34th Street

The Text Analysis Issue

Frequency of Mental Health-related Articles per Year

Sentiment Distribution by Year

Sentiment Analysis by Section Over the Years
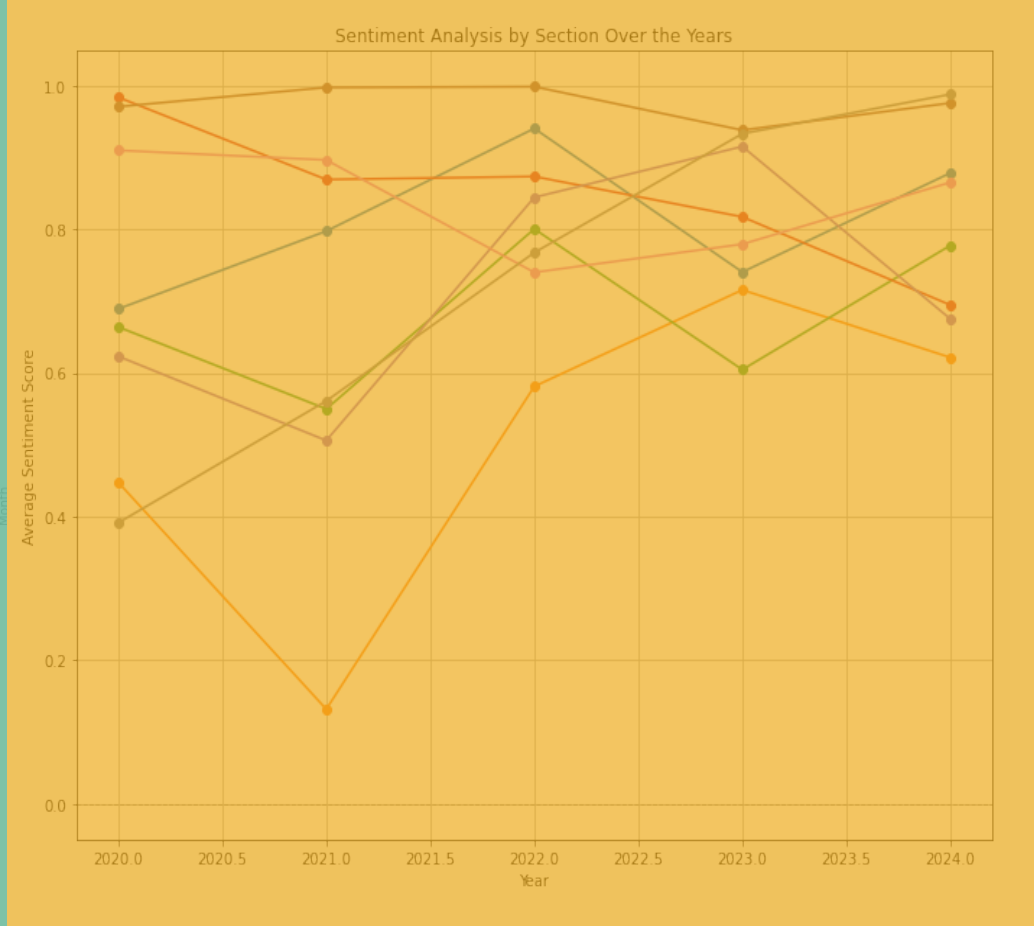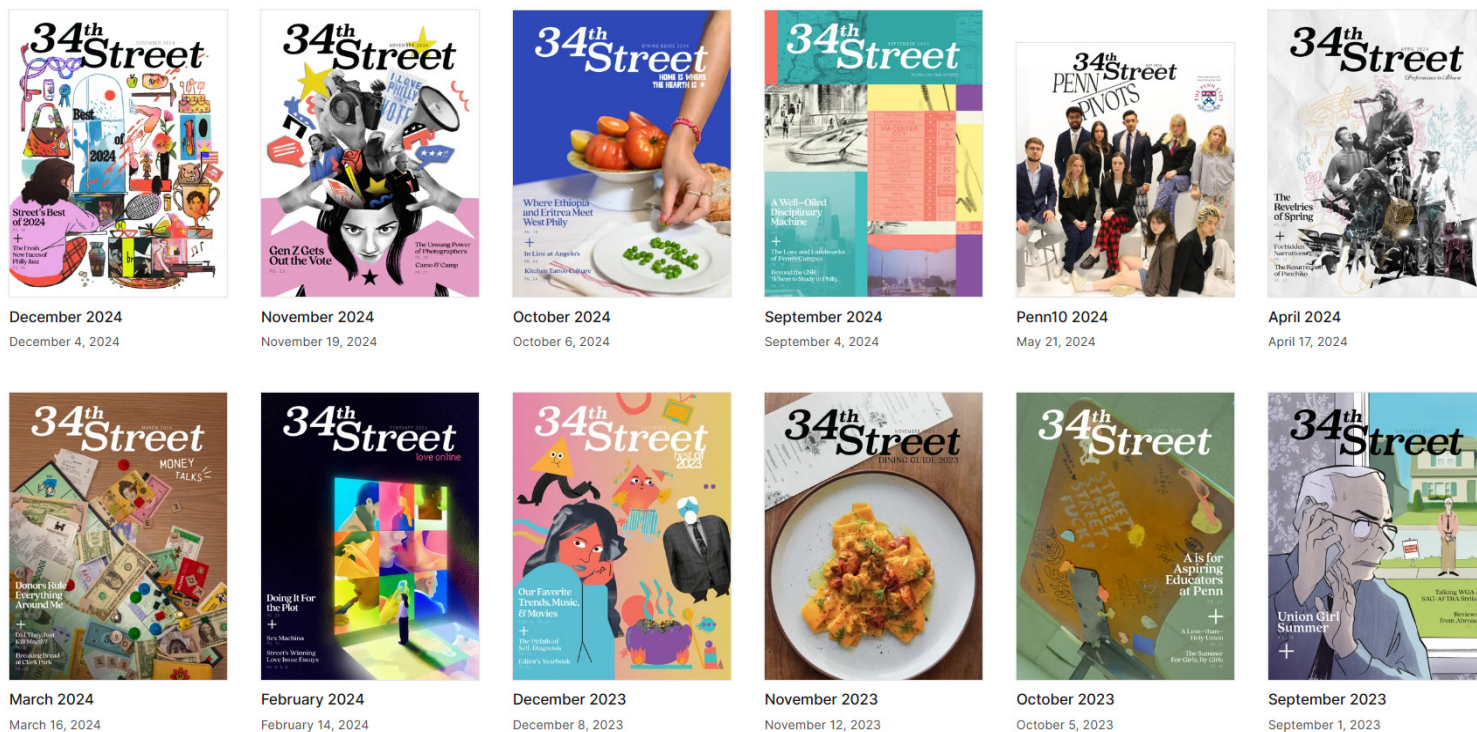
An Introduction

An overview of our 34th Street Data Analysis, including our research question and hypothesis

BY ANDREW LU & FIONA HERZOG

December 2024
December 4, 2024

November 2024
November 19, 2024

October 2024
October 6, 2024

September 2024
September 4, 2024

Penn10 2024
May 21, 2024

April 2024
April 17, 2024

March 2024
March 16, 2024

February 2024
February 14, 2024

December 2023
December 8, 2023

November 2023
November 12, 2023

October 2023
October 5, 2023

September 2023
September 1, 2023

If you haven't read 34th Street Magazine, where have you been? (Seriously, go pick up an issue in Anneberg right now.) Both authors write for 34th Street Magazine, and we were interested in looking more at the past articles for the publication we both contribute to.

From an initial read through of some older issues, we realized the overall tone and direction of the magazine have shifted significantly in the past few years. In 2020, features included titles such as *"'Zoomed Out,' 'Lonely,' and 'Tired': Hours online with little social interaction wear on Penn students"* and *"'You Can't Not Take That Home': Penn Nurses on the Emotional Toll of Coronavirus"*. These articles differed significantly in the topics covered by more recent features, encouraging us to look deeper into what other trends could be uncovered through computational analysis.

Crucially, 34th Street is a student magazine, written, edited, and published entirely by Penn undergraduates. While the writers for 34th Street only account for a small group of viewpoints, the topics and attitudes reflected in their writing can serve as a lens to investigate what's important and salient to the broader student population.

This analysis looks at the corpus of 34th Street articles since 2020. Using Frequency/N-gram Analysis, Key Word In Context, Sentiment Analysis, and Topic Modeling, we will be looking at how articles in 34th Street have changed over time, using mental health as a key theme to direct research.

Research Question:

How have themes such as mental health and well-being been portrayed in 34th Street? since COVID and how have these narratives changed over time?

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Hypothesis:

Our hypothesis is that with some variation, the sentiment of articles and topics featured were generally darker and more pessimistic closer to COVID, and have gotten gradually more optimistic over the years since.


Data Analysis

N-gram Analysis, Frequency Lists, KWIC, Sentiment Analysis, and Topic Modeling

BY PYTHON

We plotted the ratio the number of articles classified as mental-health articles against the number of total articles published that year. We then did the same thing by month.

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From this plot, we have found that the frequency of mental health articles has stayed relatively consistent. The highest frequency of mental health articles was in 2021, then 2022, then 2024. However, our findings later suggest that the reason for high mental health article count varies across these years.
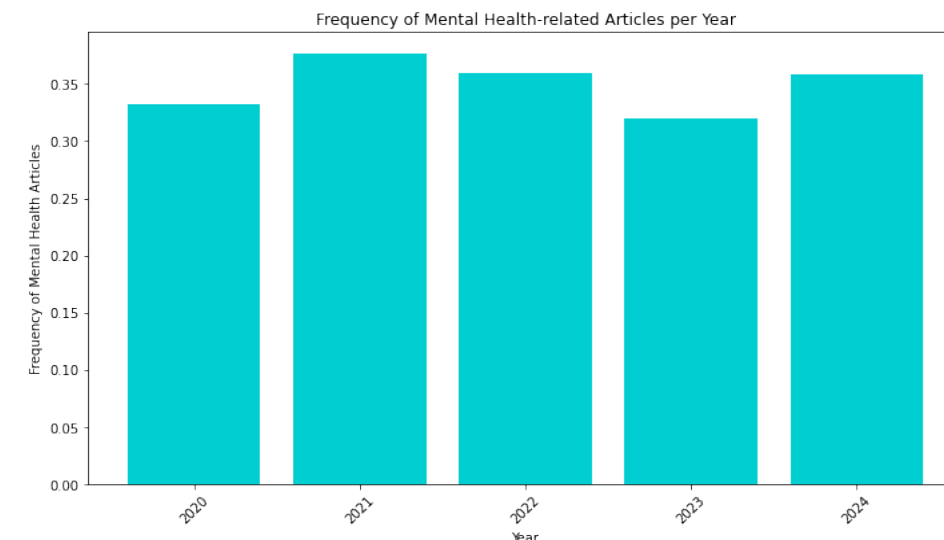
The monthly plot of mental health-related articles reveals some key trends tied to the academic calendar. Spikes in article counts are observed around the start of each school semester, particularly in the months of September to December and February to April, which suggests that as students return to school and face academic challenges, mental health topics become more prominent in discussions. This aligns with the natural rhythms of student life, where periods of high academic stress might lead to more articles being written.

However, the overall decline in the number of mental health-related articles over time is notable. This dip, especially post-pandemic, could indicate that students are facing fewer mental health challenges compared to the height of the pandemic. This pattern could suggest that students are shifting their focus to other aspects of their lives and studies, leading to a decrease in a desire to cover mental health struggles, and instead more variety in content.
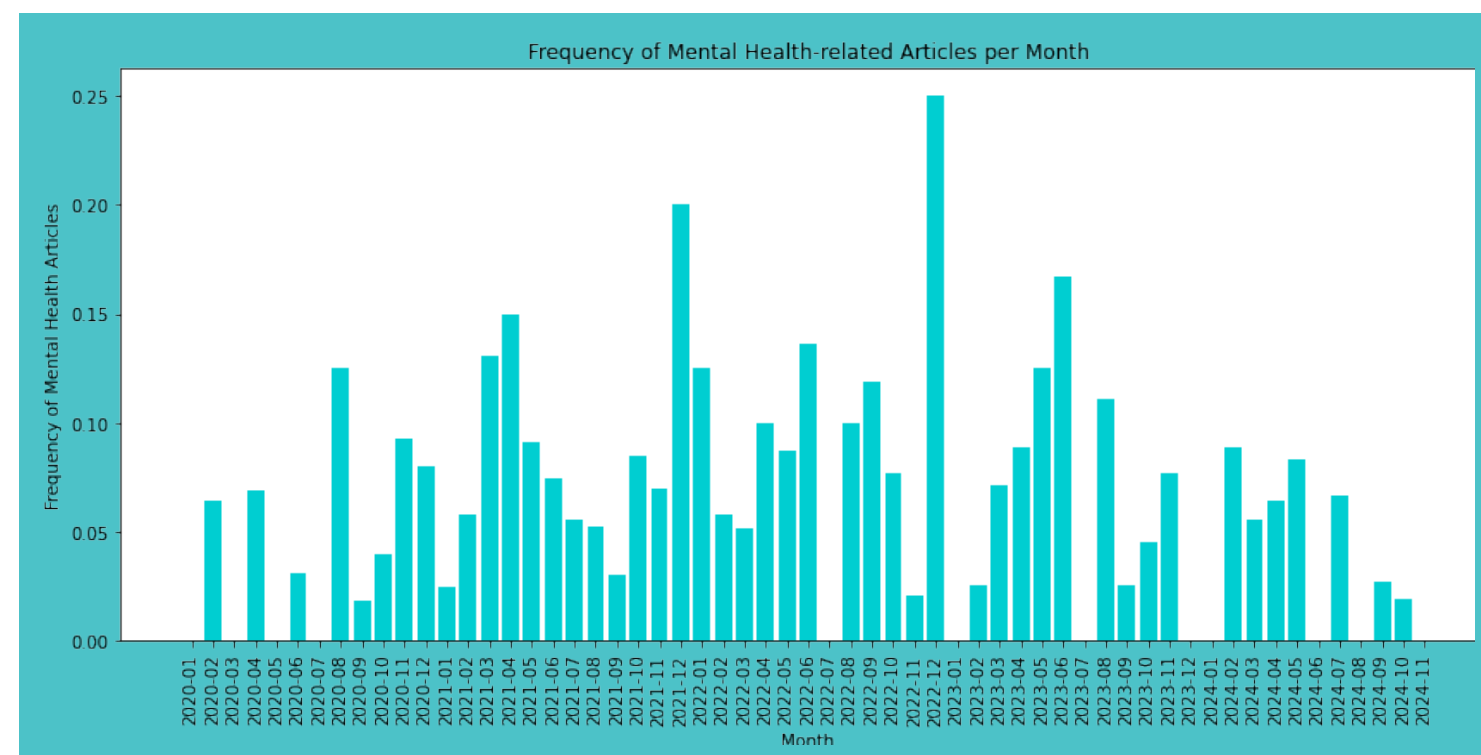
N-Gram Analysis

We performed n-gram analysis to see in articles that were then classified as mental health articles, what were common phrases that appeared. We did this to identify the specific content of the mental health articles.

2020 - Mental health discussions in 2020 seem heavily tied to personal feelings and reflections (e.g., "feel like," "even though") and the influence of social media. The pairing with "high school" suggests attention to the struggles of adolescents or young adults, potentially exacerbated by the pandemic's early phases.

2021 - This year saw the highest focus on mental health. Content is deeply linked to social media platforms, especially Instagram (e.g., "post," "view post"). This suggests that discussions around mental health were tied to online expression and validation, emphasizing concerns about social media's psychological impact. The persistence of "high school" and "feel like" points to sustained interest in youth mental health narratives and personal stories.

2022 - Mental health discussions broaden this year to incorporate themes like physical health (palliative care) and economic challenges (food insecurity). This reflects a shift to systemic and intersectional issues examining how structural inequities and physical health crises impact mental well-being. "Social media" remains a strong theme, although its prominence slightly decreases compared to 2021.

2023 - Mental health continues to feature prominently, but the narrative shifts toward university-specific challenges with "Penn students" seeing high relevance. Articles might explore mental health issues faced by young adults in higher education, including academic pressures, transition to independence, and community life.

2024 - Mental health remains a significant focus but appears less dominant compared to prior years. Discussions diversify into urban lifestyles (bike lanes, New York) and daily routines ("every day"). The continued presence of "high school" and "social media" indicates ongoing exploration of their effects on mental health, while other lifestyle-oriented themes suggest a potential shift toward the broader effects and causes of mental health, rather than a response towards an event.

'2020': [(('mental', 'health'), 74), (('feel', 'like'), 60), (('high', 'school'), 54), (('even', 'though'), 49), (('social', 'media'), 46), (('penn', 'students'), 44), (('post', 'shared'), 38), (('view', 'post'), 37), (('post', 'instagram'), 37), (('first', 'time'), 32)]}

'2021': [(('high', 'school'), 115), (('mental', 'health'), 114), (('feel', 'like'), 97), (('social', 'media'), 77), (('even', 'though'), 64), (('instagram', 'post'), 62), (('view', 'post'), 61), (('post', 'instagram'), 61), (('post', 'shared'), 61), (('first', 'time'), 55)],

'2022': [(('mental', 'health'), 103), (('social', 'media'), 86), (('high', 'school'), 73), (('feel', 'like'), 66), (('palliative', 'care'), 48), (('penn', 'students'), 42), (('united', 'states'), 40), (('first', 'time'), 39), (('even', 'though'), 36), (('food', 'insecurity'), 35)],

'2023': [(('mental', 'health'), 77), (('high', 'school'), 54), (('feel', 'like'), 47), (('social', 'media'), 45), (('penn', 'students'), 44), (('new', 'york'), 42), (('asteroid', 'city'), 30), (('united', 'states'), 28), (('water', 'bottle'), 27), (('locust', 'walk'), 26)],

{'2024': [(('social', 'media'), 45), (('new', 'york'), 38), (('feel', 'like'), 38), (('high', 'school'), 33), (('bike', 'lanes'), 30), (('penn', 'students'), 25), (('mental', 'health'), 23), (('united', 'states'), 22), (('first', 'time'), 19), (('every', 'day'), 19)],

2020 *2021* *2022* *2023* *2024*

2020 - Sections such as Arts (0.984), Ego (0.971), and Style (0.910) maintained high positivity, likely focusing on creativity, community, and uplifting content. By contrast, Focus (0.448) and Word on the Street (0.391) reflect more critical or somber coverage, possibly due to pandemic-related reporting (e.g., systemic inequities, struggles faced by everyday individuals. Cultural sections like Music (0.689) and Film (0.664) provided entertainment and escapism but were muted compared to pre-pandemic norms.

2021 - Sentiment remained low or stable in most sections compared to 2020, signaling the emotional and societal toll of COVID-19's peak year. Focus (0.132) had the lowest score, potentially due to coverage of polarizing events like racial justice movements, the vaccine rollout, or prolonged isolation. Uplifting sections like Ego (0.997) and Style (0.896) maintained positivity, continuing to focus on community and relatable stories. Creative and entertainment-driven sections (Arts, Style, Music, Film) saw moderate positivity, highlighting a collective reliance on art and culture as coping mechanisms.

2022 - Sentiments began to rise consistently across most sections, reflecting growing hope, recovery, and adaptation. Music (0.940) and Features (0.844) were the highest in increase in sentiment scores, suggesting interest in narratives of creative expression, resilience, and in-depth reporting.

2023 - Sentiments continued an upward trajectory or stabilized in most sections. Word on the Street (0.933) experienced substantial growth, reflecting an increased emphasis on human connection and community narratives in the aftermath of the pandemic. Ego (0.938) remained consistently high, supporting the same theme of individual and community-centric positivity. Some slight declines (e.g., Film (0.604), Arts (0.817), Music (0.740)) suggest a rebalancing, as writers no longer looked to these mediums as a means of coping, but rather as a means to write critique on new releases.

2024 - Sentiments across sections showed mixed results: while Word on the Street (0.988), Ego (0.976), and Music (0.878) remained strong, some sections like Features (0.675) and Arts (0.694) saw noticeable dips. These shifts could indicate writers responding negatively to the many international and national crises that plagued the US in 2024. Furthermore, in 2024, the University of Pennsylvania faced many issues that may have negatively affected students. Thus, writers for these sections could have responded by writing. However, positive trends in Style (0.865) and Focus (0.621) signal an enduring focus on rebuilding experiences and community relevance.

Sentiment Analysis Over the Years

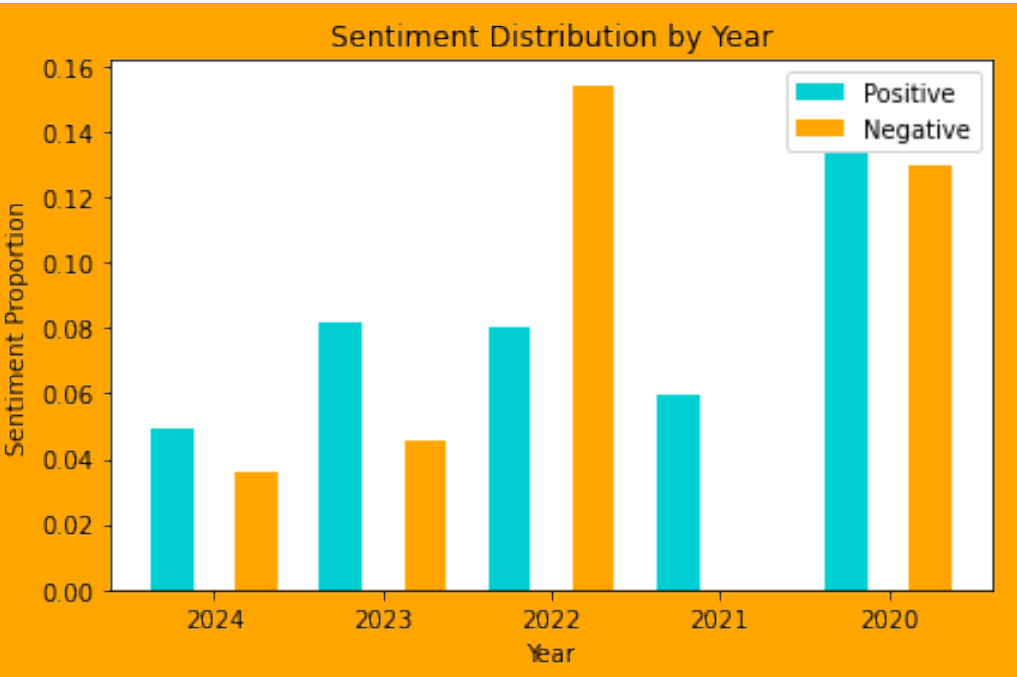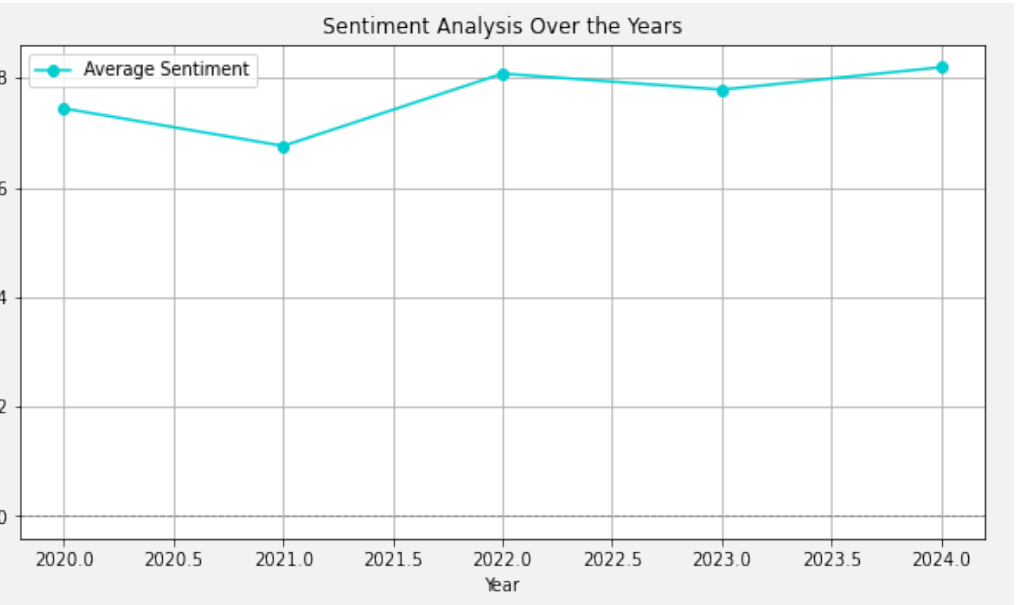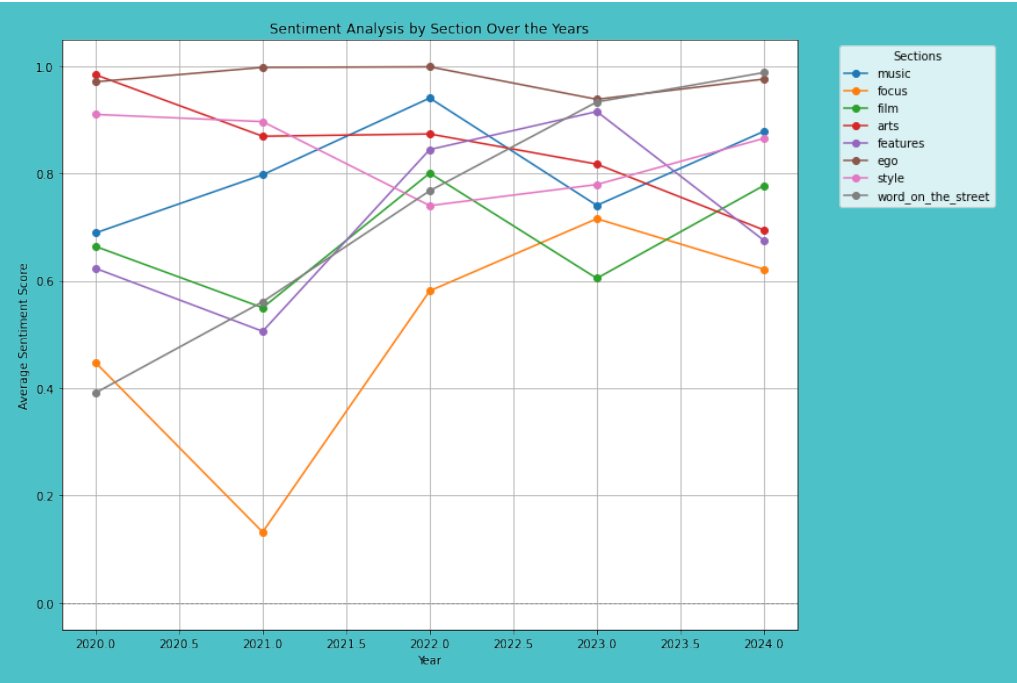Average Sentiment
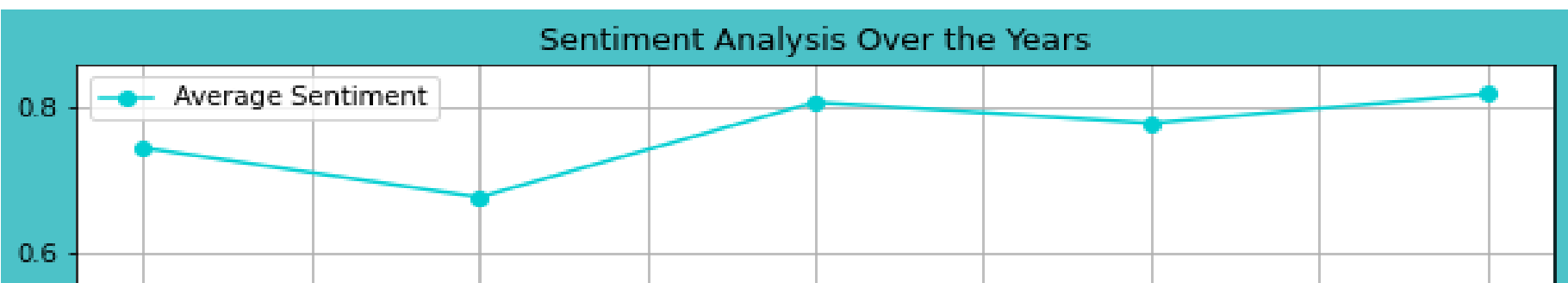
Sentiment Analysis

Now that we knew per year what the content was, we wanted to investigate whether sentiment. For instance, discussions of mental health can be in the context of poor mental health, or it can be in the context of positive actions to aid in stable mental health. The folloiwng showcases some of our findings.

Over the years, we have found that after 2021, the sentiment score in articles has increased. Thus, we can attribute the high frequency of mental health articles in 2021 as a negative, where many writers were expressing dissatisfaction. We suppose this is in response to COVID, where many writers were unable to enjoy the college lives they were promised while being locked in close proximity with their families, partners, etc. However, from this chart, we can then see that as the years passed, even though there were still mental health articles written, the overall sentiment increased, indicating that the conversation surrounding mental health became more varied and not just strictly discussing poor mental health.

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KWIC Analysis

Now that we knew per year what the content was, we wanted to investigate whether sentiment. For instance, discussions of mental health can be in the context of poor mental health, or it can be in the context of positive actions to aid in stable mental health. The folloiwng showcases some of our findings.

Sentiment Analysis by Section Over the Years

Sentiment Analysis Over the Years

Sentiment Distribution by Year

Year: 2020; Top N-gram: mental health
Contexts:
- schools in west philly and mental health facilities" of course the pandemic
- struggles with drugs recovery and mental health through lo-fi beats and miller's
- resource for overall wellbeing and mental health nostalgic reverie causes people to
- to report good or excellent mental health uncertainty plagues the generation from
- the constant magnification of dark mental health jokes as encouragement of anxiety
- depression perhaps even romanticizing the mental health concerns therapists view gen z's
- humor to cope with their mental health as a negative coping skill
- viewpoint gen z's approach to mental health and societal problems truly is
- isn't demonized nor is her mental health used to set her up
- by the national institute of mental health is an intense persistent fear

Year: 2021; Top N-gram: high school
Contexts:
- to become a rockstar" in high school on the other hand nico—described
- your old diary entries from high school after years of therapy you
- teenager in a los angeles high school only adds to the shows
- grade classroom at andrew hamilton high school "once a week for three
- writing support to paul robeson high school students ellison talked with the
- and college readiness measure for high school students in pennsylvania ellison says
- to have experienced half of high school during a pandemic penn's first
- our most recent memories of high school lay the groundwork for who
- some current first years associate high school with a grueling avalanche of
- a general sense of normalcy high school is known to be an

Year: 2022; Top N-gram: mental health
Contexts:
- programming spanning from stem to mental health and wellness however convincing local
- of philadelphia have created school-based mental health service resources while projects around
- for being bad for people's mental health listeners and sharers alike just
- or neglect were going unnoticed mental health also faltered for students during
- 2020 students experiencing food insecurity mental health challenges and abuse were not
- more awareness around anxiety depression mental health and disabilities but its also
- to prioritize myself and my mental health and know when things are
- albums that touched on poor mental health depression and addiction entergalactic portrays
- running is your brain and mental health and 100% of life is
- a student group that runs mental health and active listening workshops around

Year: 2023; Top N-gram: mental health
Contexts:
- charge of their physical and mental health every year the college hosts
- looking at violence through a mental health perspective and investigating the impact
- accessible treatment according to dewitt mental health and addiction issues the cost
- access to addiction treatment and mental health services social security benefits that
- with tenuous grasps on their mental health cheryl is hiding her dead-a-few-years
- the constant student conversation around mental health is senior milan chand c
- passion and enthusiasm to promote mental health awareness and make those around
- milan always ensures that his mental health is his first priority name
- lab you're quite involved with mental health awareness initiatives could you tell
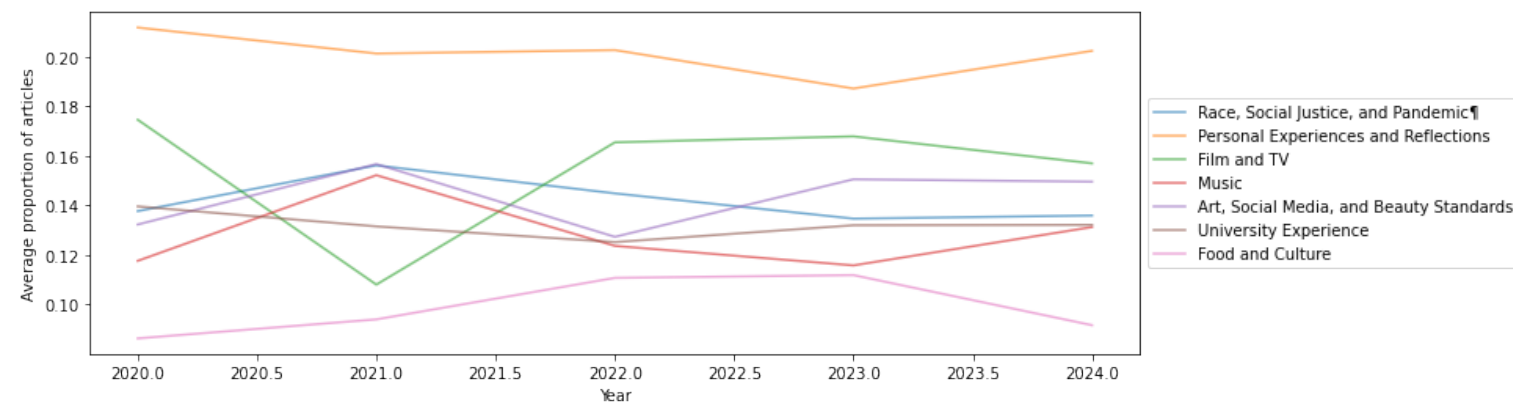- up getting really involved with mental health awareness within my town i

Year: 2024; Top N-gram: social media
Contexts:
- with the same one-word prompt social media timelines are flooded with thousands
- high schools the impact of social media by bringing in local legislators
- difficult in the age of social media wang says that for students
- social media" this overdependence on social media leads predictably to polarizing `opinions
- over half of teens used social media to get news beyond contributing
- news beyond contributing to misinformation social media also has another unintended effect
- some cases ai videos and social media posts about the legitimacy of
- disinformation has become prevalent on social media and those who are on
- algorithms creating echo chambers however social media has positive engagement impacts especially
- do digital testimonies on our social media about how these things are

ANALYSIS ON THE SENTIMENT OF CONTENT

2020 - Top N-gram: mental health
- Positive Sentiment: 13.35%
- Neutral Sentiment: 73.68%
- Negative Sentiment: 12.98%

COVID-19 drove heightened attention to mental health, with emphasis on issues like anxiety, depression, and uncertainty among Gen Z students. The tone blends realism and empathy—capturing both struggles and coping mechanisms like humor and music as tools for navigating challenges. Mental health is positioned as a significant societal issue, magnified by isolation and social disruption. The negative sentiment (12.98%) likely reflects concerns such as pandemic-induced stress, systemic inequalities in care access, and pervasive uncertainty.

2021 - Top N-gram: high school
- Positive Sentiment: 5.93%
- Neutral Sentiment: 94.07%
- Negative Sentiment: 0.00%

Discussion shifts to the educational experience of high school students, often affected by remote learning and truncated social development during the pandemic. Content highlights the challenges of coping with disrupted routines and adapting to new norms, framed with a neutral and factual lens.

2022 - Top N-gram: mental health
- Positive Sentiment: 8.01%
- Neutral Sentiment: 76.57%
- Negative Sentiment: 15.42%

Post-pandemic, there's a notable surge in mental health-themed discourse, highlighting innovations like school-based programs and community awareness initiatives. Sentiments around mental health challenges and the need for systemic reforms—such as the lack of equitable resource distribution—are prevalent. The spike in negative sentiment (15.42%) reflects editorial focus on systemic inadequacies and worsening mental health among marginalized groups, balanced by positive emphasis on local initiatives and recovery efforts. It suggests a shift toward advocacy-driven discussions, reflecting society's push for structural change.

2023 - Top N-gram: mental health
- Positive Sentiment: 8.19%
- Neutral Sentiment: 87.23%
- Negative Sentiment: 4.58%

A tone of agency and empowerment emerges in mental health coverage, focused on individual and collective action. Stories discuss youth-driven awareness initiatives and portray mental health through relatable anecdotes, emphasizing self-prioritization and grassroots activism. A drop in negative sentiment (4.58%) underscores a hopeful shift, balancing factual storytelling with solutions and celebratory narratives. The emphasis on self-care and resilience signifies collective healing and increased societal dialogue around mental health stigmatization.

2024 - Top N-gram: social media
- Positive Sentiment: 4.94%
- Neutral Sentiment: 91.48%
- Negative Sentiment: 3.58%

Coverage ties mental health discourse to the broader influence of social media, especially for adolescents. Articles explore topics such as echo chambers, misinformation, and social validation culture while also highlighting positive social engagement opportunities. The data shows a decline in both positive and negative sentiment, reflecting a tendency toward analytical and reflective neutrality. This nuanced approach suggests editorial efforts to address polarization and complexity without oversimplifying effects (either as entirely detrimental or beneficial).

Topic Modeling
Advanced Topic Modeling using Latent Dirichlet Allocation

TOPICS IN LDA MODEL:

Topic #1: says people students penn community philadelphia black many work health city support university public student change members american school political care would history social violence pandemic campus issues year years new center communities asian police workers need resources make first

Topic #2: love life first people would back day know way says get friends every never much still year feel new something make home us see could think things school world night around felt always two go want years work room away

Topic #3: film show movie characters story season character films series new world first shows many two love best episode however television movies life family still audience people comedy much yet though well way white watch may year stories see cast star

Topic #4: music album song songs pop love track new artists band first sound lyrics record swift fans year released artist release tracks two rock world musical best years would still group dance back albums single yet however voice many past well

Topic #5: art women social media tiktok people instagram post many fashion black world often new work body culture content way videos look artists app white make video us may men users online beauty color female view made brand however shared life

Topic #6: penn people really students says think lot year school first would campus get college community student work something different experience want things going class go feel know group i'm way able street life always semester new many classes love years

Topic #7: food philadelphia philly city restaurant post new street day dining location place business make home coffee shared instagram restaurants kitchen community park st th experience view people made market every says get first meal local go cooking great menu shop

CATEGORIZING THE TOPICS

From the above keywords, these topics can be categorized into the following approximate categories

1. Race, Social Justice, Pandemic
2. Personal Experiences/Reflections
3. Film and TV
4. Music
5. Art, Social Media, Beauty Standards
6. University Experience
7. Food and Culture

The first category is likely tied to specific global events, and the second category is likely tied to personal reflections and events that may cause stress. The next few topics tie specifically into sections: Film & TV, Music, Arts, and Style (which is meant to focus on University life and the student experience). Even the first two topics may align with sections. Both the Features and Focus section are geared towards covering current events, and the Word on the Street section covers personal essays from writers - aligning with topic 2. Topic 7 is mostly about food and restaurants: while not tied to a specific section, 34th Street publishes a dining guide full of restaurant reviews and food related content every year, which may explain it's prevalence.

Overall, it seems the topics mostly align with the sections of the magazine. This is really interesting, as it shows that article subject matter is definitively corralled by the section groups that have been set out by the magazine.

Whether or not those pre-determined sections are comprehensive or exhaustive is up for debate, but seem to capture many of the predicted key-words identified earlier. For example "pandemic" and "police" are two large stressors key to 2020. Additionally, the n-gram analysis from before predicted social media to be largely associated with our mental health key words, and words like "instagram" and "tiktok" appear frequently across the topic areas.

After plotting the distribution of these topics over time, a couple interesting trends emerge. First, Personal Experience and Reflections are routinely the top category. These key words likely appear in a broad range of articles in relation to student's personal experiences.

Importantly, the Race, Social Justice and Pandemic Category was the second highest during 2021, with a steep drop off the following year. These key words related to global events are tied directly to that time period, but continue to be important afterwards.

The last category is Art, Social Media, and Beauty Standards, which has risen to be the 2nd most common topic area in 2021 and 3rd after 2023. This demonstrates a change in what is likely causing mental health conflicts with students, as social media continues to emerge as a recurring trend.

Lastly, Film and TV consistently appears to be the second most common, which is interesting, although not immediately explainable. The rest of the categories have relatively consistent frequencies with varying prevalence.

Conclusion
Key Takeaways from Analysis

BY ANDREW & FIONA

The examination of 34th Street Magazine's coverage of mental health since the onset of COVID-19 reveals a fascinating evolution in themes, sentiments, and approaches over the years.

Mental health-related articles peaked in 2021, correlating with pandemic challenges, before gradually declining.

Early pandemic coverage (2020-2021) was dominated by themes of personal struggle, social isolation, and the pervasive impact of social media. Post-2021, the narrative broadened to explore systemic challenges, societal reforms, and diverse factors influencing mental health.

Initial sentiment skewed towards negativity, reflecting the toll of the pandemic. Over time, articles adopted more positive and neutral tones, focusing on recovery, advocacy, and constructive discussions about mental health and well-being.

Despite the diversification of topics, recurring elements such as "high school" and "social media" highlight ongoing concerns about youth mental health and digital influences.

Overall, 34th Street Magazine's exploration of mental health has transitioned from immediate, reactive coverage during the pandemic to a more sustained, nuanced engagement with the topic. This progression mirrors broader societal trends, where the dialogue around mental health has shifted from crisis response to a more nuanced understanding that recognizes the vast and complex scope of factors contributing to mental health struggles.

Thank You!
34th Street