Analysis on The COVID-19 Pandemic Disrupted Both School Bullying and Cyberbullying*

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Will Davidson Jason Ngo Annie Yan

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1 Introduction

Anti-Asian violence skyrocketed over the pandemic. The Center for the Study of Hate and Extremism published a report showing how anti-Asian hate crimes grew by 339 percent last year compared to the year before. The racism was fueled by the pandemic, mainly occurring in highly populated urban cities like New York, San Francisco, and Los Angeles. The percentages of Asian hate crimes in New York rose from 30 to 133 and in San Francisco from 9 to 60. American culture pretends Asian Americans face no discrimination or racism. There are countless examples where when the U.S. was faced with an economic downturn, Asian Americans were affected. The 1982 killing of Vincent Chin in Detroit came after the 1980-1982 Detroit recession and The Page Act of 1875, America's first immigration law that banned Chinese women after the Great Panic of 1873. It's safe to assume an economic horror like the pandemic would lead to hate. It was disconcerting reading about the different hate acts that occurred, and it was clear there needed to be culturally appropriate and accessible community safety programs. From the data provided, we decided to clean it, focusing on the states with an Asian population. There has been mainstream media coverage of anti-Asian racism but little effort toward the Asian American Youth.

*Code and data are available at: https://github.com/AnnieYan0807/Analysis-on-The-COVID-19-Pandemic-Disrupted-Both-School-Bullying-and-Cyberbullying.

1.1 Estimand

In the study, our estimated population vary for different datasets. The population of the data used in Figure 1, Figure 2, and Figure 3 contains people who live in the top ten states with the highest Asian population. These states includes California, Florida, Hawaii, Illinois, Massachusetts, New Jersey, New York, Texas, Virginia, and Washington. ("Asian American Population by State 2023" (n.d.)) The population of data used in Figure 5, Figure 6, and Figure 7 are people who live in the bottom ten states with the lowest Asian population. These states includes Arkansas, Maine, Mississippi, Montana, North Dakota, South Dakota, Alabama, West Virginia, Wyoming, and Kentucky.Nationwide data used in Figure 4 includes population of all people who live in the United States.

2 Data

2.1 Data collection

The data used in this study were pulled from reproducible package of article "Data and code for: The COVID-19 pandemic disrupted both school bullying and cyberbullying." (Bacher-Hicks et al. (2021)) According to the article, raw data were provided from Google Trends and Youth Risk Behavior Survey.

To analysis these data, R programming language (R Core Team (2020)), tidyverse (Wickham et al. (2019)), and dplyr (Wickham et al. (2023)) are used. ggplot2 (Wickham (2016)) has been used in order to produce graphic reports. The use of knitr (Xie (2014)) helped us to generate tables. Lubridate (Grolemund and Wickham (2011)) are used to reformat dates.

2.2 Measurements

All the data we used is from after 2016. In our study, bullying data includes school bullying data and cyberbullying data. We measure the intensity of bullying by number of hits in one day. In the paper, we will refer it as search frequency.

2.3 Data Analysis

2.3.1 Bullying search droped after COVID-19

Figure 1 shows the number of Google hits for all 'bullying' searches in the top ten states with the highest Asian populations. According to Bacher-Hicks, there is a positive correlation between search intensity and frequency of victimization (Bacher-Hicks, 8). While unusually high peaks occur during March 2017 and 2018 with the frequency reaching 400, and the lowest

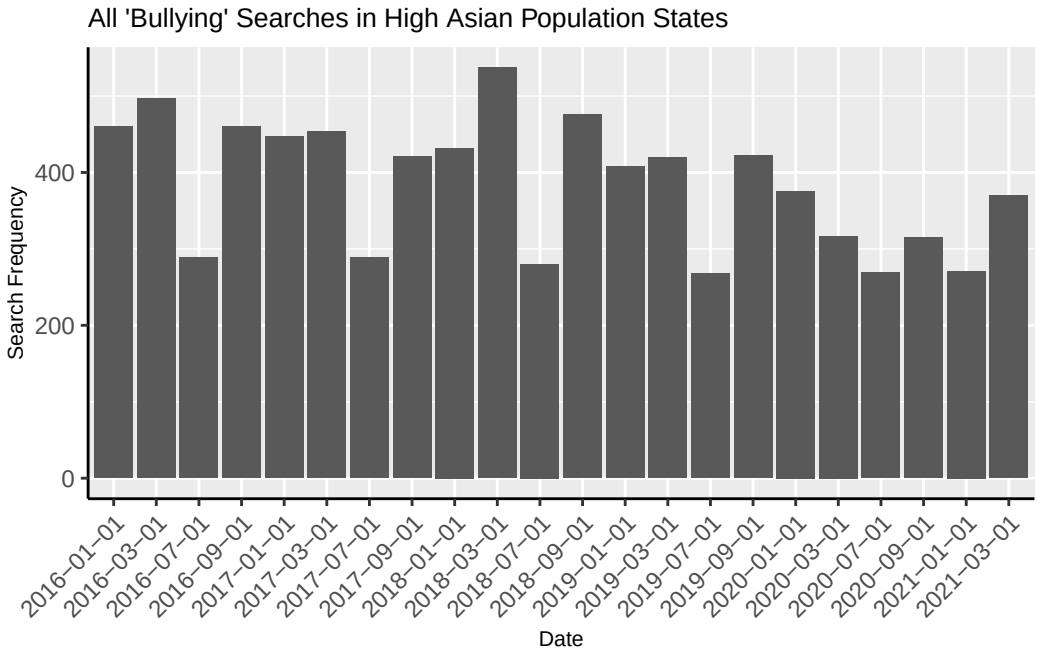

Figure 1: All Bullying Searches in High Asian Population States

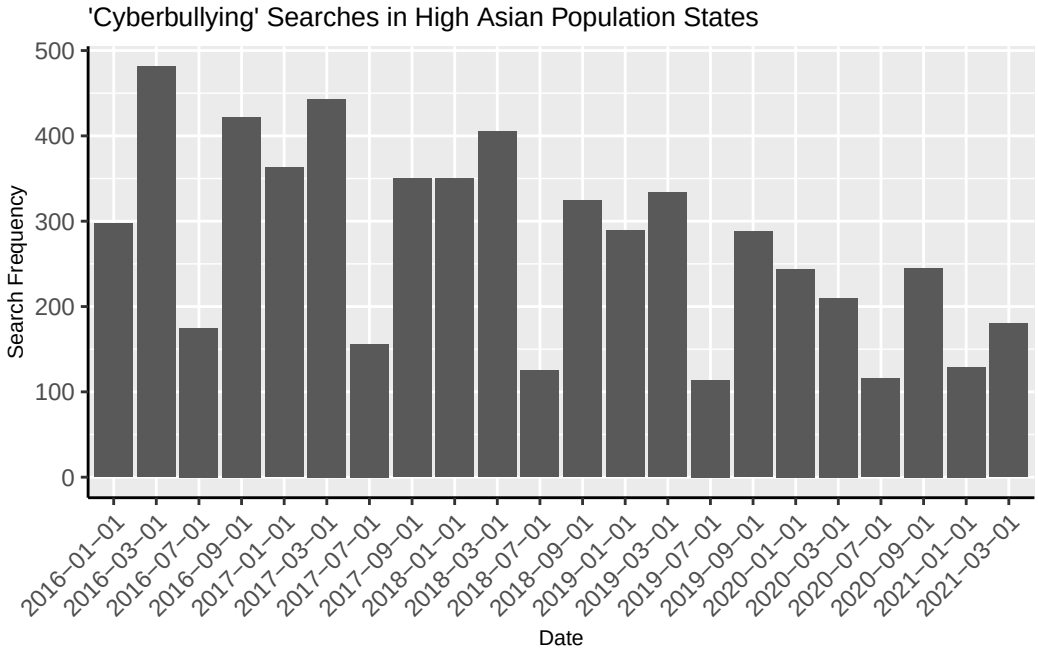

Figure 2: Cyberbullying Searches in High Asian Population States

clicks during summer months with numbers consistently below 200, the overall trend from 2016 to the start of the pandemic shows an overall decline. In 2020, when the pandemic began well known to the public, there continues to be a decline in overall search intensity. On average the 2020 frequency was lower than in previous years. This was the same time period when most schools were shut down and classes were offered online which could lead to the conclusion that bullying decreased when students were not attending classes in person. There is a slight rise in the summer of 2020 that is compared to the 2016 data and a reverse of the declining trends seen over the years, however, the following summer this number is reduced to the lowest number seen over the years. This blimp at the start of the pandemic could be a result of students being in lock down with more online time. Overall, the trend in search frequency and therefore, victimization, has been relatively stable with a slight decline up to the start of the pandemic and then we see further declines as a result of online learning, school closures and isolation during COVID-19. This graph shows there was no increase in bullying of Asian students by their peers during the pandemic in the top ten states with high Asian populations.

2.3.2 Correlation between asian population of states and school bullying numbers

We conducted a study to determine if there was a correlation between the increasing anti-Asian sentiment and school bullying in the United States. To do this, we analyzed the correlation between the search frequency for the term "school bullying" and the Asian population of each state. Figure 3 and Figure 4 were used to compare the search frequency of the keyword "school bullying" and the date.

Figure 3 shows the frequency of the keyword "school bullying" searched online within the top ten states with the highest Asian population. The graph indicates that March 1st, 2018, had the highest number of searches for "school bullying" at over 400. Typically, the search frequency for "school bullying" is highest in March, and there is a significant drop in search frequency every July at approximately 150 searches when summer vacation is halfway through. In contrast, data for September and January are relatively closer to the average, ranging from 150 to 300.

Figure 4 presents data on the search frequency of the keyword "school bullying" nationally since 2016. Like Figure 4, March 1st, 2018, had the highest search frequency at 2000 nationally. On the other hand, July's search frequency was always at the lowest level, with data from 2016 to 2021 never exceeding 750. September and January have a similar level of search frequency ranging from 750 to 1500, which is closer to the overall average. In terms of trends, the search frequency with respect to date was relatively consistent in both the top ten states with the highest Asian population and nationwide. Based on our analysis, we did not find a correlation between school bullying searches and the Asian population of the state.

Upon comparing Figure 3 and Figure 4, we observed a consistent trend. Notably, the months of January and September, which mark the beginning of school, exhibit comparable search

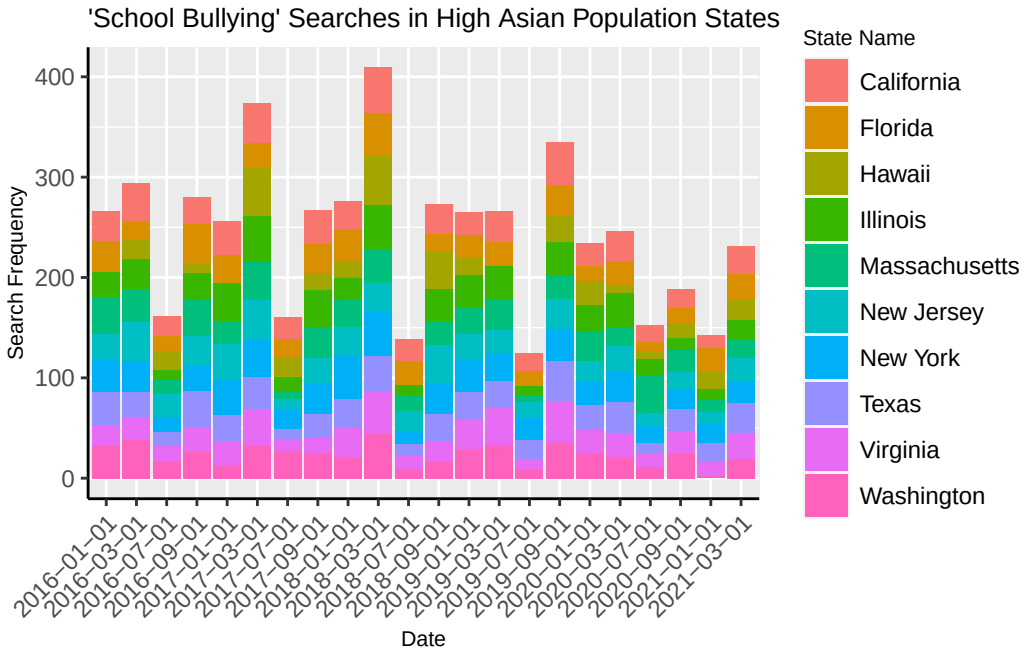

Figure 3: School bullying searches in top 10 states with highest asian population

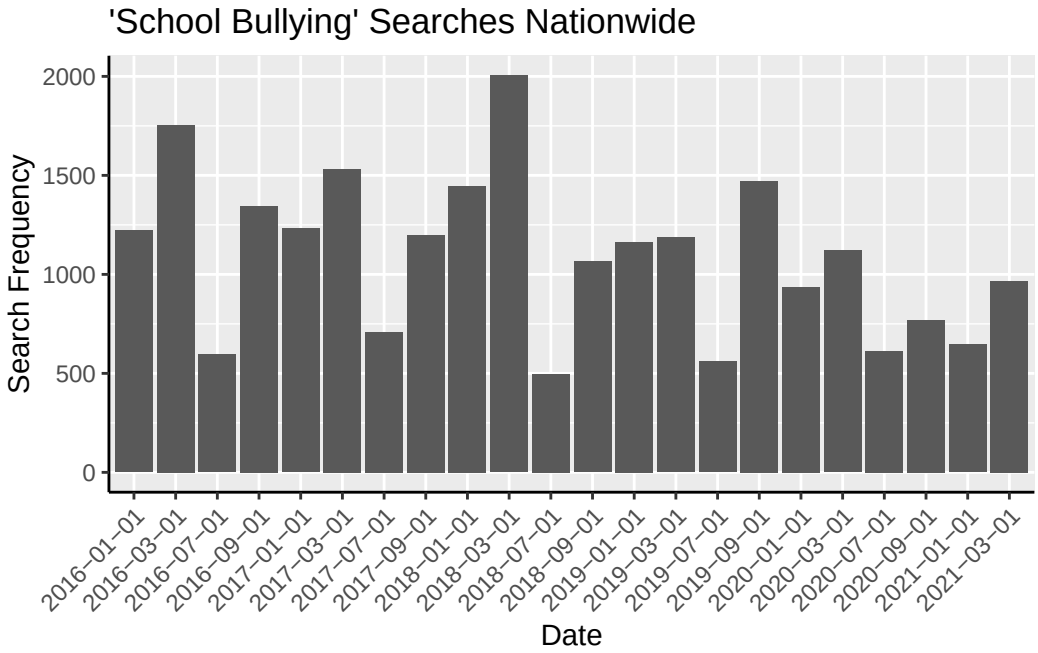

Figure 4: School bullying searches nationwide

frequency levels for the keyword "school bullying." Meanwhile, March, which falls in the middle of the semester, experiences a significant surge in search frequency, as seen in both national data and the top ten states with the highest Asian population. On the other hand, July, which is in the middle of summer break, displays a considerable drop in search frequency in both graphs. Overall, the trend in search frequency with respect to date remains relatively consistent across the top ten states with the highest Asian population and the entire nation. Therefore, the comparison of these two graphs did not establish any significant correlation.

2.3.3 Comparing top 10 with highest Asian population and bottom 10 states with lowest Asian population

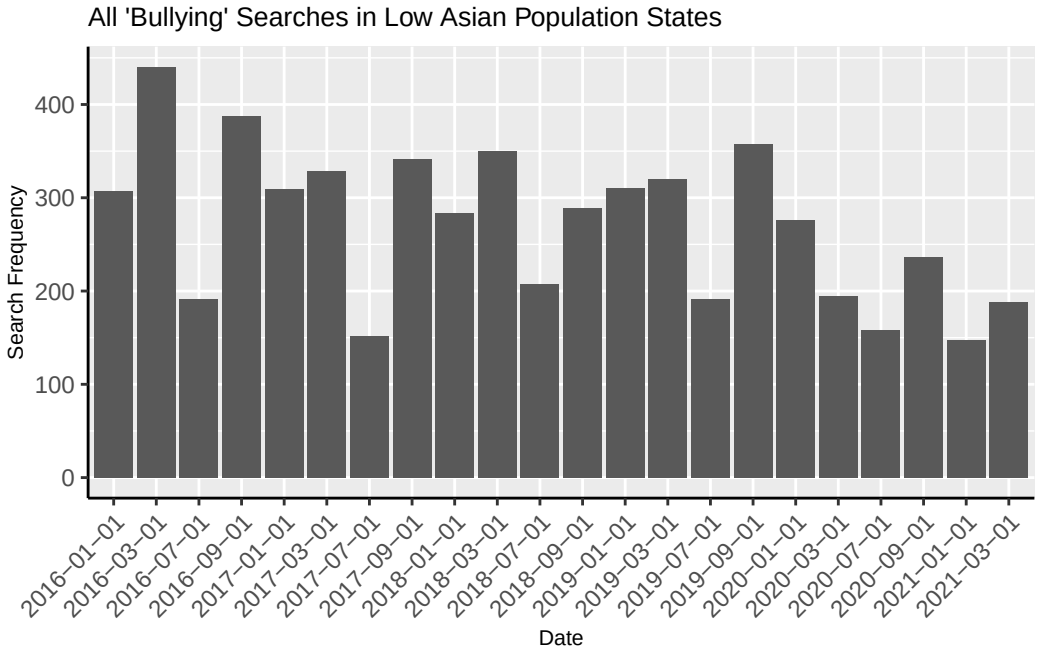

Figure 5: Bullying searches in the lowest Asian population states.

Figure 5 shows the bullying searches in states with the bottom 10 Asian population. In all three metrics, there is a decrease in bullying searches in comparison to bullying searches in the top 10 states. The data shows that having a high population of Asian people did have an effect on school bullying searches during the pandemic. The higher the Asian population, the more bullying searches there were.

However, one weakness of this comparison is that there is sampling bias with this set. The total population numbers for the bottom 10 Asian population states are dwarfed by the total population numbers of the top 10 Asian population states. So naturally, there would be less bullying searches in a state like Montana, which has around 2.7% of California's total

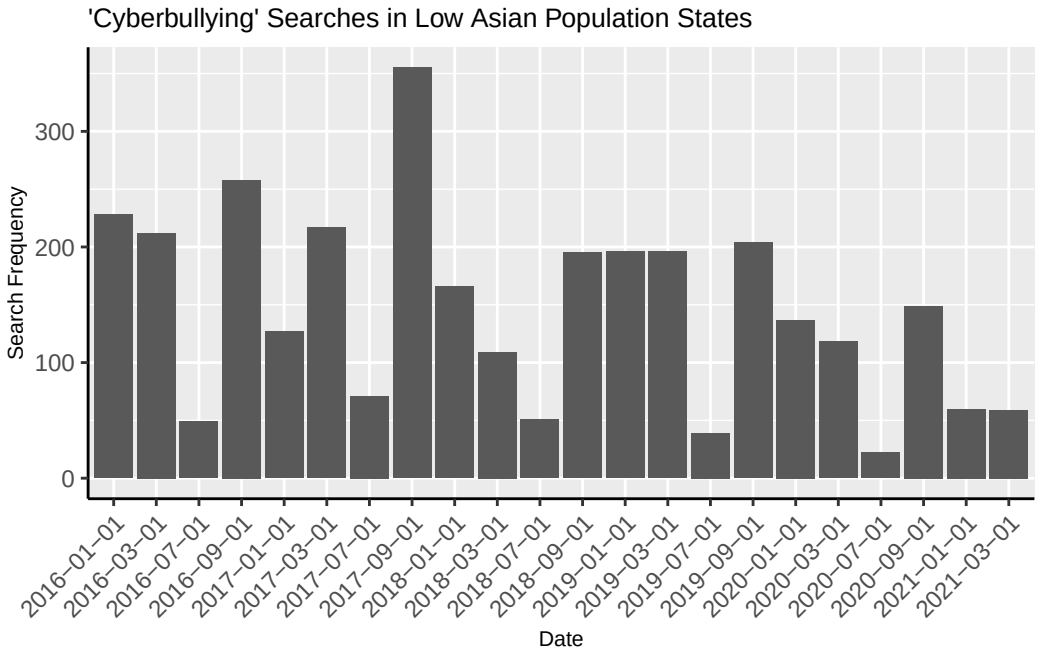

Figure 6: Cyberbullying searches in the lowest Asian population states.

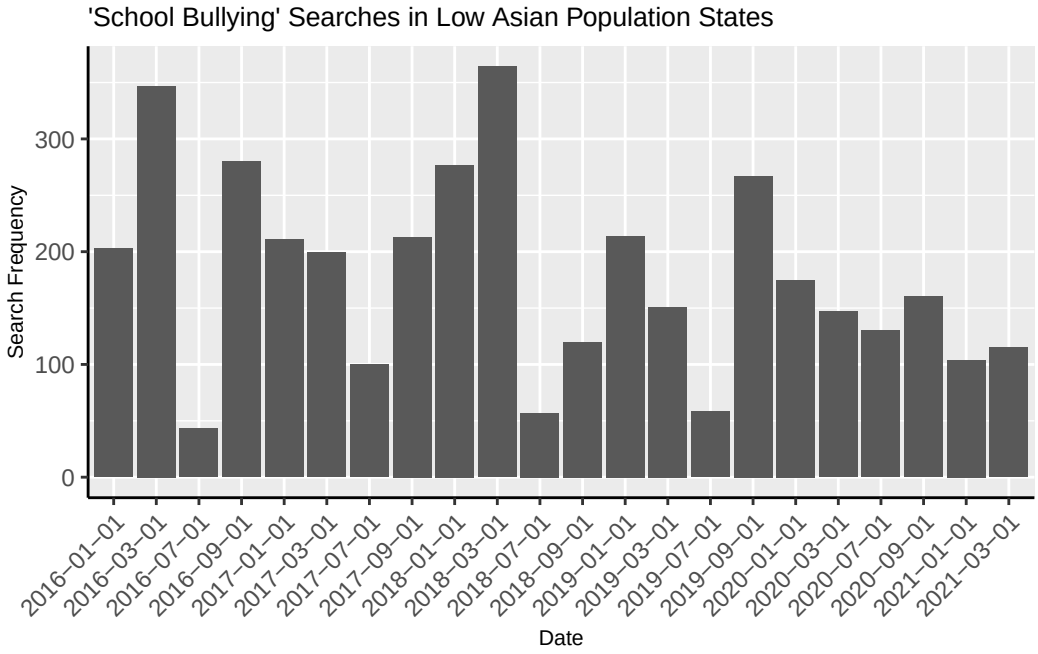

Figure 7: School bullying searches in the lowest Asian population states.

population. This is where our approach of using raw search data reaches it's limit, as we cannot draw an accurate comparison of search ratios due to the massive difference in total population numbers.

3 Results

According to our previous investigations, search frequency for bullying in the top ten states with the highest Asian population slightly decreased after the start of the pandemic. This trend not only affected overall bullying search, but also had an impact on the search frequency trend for cyberbullying. Our observations indicate that the pandemic did not increase bullying in Asian American students. A later study that examined the correlation between the Asian population of states and school bullying numbers showed similar results. The study compared search intensity trends for the keyword "school bullying" in the top 10 states with the highest Asian population to nationwide data, but found no correlation between school bullying searches and the Asian population of the state. Further evaluation compared data from the top 10 states with the highest Asian population to the bottom 10 states with the lowest Asian population. This research showed that having a high population of Asian people did have an effect on school bullying searches during the pandemic, with higher Asian populations resulting in more bullying searches. Our study took three different angles to observe the relationship between the Asian population and search frequency in bullying, but only one of them showed a correlation. Therefore, future studies are needed to determine if a statistically significant correlation exists between the Asian population and bullying. It's important to continue investigating and addressing the issue of bullying in all populations and to develop effective interventions and prevention strategies to reduce its occurrence.

4 Discussion

4.1 Bullying search relate to COVID-19

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4.2 Correlation between asian population of states and school bullying numbers

As discussed earlier, there has been a significant increase in anti-Asian culture in the United States over the past year. Many may be attributed to the spread of misinformation and xenophobic rhetoric related to the COVID-19 pandemic, which has stoked hatred against Asian communities. Reports show that 81% of Asian adults state violence against them is increasing. (Ruiz, Edwards, and Lopez (2022)) Over 3800 hate-related verbal and physical assaults against

Asian Americans have been reported during the pandemic. ("Asian Americans Reported 3,800 Hate-Related Incidents During the Pandemic, Report Finds" (2021))

This culture of anti-Asian violence has also impacted schools, with many Asian students reporting incidents of racism and discrimination in the classroom. Reports show 68% of attacks were verbal harassment. Some students may have faced racially discriminated comments, while others may have experienced exclusion or isolation from their peers. These reports have drawn our attention. We are eager to learn if there is a need to increase education and awareness among students, as well as efforts to combat racism and discrimination in all forms.

In the previous section, our investigation did not reveal any correlation between the Asian population of a state and the frequency of searches related to school bullying by comparing trends in two graphs. While anti-Asian culture is still a large concern in the U.S., it does not seem to have a direct impact on school bullying. It is possible that factors like school policies, awareness campaigns, and changes in social media usage have made a positive impact on preventing discrimination and stereotyping from happening.

4.3 Comparing top 10 with highest Asian population and bottom 10 states with lowest Asian population

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5 Weaknesses

While our study provides some insights into the search frequency of school bullying and its correlation with the Asian population, it has several limitations. Firstly, we only looked at the search frequency of the keyword "school bullying" and did not consider other related search terms or social media platforms, which may not fully capture the prevalence of school bullying in schools. Secondly, we did not control for other variables, such as socioeconomic status, which may also impact the prevalence of school bullying. Lastly, as we only analyzed data up until 2021, our study may not reflect any potential changes in search behavior or trends in recent months or years. These limitations should be taken into consideration when interpreting our findings and drawing conclusions.

Furthermore, we did not perform any correlation testing to establish a relationship between the Asian population and the search frequency of "school bullying" accurately. We simply compared the search frequency of the top ten states with the highest Asian population and nationwide data. To determine if there is a statistically significant relationship between the two variables, a formal correlation test is required. However, it is also important to note that correlation does not mean causation. Even if the search frequency of "school bullying" and the Asian population in a state are significantly correlated, it does not imply that the increasing incidence of school bullying is caused by a high Asian population or that anti-Asian culture

impacts school campuses. Other factors, such as confounding variables or common causes, may influence the observed relationship. As a result, further studies are needed to examine the impact of anti-Asian culture on school bullying.

In conclusion, our study has some limitations that should be taken into account when interpreting our results. Although we provide some insights into the correlation between the Asian population and the search frequency of "school bullying," future research is required to investigate the potential causes of school bullying, particularly those related to anti-Asian culture.

6 Next steps

As discussed above, further studies are crucial for our studies. Some potential steps include establishing more in-depth data analysis, adding more control variables, and conducting formal correlation tests. To establish a more in-depth data analysis on school bullying and its relationship with the Asian population, we suggest introducing more factors that relate to school bullying, such as other related search terms and various social media, to provide a more complete picture of the issue. Adding more control variables is another direction to further testing school bullying and its relationship with the Asian population. Age range, race, gender, or even socioeconomic status all can influence school bullying. Taking these factors into consideration can help us to identify potential areas for intervention. Furthermore, it is important to conduct formal correlation tests to determine the statistical significance of the relationship between school bullying and the Asian population. Gathering more data, such as Asian population in different states, can be helpful in this regard. The correlation coefficient can be calculated to determine the strength and direction of the relationship between the two variables. Besides, additional research is necessary to identify the underlying factors driving the relationship between school bullying and the Asian population.

7 Bias

Google's reported data doesn't consider the sample of users or data points. There is an evident sample bias that takes occurs in this study. The general population can be under or overrepresented. It's unsure which students' searches are being used, making their age and ethnicity unclear. The broad population must be represented and used in our data. User behavior is measured by how many hits particular buzzword use. This measurement can be flawed as students may search other buzzwords or not use the internet to gather research on bullying and how to receive help. Google may only report positive trends and ignore negative ones leaving the data skewed.

People have the fundamental right to privacy in all aspects of life. When on the internet, the average individual is dealing with information about their personal life, health, and sensitive

topics they may not want to be shared. When choosing what data to report on, Google must be aware of this and careful that they're not impinging on the fundamental human right of privacy. There needs to be more information out there to educate the public on how their information is being used. The average citizen must be aware that their data is collected and used for reports. Hackers are constantly trying to infiltrate and use users' information for their gain. Security measures need to be introduced to protect search data from unauthorized access. The results an individual gets based on their search relate to their demographic and algorithm. Our dataset needs to be looked at with this in mind. An ethical lens must always be used when looking at people's search data to prevent discriminatory practices.

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