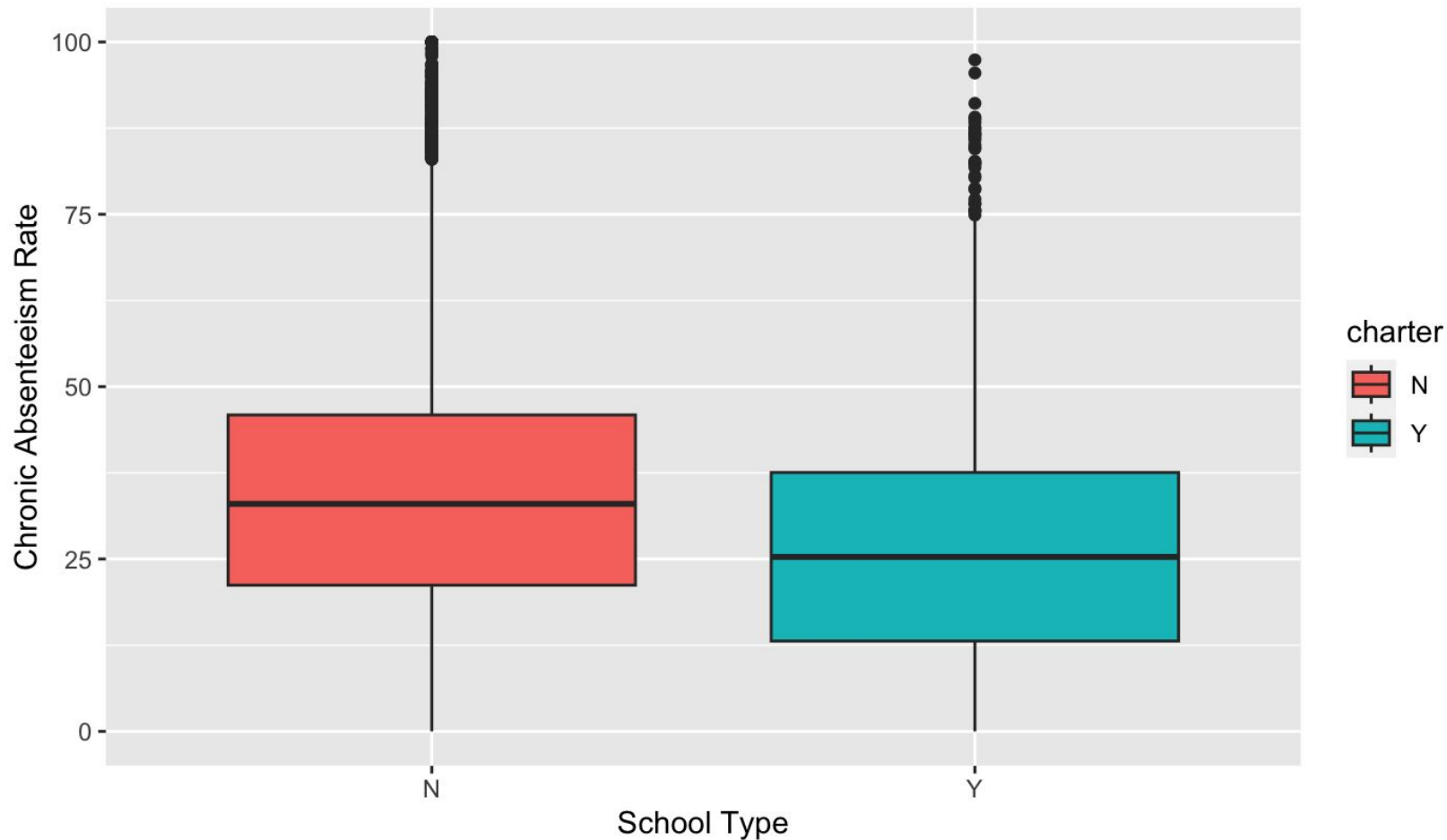
-2.577810 3.879835

sample estimates:

mean of x mean of y

55.40902 54.75801

Distribution of Chronic Absenteeism Rates by School Type



Chronic Absenteeism Rate by School Type

Charter School	N	Sample Mean	Sample Std. Dev
N	8622	35.15	19.37
Y	1283	26.95	18.41



Difference in chronic absenteeism rate is significant at 95% Level of Significance in favor of Charter Schools

Welch Two Sample t-test

data: ca_charter and ca_public

t = -14.78, df = 1732.3, p-value < 2.2e-16

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval:

-9.287698 -7.111556

sample estimates:

mean of x mean of y

26.94981 35.14943



Conclusion





Unable to conclude that Charter Schools are better than Public Schools

- Charter school outperformed Public school in suspension rate and chronic absenteeism rate
- Public school outperformed Charter school in graduation rate and dropout rate

Charter School vs. Public Schools

Category	Charter	Public
suspension_rate	1	0
graduation_rate	0	1
dropout_rate	0	1
college_going_rate	0	0
chronic_absenteeism_rate	1	0



Things can always be improved...

- Methodology use for creating a summary metric, used an equal weighting for each of the independent variables included
- Data did not take into account comparative performance across different demographic subgroups (e.g. race/ethnicity, gender, family income, foster status, homeless status, etc.)
- Analysis omitted a number of other potential qualitative factors that could have significant impact to the overall findings

Appendix



Link to published project files

- http://rpubs.com/korymartin/data606_final_project
- https://github.com/klmartin1998/data606_final_project



Description and link to source files

- [Public Schools and Directory](#) - Downloadable files containing general information about California's public schools and districts.
- [Discipline File](#) - Downloadable data about student discipline and the use of behavioral restraints and seclusion disaggregated by ethnicity, gender, program subgroup, and grade span.
- [Graduation and Dropout File](#) - Downloadable data files of the Four-year Adjusted Cohort Graduation Rate (ACGR) and Outcome data reported by race/ethnicity, program subgroup, and gender.
- [Chronic Absenteeism File](#) - Downloadable data files containing student absenteeism data by race/ethnicity, gender, program subgroup, and grade span. Chronic absenteeism counts, cumulative enrollment, and chronic absenteeism rate data are provided.
- [College-Going Rate for High School Completers File \(16-month\)](#) - College-Going Rate (CGR) for California high school completers 16 months after high school completion reported by race/ethnicity, student group, and academic year.



Documentation for Source Files

- Public Schools and Districts - <https://www.cde.ca.gov/ds/si/ds/fspubschls.asp>
- Chronic Absenteeism - <https://www.cde.ca.gov/ds/ad/fsabd.asp>
- Suspensions - <https://www.cde.ca.gov/ds/ad/fssd.asp>
- Dropout - <https://www.cde.ca.gov/ds/ad/fsacgr.asp>
- Post-Secondary Enrollment - <https://www.cde.ca.gov/ds/ad/fscgr16.asp>