Gov50 Final Project

Comparing and Analyzing the Rates of Success in Competitive High School Debate Between Private and Public Schools

Omar Sotelo and Grace Kim

Introduction:

The question we wanted to answer with our project was, what is the difference in competitive success between private and public schools in high school debate? There is a huge disparity in the number of resources offered to students at public and private schools. We think that comparing the competitive outcomes between these two groups could give policy makers key insight about resource disparities and educational inequality. Our hypothesis is that Private schools have statistically significant higher rates of competitive success in high school debate than public schools. This means that we should see debaters from private schools receiving higher speaker scores and z-scores than debaters from public schools.

Dataset: We decided to limit our dataset to LD octas bid tournaments from 2020-2021 for a few reasons. First, we decided to limit the time-frame to 2020-2021 because it would eliminate the possibility of varying results do to a transition to online debate. We also wanted to limit our dataset to just LD debate because it is a 1v1 format versus other forms of debate being 2v2 or 3v3. This allowed us to look at individual competitive success. Finally, we used only octas bid tournaments because these are national tournaments that are the most organized, have the most attendees, most qualified judges, and most impactful for debaters' competitive success. In order to compile our data, first, we created a scrape function to scrape the data and export it to a dataframe from the website tabroom.com which is a website that hosts debate tournaments online as well as stores the results of past tournaments. Then we cleaned up our data so each dataset would have the same columns and column names, this was very code intensive (over 200 lines of code!). We also manually created a key for each unique school in our dataset because some schools had weird names (ex: independent entries), and there were only 300 unique school names. When we are analyzing our data, we will be utilizing the 1HL Speaker Scores and the Z-scores. For context, in Lincoln-Douglas Debate, students are awarded a speaker score ranging from 0-30 (speaker scores most typically range from 25-30, 25 being very bad and 30 being perfect; anything below 25 is reserved for speeches that had some other problem, like if the speaker said something offensive). The 1HL Speaker Total Score is the sum of the speaker points subtracting the highest and lowest speaks. The Z-score is a score that just sums the speaks but tries to account for judge biases (ie. some judges just naturally give higher or lower speaks) and standardized everyone's score.

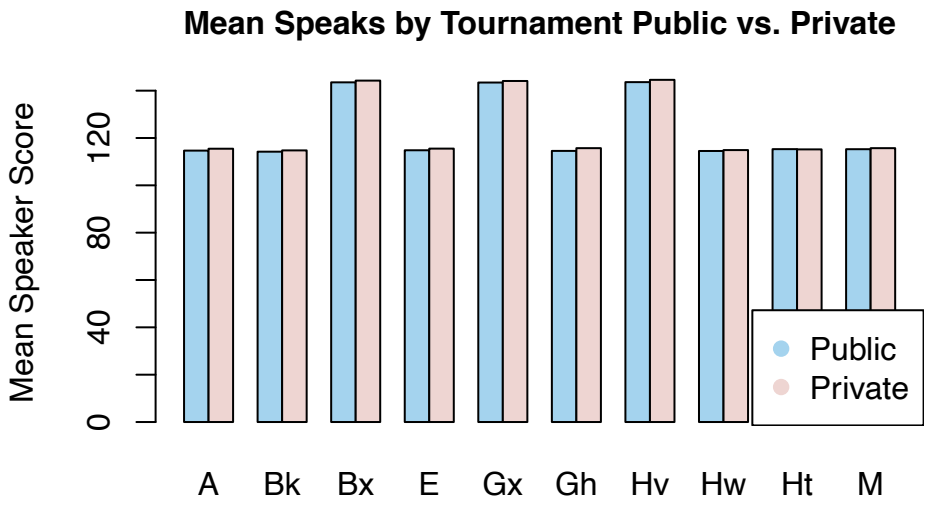
Methodology: First, we will take initial counts of public vs. private school attendance at tournaments to gauge representation. Next, we will start our initial mean comparisons and to get an initial understanding of our data. Then, we will switch our analysis to be tournament by tournament and round by round. We will then find the difference in round average speaks and find the 95% and 99% confidence intervals for the difference between private and public schools. We will then run these tests again using Z-score to try and account for judge biases.

Analysis:

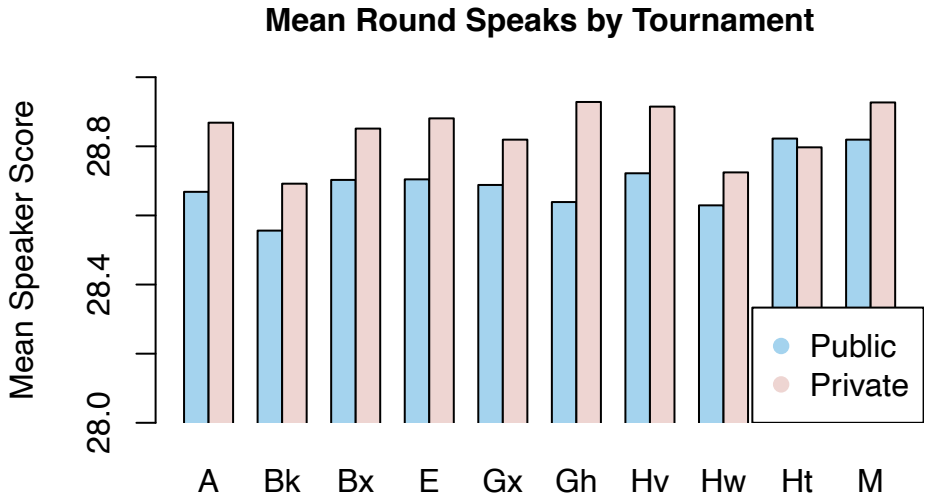
Initial Count of Students: We started with an initial count of the number of public vs. private school students to gauge tournament attendance by school type. We found that there are 541 in attendance from private schools and 1048 in attendance from public schools. There are nearly double the amount of public

school students as private school students at these tournaments. While this may seem like there are a lot of public school students at these tournaments, there are proportionally pretty low attendance (much more public students in the US than private and yet private school students make up about 1/3 of tournament attendance)

Mean of Student Speaks: This initial mean of student speaks at schools will give us a baseline understanding of our data. When we average the scores for public schools across all tournaments, we get 126.7043607. However, the private school average comes out to be 123.8707024. This initial mean comparison shows us that public schools students perform better on average. This actually goes against our initial hypothesis that private schools will compete better. However, there may be a confounding variables at play such as the number of rounds per tournament. We can try to account for this by calculating the mean speaker score by tournament instead of overall. We will then create a graph to show tournament by tournament averages.



This graph shows that on average, private schools are competing better at every tournament except Heart of Texas. It also shows us that certain tournaments like Bronx, Glenbrooks, and Harvard all have significantly higher speaker averages than the other tournaments. This is because those three tournaments actually have more one more preliminary round than the other tournaments that gets added into the students' total speaks. In order to be able to compare tournaments to each other without the number of rounds skewing the data, we can find the average speaks per round by tournament instead of looking at the total speaks by tournament.



Now that we know that the tournament rounds is a confounding variable, we can account for it by using the round average rather than total speaks in further calculations. We should also find the round average for each individual rather than the overall tournament round averages so that we do not weigh all tournaments equal to each other (it is important that we do not weigh these tournaments equal to each other because certain tournaments have higher attendance than others and the proportions for attendance vary as well - we do not want tournament size to affect our results, rather we want to look at individual performance between public and private school students). We can do this by subsetting students by public vs. private rather than by tournament. We will also do a means comparison of round averages between all public school students and all private school students. The initial mean for public schools was 28.6903989, while the initial mean for private schools was 28.8203142.

Confidence Interval Testing: Next, we want to know if this difference in public vs. private school student averages was statistically significant. We can find this out by calculating a 95% and a 99% difference in means confidence interval and testing to see if 0 is a value within either confidence interval.

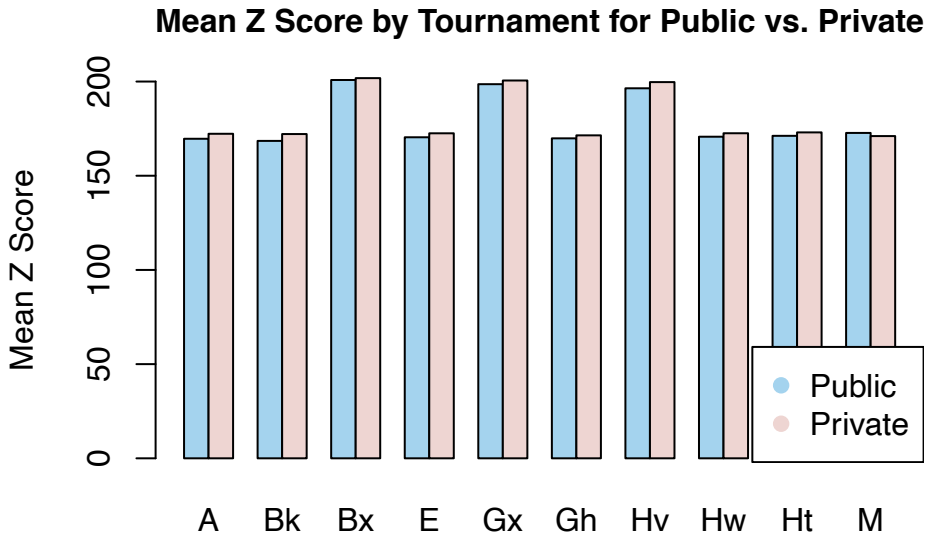
95% Confidence Interval: 0.0870045, 0.1728262 and 99% Confidence Interval: 0.073521, 0.1863098

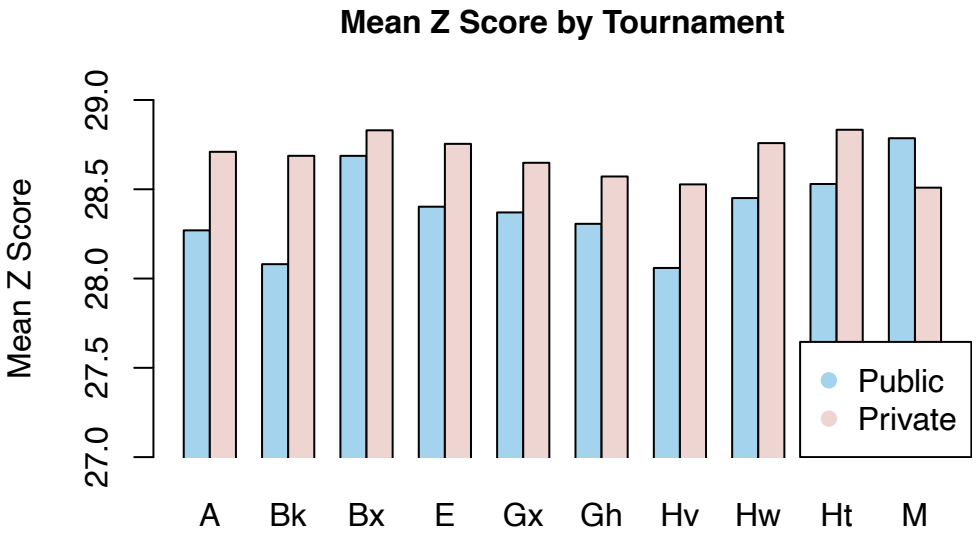
Since 0 is not a value in either the 95% or the 99% confidence interval we can say that the difference in performance between public and private schools is significant.

However, it is possible that judge preferences or judge biases can effect the speaker scores (ie. some judges just give lower speaks while some judges just give higher speaks). Thus, we can use the Z scores to try and account for judge bias. We will repeat all the same analysis that we did for 1HL Speaker Scores but use Z Scores instead.

Z-Scores Public schools Z mean: 181.9281966, Private schools Z mean: 180.6561368

Again, the initial mean goes against our hypothesis because it shows that the public school mean Z score is higher than the private school mean. We will run the same tournament by tournament analysis.



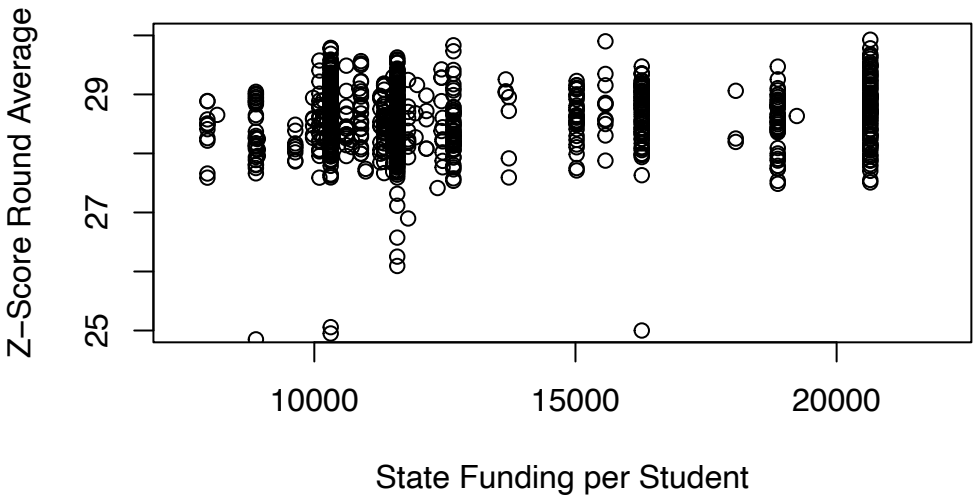


Looking at the mean per round, the private scores are now higher. This shows that round size at tournaments acted as confounding variables when determining public vs. private school competitive success rates. Again, we should find the round average for each individual to use in further calculations so we do not weigh certain tournaments as equal to other tournaments even though they had different sample sizes. The public schools' round average is 28.3554169 and the private schools' round average is 28.6884649.

Confidence Interval Testing: Once again, we will look for the 95% and the 99% difference in means confidence intervals and test if 0 is a value within the interval.
95% Confidence Interval: 0.2087071, 0.4573889 and 99% Confidence Interval: 0.1696364, 0.4964597
0 is not a value in this confidence interval so we know the difference between public and private school z-score means is significant.

Conclusion: When we found the confidence intervals for our data, zero was never a value in the 95% or the 99% difference in means confidence intervals which indicate that there was a significant difference between the two groups. This difference could be attributed to a number of factors but the most likely explanation is that private schools simply have access to more resources than public schools.
Limitations: A few limitations is that we have a relatively small sample size because we could only use tournament data from 2020-2021. This was still preferable to using data from other years because COVID influenced much of whether tournaments were online or in-person. It was also better than using other tournaments because other non-octa bid tournaments have different levels of competitiveness, different proportions of turnout, and different standards for judging. Interval Validity: High, the only possible confounder would be participation (ie. whether speaker scores could be higher for public schools if the proportion of students from all public schools in the United States was the same as the proportion of students from all private schools in the United States). External Validity: Relatively high, in general, observational studies are relatively high. The only possible confounder could be that we chose octa bid tournaments which definitely have higher private school turnout than local tournaments.

Future Steps: Looking at Public School Success by State Funding




```
##
## Call:
## lm(formula = public$zaverage ~ public$funding)
##
## Coefficients:
##    (Intercept)  public$funding
##      2.824e+01       8.983e-06
```

In order to further analyze the correlation between access to resources and competitive success, we ran a basic linear regression on data with state funding and Z-score round averages in public schools and found that for each $1000 per student that a state puts into education, Z-score round averages increase by 0.008983. Further analysis on the correlation between distribution of funding by county or region and public school competitive success could help identify what variables are contributing to the success of some public schools but not others.

Rates of Competitive Success in High School Debate Between Private and Public Schools

Omar Sotelo and Grace Kim

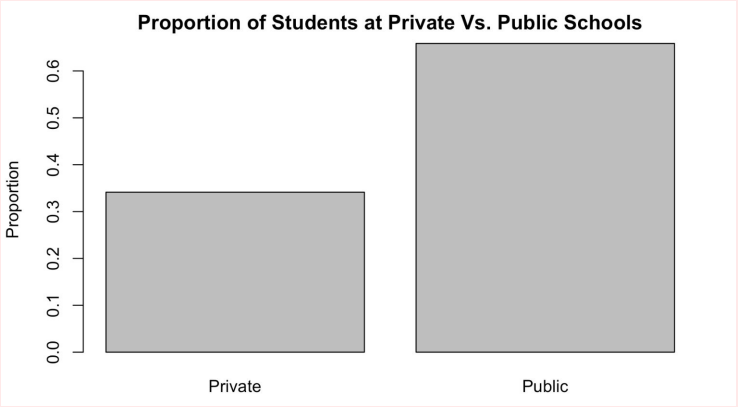
Question: What is the difference in competitive success between private and public schools in high school debate?

Motivation: There is a wide gap between the resources offered to students at private and public schools. Studying disparities in public and private competitive success in debate can give policy makers better insight into educational inequality.

Our Hypothesis: Private schools have statistically significant higher rates of competitive success in high school debate than public schools. This means that we should see debaters from private schools receiving higher speaker scores and z-scores than debaters from public schools.

Data: We decided to limit our dataset to LD octas bid tournaments from 2020-2021 for a few reasons. First, we decided to limit the time-frame to 2020-2021 because it would eliminate the possibility of varying results do to a transition to online debate. We also wanted to limit our dataset to just LD debate because it is a 1v1 format versus other forms of debate being 2v2 or 3v3. This allowed us to look at individual competitive success. Finally, we used only octas bid tournaments because these are national tournaments that are the most organized, have the most attendees, most qualified judges, and most impactful for debaters' competitive success. In order to compile our data, first, we created a scrape function to export the data to a dataframe. Then we cleaned up our data so each dataset would have the same columns and column names, this was very code intensive (over 200 lines of code!). We also manually created a key for each unique school in our dataset because some schools had weird names (ex: independent entries), and there were only 300 unique school names.

Approach: We started by trying to get an initial understanding of our data by graphing the proportions of students at tournaments, and then an initial mean comparison of speaker scores. When we did this, we found that the initial means for public schools were higher than the initial means for private schools. We then identified a potential confounding variable (the number of rounds per tournament), and switched our analysis to be tournament by tournament and round by round. We found the difference in round average speaks and found the 95% and 99% confidence intervals for the difference between private and public schools. Once we did this, we also ran this test for the z-scores in order to account for judge biases.



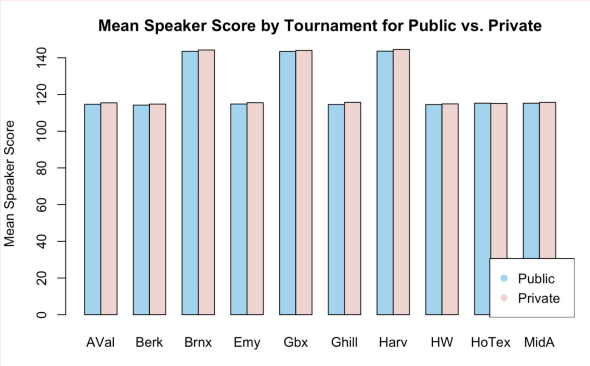
Public School Mean	Private School Mean
126.7044	123.8868

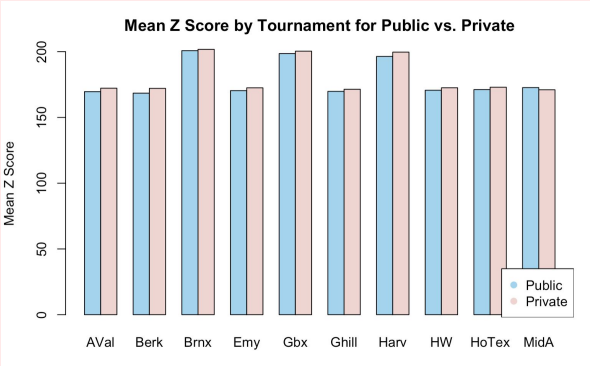
Advantages: Using tabroom data, we were able to account for judge biases using the z-score. By grouping the data by tournament, we were also able to identify confounding variables in the data set such as number of rounds in the tournament. It was also beneficial that there are already classifications of tournaments so we could pick out the octas bid tournaments and feel confident that we were looking at tournaments with around the same level of competitiveness. Also advantageous to use LD Debate to eliminate possible outliers like hybrid schools in other events.

Disadvantages: We had to manually categorize schools in public and private because it would've taken super long to loop through every single public and private school in the US and account for outlier entries like independent ones that were not school affiliated. We don't know the impact of small things like if a student switched schools. The sample size was also relatively small.

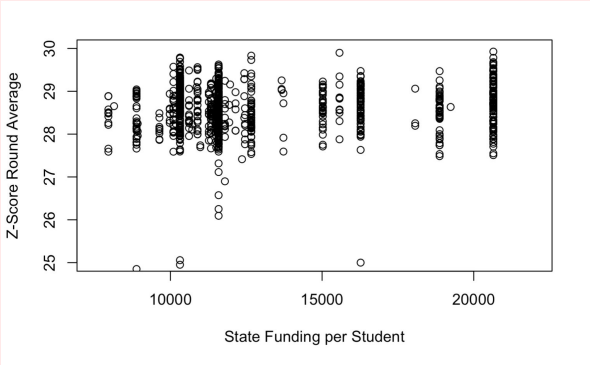
Main Results: We found that there was a statistically significant difference between the competitive success of students at private vs. public schools. The 99% Confidence Interval for Speaker Scores -1HL was 0.129±0.056. The 99% Confidence Interval for Z-scores was 0.331±0.163.

Interpret: When we found the confidence intervals for our data, zero was never a value in the 95% or the 99% difference in means confidence intervals which indicate that there was a significant difference between the two groups. This difference could be attributed to a number of factors but the most likely explanation is that private schools simply have access to more resources than public schools.





Future Steps: In order to further analyze the correlation between access to resources and competitive success, we ran a basic linear regression on data with state funding and Z-score round averages in public schools and found that for each $1000 per student that a state puts into education, Z-score round averages increase by 0.008983. Further analysis on the correlation between distribution of funding by county or region and public school competitive success could help identify what variables are contributing to the success of some public schools but not others.



Works Cited

"Education Spending by State - How Does Your State Compare?" *Teaching Certification*, https://teaching-certification.com/teaching/education-spending-by-state/.

Gov 50 Data: Power Presentation Scoring

Write your group names here: ___Grace Kim and Omar Sotelo

For each group that presents, please provide score for each category out of **20**, where **0 is least well satisfied for this category and 20 is fully satisfied for this category**. You will select your scores for each category below based on the **presentation slides** and **group Q&A**.

1. "Q": Is the **Question** clear and interesting? (Should we care?)
2. "H": Is the **Hypothesis** clear and presented in an understandable manner?
3. "Identify": Is the estimand of interest (can be causal/associative/predictive) carefully estimated? Is the group using an approach that is appropriate for the question/hypothesis? Are the advantages/disadvantages of the identification approach clearly stated/understandable?
4. "Interpret": Are the interpretations of the findings understandable and reasonable?
5. "Visual": Are the findings visually presented in an appealing and intuitive way?

Before you score each group, make sure assess both **presentation and Q&A**.

Group	**Notes**	**Q**	**H**	**Identify**	**Interpret**	**Visual**	**Best present**
Aidan Scully	Latin America	20	20	20	20	20	20
Alice Khayami and Kyra Willoughby	Women Leaders	20	20	20	20	20	20
Juan Guzman and Ibrahim Ibrah	Student Performance	20	20	20	20	20	20
Claire Duncan and Jen Hughes	Assassination and GDP	20	20	20	20	20	20
Jack and Lillian ✓	Assassinations, frequency, and instability	20	20	20	20	20	20
Grace and Omar ✓	Debate, Private vs Public						

You may vote for **<u>two</u>** groups for best power presentation. Simply put a check mark for the two groups you select (you may vote for your own group for one of the two). The group that receives the most votes for best power presentation will receive a half grade bump (e.g. from B+ to A-).

Final Project grades will be calculated in the following way: Adeline's score card: 10%; Section Leader score card: 20%; Group average scores from other groups: 50%; Write up 20%.