Are Charter Schools Better than Public Schools?

DATA 606 - Kory Martin

Agenda

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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?”

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

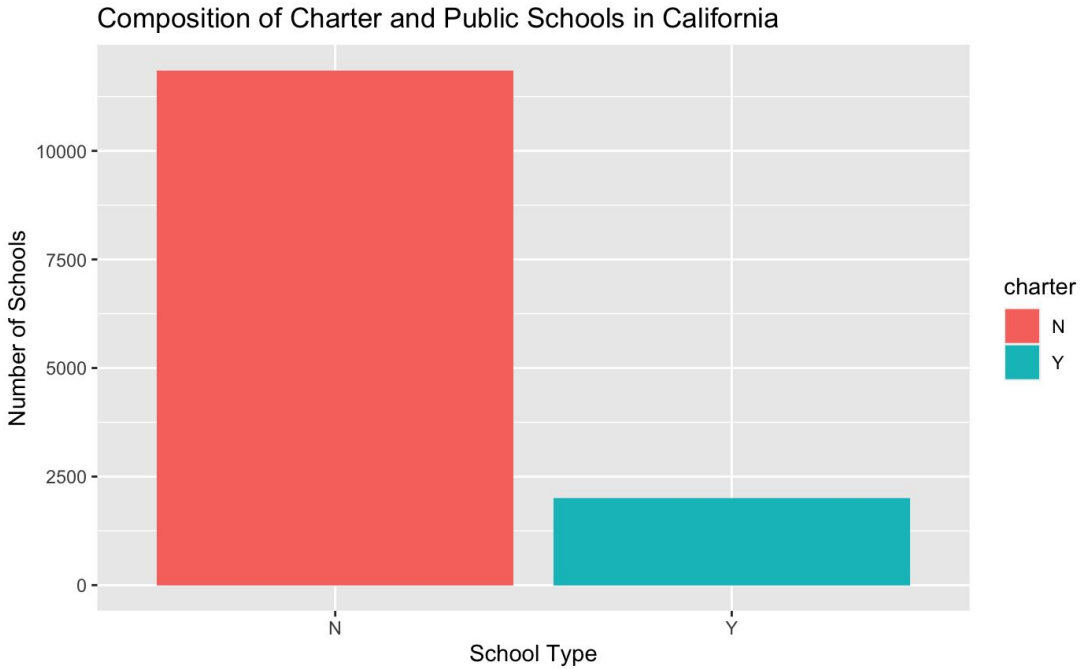
Methodology

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)

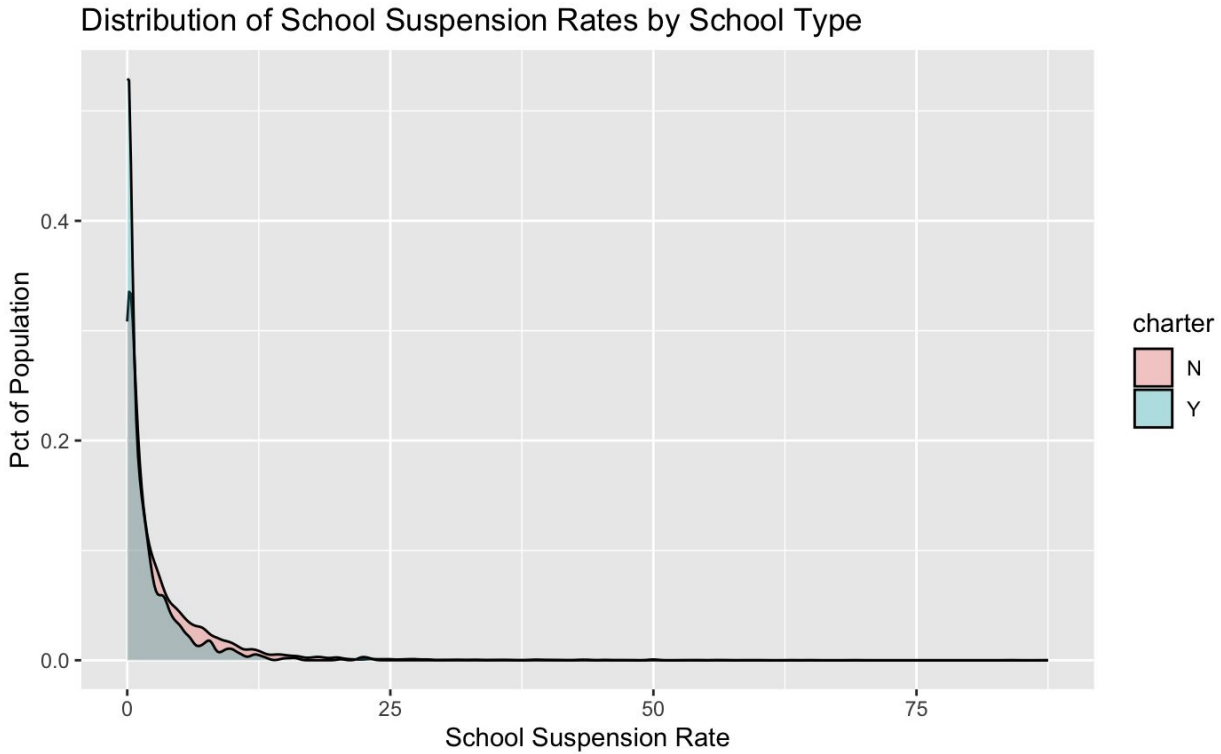
School Level	N	Pct of Total
elementary	787	0.39
elementary-high combo	468	0.23
high school	541	0.27
intermediate/middle/junior high	207	0.10

Elementary Schools represent 57% of all Public Schools

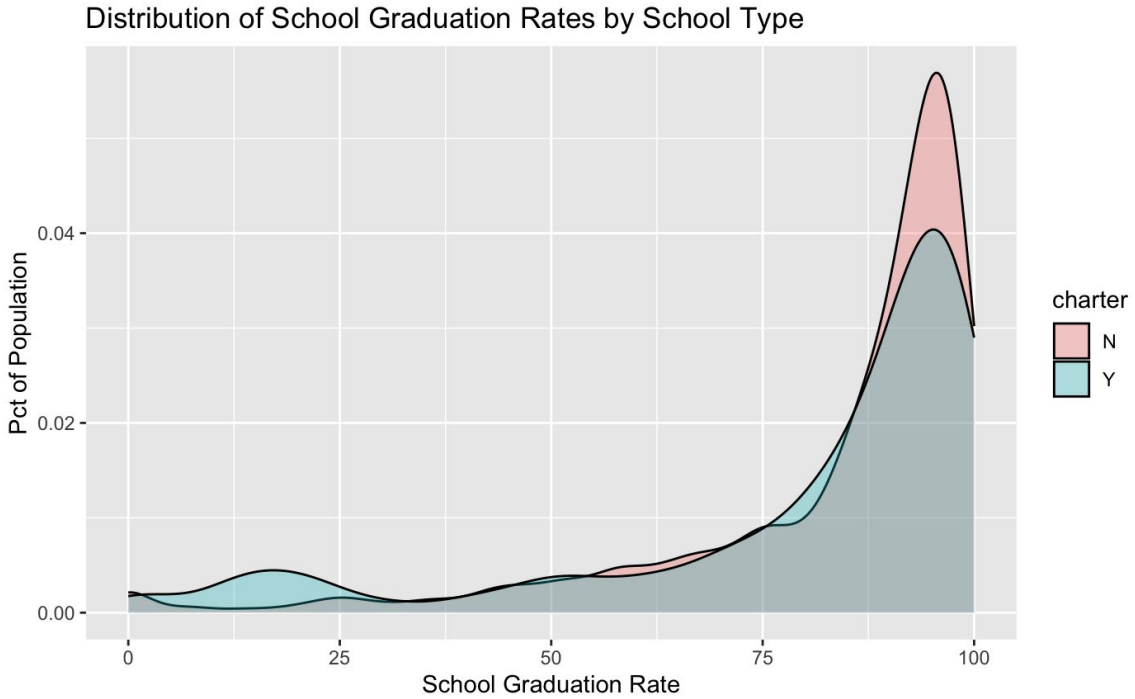
Number of Schools by School Level (Public)

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

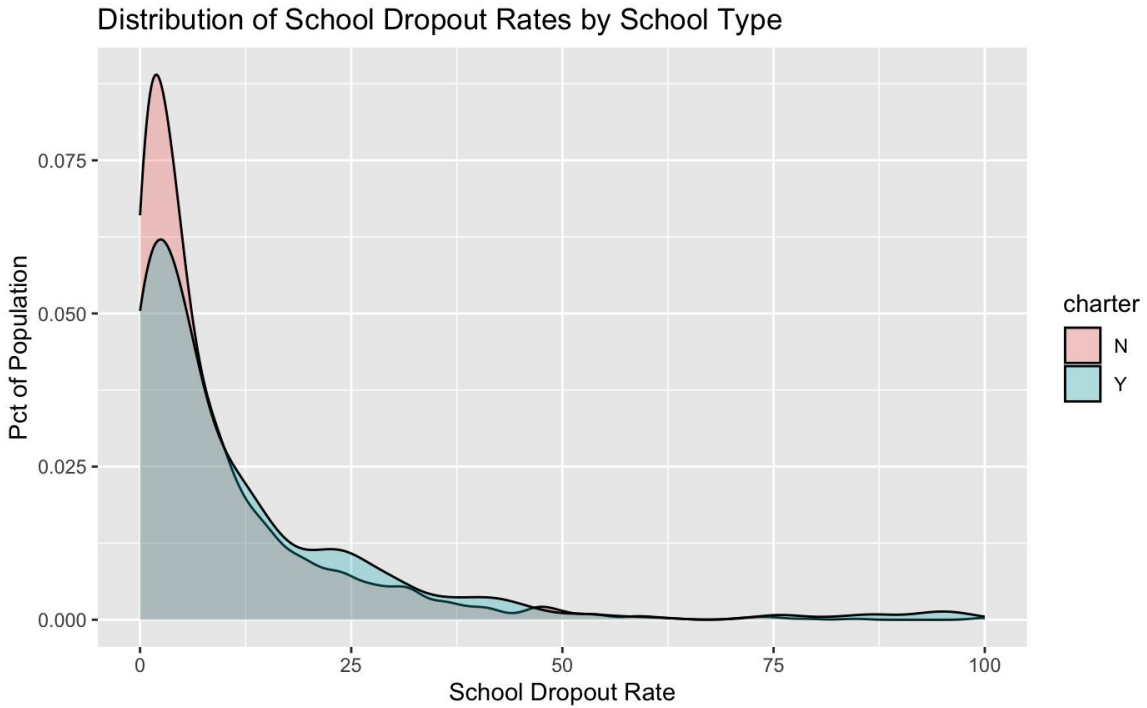
Mean suspension rate is 1.7% for Charter Schools vs. 3.3% for Public Schools



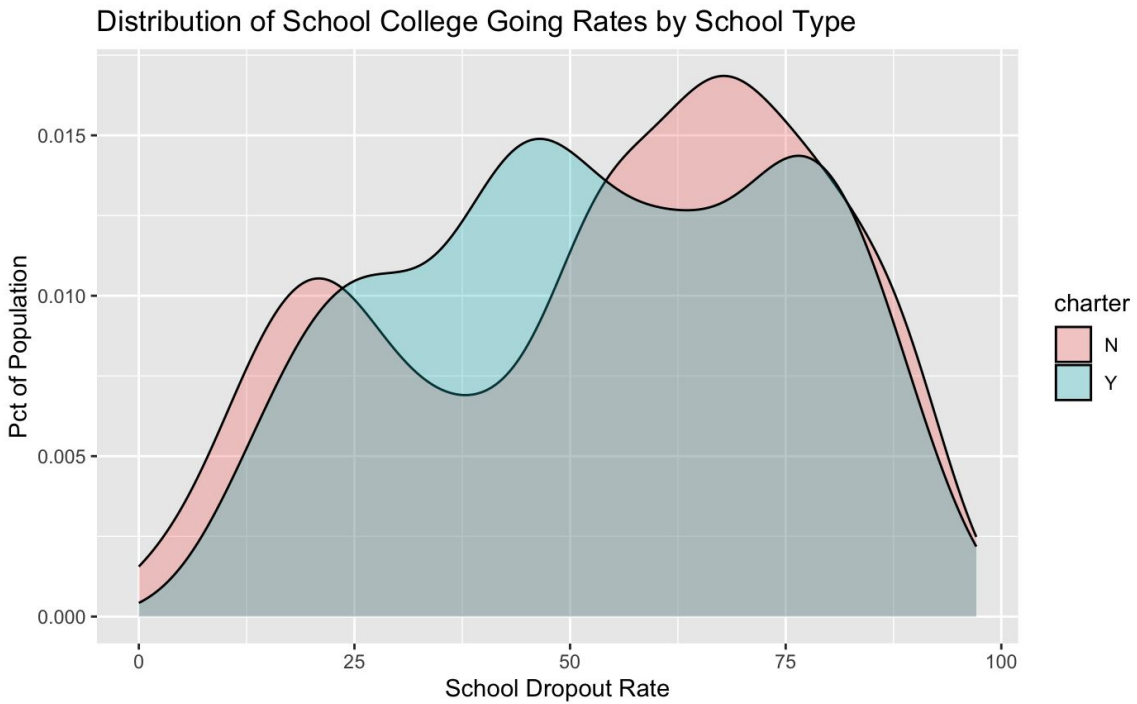
Mean graduation rate is 79% for Charter Schools vs. 83% for Public Schools



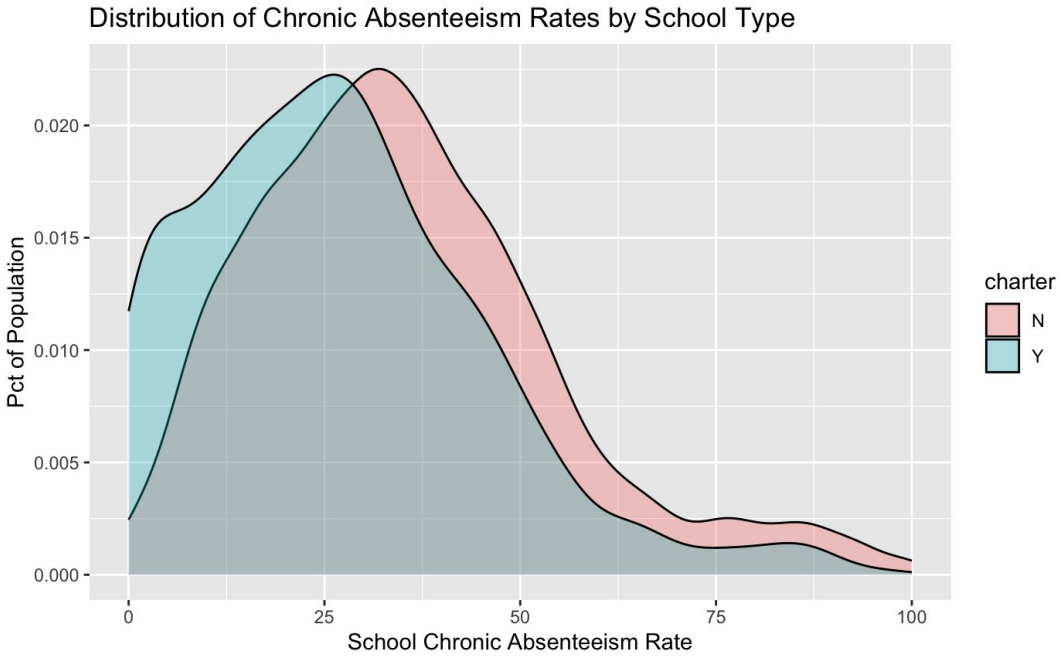
Mean dropout rate is 12% for Charter Schools vs. 9% for Public Schools



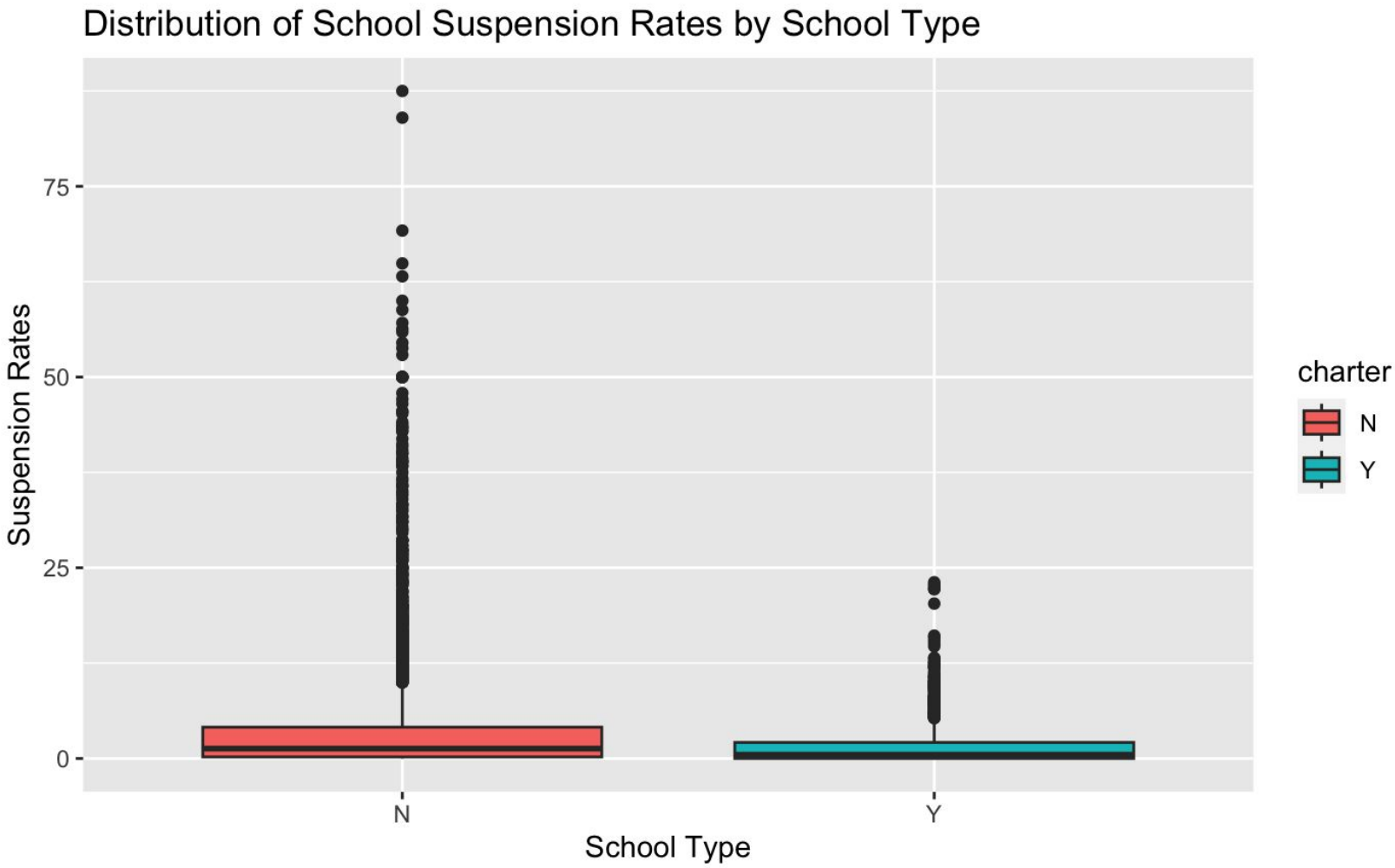
Mean college going rate is 53% for Charter Schools vs. 54% for Public Schools



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
75
50
25
0
N
Y
School Type
charter
N
Y

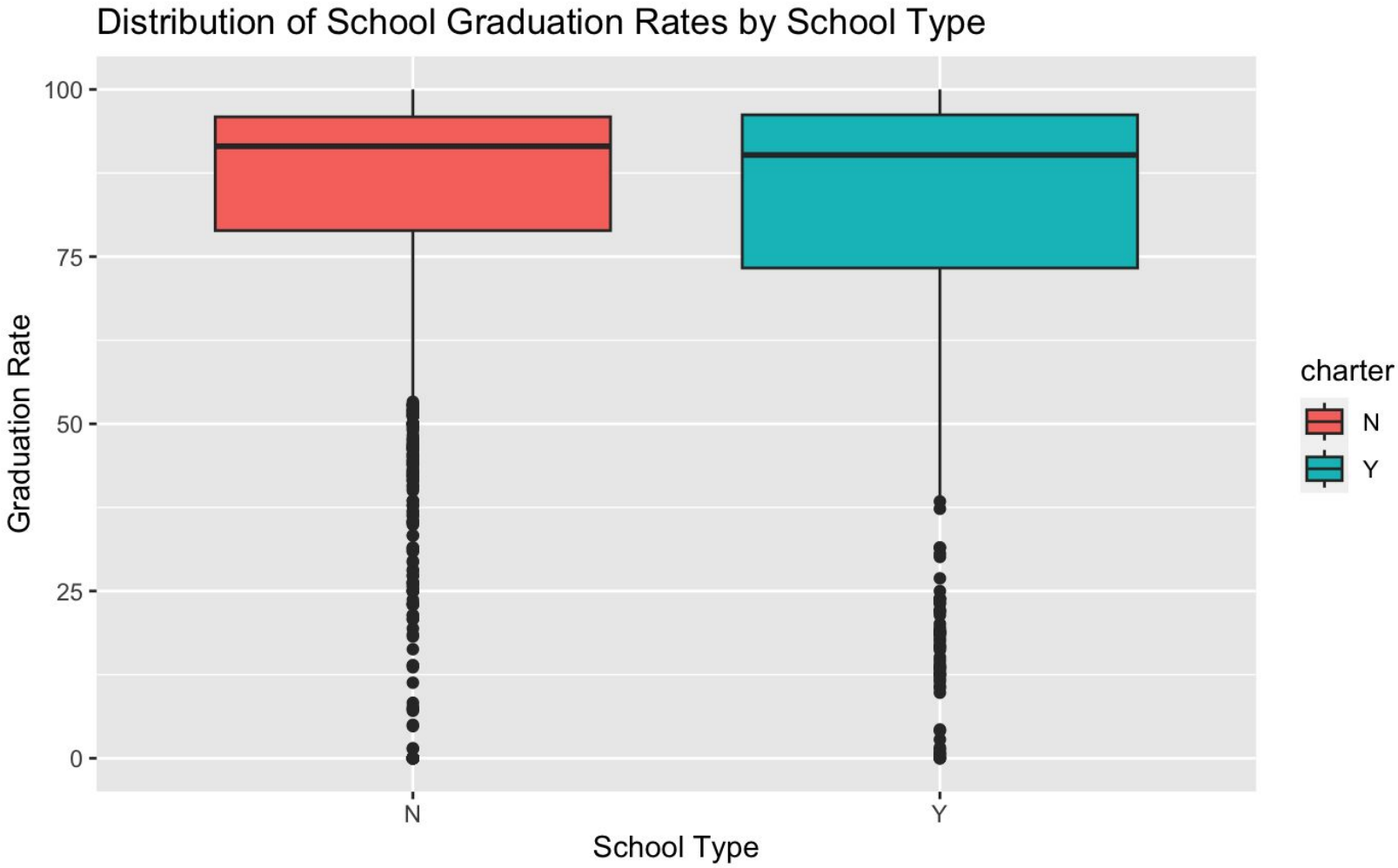
Suspension Rates by School Type

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 Rate
100
75
50
25
0
N
Y
School Type
charter
N
Y

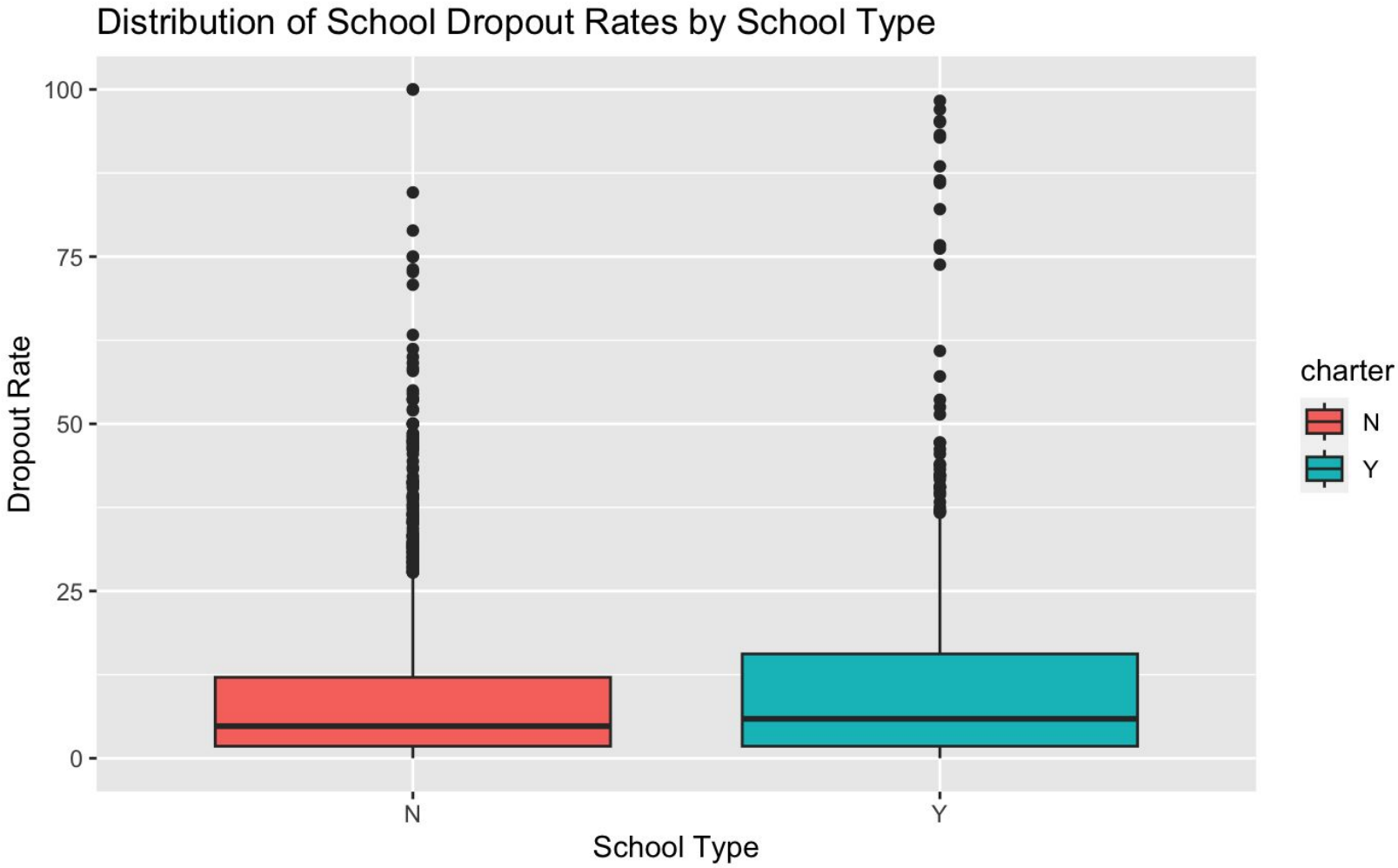
Graduation Rates by School Type

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 Rate
100
75
50
25
0
N
Y
School Type
charter
N
Y

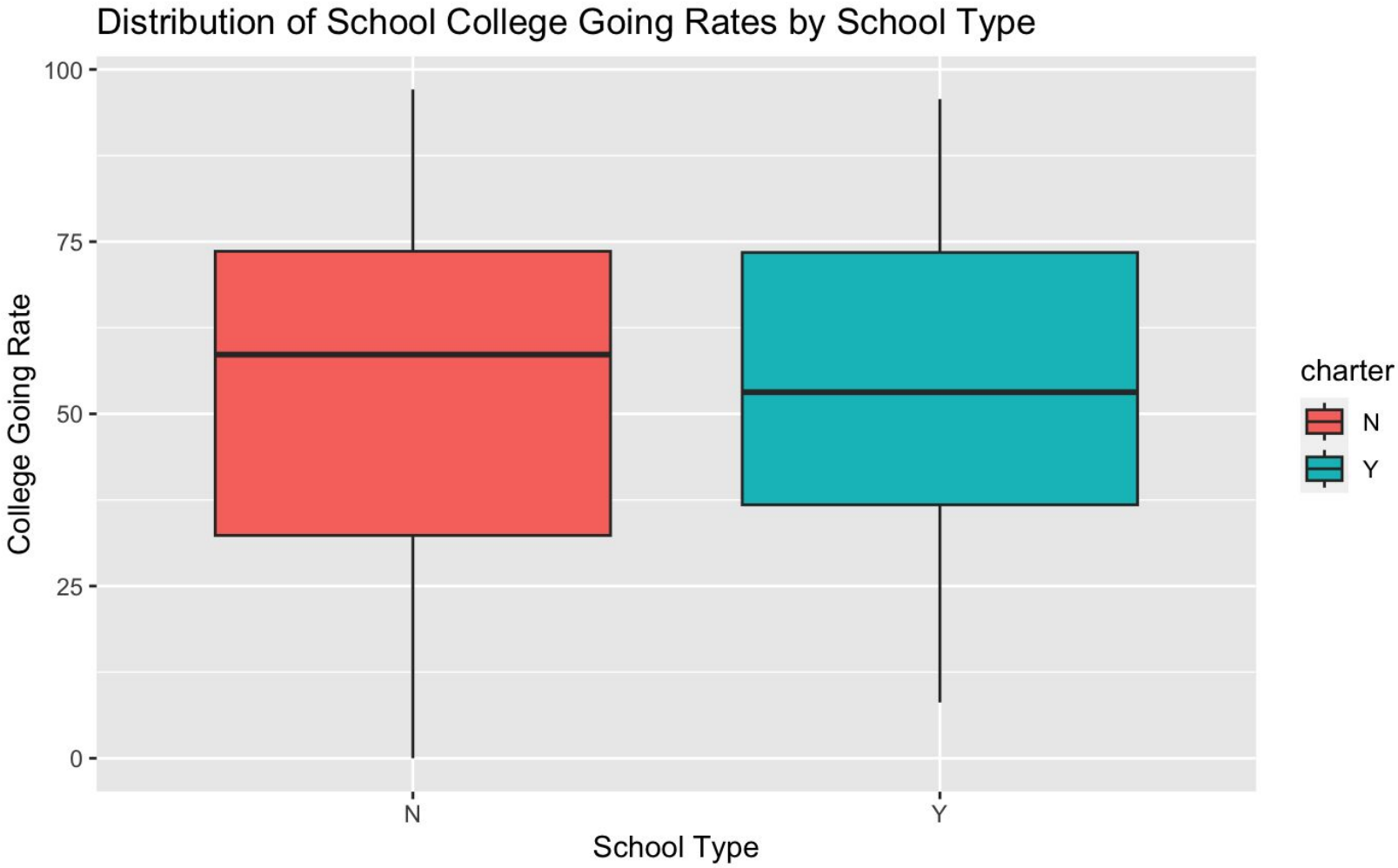
Dropout Rates by School Type

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
100
75
50
25
0
College Going Rate
N
Y
School Type
charter
N
Y

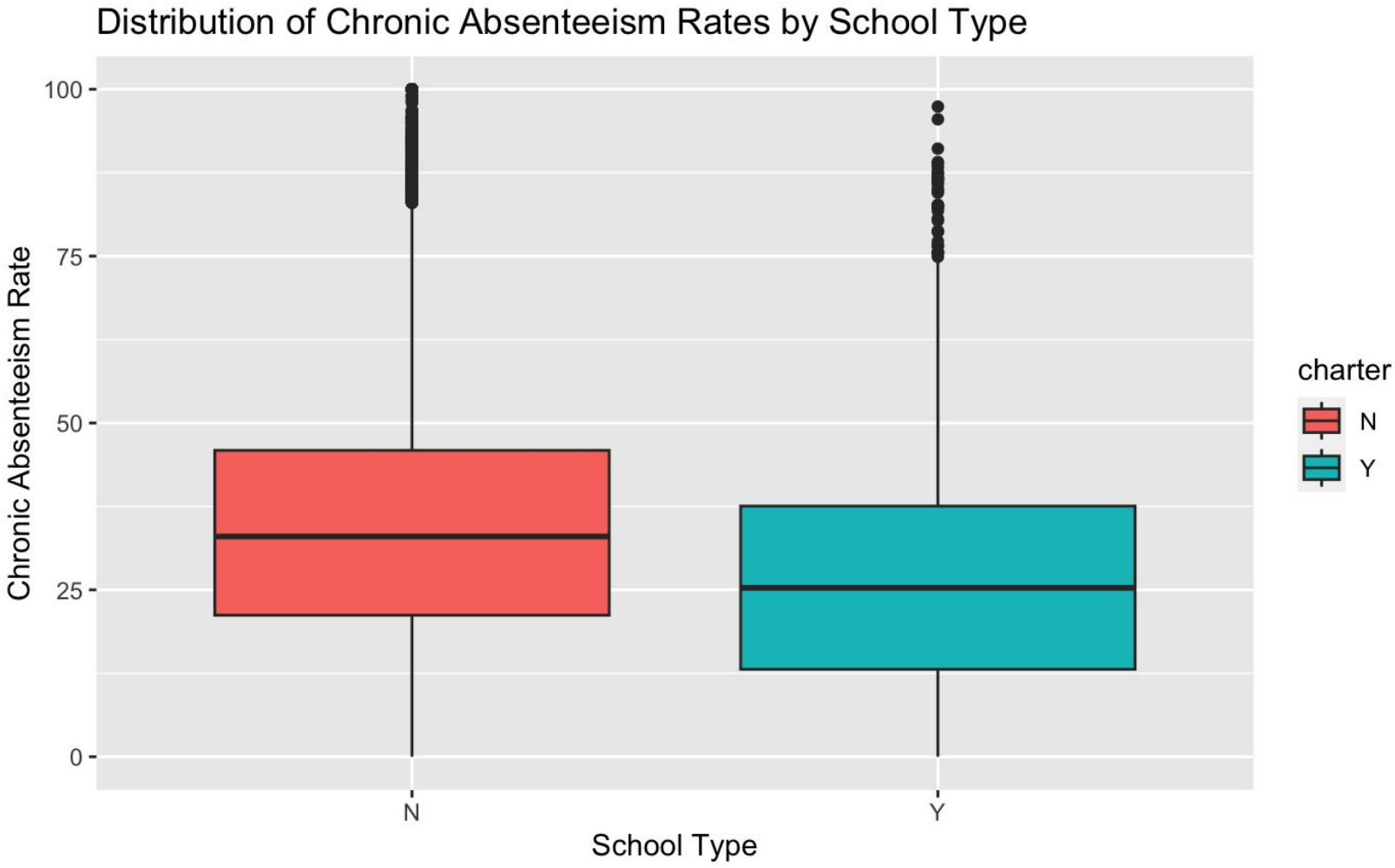
College Going Rates by School Type

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-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
100
75
50
25
0
N
Y
School Type
charter
N
Y

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

Why is this analysis important?

- Educational attainment contains 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

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