

Exploring Political Discourse Among High School Journalists with Web Scraping and AI Technology

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SUMMARY

Within the U.S., the viewpoints of younger generations, especially those not yet eligible to vote, are often overlooked despite offering valuable insights into the nation's future. In this study, we provided greater coverage of adolescent stances by investigating the political perspectives and trends of high school journalists, utilizing web scraping methods and artificial intelligence (ChatGPT-4o). We developed a Python program, "JournalScape," to analyze over 153,000 articles from 1,971 high school publications across the nation. Each article was categorized by topic and assigned a political lean score. We hypothesized that student journalists' views would align with local county politics, with a slight progressive shift due to younger age. The results indicate that high school publications exhibit lower levels of political polarization compared to mainstream media, and journalists' views showed no significant correlation with local voting patterns, though tending to lean moderately liberal overall. The reduced polarization may be attributed to the less restrictive, more open-ended nature of high school journalism, while the progressive skew could stem from social media and cultural differences. For future research, the methodology employed in JournalScape can be applied to gauge views on specific topics, such as climate change and gun control, and offers a novel solution to survey diverse viewpoints on a large scale. Overall, by assessing critical topics and political patterns in student journalism, this study presents a snapshot of the concerns of today's youth. Key issues and broader trends identified provide valuable insights to guide future policymaking, especially in areas like education and culture.

INTRODUCTION

Every U.S. election cycle, many factors influence the ultimate result, such as voter turnout, swing states, and party trends. While politicians vie for their party and analysts busy themselves with predictions, teenagers' opinions are often under-examined.

Because many adolescents are still too young to vote, their political views often go unnoticed. Most political studies today exclude age groups below 18 and typically begin their demographic focus with young adults, in the 18-24 or 18-29 age groups, missing the political discourse and civic engagement of younger teens in online and school environments (1). However, as the future of the nation, younger generations

deserve a greater spotlight, with deeper and more nuanced explorations of their political perspectives, attitudes, and behaviors. Research on minimum voting age found that 16- and 17-year-olds were just as capable of recognizing conflicting viewpoints on matters that impact their rights and demonstrated greater capacity for complex reasoning than adults (2). Though most teenagers can't voice their opinions by voting, they do still share their thoughts through channels like high school journalism.

Beyond reporting on school news or sports events, high school publications also function as platforms where students can write and share their ideas and opinions with their greater community. Unfortunately, due to the vast number of publications out there, this wide plethora of perspectives usually doesn't make it past the local sphere.

To get a more detailed look at political trends among teenagers, we developed a web scraping program called JournalScape to gather information from high school journalism publications across the U.S. and determine ideological nuances. It surveyed over 153,000 articles from 1,971 unique publications across all 50 states, totaling over 45 million words, and used OpenAI's latest AI language model, ChatGPT-4o, to perform political analysis. As a large-language model (LLM) trained on billions of datasets across the Internet, GPT-4o's ability to extract key ideas from large bodies of text in short timeframes makes it an ideal choice for analyzing journalism articles on a large scale. A recent study found that GPT-4o classifies political affiliation of online material with better accuracy, reliability, and lower or equal bias compared to human analysts (3). After collecting relevant data, JournalScape assessed the political lean of each article, allowing us to profile the opinions across student publications.

We hypothesized that the political views of high school journalists would correlate to some degree with political trends of their local area, as teenagers' perspectives are often shaped by their surrounding environment, including peers, parents, and other biases (4). We also hypothesized that publications would present more progressive stances on average because research shows younger populations increasingly align with the Democratic Party, with 66% of voters aged 18-24 identifying as Democrats (5). After analyzing findings from JournalScape, we found that student journalists do not exhibit the same pattern of polarization seen in professional media. Instead, they present a broad spectrum of views with no correlation to county voting statistics. However, the average political lean across all high school publications did show a slight Democratic bias. All in all, this work offers a novel approach to processing and analyzing large-scale online content to determine perspectives and trends among particular groups, addressing the limitations of manual and

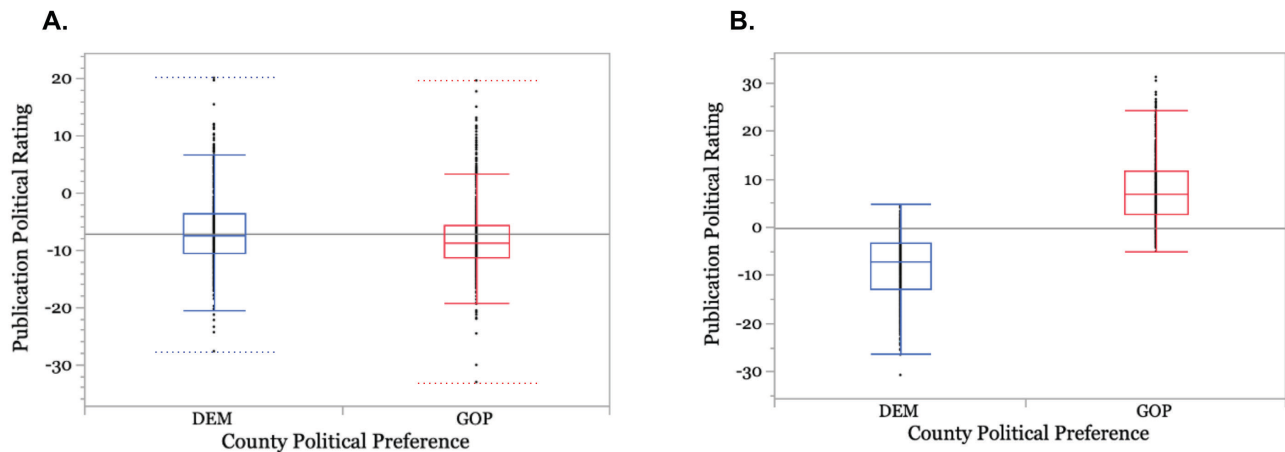


Figure 1: Publications from both county groups leaned moderately liberal. Box plot of publication political ratings grouped by county preference. County groups were defined as party voting percentage > 50%. (A) Box plots show actual data collected and analyzed. Dotted lines indicate minimum and maximum ratings. (B) Box plots model a hypothetical case if most publications are aligned with their county's lean. This polarized scenario was constructed based on the following formula: $(\text{GOP\%} - \text{DEM\%}) * 30 + \text{a random number from a uniform distribution across } -5 \text{ to } 5$.

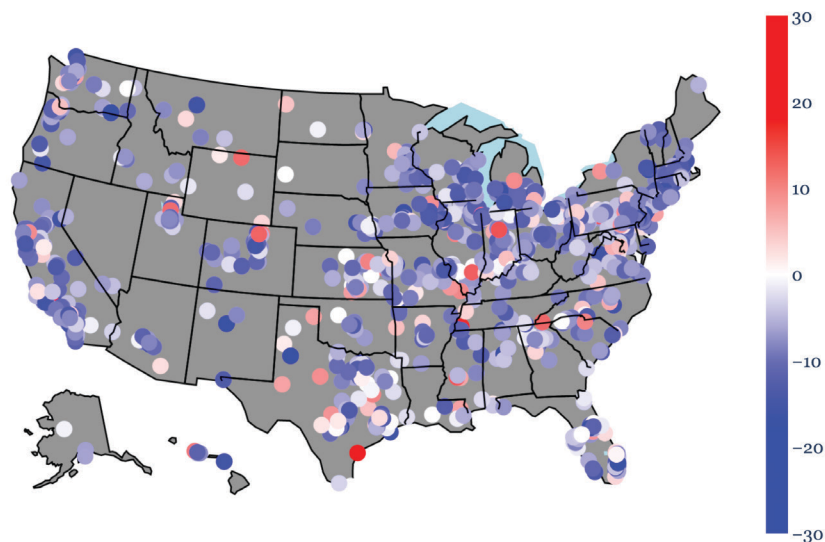


Figure 2: Cities display interspersed political leans that frequently deviate from broader state-level trends. Scatter map of the political leans of high school publications by city. Each dot represents a city, color-coded by the simple average of the political ratings of all publications in that city. Note that the map does not include all U.S. cities, as some areas lack sufficient high school journalism publications or data. The color scale goes from -30 to 30 instead of -42 to 42 to show more of the gradient (no city surpassed a score of ± 30).

subjective methods. By exploring political discourse in high school journalism, we also shed light on the evolving views of future voters and highlight opportunities for reducing polarization and improving transparency in both media and policymaking.

RESULTS

In this study, we developed a Python program, JournalScrape, to analyze articles from high school publications. We used the program to analyze and rate articles on a political scale of -42 (liberal) to 42 (conservative), which served as the basis for the rest of the data. For example, "Senator Lindsey Graham Should Not Be Making Decisions On Behalf Of Women," was rated -35.0 (very liberal); "No need to bridge gender gap," was rated 30.0 (very conservative); "Racial Slurs And Discrimination," was rated

-10.0 (moderate liberal); and "Prominent Police Roles," was rated 10.0 (moderate conservative) (6,7,8,9).

To explore the nuances of polarization among student journalists, publications were paired with official voter data by county and split into two groups, Democrat-leaning (DEM) or Republican-leaning (GOP), depending on the political leanings of their respective counties based on past election data. The overall political ratings of high school publications from both Republican and Democrat-voting counties leaned toward the Democratic side with a score of -7.14 (moderately left), a stark contrast to the hypothetical county-polarized scenario (Figure 1A and Figure 1B). Publication ratings in Democrat-voting counties (DEM) varied from +20 (very conservative) to -27 (very liberal). Likewise, ratings in Republican-voting counties (GOP) ranged from +18 (very conservative) to -34 (very liberal) (Figure 1A).

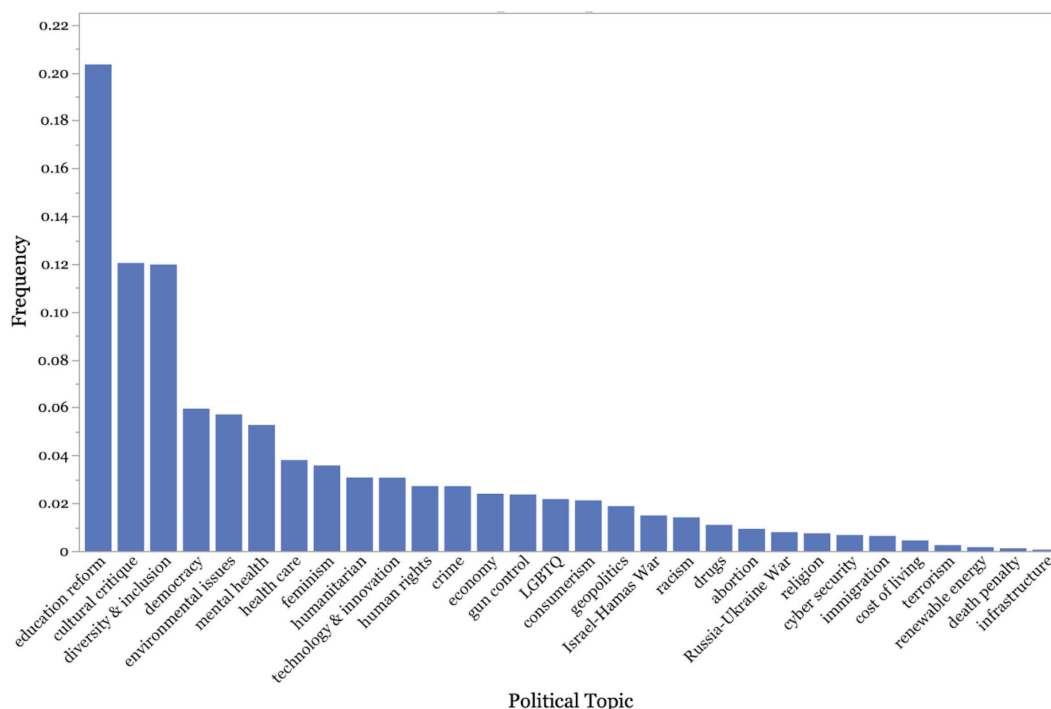


Figure 3: Popular political topics among high school journalists. Relative frequency of articles per political topic. Articles were categorized using ChatGPT-4o, and relative frequency was calculated as the topic's article count divided by the total article count.

For a geographic overview of the political distribution, high school publications were grouped by city and plotted on a scatter map (**Figure 2**). Affirming the progressive trend, the majority of cities leaned Democratic, even in states traditionally associated with the Republican Party. For example, Texas, often considered a Republican stronghold, had 68 out of 87 surveyed cities with liberal-leaning scores (< 0). Of these, 43 were moderately left (magnitude ≤ 10 , slightly less than half of the magnitude range) and 25 were extremely left (magnitude > 10). Of the 1,208 cities shown, 1,056 had liberal scores (< 0), while only 152 had conservative scores (> 0). However, despite the uneven distribution of political affiliations and liberal average, partisanship was not strongly divided by zones. Both Democratic and Republican counties contained cities with wide ranges of political stances. Furthermore, cities with both conservative and liberal leanings were also noticeably intermixed with frequent instances of adjacent cities holding opposing political leans, suggesting a low degree of polarization by region among school publications.

For a more detailed look at frequently discussed subjects among student journalists, articles were sorted into political topics such as climate change, gun control, and human rights. Education reform emerged as the most popular, accounting for over 20% of articles (**Figure 3**). This is consistent with the fact that students, spending much of their time in school, are more likely to focus on issues within their educational environment before highlighting other concerns. Cultural critique and diversity & inclusion followed closely behind, each consisting of approximately 12% of all articles. Together, these three categories highlight the primary focus of student journalists: first, addressing shortcomings in education, and second, exploring social issues related to culture and diversity within their communities. Examining student stances

calculated by averaging the political scores of articles in each category, diversity & inclusion articles exhibited a moderate liberal skew of -8.06, while education reform and cultural critique articles maintained political leanings close to neutral, with average scores of -2.45 and -2.54, respectively (**Figure 4**). Issues such as terrorism, religion, and geopolitics demonstrated slight conservative skews of 1.88, 1.22, and 0.18, respectively. The relatively neutral scores across the board suggest that student journalists bring a variety of perspectives from both sides of the political spectrum, which results in an overall balanced average.

Comparing student views and broader county trends, school publication leanings showed little to no correlation with their county lean. The distribution curves were nearly identical in position, with an overlap coefficient of 0.714 (71.4% overlapping area) and a difference in means of 1.27 (**Figure 5A**). In fact, the Republican group had an average political rating of -7.77, more liberal than that of the Democratic county group (-6.50). In contrast, the modeled polarized scenario has an overlap coefficient of 0.405 (40.5% overlapping area) and a difference in means of 16.1 (**Figure 5B**). Given that the difference in means is small and opposite to political party, we concluded that there was no relationship between student views and county leans. The lack of polarization within publication political ratings indicates that high school journalists exhibit less political division. Moreover, many publications in both groups held opposite political viewpoints to their counties'. Most schools in Republican-voting regions exhibited predominantly liberal ideologies, whereas some publications in Democrat-voting areas displayed more conservative leanings, as evidenced by the skewed distribution on the right end of the DEM distribution curve (**Figure 5A**). The lack of correlation with



Figure 4: Education reform and cultural critique are popular topics that lean slightly democratic. Word cloud of popular topics across 36,000+ articles outlining the most discussed topics among high school journalists. Font size correlates to frequency, and color corresponds to the average political stance on that subject. Larger words indicate more articles written by student journalists on a topic, while smaller words represent fewer articles. Bluer topics have an average political rating across all articles that leans Democratic, while redder topics lean Republican. Not all 153,000 articles were included due to irrelevance to political issues or outlier categories. Every article was sorted into exactly one category. Color scale goes from -30 to 30 instead of -42 to 42 to show more of the gradient (no category surpassed a score of ± 30).

local political trends suggests that high schoolers, or at least student journalists, write about views that deviate from their greater adult community, expressing themselves more independently than previously imagined (4).

DISCUSSION

Based on the results of this study, high school publications tend to produce stories that lean more moderate and exhibit little correlation with region, indicating lower political polarization. By sorting articles by category, we highlighted the wide range of issues discussed in high school publications as well as the balanced viewpoints presented across various subjects (Figure 3, 4). Partitioning publications by county voting data further revealed that the political perspectives of student journalists showed no correlation with local political patterns (Figure 1, 5).

These trends contrast with the increasing polarization observed in mainstream media (10). One possible explanation is that professional media often aligns with political “niches,” sticking to one party regardless of the topic. In contrast, high school journalism fosters a more open environment that encourages liberated thinking and bolder writing, even if it diverges from the local political climate. While school publications may still face restrictions from their faculty advisor or administration, their non-professional nature generally allows students to freely express themselves without the constraint of catering to a specific audience for commercial interests. Furthermore, while professional media in the U.S. is predominantly controlled by six major companies (11), thousands of independent, student-run publications exist. This vast number of student media sources contributes diverse perspectives, which may help explain the lower level of political polarization observed.

Looking at averages, the moderate Democratic lean among student journalists aligns with the tendency of younger

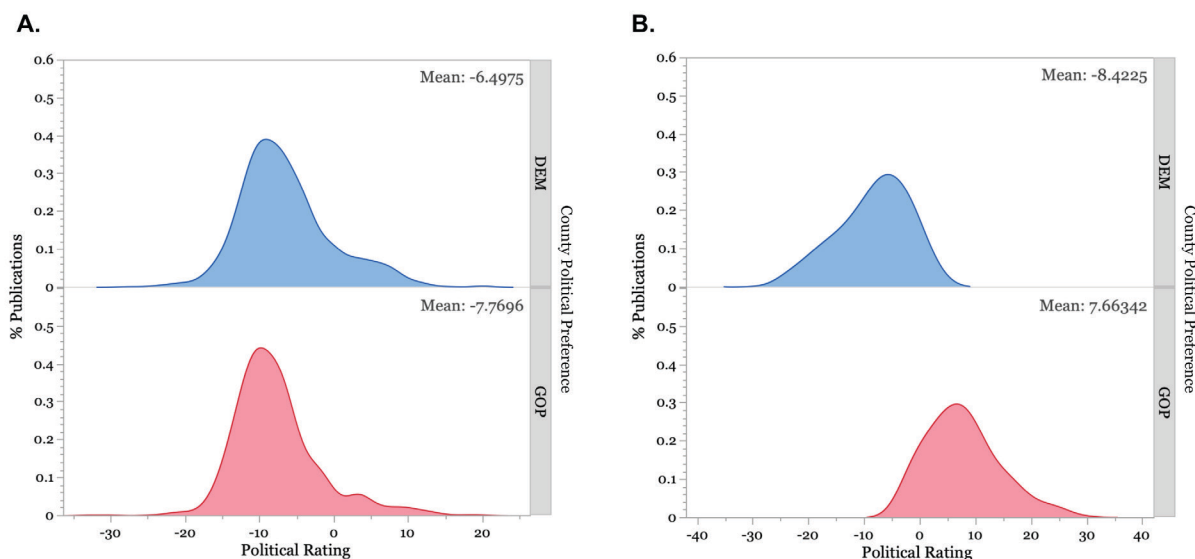


Figure 5: Publication political leans share minimal correlation to county trends. Distribution of publication political ratings grouped by county preference. County groups were defined as party voting percentage > 50%. (A) Distribution curves show actual data collected and analyzed. (B) Distribution curves model a hypothetical case if most publications are aligned with their county’s lean. This polarized scenario was constructed based on the following formula: $(\text{GOP}\% - \text{DEM}\%) \times 30 + \text{a random number from a uniform distribution across } -5 \text{ to } 5$.

generations, such as Millennials and Gen-Z, to support progressive positions (5). This trend could also be influenced by social media trends, which often lean left, as well as cultural differences within adolescent populations (12). However, further research is needed to fully explore these nuances.

By harnessing the power of GPT-4o, JournalScape serves as a new way to process online content. Current analyses are typically done manually by professional political scientists through procedures such as keyword identification and category sorting (13). For example, Ad Fontes Media, a company that rates the political bias of media sources, has a team of 60 analysts that rate articles using a predefined set of steps (14). However, subjectivity and human error associated with this type of analysis makes it prone to inconsistencies. For bigger datasets containing thousands of articles, manual analysis becomes tedious and impractical. The web-scraping and AI-driven methods used in this research enable the collection and analysis of viewpoints at a much larger volume. Future work employing similar strategies could explore other online communities, such as Twitter or Reddit forums, or dig deeper into specific topics like climate change, abortion, and gun control; these studies could determine how perspectives vary by community and location and similarly gauge levels of polarization by topic.

While more efficient than manual processes, some limitations do exist in this computing-oriented methodology. JournalScape relied on the fact that most high school publications use standardized site templates from School Newspapers Online (SNO), making web-scraping easier due to consistent HTML formats. However, future studies on less organized online environments, such as college media, professional media, or social media, may face challenges with web-scraping due to the lack of uniform site formats, requiring more advanced techniques and algorithms. Additionally, during extractions, articles were shortened into summaries for more efficient processing by ChatGPT-4o, which poses as another limitation as key information may have been cut out in some pieces. Furthermore, the medium of student articles may not necessarily be representative of the student's own views, as articles often go through multiple rounds of revision from other editors and the faculty advisor before publication. Inherent biases in ChatGPT-4o and other LLMs, along with a lack of context behind articles and topics, could also potentially distort the data and compromise the quality of political analysis (15).

Nevertheless, this study provides a unique and unfiltered glimpse into the minds of future voters and leaders. Results from this research indicate that high school media exhibit lower political polarization, as compared to the high levels of polarization in professional journalism today. In addition, policymakers may be able to better adjust to younger audiences by identifying and analyzing popular issues among student journalists. All in all, assessing political patterns within high school journalism spotlights the perspectives of the younger generation, and amidst the growing division in America today, the results of this data-scraping journey could possibly point to a less polarized, more inclusive future.

MATERIALS AND METHODS

We developed JournalScape in Python (v3.11.5) to scrape and analyze data from thousands of high school journalism programs. First, we obtained publication information from

the School Newspapers Online (SNO) network, a popular site template used by thousands of journalism programs (16). Publications that lacked a stable URL connection or returned an unsuccessful page status (e.g. 404) were filtered out. We then recorded the details of each publication, including school name, city, and state, to a .csv file.

Next, the program sifted through each publication's website and searched for three target sections: news, opinions, and features. The majority of articles with a clear political stance typically fell into these three categories because other sections, such as sports or entertainment, often housed neutral or unrelated content. Additionally, section names often varied from school to school. For example, while one high school publication has an "opinion" section, other schools call it "op-ed" or even "politics" (17, 18, 19). To get around this issue, JournalScape scanned the publication's homepage and identified possible keywords for the three sections, like "events" as an alias for news, "showcase" for features, or "editorial" instead of opinions. This improvement made the program more flexible and reduced the number of sections missed or overlooked during web-scraping, as manual checks during early versions revealed gaps.

We extracted up to 30 of the latest articles from each section (or less if the section contained less than 30 articles) and scraped the headline and body text. For cost-saving purposes, the body text was cut into a 1500-character-long summary using Python's Natural Language Toolkit library (NLTK 3.8.1) by taking sentences from the introduction (commonly called the "lede") and conclusion of each article (20).

Then, the summary and headline of the article were fed into two stages of analysis: "black-and-white" analysis with ChatGPT-3.5 Turbo and "detailed" analysis with their more powerful ChatGPT-4o model (21). The first "black-and-white" stage removed unrelated or neutral articles, such as stories that covered school news without subjective elements. The prompt given to the GPT-3.5 Turbo for this stage was in the following format: "Take into account this article with headline <headline> and body text <body text>. Is this article related to any social or political stances/ideas/topics at all? Answer with strictly Y or N." Some samples of analyzed pieces include "Stampede staff shares thoughts on Russia and Ukraine," with a response of "Y", or "AP Showdown: The Best and Worst APs," with a response of "N" (22, 23).

For articles containing a social or political stance, ChatGPT-4o assigned a rating between -42 and 42. We defined political rating (or political lean) as an individual or group's general inclination toward a political party, based on their alignment with its policies and positions. Bounds of -42 to 42, frequently used by media bias checkers, lend ample space for a wide spectrum of viewpoints from moderate to more extreme leans, making it a suitable range for political ratings.

For this step, the prompt provided to the AI model was in the following format: "Assign a political lean score on a scale of -42 (left) to 42 (right) to this article, <headline> and <body text>. Be specific and precise, one significant figure." Example ratings from previously assigned articles were also fed to the model as a point of reference. The temperature (randomness) was set to 0.6 and the Top P (cumulative probability distribution) was set to 0.5, both below the default values of 1, to make the language model more deterministic

and consistent in its responses.

Alongside a numerical rating, every article was also categorized by ChatGPT-4o into one of 30 political topics: education reform, geopolitics, Russia-Ukraine War, Israel-Hamas War, diversity & inclusion, democracy, humanitarian, LGBTQ, feminism, death penalty, religion, infrastructure, human rights, economy, cost of living, consumerism, health care, abortion, environmental issues, racism, renewable energy, cyber security, technology & innovation, crime, mental health, cultural critique, gun control, drugs, terrorism, and immigration. Many topics were derived from the list of commonly debated policy issues created by the U.S. Department of State (24). However, the final list was manually curated by grouping closely aligned topics like climate change and environmental issues and including issues specific to current times (e.g. Israel-Hamas War) for relevancy. The frequency and average political stance on each topic were then calculated and visualized through a color-coded word cloud diagram generated using Python's WordCloud library (25).

Looking at big picture data, JournalScape derived the cumulative score for a publication by calculating the mean square of all its article ratings, which is a way of taking an average that involves summing the squares of each value and dividing by the total number of values. This method of averaging gave more weight to more extreme-rated articles. For example, if a particular high school publication had 29 stories all rated as -1 (close to neutral) but one story rated as +29 (extremely conservative), a simple average would rate this publication as 0.0. On the other hand, the square mean approach would rate the very same publication as a +5.2, weighing outliers more significantly to facilitate easier polarization analysis by making extreme data more pronounced.

To better assess political leanings across cities, JournalScape grouped each publication by city and calculated an overall political score for the city with a simple average, with city information retrieved from an online U.S. cities database (26). Considering the larger scale and bigger diversity of schools, the square mean was not applied in this case, because a single extreme school shouldn't skew the stance of an entire city. Finally, the cities and their political ratings were visualized on a scatter map created with the "plotly" library for Python (27). For the distribution curves and box plots, we grouped publications into counties using U.S. Zip Code data, and county groups were determined through a simple majority of total votes for each party using political data from the 2016 U.S. presidential election (28, 29). These figures were made in JMP, a statistical software (30).

The JournalScape program can be accessed from the GitHub repository at the following link:
github.com/ViceBitz/JournalScape.

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