

# The Relationship of Student Attendance and Student Proficiency in English, Language, and Arts

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## Abstract

While multiple researchers have suggest a relationship between student attendance and student proficiency, our research examined this relationship using school-level data from the Oregon Department of Education in the latest academic year, 2021-2022.

Our regression model predicts that any 1 percentage point increase in a school's ratio of regular attenders, there is an additional, statistically significant 0.75 percentage point increase in the school's ratio of students proficient in English, Language, and Arts.

We also provide a preliminary observation of how the attendance-proficiency relationship varies across student racial and ethnic groups. While our visual exploration suggests that this relationship does vary, additional research is needed to take into account other factors that may correlate with race such as familial background and socio-economic factors.

## Introduction

It is a common assumption that with chronic absenteeism, students' academic performance decreases, as when students fail to attend school, they miss the opportunity to learn. Previous reviews have stated that chronic absenteeism produces multiple impacts on student outcomes, including lower scores on reading and math, social-emotional development, grade retention and dropout and student discipline (Patnode, Gibbons, and Edmunds 2018). On the long run, chronic absenteeism may lead to failure to graduate, underemployment, and financial instability (Henderson, Hill, and Norton 2014). In turn, regular attendance to classes should be a predictor of better performance, and lead to an increased likelihood of graduation.

Multiple social and economic factors can affect attendance to school. Among these are economic hardship, food insecurity, housing instability, health care access, failing home and school infrastructure, transportation, under-resourced schools, school climate and culture, and attendance culture (Henderson, Hill, and Norton 2014). In fact, school attendance can vary by student group. A national report found variations in attendance and chronic absenteeism when comparing gender, race/ethnicity and language status, free or reduced- price lunch eligibility (proxy for poverty status), and individualized education program status (proxy for disability status) (Garcia and Weiss 2018).

School profiles and reports to the Department of Education include relevant information on school characteristics that can be used to understand how social and economic factors affect student performance (Oregon Department of Education n.d.). In the state of Oregon, previous data has shown how factors related to absenteeism affect student performance. For example, a report from 2014 showed that in Oregon children of color were disproportionately affected by the consequences of chronic absenteeism. In addition, it showed that for 2009-2010, the student groups with higher absenteeism rates were Black, American Indian and Economically Disadvantaged students (Henderson, Hill, and Norton 2014).

Regarding attendance data, in Oregon students are considered “Regular Attenders” if they attended more than 90% of their enrolled days between the beginning of the school year and the first school day in May. In contrast, they are considered chronically absent if they attended 90% or fewer of their enrolled days in this period (Oregon Department of Education 2022).

To explore if regular attendance to classes affected student performance during the school year 2021-2022, we used data from the Oregon Department of Education (ODE) to examine the following research questions:

- Does attendance rate affect student proficiency in English, Language, and Arts? and;
- Does such a relationship between attendance and proficiency vary for different racial and ethnic groups?

## Methods

We obtained two data sets from the Oregon Department of Education (ODE): attendance rate by school and student group, and proficiency in English, Language, and Arts by student group in the 2021-2022 academic year. We explored the data visually and ran a regression model to examine the relationship between attendance and proficiency in Oregon schools.

Both data sets we have contain school-level data, broken down by racial and ethnic groups. While the relationship between attendance and student proficiency would be better explained from student-level data, we were not able to obtain data in such format. Our analysis is based on data at the school or institution level.

## Methodological approach

The research questions and methodological approach we used to answer each of them are:

### **RQ1: Does attendance rate affect student proficiency in English, Language, and Arts?**

To answer the first research question, we run a linear regression model, using schools’ proficiency rate as the dependent variable, and attendance rate as the independent variable. Our regression equation is:

$$\text{Percent of proficient students} = B_0 + B_1 (\text{Percent of regular attendance}) + e$$

Our hypothesis is that schools with higher student attendance have higher rate of student proficiency in English, Language, and Arts.

### **RQ2: Does such a relationship between attendance and proficiency vary for different racial and ethnic groups?**

For the second question, we looked at whether students’ racial and ethnic backgrounds had implications on the effect of attendance on student proficiency. In other words, if students have different racial and ethnic backgrounds, would attendance improve proficiency in the same way. From the literature we reviewed, our hypothesis is that schools will see different impacts of attendance on proficiency for different student groups. To answer this question, we only developed an assessment of the data based on multiple graphics, without fitting a statistical model.

## Data description and preparation

We used (R Core Team 2021) package (Müller 2020) to read in the two data sets from Oregon Department of Education (ODE) into the (R Core Team 2021) environment. We use (Firke 2021) to clean the names. After preparing the data sets, we display them as tables using (Wickham et al. 2019).

The first data set is student performance in English Language and Arts (ELA) from all schools in the state. The data set provides the number and percentage of students that are proficient in each of the four levels of ELA proficiency, stratified by school, race and ethnicity, and grade level. This data set has 20046 rows and 20 columns.

The second data set is student attendance data from all the schools in Oregon. This data set provides the number and percentage of regular attenders as well as those of chronically absent students, stratified by school and either race and ethnicity or grade level. This data set has 42295 rows and 11 columns.

We cleaned the two data sets by removing rows with no data and rows with suppressed data, marked as “-” and “\*” respectively. We use {dplyr} package functions in (Wickham et al. 2019) to do so.

After cleaning, we merged the two data sets by matching schools’ IDs and student race and ethnicity. Rows with attendance data only or proficiency data only will be removed. We used the *left\_join* in the {dplyr} and *drop\_na* in {tidyr}, all contained in (Wickham et al. 2019).

After cleaning the data, a total of 1086 schools were included in the sample, containing information of the percentage of proficient students and the percentage of regular attendance by race or ethnicity in each school. We use this cleaned data set to run a regression model as described in the Methodological approach section.

From our clean data set, we identified six racial and ethnic groups: Asian, Black African American, Hispanic/Latino, Multi-racial, Pacific Islander and White. Pacific Islander included students identified as having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands and not Hispanic. We examined the relationship between attendance and student proficiency for each racial and ethnic group using a summary table (attained by using *pivot\_wider*, *pivot\_longer*, and *kable*) and a visual exploration (attained by using *ggplot*). We did not run regressions for the racial and ethnic groups.

## Results

### The relationship between attendance and proficiency at school level

We ran a simple regression analysis to examine the relationship between the percentage of regular attenders and the percentage of proficient students in Oregon schools. A total of 1086 Oregon schools with existing data were included in the sample.

The results indicated that the percent of regular attendance could statistically significantly predict the percent of proficient students  $B1=0.75$ ,  $SE(B1)=0.02$ ,  $t(2237)=32.5$ ,  $p<.0001$ . The results explained that regular attendance accounted for 32% of the explained variability in the percent of proficient students,  $F(1, 2237) = 1056$ ,  $p < .0001$ . The regression equation was:

$$\text{Percentage of proficient students} = -6.09 + 0.75 (\text{Percentage of regular attendance})$$

This equation indicates that for a 1 percentage point increase in a school’s ratio of regular attenders, there is a 0.75 percentage point increase in that school’s ratio of proficient students in English, Language, and Arts. We created Figure 1 to demonstrate our data analysis using {ggplot2} of (Wickham et al. 2019).

## Student Attendance and Proficiency Rate in English, Language, and Arts

Data from Oregon Education Department

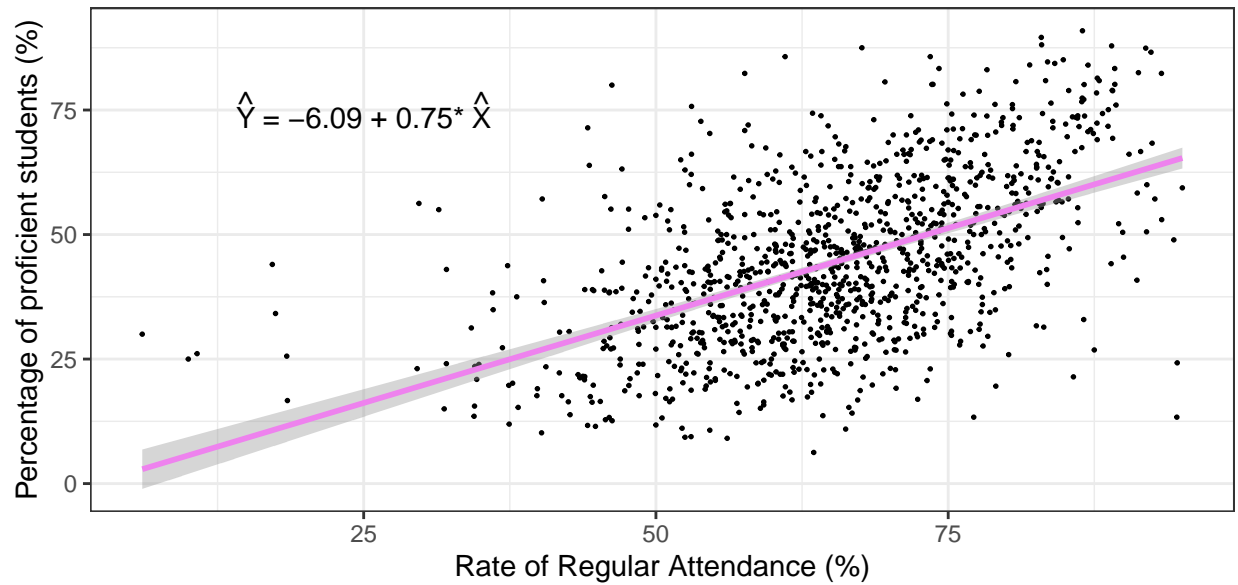


Figure 1

## The relationship between attendance and proficiency among different student racial and ethnic groups

Table 1 provides a summary of the mean attendance rate and mean proficiency rate for six racial and ethnic groups across Oregon schools. Figure 2 and Figure 3 provide a visual display of how attendance and proficiency data spread for different groups.

Table 1: Summary table

Race/ ethnicity	Percent regular attenders	Percent proficient
Asian	86.21	64.18
Black African American	50.61	19.60
Hispanic/Latino	56.12	26.11
Multi Racial	66.25	51.56
Pacific Islander	36.18	15.99
White	67.28	50.98

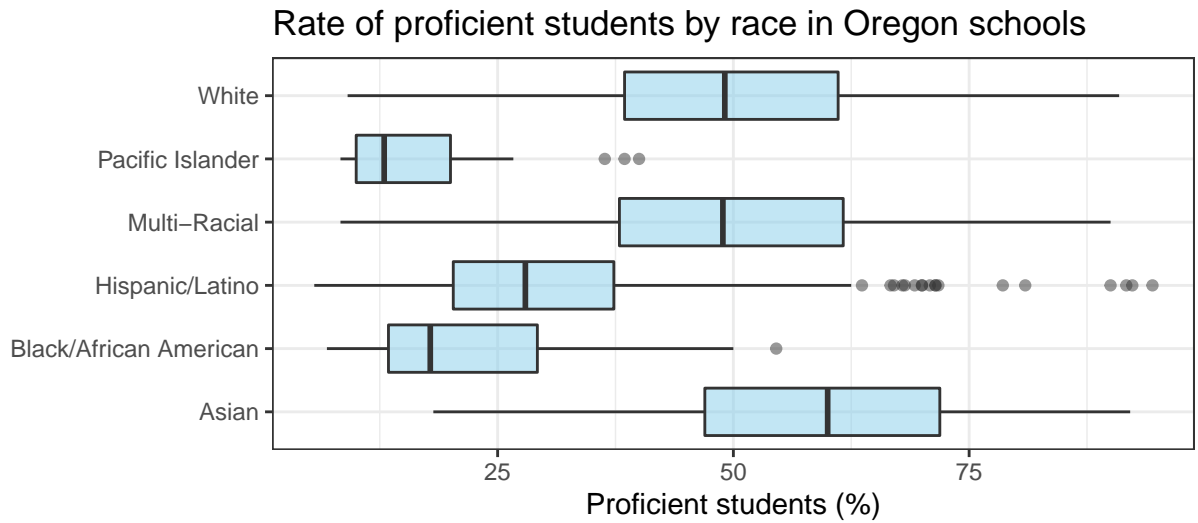


Figure 2

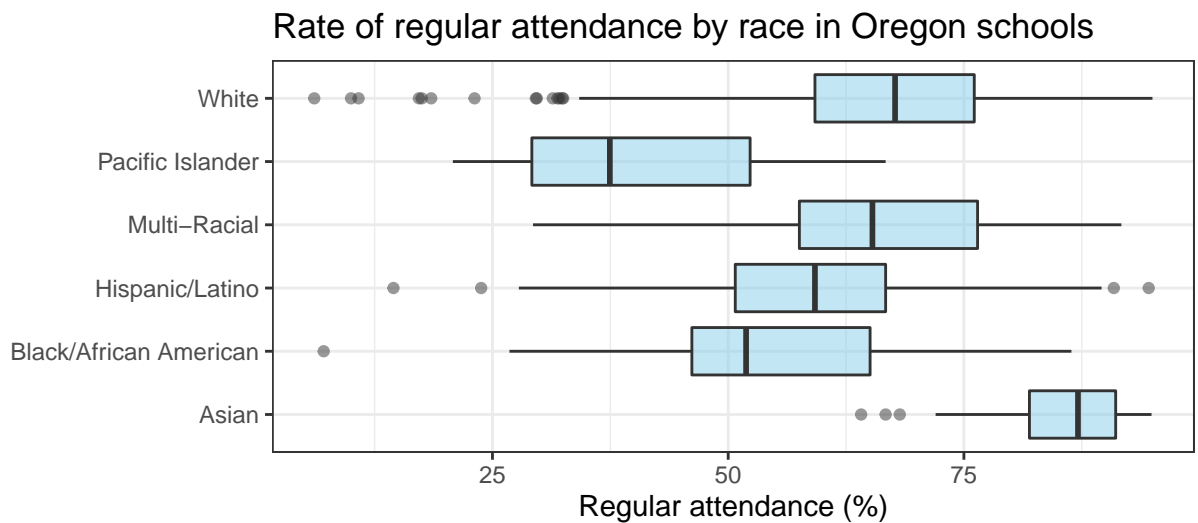


Figure 3

In term of proficiency, there are vast differences in the mean rate of proficient students between different racial and ethnic groups. If we take White as the reference group with 50.98% students proficient in English, Language, and Arts, the Asian group had a higher proficiency rate of 64.18% while the Pacific Islander, Black/African American, and Hispanic/Latino groups had considerably lower proficiency rates of 15.99%, 19.60%, and 26.11%, respectively.

In term of attendance, we found a similar pattern, although the differences are less profound. The White reference group had 67.28% regular attenders. The Asian group surpassed the White group with 86.21% regular attenders. This ratio for Pacific Islanders, Black/African Americans, and Hispanics/Latinos is 36.18%, 50.61%, and 56.12%, respectively.

The Multi-racial group had similar rates as the White group in both attendance and student proficiency with slight differences.

In Figure 4 below, we used *facet\_wrap* function of {ggplot2} plot the rate of regular attendance by percentage of proficient students based on the race.

## Student Attendance and Proficiency Rate in English, Language, and Arts by Different Races

Data from Oregon Education Department

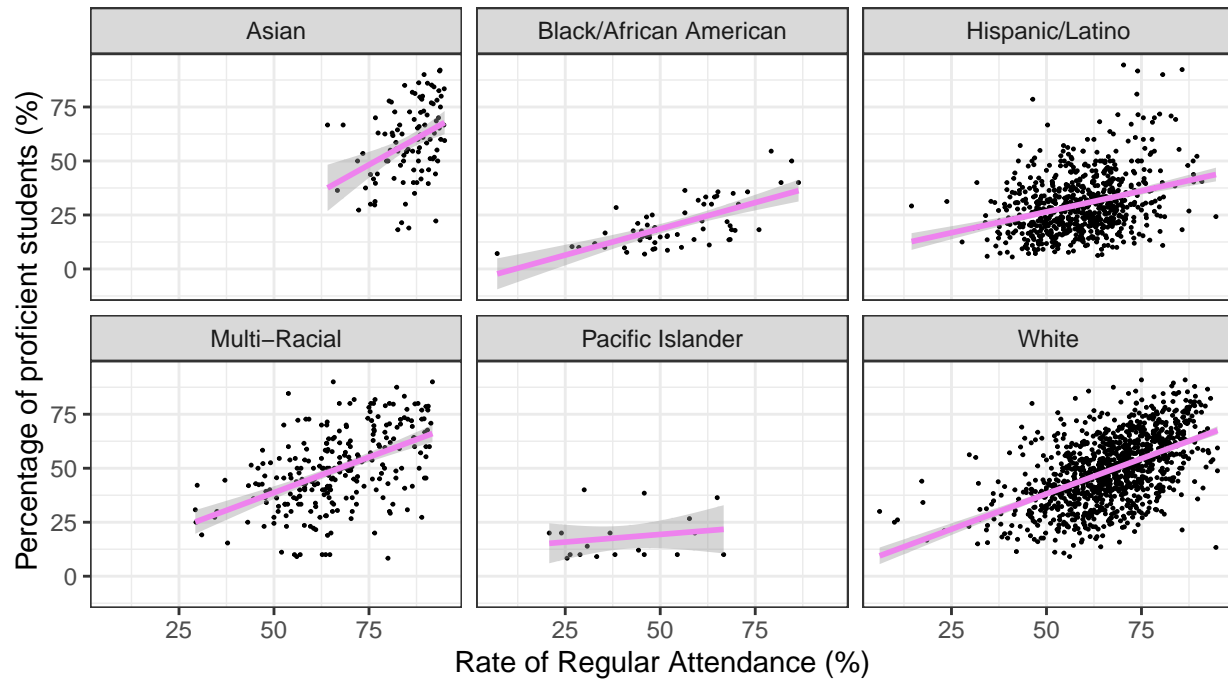


Figure 4.

When faceted by students' racial and ethnic groups, we can see a clear change in the slope of the line. Using White students as the reference group, the Asian group has a steeper slope, suggesting 1% increase in attendance rate results in a higher increase in the rate of proficiency for the Asian group than for the White group. Whereas, the Black/African American group, the Hispanic/Latino group, and the Pacific Islander group had flatter lines, suggesting that the positive impact of attendance rate on proficiency rate is weaker for these groups than for their White counterparts.

Interestingly, all the data points for the Asian group show up after in the far right part of their plot, indicating uniformly high attendance rate for this group of students - above 60% in all the schools we looked at, while the Pacific Islander group had low attendance - below 70% across all schools.

## Discussion & Conclusions

Based on data of Oregon schools in the 2021-2022 academic year, our model predicts that for every 1 percentage point increase in attendance rate, schools will see an additional 0.75% percentage point in their ratio of students that are proficient in English, Language, and Arts, and the relationship is statistically significant. This agrees with (Henderson, Hill, and Norton 2014) whose study shows that regular attendance to classes should be a predictor of better performance. Our model suggest that a reasonable measure schools can use to improve proficiency rate is to encourage students to attend class more regularly. Policies such as offering free school lunch, addressing bullying, and providing teachers with diversity, equity, and inclusion training have the potential to improve attendance, and should be considered as schools attempt to improve student proficiency.

Our data comparison across student racial and ethnic groups confirms the findings of (Garcia and Weiss 2018) that attendance and chronic absenteeism vary when comparing various groups and socio-economic factors. (Henderson, Hill, and Norton 2014) has similar finding that multiple social and economic factors

can affect attendance to school which include economic hardship, food insecurity, housing instability, health care access, failing home and school infrastructure, transportation, under-resourced schools, school climate and culture, and attendance culture.

Our research also looked at how the relationship between attendance and proficiency varies across student racial and ethnic groups. Based on our preliminary observation and our literature review, we suppose that there are other variables that correlate with racial and ethnic groups and it is those omitted variables, not racial and ethnic groups that have impacts on the relationship between attendance and proficiency. For example, students coming from lower-income households that frequently experience food insecurity might have anxiety and stress that affect their performance, even when their attendance rates are the same as the reference group. While our visual exploration suggests the relationship does vary, additional research is needed to confirm this hypothesis and identify the relationship patterns. This leads us to conclude that interpretation this research could be expanded to include other variables such as household incomes, free school lunch, parents' education attainment, and other relevant factors.

To conclude, our research, based on data from Oregon schools, confirmed the relationship between attendance and student proficiency as many researchers have suggested. While our preliminary data exploration suggest that this relationship varies across student racial and ethnic groups, there need to be additional research that takes into account other family background and socio-economic factors.

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